

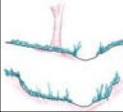
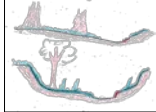
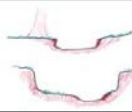
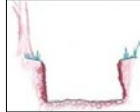
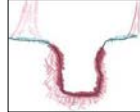
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	A		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI
	Optimal	Suboptimal	Marginal	Poor	Severe		
							
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	3	2.00
NOTES>>							

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>
	Optimal	Suboptimal	Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	100%					100%	CI
	Score >	1.5						1.50
							Rt Bank CI >	1.50
							Lt Bank CI >	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI
	Optimal	Suboptimal	Marginal	Poor		
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	High	1.20
Score	1.5	1.2	0.9	0.5		

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	A	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.24
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

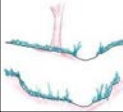
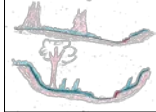
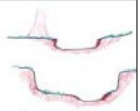

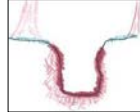
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Unified Stream Methodology for use in Virginia

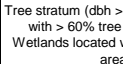
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	B		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Marrowbone Creek??							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
 <p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.2												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.20	CI				
	Score >	1.2						Lt Bank CI >	1.20	1.20				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	B	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.26
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R6	03010103	3/28/19	E		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA,JB		Unnamed Tributary to Marrowbone Creek							

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>	
	Optimal	Suboptimal		Marginal		Poor			
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5					
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.							Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area>	100%					100%		
	Score >	1.2							
Left Bank	% Riparian Area>	100%					100%		
	Score >	1.2							
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH							CI= (Sum % RA * Scores*0.01)/2		
							Rt Bank CI >	1.20	CI
							Lt Bank CI >	1.20	1.20

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.60
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



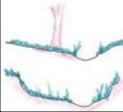
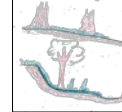
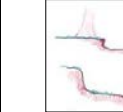


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	G		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		tributary to Marribone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI				
	Optimal	Suboptimal	Marginal	Poor	Severe						
											
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	1.5	2.4	2	1.6	1	2.40
NOTES>>											

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>	
	Optimal	Suboptimal	Marginal	Poor	High	Low			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
	1.5	1.2	1.1	0.85	0.75	0.6	0.5		
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100			
Right Bank	% Riparian Area >	100%					100%		
	Score >	1.2							
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area >	100%					100%		
	Score >	1.2							
							Rt Bank CI >	1.20	CI
							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI
	Optimal	Suboptimal	Marginal	Poor		
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	High	1.20
Score	1.5	1.2	0.9	0.5		

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	G	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.26
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

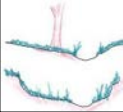
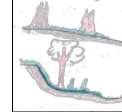
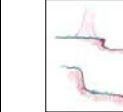


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	H		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		tributary to Marribone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI				
	Optimal	Suboptimal	Marginal	Poor	Severe						
											
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	1.5	2.4	2	1.6	1	2.40
NOTES>>											

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>
	Optimal	Suboptimal	Marginal	Poor	High	Low		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	100%					100%	CI
	Score >	1.5					1.50	1.50
								CI

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI
	Optimal	Suboptimal	Marginal	Poor		
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	High	1.20
Score	1.5	1.2	0.9	0.5		

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	H	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.32
		RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

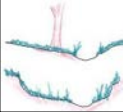
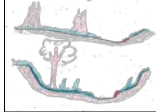
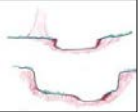

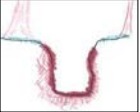
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	J		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		tributary to Marribone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	1.5	2.4	2	1.6	1	1.60
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal		Poor									
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%					100%							
							Score >	1.2						CI = (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.20	CI				
							Score >	1.2	Lt Bank CI >	1.20	1.20			

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	J	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.10
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R6	03010103	3/28/19	K		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA,JB		Unnamed Tributary to Marrowbone Creek							

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.							Ensure the sums of % Riparian Blocks equal 100	
Right Bank	% Riparian Area>	100%					100%	
	Score >	1.2						
Left Bank	% Riparian Area>	100%					100%	
	Score >	1.2						
$CI = (\text{Sum } \% RA * \text{Scores} * 0.01) / 2$								
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH								

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.60
RCI = (Riparian CI) / 2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	03010103	2/27/2019	L		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

		Ensure the sums of % Riparian Blocks equal 100						
Right Bank	% Riparian Area>	95%	5%					100%
	Score >	1.2	0.6					
Left Bank	% Riparian Area>	90%	10%					100%
	Score >	1.2	0.6					

CI= (Sum % RA * Scores*0.01)/2

Rt Bank CI >	1.17	CI
Lt Bank CI >	1.14	1.16

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >> 0.58

RCI= (Riparian CI)/2

COMPENSATION REQUIREMENT (CR) >> N/A

CR = RCI X LF X IF

INSERT PHOTOS:



Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	03010103	2/27/2019	M		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.							Ensure the sums of % Riparian Blocks equal 100	
Right Bank	% Riparian Area>	100%					100%	
	Score >	1.2						
Left Bank	% Riparian Area>	100%					100%	
	Score >	1.2						
CI= (Sum % RA * Scores*0.01)/2 Rt Bank CI > 1.20 CI Lt Bank CI > 1.20 1.20								

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.60
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



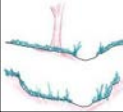
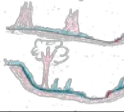
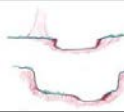
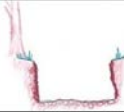
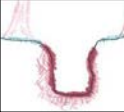
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	03010103	3/1/2019	N		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>1.60</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>		
	Optimal	Suboptimal	Marginal		Poor				
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>			
<p>Condition Scores</p>	<p>1.5</p>	<p>High</p>	<p>Low</p>	<p>High</p>	<p>Low</p>	<p>High</p>		<p>Low</p>	
	<p>1.5</p>	<p>1.2</p>	<p>1.1</p>	<p>0.85</p>	<p>0.75</p>	<p>0.6</p>		<p>0.5</p>	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>			
<p>Right Bank</p>	<p>% Riparian Area ></p>	<p>100%</p>					<p>100%</p>		
	<p>Score ></p>	<p>1.2</p>							
								<p>CI= (Sum % RA * Scores*0.01)/2</p>	
<p>Left Bank</p>	<p>% Riparian Area ></p>	<p>100%</p>					<p>100%</p>		
	<p>Score ></p>	<p>1.2</p>							
							<p>Rt Bank CI ></p>	<p>1.20</p>	<p>CI</p>
							<p>Lt Bank CI ></p>	<p>1.20</p>	<p>1.20</p>

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>Stream Gradient</p>	
<p>Score</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>High</p>
					<p>CI</p>
					<p>0.50</p>

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	03010103	3/1/2019	N	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.96
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

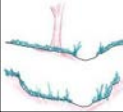
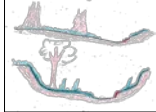
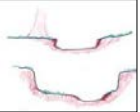

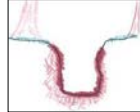
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	03010103	3/1/2019	O		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>1.60</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6		Low 0.5
<p>Ensure the sums of % Riparian Blocks equal 100</p>								
Right Bank	% Riparian Area >	100%					100%	
	Score >	1.2						
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	100%					100%	
	Score >	1.2						
							Rt Bank CI >	1.20
							Lt Bank CI >	1.20
CI								

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p style="text-align: center;">Stream Gradient</p> <p style="text-align: center;">High</p>	
Score	1.5	1.2	0.9	0.5	CI
					0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	03010103	3/1/2019	O	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.96
		RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)
	COMPENSATION REQUIREMENT (CR) >>	N/A
		CR = RCI X LF X IF

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

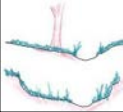
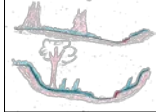
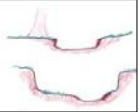

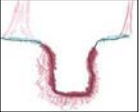
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/02/2019	P		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	1.60
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.2						CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.20	CI				
	Score >	1.2						Lt Bank CI >	1.20	1.20				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	0.90
NOTES>>									
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/02/2019	P	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.04
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
	Martinsville Connector (VDOT)	Henry	R6	03010103	3/28/19	Q		N/A
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map	
SA,JB		Unnamed Tributary to Marrowbone Creek						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal		Marginal		Poor	
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5			
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100	
Right Bank	% Riparian Area>	100%					100%
	Score >	1.2					
Left Bank	% Riparian Area>	100%					100%
	Score >	1.2					
CI= (Sum % RA * Scores*0.01)/2 Rt Bank CI > 1.20 CI Lt Bank CI > 1.20 1.20							

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.60
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



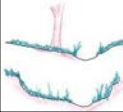
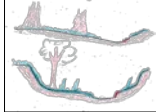
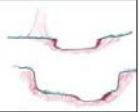

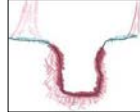
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/02/2019	R		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.2												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.20			CI		
	Score >	1.2						Lt Bank CI >	1.20			1.20		

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	0.50
NOTES>>									
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/02/2019	R	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH						
						CI
						1.50

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	1.12
RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

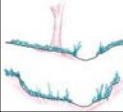
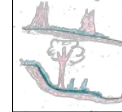
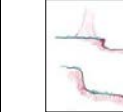


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/02/2019	S		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	10%	90%				100%	Rt Bank CI > 1.50
	Score >	1.5	0.75					Lt Bank CI > 0.83
								CI
								1.16

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/02/2019	S	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.03
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

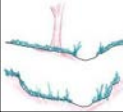
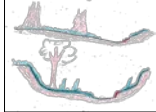
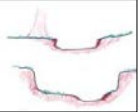

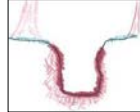
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/02/2019	U		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	1.60
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal		Poor									
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.2												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.20	CI				
	Score >	1.2						Lt Bank CI >	1.20	1.20				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	0.50
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/02/2019	U	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.96
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

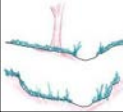
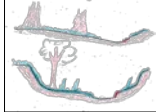
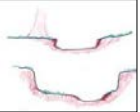

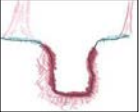
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/02/2019	V		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>1.60</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal	Marginal	Poor				
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>		
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>							<p>Ensure the sums of % Riparian Blocks equal 100</p>	
Right Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	10%	90%				100%	Rt Bank CI > 1.50
	Score >	1.5	0.75					Lt Bank CI > 0.83
1.16								

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p>Stream Gradient High</p>
Score	1.5	1.2	0.9	0.5	CI 0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/02/2019	V	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.95
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
	Martinsville Connector (VDOT)	Henry	R6	03010103	3/28/19	X		N/A
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map	
SA,JB		Unnamed Tributary to Marrowbone Creek						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category								NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
			High	Low	High	Low	High	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area>	100%					100%	
	Score >	1.2						
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area>	100%					100%	
	Score >	1.2						
		Rt Bank CI >		1.20		CI		
		Lt Bank CI >		1.20		1.20		

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.60
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



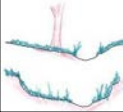
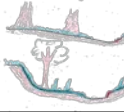
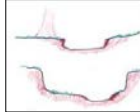
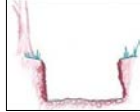
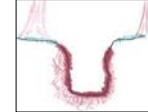
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	03010103	2/27/2019	Y		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	2.00
Scores	3	2.4	2	1.6	1	

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	High	Low	High	Low	High	Low	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100						
Right Bank	% Riparian Area>	100%				100%
	Score >	1.2				
						CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	100%				100%
	Score >	1.5				
						Rt Bank CI > 1.20
						Lt Bank CI > 1.50
						1.35

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	High

Stream Gradient **CI**

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	03010103	2/27/2019	Y	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.23
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

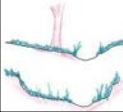
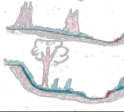
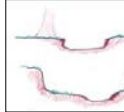

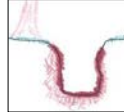
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	03010103	2/27/2019	Z		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Scores	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category								
	Optimal	Suboptimal	Marginal	Poor					
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Scores	1.5	High	Low	High	Low	High	Low		

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

	% Riparian Area>	100%						100%	
Right Bank	Score >	1.2							
									CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	100%						100%	CI
	Score >	1.2						1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	CI

Stream Gradient **High** **CI**

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	03010103	2/27/2019	Z	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.28
		RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)
		COMPENSATION REQUIREMENT (CR) >>
		N/A
CR = RCI X L _i X IF		

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

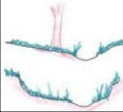
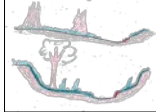
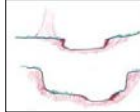
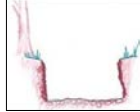
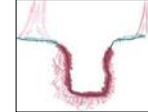
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R4	03010103	2/27/2019	AB		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		AB							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category								
	Optimal	Suboptimal	Marginal	Poor					
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Scores	1.5	High	Low	High	Low	High	Low		

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

						Ensure the sums of % Riparian Blocks equal 100				
Right Bank	% Riparian Area >	100%							100%	
	Score >	1.2								
CI= (Sum % RA * Scores*0.01)/2										
Left Bank	% Riparian Area >	100%							100%	
	Score >	1.2								
								Rt Bank CI >	1.20	CI
								Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		
Scores	1.5	1.2	0.9	0.5	Stream Gradient	
					High	CI
					1.50	

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R4	03010103	2/27/2019	AB	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.20
		RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)
		COMPENSATION REQUIREMENT (CR) >>
		N/A
CR = RCI X L ₁ X IF		

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

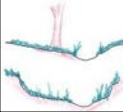
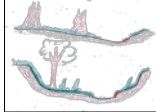
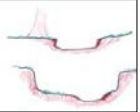

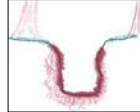
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	AC		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal		Poor									
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	AC	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.24
		RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)
	COMPENSATION REQUIREMENT (CR) >>	N/A
		CR = RCI X LF X IF

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

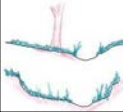
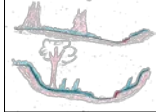
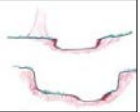

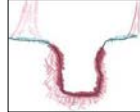
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R4	03010103	2/27/2018	AD		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	2.40
Score	3	2.4	2	1.6	1	

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor	High	Low		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

- Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
- Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
- Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	95%	5%				100%	
	Score >	0.6	1.5					
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area>	100%					100%	
	Score >	1.5						0.65
								1.07

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R4	03010103	2/27/2018	AD	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.90

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.05
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R6	03010103	3/28/19	AE		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA,JB		Unnamed Tributary to Marrowbone Creek							

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area >	100%					100%	
	Score >	1.2						
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI > 1.20 CI
	Score >	1.2						Lt Bank CI > 1.20 1.20

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.60
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



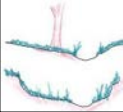
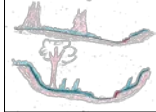
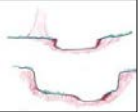

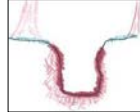
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	AF		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	3.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal		Poor									
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.50
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	AF	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.50
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

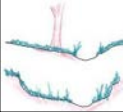
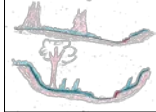
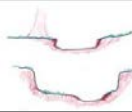
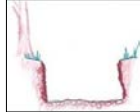
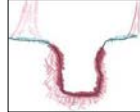
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	AI		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal		Poor									
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>							<p>Ensure the sums of % Riparian Blocks equal 100</p>							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50				CI	
	Score >	1.5						Lt Bank CI >	1.50				1.50	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	0.90
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	AI	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.18
		RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)
	COMPENSATION REQUIREMENT (CR) >>	N/A
		CR = RCI X LF X IF

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R6	03010103	3/28/19	AK		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA,JB		Unnamed Tributary to Marrowbone Creek							

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area>	100%					100%	
	Score >	1.2						
Left Bank	% Riparian Area>	100%					100%	
	Score >	1.2						
CI= (Sum % RA * Scores*0.01)/2 Rt Bank CI > 1.20 CI Lt Bank CI > 1.20 1.20								

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.60
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
	Martinsville Connector (VDOT)	Henry	R6	03010103	3/28/19	AL		N/A
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map	
SA,JB		Unnamed Tributary to Marrowbone Creek						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.							Ensure the sums of % Riparian Blocks equal 100	
Right Bank	% Riparian Area >	100%					100%	
	Score >	1.2						
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area >	100%					100%	
	Score >	1.2						
								Rt Bank CI > 1.20 CI
								Lt Bank CI > 1.20 1.20

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.60
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R6	03010103	3/28/19	AM		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA,JB		Unnamed Tributary to Marrowbone Creek							

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100					
Right Bank	% Riparian Area>	100%			100%
	Score >	1.2			
Left Bank	% Riparian Area>	100%			100%
	Score >	1.2			

CI= (Sum % RA * Scores*0.01)/2

Rt Bank CI > 1.20 CI

Lt Bank CI > 1.20 1.20

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >> 0.60

RCI= (Riparian CI)/2

COMPENSATION REQUIREMENT (CR) >> N/A

CR = RCI X LF X IF

INSERT PHOTOS:



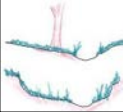
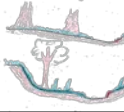
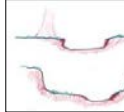

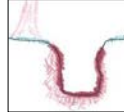
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	03010103	2/27/2019	AN		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	1.60
Scores	3	2.4	2	1.6	1	

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	High	Low	High	Low	High	Low	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	100%						100%	
	Score >	1.5							
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area>	100%						100%	
	Score >	1.5							
Rt Bank CI > 1.50									
Lt Bank CI > 1.50									

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient
					High
					CI
					0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	03010103	2/27/2019	AN	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.02
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

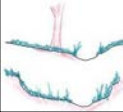
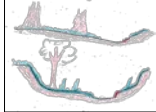
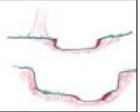

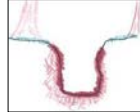
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	AO		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p> <p>2.4</p> <p>2</p> <p>1.6</p> <p>1</p>	<p>2.00</p>
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6		0.5
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>								
Right Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
Rt Bank CI >							1.50	
Lt Bank CI >							1.50	
CI							1.50	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p style="text-align: center;">Stream Gradient</p> <p style="text-align: center;">High</p>	
Score	1.5	1.2	0.9	0.5	CI
					1.20

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	AO	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.24
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R6	03010103	3/28/19	AP		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA,JB		Unnamed Tributary to Marrowbone Creek							

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>		
	Optimal	Suboptimal		Marginal		Poor				
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.				
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5						
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.							Ensure the sums of % Riparian Blocks equal 100			
Right Bank	% Riparian Area>	100%					100%			
	Score >	1.2								
Left Bank	% Riparian Area>	100%					100%			
	Score >	1.2								
								CI= (Sum % RA * Scores*0.01)/2		
								Rt Bank CI >	1.20	CI
								Lt Bank CI >	1.20	1.20

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.60
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



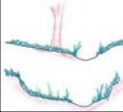
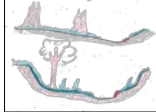
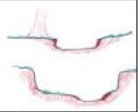

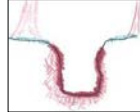
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R4	02070010	3/01/2019	AR		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	1.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal		Poor									
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI
	Optimal	Suboptimal	Marginal	Poor		
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	High	0.50	
Score	1.5	1.2	0.9	0.5		

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R4	02070010	3/01/2019	AR	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.90
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
	Martinsville Connector (VDOT)	Henry	R6	03010103	3/28/19	AU		N/A
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map	
SA,JB		Unnamed Tributary to Marrowbone Creek						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area>	100%					100%	
	Score >	1.2						
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	100%					100%	Rt Bank CI > 1.20 CI
	Score >	1.2						Lt Bank CI > 1.20 1.20

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.60
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



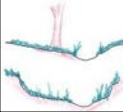
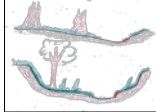
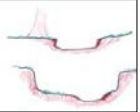

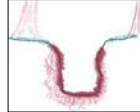
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	AW		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>> Area shows signs of recent clearcut. Very young vegetation. Stands of 2-6 inch pine and poplar within vicinity.					
	Optimal	Suboptimal	Marginal	Poor	High	Low							
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>							<p>Ensure the sums of % Riparian Blocks equal 100</p>						
Right Bank	% Riparian Area >	100%					100%						
	Score >	1.5											
								CI= (Sum % RA * Scores*0.01)/2					
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI			
	Score >	1.5						Lt Bank CI >	1.50	1.50			

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI
	Optimal	Suboptimal	Marginal	Poor		
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	High	0.50	
Score	1.5	1.2	0.9	0.5		

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	AW	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.10
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R6	03010103	3/28/19	AX		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA,JB		Unnamed Tributary to Marrowbone Creek							

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%		
	Score >	1.2								
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20
	Score >	1.2							Lt Bank CI >	1.20

CI= (Sum % RA * Scores*0.01)/2

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >> 0.60

RCI= (Riparian CI)/2

COMPENSATION REQUIREMENT (CR) >> N/A

CR = RCI X LF X IF

INSERT PHOTOS:



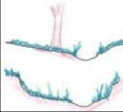
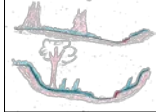
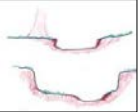

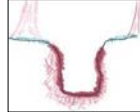
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/04/2019	BA		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>> Area shows signs of recent clearcut. Very young vegetation. Stands of 2-6 inch pine and poplar within vicinity.					
	Optimal	Suboptimal	Marginal	Poor									
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>							<p>Ensure the sums of % Riparian Blocks equal 100</p>						
Right Bank	% Riparian Area >	100%					100%						
	Score >	1.2											
								CI= (Sum % RA * Scores*0.01)/2					
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.20	CI			
	Score >	1.1						Lt Bank CI >	1.10	1.15			

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	0.90
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/04/2019	BA	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.11
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R6	03010103	3/28/19	BB		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA,JB		Unnamed Tributary to Marrowbone Creek							

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.							Ensure the sums of % Riparian Blocks equal 100	
Right Bank	% Riparian Area>	100%					100%	
	Score >	1.2						
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	100%					100%	Rt Bank CI > 1.20 CI
	Score >	1.2						Lt Bank CI > 1.20 1.20

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.60
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R6	03010103	3/28/19	BE		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA,JB		Unnamed Tributary to Marrowbone Creek							

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.							Ensure the sums of % Riparian Blocks equal 100	
Right Bank	% Riparian Area>	100%					100%	
	Score >	1.2						
Left Bank	% Riparian Area>	100%					100%	
	Score >	1.2						
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH								CI= (Sum % RA * Scores*0.01)/2 Rt Bank CI > 1.20 Lt Bank CI > 1.20 CI

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.60
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



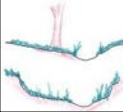
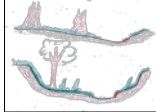
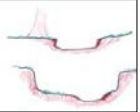

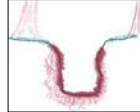
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/04/2019	BG		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	2.00
Score	3	2.4	2	1.6	1	
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p> <p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p> <p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>		<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p> <p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>			
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>		
Right Bank	% Riparian Area >	70%	30%				100%	
	Score >	1.5	1.1					
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	100%					100%	CI
	Score >	1.5						1.44
<p>3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.</p>								

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI 0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/04/2019	BG	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.09
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

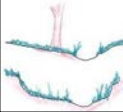
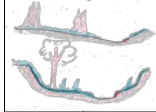
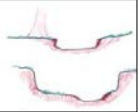

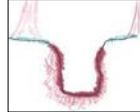
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/04/2019	BH		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	2.00
Score	3	2.4	2	1.6	1	
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area >	70%	30%				100%	
	Score >	1.5	1.1					
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI > 1.38
	Score >	1.5						Lt Bank CI > 1.50
								1.44

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI 0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/04/2019	BH	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.09
		RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)
	COMPENSATION REQUIREMENT (CR) >>	N/A
		CR = RCI X LF X IF

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

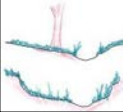
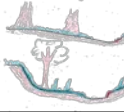
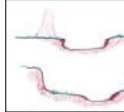

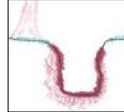
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R4	02070010	3/04/2019	BJ		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.40</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal		Poor		
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>	
Right Bank	% Riparian Area >	85%	15%				100%
	Score >	1.5	1.1				
CI= (Sum % RA * Scores*0.01)/2							
Left Bank	% Riparian Area >	95%	5%				100%
	Score >	1.5	1.1				
						Rt Bank CI >	1.44
						Lt Bank CI >	1.48
						CI	1.46

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>Stream Gradient</p>	
Score	1.5	1.2	0.9	0.5	High
					CI
					1.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R4	02070010	3/04/2019	BJ	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.37
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

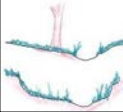
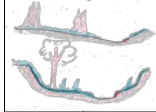
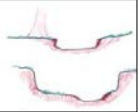

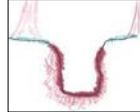
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/04/2019	BM		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.00</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>> Area has been recently logged. Area lacks vegetation for stabilization.	
	Optimal	Suboptimal	Marginal	Poor	High	Low		
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>		
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>		
Right Bank	% Riparian Area >	50%	50%				100%	
	Score >	0.6	0.85					
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area >	60%	40%				100%	Rt Bank CI > 0.73
	Score >	0.6	0.85					Lt Bank CI > 0.70
								0.71

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p>Stream Gradient High</p>
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/04/2019	BM	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.94
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

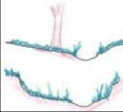
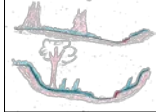
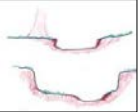

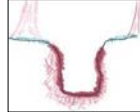
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/04/2019	BT		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	2.00
Score	3	2.4	2	1.6	1	

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor	High	Low		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p> <p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p> <p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p> <p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	High	Low		
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>		
Right Bank	% Riparian Area >	65%	35%				100%	
	Score >	1.5	0.85					
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	15%	85%				100%	
	Score >	1.5	0.85					
							Rt Bank CI >	1.27
							Lt Bank CI >	0.95
							CI	1.11

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/04/2019	BT	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.58

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.12
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

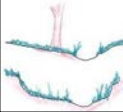
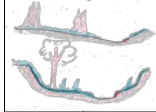
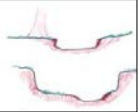

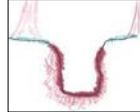
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	BW		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	2.00
Score	3	2.4	2	1.6	1	
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>> Area has been recently logged. Area lacks vegetation for stabilization.
	Optimal	Suboptimal	Marginal	Poor	High	Low	
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100	
Right Bank	% Riparian Area >	100%					100%
	Score >	0.6					
							CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area >	100%					100%
	Score >	0.6					
							Rt Bank CI > 0.60
							Lt Bank CI > 0.60
							CI
							0.60

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	BW	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.00
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

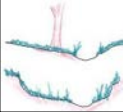
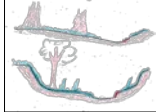
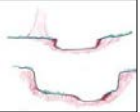

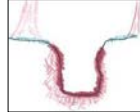
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/04/2019	BX		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>1.60</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>		
	Optimal	Suboptimal	Marginal	Poor	High	Low			
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>			
<p>Condition Scores</p>	<p>1.5</p>	<p>1.2</p>	<p>1.1</p>	<p>0.85</p>	<p>0.75</p>	<p>0.6</p>	<p>0.5</p>		
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>							<p>Ensure the sums of % Riparian Blocks equal 100</p>		
<p>Right Bank</p>	<p>% Riparian Area ></p>	<p>100%</p>					<p>100%</p>		
	<p>Score ></p>	<p>1.5</p>							
								<p>CI= (Sum % RA * Scores*0.01)/2</p>	
<p>Left Bank</p>	<p>% Riparian Area ></p>	<p>100%</p>					<p>100%</p>		
	<p>Score ></p>	<p>1.5</p>							
							<p>Rt Bank CI ></p>	<p>1.50</p>	<p>CI</p>
							<p>Lt Bank CI ></p>	<p>1.50</p>	<p>1.50</p>

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p>Stream Gradient</p>
<p>Score</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>High</p>
					<p>CI</p>
					<p>0.90</p>

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/04/2019	BX	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.06
		RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)
	COMPENSATION REQUIREMENT (CR) >>	N/A
		CR = RCI X LF X IF

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

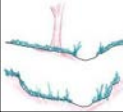
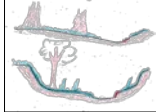
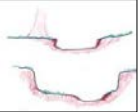

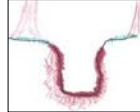
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/04/2019	BZ		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>3.00</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>> Area has been recently logged. Area lacks vegetation for stabilization.	
	Optimal	Suboptimal	Marginal	Poor	High	Low		
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>		
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>		
Right Bank	% Riparian Area >	100%					100%	
	Score >	0.6						
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area >	80%	20%				100%	Rt Bank CI > 0.60
	Score >	0.6	1.2					Lt Bank CI > 0.72
								0.66

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p>Stream Gradient</p>
Score	1.5	1.2	0.9	0.5	<p>High</p>
					CI 1.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/04/2019	BZ	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.33
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R6	03010103	3/28/19	CI		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA,JB		Unnamed Tributary to Marrowbone Creek							

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area>	100%					100%	
	Score >	1.2						
Left Bank	% Riparian Area>	100%					100%	
	Score >	1.2						
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH								
NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.								
THE REACH CONDITION INDEX (RCI) >>								0.60
RCI= (Riparian CI)/2								
COMPENSATION REQUIREMENT (CR) >>								N/A
CR = RCI X LF X IF								

INSERT PHOTOS:



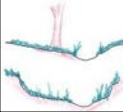
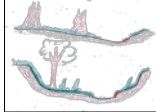
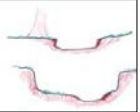

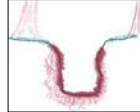
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/04/2019	CK		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.00</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>		
	Optimal	Suboptimal	Marginal		Poor				
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>			
<p>Condition Scores</p>	<p>1.5</p>	<p>High</p>	<p>Low</p>	<p>High</p>	<p>Low</p>	<p>High</p>		<p>Low</p>	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>									
<p>Right Bank</p>	<p>% Riparian Area ></p>	<p>100%</p>					<p>100%</p>		
	<p>Score ></p>	<p>1.5</p>							
<p>CI= (Sum % RA * Scores*0.01)/2</p>									
<p>Left Bank</p>	<p>% Riparian Area ></p>	<p>100%</p>					<p>100%</p>		
	<p>Score ></p>	<p>1.5</p>							
							<p>Rt Bank CI ></p>	<p>1.50</p>	
							<p>Lt Bank CI ></p>	<p>1.50</p>	
<p>3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.</p>									

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>Stream Gradient</p>	
<p>Score</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>High</p>
					<p>CI</p>
					<p>1.20</p>

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/04/2019	CK	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.24
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R4	03010103	3/1/2019	CL		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal		Marginal		Poor	
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5			

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

		Ensure the sums of % Riparian Blocks equal 100								
Right Bank	% Riparian Area>	100%					100%			
	Score >	1.5								
							CI= (Sum % RA * Scores*0.01)/2			
Left Bank	% Riparian Area>	100%					100%	Rt Bank CI >	1.50	CI
	Score >	1.5						Lt Bank CI >	1.50	1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.75
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



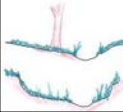
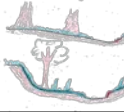
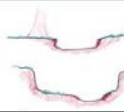
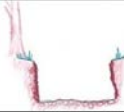
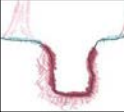
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R4	02070010	3/05/2019	CN		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	3.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	0.90
NOTES>>									
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R4	02070010	3/05/2019	CN	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.38
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

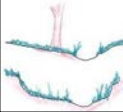
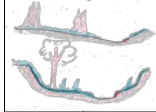
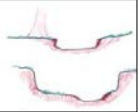

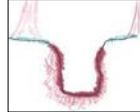
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R4	02070010	3/05/2019	CR		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal		Poor									
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI
	Optimal	Suboptimal	Marginal	Poor		
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	High	0.90	
Score	1.5	1.2	0.9	0.5		

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R4	02070010	3/05/2019	CR	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.10

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.10
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

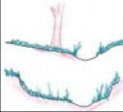
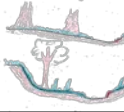
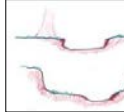

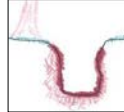
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	CS	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/05/2019			N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	2.40
Score	3	2.4	2	1.6	1	
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>		
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5		
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100			
Right Bank	% Riparian Area >	100%					100%		
	Score >	1.5							
								CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area >	100%					100%		
	Score >	1.5							
							Rt Bank CI >	1.50	
							Lt Bank CI >	1.50	CI

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					1.20

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/05/2019	0	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.32
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

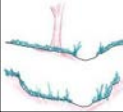
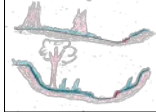
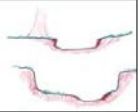

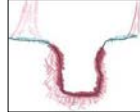
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/05/2019	CU		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>> Area has been recently logged. Area lacks vegetation for stabilization.					
	Optimal	Suboptimal	Marginal	Poor	High	Low							
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>							<p>Ensure the sums of % Riparian Blocks equal 100</p>						
Right Bank	% Riparian Area >	100%					100%						
	Score >	0.6											
							CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	0.60	CI			
	Score >	0.6						Lt Bank CI >	0.60	0.60			

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/05/2019	CU	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.06
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

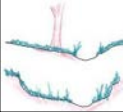
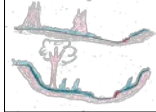
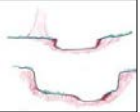

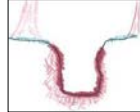
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/05/2019	CV		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal		Poor									
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/05/2019	CV	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.32
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

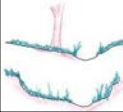
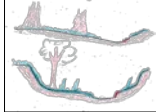
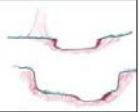

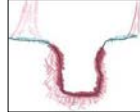
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/05/2019	CW		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal		Poor									
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>							<p>Ensure the sums of % Riparian Blocks equal 100</p>							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50					CI
	Score >	1.5						Lt Bank CI >	1.50					1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/05/2019	CW	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.32
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

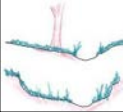
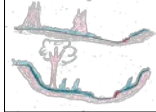
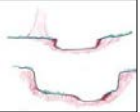

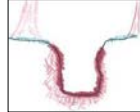
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/05/2019	CY		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal		Poor									
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/05/2019	CY	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.32
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

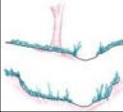
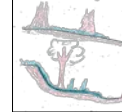
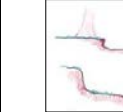


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R3	02070010	3/05/2019	CZ		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA, JB		Unnamed Tributary to Marrowbone Creek							

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal		Poor									
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
0.00	Martinsville Connector (VDOT)	Henry	R3	02070010	3/05/2019	CZ	0	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.32
	COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF		

INSERT PHOTOS:



Open water pond with an inlet and outlet. Inline pond.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
	Martinsville Connector (VDOT)	Henry	R6	03010103	3/28/19	DA		N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
SA,JB		Unnamed Tributary to Marrowbone Creek							

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	100%						100%
	Score >	1.2						
Left Bank	% Riparian Area>	100%						100%
	Score >	1.2						

CI= (Sum % RA * Scores*0.01)/2

Rt Bank CI >		1.20					CI
Lt Bank CI >		1.20					1.20

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.60
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:

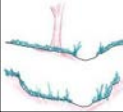
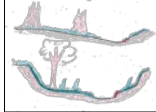
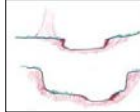
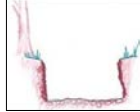
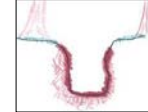
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/4/2019	1-A	86	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Little Marrowbone Creek					S-1: Z1-9/Y1-9		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							
	Optimal	Suboptimal	Marginal	Poor				
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	High	Low	High	Low	High	Low	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area >	80%	20%					100%	
	Score >	1.5	0.5						
								CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area >	100%						100%	
	Score >	1.5							
							Rt Bank CI >	1.30	CI
							Lt Bank CI >	1.50	1.40

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		
Scores	1.5	1.2	0.9	0.5	Stream Gradient	
					High	CI
					1.20	

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/4/2019	1-A	86	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.18
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at Stream Reach 1-A. The reach was incised with active erosion at a culvert. The right riparian buffer consisted of 80% mature tree cover and 20% impervious surfaces associated with State Route 220. The left riparian buffer consisted of 100% mature tree cover. The instream habitat was present in 30%-50% of the reach and consisted of riffles, pools, leaf packs and substrate of various particle sizes. The channel was riprapped at the culvert upstream.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

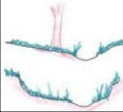
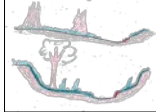
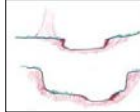
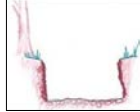
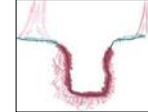
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	4/27/2019	1-B	115	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF		Unnamed Tributary to Little Marrowbone Creek					S-1: ZZU1-2, ZZV1-3		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area >	100%						100%	
	Score >	1.5							
								CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area >	100%						100%	
	Score >	1.5							
							Rt Bank CI >	1.50	CI
							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	4/27/2019	1-B	115	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.70

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.94
		RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)
	COMPENSATION REQUIREMENT (CR) >>	N/A
		CR = RCI X L _i X IF

INSERT PHOTOS:



Looking upstream at Stream Reach 1-B. The stream is often incised with erosion present on both banks. The left bank riparian buffer consists of mature forest with greater than 60% tree canopy cover and impervious surfaces. The right bank consists of a wetland and mature forest with greater than 60% tree canopy cover. Instream habitat is present in less than 10% of the stream. Channel alteration is present in 60-80% of the reach from a concreted culvert and rip-rap.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

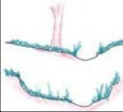
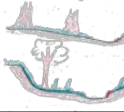
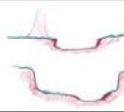
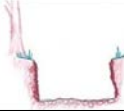
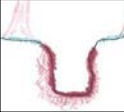
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/4/2019	2-A	195	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Little Marrowbone Creek					S-2: A1-5/B1-2/C3-8/X1-10/W1-7		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	1.60

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	50%	50%				100%		
	Score >	1.5	0.5						
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area>	50%	50%				100%		
	Score >	1.5	0.5						
							Rt Bank CI >	1.00	CI
							Lt Bank CI >	1.00	1.00

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High
					CI 0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/4/2019	2-A	195	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.96
RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at Stream Reach 2-A. The reach was incised with active erosion at a culvert located at the top of the reach. The riparian buffers consist of 50% mature tree cover and 50% impervious surfaces associated with State Route 220. The in-stream habitat is present in 10%-30% of the reach and consisted of riffles, pools, leaf packs and substrate of various particle sizes. The channel was riprapped at the culvert.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

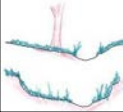
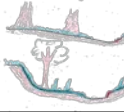
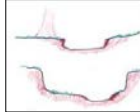
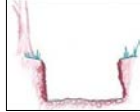
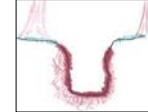
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/4/2019	3-A	148	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Little Marrowbone Creek					S-3: B1-3/C1-8		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
Scores	1.5	High	Low	High	Low	High	Low

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area >	100%						100%	
	Score >	1.5							
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area >	100%						100%	
	Score >	1.5							
							Rt Bank CI >	1.50	CI
							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient
					High
					CI
					0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/4/2019	3-A	148	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.06
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking downstream at Reach 3-A. The reach was level with stable banks and few areas of active erosion; however, severe aggregation is occurring within the reach due to a collapsed culvert crossing State Route 220 and associated with Reach 2-A. The riparian buffers consisted of 100% mature tree cover and wetlands. The in-stream habitat was present in less than 10% of the reach. The channel had no sign of alteration.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

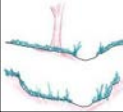
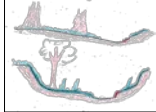
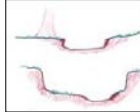
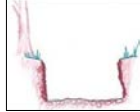
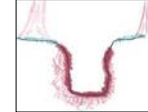
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/4/2019	4-A	123	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Little Marrowbone Creek					S-4: D1-8/E1-6		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
Scores	1.5	High	Low	High	Low	High	Low

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	50%	50%					100%
	Score >	1.5	0.5					
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	50%	50%					100%
	Score >	1.5	0.5					
							Rt Bank CI >	1.00
							Lt Bank CI >	1.00

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient
					High
					CI
					0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/4/2019	4-A	123	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.90

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.88
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking downstream at Stream Reach 4-A. The reach was level with stable banks and had few areas of active erosion, however severe aggregation was present due to restricted flow at the culvert crossing near State Route 220. The riparian buffers consisted of 50% mature tree cover with wetlands and 50% impervious surface associated with State Route 220. The in-stream habitat is present in less than 10% of the reach. Channel alteration was present at a riprapped culvert.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

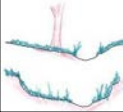
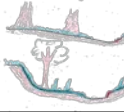
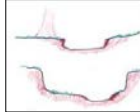
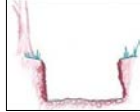
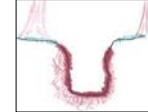
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/6/2019	5-A	92	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Little Marrowbone Creek					S-5: U1-8/V1-7		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	High	Low	High	Low	High	Low	

- Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
- Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
- Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area >	100%						100%	
	Score >	1.5							
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area >	100%						100%	CI
	Score >	1.5						1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient
					High
					CI
					1.20

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/6/2019	5-A	92	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.24
		RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)
	COMPENSATION REQUIREMENT (CR) >>	N/A
		CR = RCI X L _i X IF

INSERT PHOTOS:



Looking upstream at Stream Reach 5-A. The reach had few areas of active erosion. The riparian buffers consisted of 100% mature tree cover. Instream habitats present in 30%-50% the reach consist of riffles, pools, leaf packs and various particle sizes with minor areas of aggregation throughout. The reach starts at a culvert stabilized with riprap.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

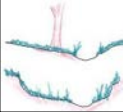
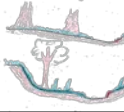
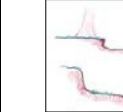

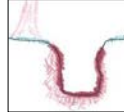
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/4/2019	6-A	174	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Little Marrowbone Creek					S-6: I1-3/I12-19/H1-9/T1-3		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	1.60

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	80%	20%				100%
	Score >	1.5	0.5				
							CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	80%	20%				100%
	Score >	1.5	0.5				
							Rt Bank CI > 1.30
							Lt Bank CI > 1.30

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High

CI 0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/4/2019	6-A	174	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.90

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.94
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at Stream Reach 6-A. The reach was incised with active erosion at the culvert at the top of the reach. The riparian buffers consisted of 80% mature tree cover and 20% impervious surfaces associated with State Route 220. Instream habitat is present in 10-30% of the reach and consisted of riffles, pools, leaf packs and substrate of various particle sizes. The channel was riprapped at the culvert.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

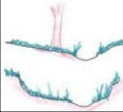
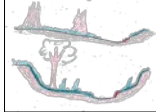
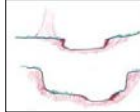
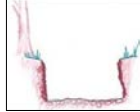
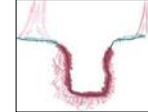
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/4/2019	7-A	41	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Little Marrowbone Creek					S-7: K1-4/J2-4		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	50%	50%				100%		
	Score >	1.2	0.5						
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area>	50%	50%				100%		
	Score >	1.2	0.5						
							Rt Bank CI >	0.85	CI
							Lt Bank CI >	0.85	0.85

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High
					CI 0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/4/2019	7-A	41	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.85
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at Reach 7-A. The reach was incised with active erosion throughout the reach. The riparian buffers consisted of 50% mature tree cover and 50% impervious surfaces associated with State Route 220. In-stream habitat was present in 10-30% of the reach and consisted of shallow riffles, pools, and a few head-cuts. Greater than 80% of the channel was culverted under State Route 220.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

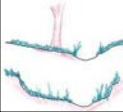
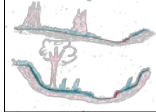
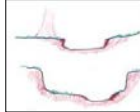
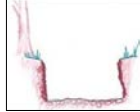
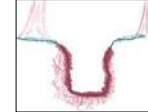
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/4/2019	7-B	284	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Little Marrowbone Creek					S-7: M 1-17/L1-13		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	1.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area >	60%	40%				100%				
	Score >	1.2	0.5								
							CI= (Sum % RA * Scores*0.01)/2				
Left Bank	% Riparian Area >	60%	40%				100%				
	Score >	1.2	0.5								
							<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">Rt Bank CI ></td> <td style="width: 15%; text-align: center;">0.92</td> </tr> <tr> <td>Lt Bank CI ></td> <td style="text-align: center;">0.92</td> </tr> </table>	Rt Bank CI >	0.92	Lt Bank CI >	0.92
Rt Bank CI >	0.92										
Lt Bank CI >	0.92										

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/4/2019	7-B	284	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.70

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.62
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at Reach 7-B. The reach was incised with areas of active erosion throughout and severe aggregation in pools and areas of slow-moving water. The riparian buffers consisted of 60% mature tree cover and 40% impervious surfaces associated with State Route 220. In-stream habitat was present in less than 10% of the reach and was degraded due to severe aggregation. 60-80% of the channel was culverted under State Route 220.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

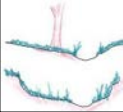
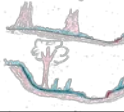
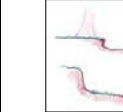


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/5/2019	7-C	578	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Little Marrowbone Creek					S-7: AB 1-39/AA1-47		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Multiple thread channels and/or subterranean flow.	CI
Scores	3	2.4	2	1.6	1	1.60

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category								
	Optimal	Suboptimal	Marginal	Poor		Poor			
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Scores	1.5	High	Low	High	Low	High	Low		

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

						Ensure the sums of % Riparian Blocks equal 100			
Right Bank	% Riparian Area >	90%	10%						100%
	Score >	1.1	1.5						
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area >	60%	10%	10%	20%				100%
	Score >	1.5	1.1	0.6	0.75				
								Rt Bank CI >	1.14
								Lt Bank CI >	1.22
								CI	1.18

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient
					High
					CI
					0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/5/2019	7-C	578	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.90

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.92
		RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)
	COMPENSATION REQUIREMENT (CR) >>	N/A
		CR = RCI X L _i X IF

INSERT PHOTOS:



Looking downstream at Reach 7-C. The reach was frequently incised with active erosion throughout and near culverts at the top and bottom of the reach. The right riparian buffer consisted of a 90% tree cover with a maintained understory and 10% tree cover with a mature canopy. The left riparian buffer consisted of 60% tree cover with a mature canopy, 10% tree cover with a maintained understory, 10% maintained lawn, and 20% non-maintained herbaceous areas. The in-stream habitat throughout the reach consisted of riffles, pools, leaf packs and substrate of various particle sizes, however, the reach was degraded due to aggregation. The channel was riprapped and channelized at culverts.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

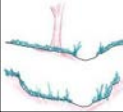
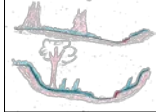
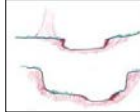
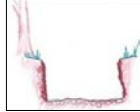
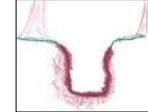
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/5/2019	7-D	734	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Little Marrowbone Creek					S-7: AB40-77, AA48-103		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	1.00
Scores	3	2.4	2	1.6	1	

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p> <p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p> <p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p> <p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>			
Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	80%	20%					100%				
	Score >	1.5	0.5									
								CI= (Sum % RA * Scores*0.01)/2				
Left Bank	% Riparian Area>	80%	20%					100%				
	Score >	1.5	0.5									
								<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">Rt Bank CI ></td> <td style="width: 10%; text-align: center;">1.30</td> </tr> <tr> <td style="width: 10%;">Lt Bank CI ></td> <td style="width: 10%; text-align: center;">1.30</td> </tr> </table>	Rt Bank CI >	1.30	Lt Bank CI >	1.30
Rt Bank CI >	1.30											
Lt Bank CI >	1.30											

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/5/2019	7-D	734	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.74
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream (northeast) at Reach 7-D. The reach was severely incised with active erosion throughout. The riparian buffers consisted of 80% mature tree cover and 20% impervious surfaces associated with State Route 220. The instream habitat throughout the reach consist of riffles, pools, leaf packs and substrate of various particle sizes, however, all habitat elements were degraded by severe aggregation. The channel was culverted under State Route 220 and riprapped at culverts.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

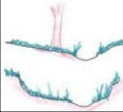
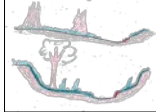
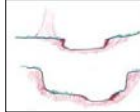
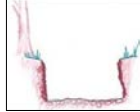
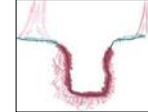
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/4/2019	8-A	154	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Little Marrowbone Creek					S-8: 01-11/N1-8/P1-12/Q1-5/R1-11		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches, channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							
	Optimal	Suboptimal	Marginal	Poor				
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	High	Low	High	Low	High	Low	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

						Ensure the sums of % Riparian Blocks equal 100			
Right Bank	% Riparian Area >	40%	60%				100%		
	Score >	0.5	1.5						
								CI = (Sum % RA * Scores * 0.01) / 2	
Left Bank	% Riparian Area >	90%	10%				100%		
	Score >	1.5	0.5						
							Rt Bank CI >	1.10	CI
							Lt Bank CI >	1.40	1.25

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		
Scores	1.5	1.2	0.9	0.5	Stream Gradient	
					High	CI
					0.50	

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/4/2019	8-A	154	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.01
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at Stream Reach 8-A. The reach was marginally incised with active erosion at a culvert and in a few areas of the reach. The right riparian buffer consisted of 60% mature tree cover and 40% impervious surfaces associated with State Route 220. The left buffer consisted of 90% mature tree cover and 10% impervious surfaces associated with State Route 220. In-stream habitat was present in less than 10% the reach. The channel was riprapped and channelized through a culvert.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

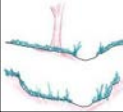
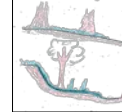
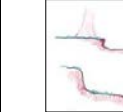


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/5/2019	9-A	370	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Little Marrowbone Creek					S-9: AJ1-4/AH1-28/AI8-13		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	1.60

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	High	Low	High	Low	High	Low	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area>	30%	10%	60%				100%
	Score >	1.5	0.5	0.6				
						CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	30%	70%				100%	
	Score >	1.5	0.5					
						Rt Bank CI >	0.86	CI
						Lt Bank CI >	0.80	0.83

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient
					High
					CI
					0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/5/2019	9-A	370	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.70

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.81
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

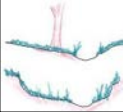
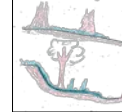
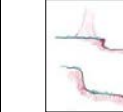


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/5/2019	10-A	224	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Marrowbone Creek					S-10: AM 1-11/AI1-8		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area >	30%	70%				100%		
	Score >	1.5	0.75						
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area >	95%	5%				100%		
	Score >	0.6	0.5						
							Rt Bank CI >	0.98	CI
							Lt Bank CI >	0.60	0.79

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High
					CI 0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/5/2019	10-A	224	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.00
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at Reach 10-A (Marrowbone Creek). The reach was suboptimal with stable and vegetated banks and a few areas with active erosion. The right riparian buffer consisted of 30% mature forest with wetlands and 70% non-maintained herbaceous areas. The left riparian buffer consisted of 95% maintained residential lawns and 5% impervious surface associated with parking lots and roads. The in-stream habitat consisted of riffles, pools, leaf packs and various particle sizes, however, the stream was degraded by aggregation and pollution. The reach was riprapped and channelized through culverts.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

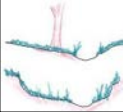
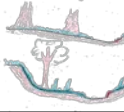
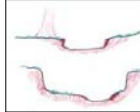
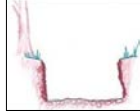
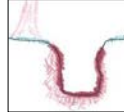
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/5/2019	10-B	213	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Marrowbone Creek					S-10: AM12-21/AR1-5		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches, channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	1.60

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	High	Low	High	Low	High	Low	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	50%	50%				100%		
	Score >	1.5	0.5						
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area>	50%	50%				100%		
	Score >	1.5	0.5						
							Rt Bank CI >	1.00	CI
							Lt Bank CI >	1.00	1.00

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		
Scores	1.5	1.2	0.9	0.5	Stream Gradient	
					High	CI
					0.90	

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/5/2019	10-B	213	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.80
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking downstream (west) at Stream Reach 10-B (Marrowbone Creek). The reach channel had active erosion throughout the stream. The riparian buffers consisted of 50% impervious surface associated with State Route 220 and 50% mature forest with wetlands. The in-stream habitat consisted of a deep-water with varying substrate. The channel was altered at the state route 220 bridge crossing Marrowbone Creek.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

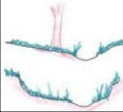
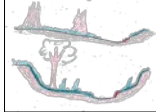
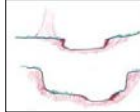
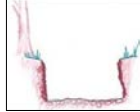
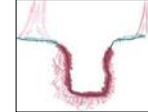
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/5/2019	11-A	212	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Marrowbone Creek					S-11: BC1-10/BB1-13		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			
Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	10%	70%	20%				100%		
	Score >	1.5	0.75	0.5						
CI= (Sum % RA * Scores*0.01)/2										
Left Bank	% Riparian Area>	65%	20%	15%				100%		
	Score >	0.75	0.5	1.5						
								Rt Bank CI >	0.78	CI
								Lt Bank CI >	0.81	0.79

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/5/2019	11-A	212	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.92
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at Reach 11-A. The reach channel was marginal with stable and vegetated banks with some areas of erosion. The riparian buffers consisted of impervious surfaces associated with State Route 220 and forested areas with an immature forest/shrub canopy. The in-stream habitat was degraded by severe aggregation. The reach was channelized and riprapped at a culvert under State Route 220.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

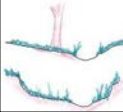
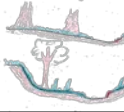
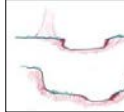

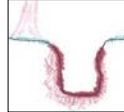
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/6/2019	12-A	203	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Marrowbone Creek					S-12: AZ1-15/BA1-23		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category								
	Optimal	Suboptimal	Marginal	Poor					
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Scores	1.5	High	Low	High	Low	High	Low		

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

						Ensure the sums of % Riparian Blocks equal 100					
Right Bank	% Riparian Area>	70%	30%						100%		
	Score >	1.2	0.6								
										CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	50%	50%						100%		
	Score >	1.2	0.6								
									Rt Bank CI >	1.02	CI
									Lt Bank CI >	0.90	0.96

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		
Scores	1.5	1.2	0.9	0.5	Stream Gradient	
					High	CI
					0.50	

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/6/2019	12-A	203	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.95
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking downstream at Reach 12-A. The reach channel was marginal with stable and vegetated banks with some areas of erosion. The riparian buffers consisted of impervious surfaces associated with State Route 220 and forested areas with an immature forest/shrub canopy. The in-stream habitat was degraded by severe aggregation. The reach was channelized and riprapped at a culvert under State Route 220.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

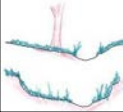
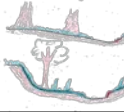
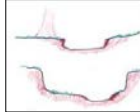
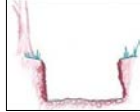
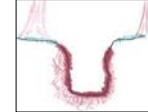
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VODT)	Henry	R3	03010103	3/6/2019	13-A	88	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Marrowbone Creek					S-13: AY1-19/AX1-10		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category								
	Optimal	Suboptimal	Marginal	Poor					
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Scores	1.5	High	Low	High	Low	High	Low		

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area >	60%	40%					100%		
	Score >	0.5	1.5							
								CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area >	65%	35%					100%		
	Score >	1.5	0.5							
								Rt Bank CI >	0.90	CI
								Lt Bank CI >	1.15	1.03

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		
Scores	1.5	1.2	0.9	0.5	Stream Gradient	
					High	CI
					1.20	

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VODT)	Henry	R3	03010103	3/6/2019	13-A	88	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category						NOTES>>
	Negligible	Minor	Moderate		Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5	CI 1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.11
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking downstream at Reach 13-A. The reach had active erosion in some areas. The right riparian buffer consisted of 40% mature forested areas and 60% impervious surfaces associated with parking lots and roads. The left riparian buffer consisted of 65% mature forested areas and 35% impervious surface associated with parking lots and roads. The in-stream habitat consisted of riffles, pools, leaf packs and substrate of various particle sizes. The stream was degraded by minor amounts of aggregation. The channel was riprapped and channelized through culverts.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

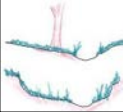
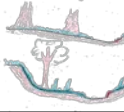
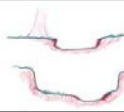
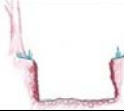
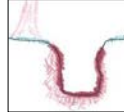
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/7/2019	14-A	150	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Marrowbone Creek					S-14: BM1-5/BN1-4/BZ1-6/CA1-6		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	1.60

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area>	40%	15%	45%			100%	
	Score >	0.5	0.75	1.5				
						CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	40%	55%	5%			100%	CI
	Score >	0.5	1.5	0.75			Rt Bank CI > 0.99	Lt Bank CI > 1.06

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High CI 0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/7/2019	14-A	150	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.70

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.77
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at Stream Reach 14-A. The reach was poor with frequent, active erosion throughout. The right riparian buffer consisted of 45% mature tree cover, 15% non-maintained herbaceous vegetation, and 40% impervious surfaces associated with State Route 220. The left riparian buffer consisted of 55% mature tree cover, 5% non-maintained herbaceous vegetation, and 40% impervious surfaces associated with State Route 220. The in-stream habitat was degraded by severe erosion. The reach was channelized through culverts.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

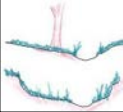
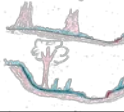
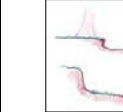


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/6/2019	15-A	124	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Marrowbone Creek					S-15: BV1-11/BY1-12		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches, channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	1.60

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			
Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5

- Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
- Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
- Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	20%	80%					100%				
	Score >	0.5	1.5									
								CI= (Sum % RA * Scores*0.01)/2				
Left Bank	% Riparian Area>	80%	20%					100%				
	Score >	0.5	1.2									
								<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">Rt Bank CI ></td> <td style="text-align: center;">1.30</td> </tr> <tr> <td>Lt Bank CI ></td> <td style="text-align: center;">0.64</td> </tr> </table>	Rt Bank CI >	1.30	Lt Bank CI >	0.64
Rt Bank CI >	1.30											
Lt Bank CI >	0.64											

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/6/2019	15-A	124	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.87
	RCI= (Sum of all CIs)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at Stream Reach 15-A. The reach was incised with active erosion throughout. The right riparian buffer consisted of 80% mature tree cover and 20% impervious surfaces associated with a stockyard. The left riparian buffer consisted of 20% high suboptimal tree cover and 80% impervious surfaces associated with State Route 220. The in-stream habitat was degraded by aggregation, erosion, and highway pollution. The reach was riprapped at the top.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

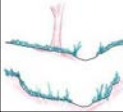
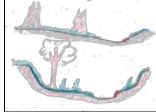
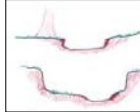
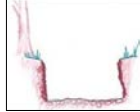
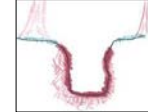
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	4/27/2019	15-B	151	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF		Unnamed Tributary to Marrowbone Creek					S-15: ZZS14, ZZT1-3		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	High	Low	High	Low	High	Low	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area >	100%						100%	
	Score >	1.5							
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area >	100%						100%	CI
	Score >	1.5						1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	4/27/2019	15-B	151	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.18
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking downstream at Stream Reach 15-B. The stream is slightly incised and a majority of stable banks with 60-80% vegetative surface protection. The left and right bank riparian buffers consist of mature forest with greater than 60% tree canopy cover. Instream habitat is present in less than 10% of the stream. No channel alteration is present within the stream.

DESCRIBE PROPOSED IMPACT:

Looking downstream at Stream Reach 15-B.G110

PROVIDED UNDER SEPARATE COVER

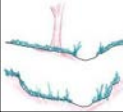
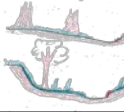
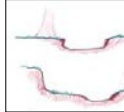

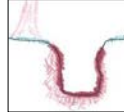
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/7/19	16-A	223	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Marrowbone Creek					S-16: BQ1-14/BR1-11		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	1.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			
Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	10%	90%				100%				
	Score >	0.75	1.5								
							CI= (Sum % RA * Scores*0.01)/2				
Left Bank	% Riparian Area>	95%	5%				100%				
	Score >	0.75	0.5								
							<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">Rt Bank CI ></td> <td style="text-align: center;">1.43</td> </tr> <tr> <td>Lt Bank CI ></td> <td style="text-align: center;">0.74</td> </tr> </table>	Rt Bank CI >	1.43	Lt Bank CI >	0.74
Rt Bank CI >	1.43										
Lt Bank CI >	0.74										
							1.08				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	High

CI
0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/7/19	16-A	223	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.62
	RCI= (Sum of all CIs)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at Stream Reach 16-A. The reach was severely incised with frequent, active erosion throughout. The right riparian buffer consisted of 90% mature tree cover and 10% non-maintained herbaceous vegetation. The left riparian buffer consisted of 95% non-maintained herbaceous vegetation and 5% impervious surfaces associated with State Route 220. The in-stream habitat was degraded by severe erosion and lack of habitat elements. Greater than 80% of the reach was channelized into a concert culvert.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

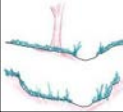
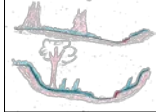
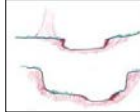
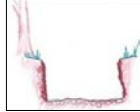
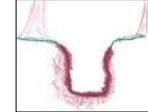
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/7/2019	17-A	98	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Marrowbone Creek					S-17: BA1-11/BT1-21/BQ13-14		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	1.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	85%	15%				100%				
	Score >	1.5	0.75								
							CI= (Sum % RA * Scores*0.01)/2				
Left Bank	% Riparian Area>	85%	15%				100%				
	Score >	1.5	0.75								
							<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">Rt Bank CI ></td> <td style="text-align: center;">1.39</td> </tr> <tr> <td>Lt Bank CI ></td> <td style="text-align: center;">1.39</td> </tr> </table>	Rt Bank CI >	1.39	Lt Bank CI >	1.39
Rt Bank CI >	1.39										
Lt Bank CI >	1.39										

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/7/2019	17-A	98	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.84
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at Reach 17-A. The reach was severely incised with frequent, active erosion throughout. The riparian buffers consisted of 85% mature tree cover and 15% impervious surfaces associated with State Route 220. The in-stream habitat was degraded by severe aggregation. The reach was channelized riprapped at a culvert.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

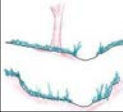
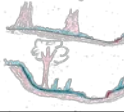
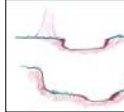

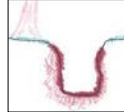
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/6/2019	18-A	164	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Marrowbone Creek					S-18: BE1-14/BD1-2,22/BF1-12		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	1.60

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	High	Low	High	Low	High	Low	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	80%	20%					100%	
	Score >	1.2	0.6						
								CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	80%	20%					100%	
	Score >	1.2	0.6						
							Rt Bank CI >	1.08	CI
							Lt Bank CI >	1.08	1.08

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		
Scores	1.5	1.2	0.9	0.5	Stream Gradient	
					High	CI
					0.90	

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/6/2019	18-A	164	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.98
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at Stream Reach 18-A. The reach channel was poor with sediment covering a large portion of the bed. The riparian buffers consist of 20% impervious surface associated with State Route 220 and 80% mature forested areas. In-stream habitat was present and consisted of riffles, pool, head-cuts and leaf packs, however, the reach was degraded by aggregation. The reach was channelized through a culvert and was riprapped for stability.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

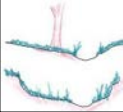
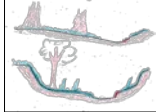
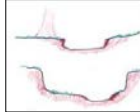
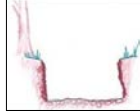
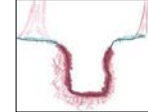
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/10/2019	19-A	105	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Marrowbone Creek					S-19: CO18-88/CR1-11		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	1.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	90%	10%					100%		
	Score >	1.5	0.6							
CI= (Sum % RA * Scores*0.01)/2										
Left Bank	% Riparian Area>	40%	30%	30%				100%	1.41	CI
	Score >	1.5	0.75	0.5					0.98	1.19

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/10/2019	19-A	105	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.80
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at Reach 19-B. The reach channel was rated severe with frequent areas of active erosion and acute aggregation. The riparian buffers consist of 10% maintained lawns and 90% mature forested areas. In-stream habitat was present in less than 10% of the reach. The reach was channelized through culvert and riprapped for stability at the top of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

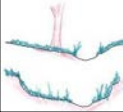
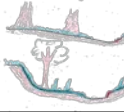
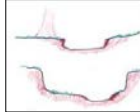
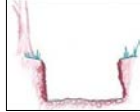
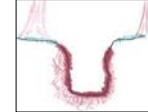
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/10/2019	20-A	191	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Marrowbone Creek					S-20: BG3-5/BG26-35		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	High	Low	High	Low	High	Low	

- Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
- Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
- Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	100%						100%	
	Score >	1.5							
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area>	100%						100%	
	Score >	1.5							
								Rt Bank CI >	1.50
								Lt Bank CI >	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient
					High
					CI
					0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/10/2019	20-A	191	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.18
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at Stream Reach 20-A. The reach channel was marginal with areas of active erosion and aggregation. The riparian buffers consist of 100% mature forested areas with wetlands. Instream habitat was present in 10-30% of the reach with many areas degraded by aggregation. The reach showed no signs of alteration.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

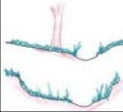
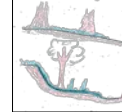
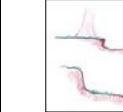


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/10/2019	20-B	416	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH/AW		Unnamed Tributary to Marrowbone Creek					S-20: CO1-5/C054-77/CM1-10/CN1-3/C		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Scores	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category								
	Optimal	Suboptimal	Marginal	Poor		Notes>>			
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Scores	1.5	High	Low	High	Low	High	Low		

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

	% Riparian Area>	100%							100%
Right Bank	Score >	1.5							
									CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	70%	30%						100%
	Score >	1.5	0.75						1.50
									1.28
									1.39

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	High

Stream Gradient **CI**

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/10/2019	20-B	416	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.26
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking downstream at 20-B. The reach was suboptimal with minor area of active erosion throughout with stable and vegetated banks. The right riparian buffer consisted of 100% mature tree cover. The left riparian buffer consisted of 70% mature tree cover and 30% densely non-maintained herbaceous area. Instream habitat was present in 30-50% of the reach and consisted of riffles, pools, head cuts, leaf packs and substrate of various particle sizes. The was channelized through culverts at the top and bottom of reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

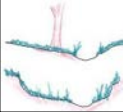
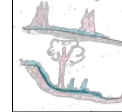
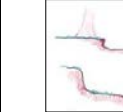


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/10/2019	21-A	497	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH/AW		Unnamed Tributary to Marrowbone Creek					S-21: CM8-49/CN3-53		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	2.00
Scores	3	2.4	2	1.6	1	

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	10%	90%					100%
	Score >	1.5	0.85					
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	10%	90%					100%
	Score >	1.5	0.85					
								Rt Bank CI > 0.92
								Lt Bank CI > 0.92

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/10/2019	21-A	497	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.12
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at Reach 21-A. The reach was marginal with some active erosion throughout. The riparian buffers consisted of 10% mature tree cover and 90% non-maintained shrub/tree layer. The in-stream habitat consisted of riffles, pools, leaf packs, varied particle sizes, and head-cuts. The reach had no signs of alteration.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

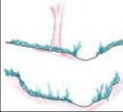
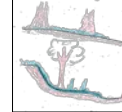
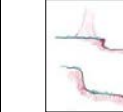


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/10/2019	21-B	50	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH/AW		Unnamed Tributary to Marrowbone Creek					S-21: CM49-53/CN53-57		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
Scores	1.5	High	Low	High	Low	High	Low

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	30%	70%				100%
	Score >	1.5	0.85				
Left Bank	% Riparian Area>	100%					100%
	Score >	0.85					

CI= (Sum % RA * Scores*0.01)/2

	Rt Bank CI >	1.05						CI
	Lt Bank CI >	0.85						0.95

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/10/2019	21-B	50	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.87
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at Stream Reach 21-B. The reach was marginal with some active erosion throughout. The right riparian buffer consisted of 30% mature tree cover and 70% non-maintained shrub/tree layer. The left riparian buffer consisted of 100% non-maintained shrub/tree layer. Instream habitat was present 10-30% of the reach and consisted of riffles, pools, leaf packs, substrate of varied particle sizes, and head-cuts, however, the reach was degraded by aggregation.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

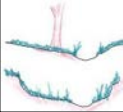
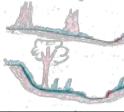
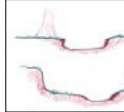

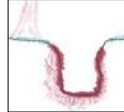
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/6/2019	22-A	111	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Marrowbone Creek					S-22: BH42-52,BJ1-11		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	High	Low	High	Low	High	Low	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	100%						100%	
	Score >	1.5							
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area>	100%						100%	
	Score >	1.5							
								Rt Bank CI >	1.50
								Lt Bank CI >	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient
					High
					CI
					1.20

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/6/2019	22-A	111	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.24
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at Stream Reach 22-A. The reach channel was marginal with common areas of active erosion and sever aggregation. The riparian buffers consist of 100% mature forested areas. Instream habitat was present in 30-50% of the reach and consisted of riffles, pools, head-cuts, leaf packs, and substrate of varied particles sizes. The reach showed no signs of alteration. The reach showed no signs of alteration.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

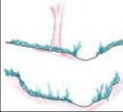
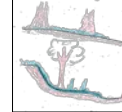
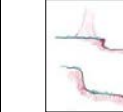


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/6/2019	22-B	346	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Marrowbone Creek					S-22: B12-29, BH15-42		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category								NOTES>>
	Optimal	Suboptimal		Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Scores	1.5	High	Low	High	Low	High	Low		

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area >	100%						100%			
	Score >	1.5									
CI= (Sum % RA * Scores*0.01)/2											
Left Bank	% Riparian Area >	85%	15%					100%	Rt Bank CI >	1.50	CI
	Score >	1.5	0.05						Lt Bank CI >	1.28	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		
Scores	1.5	1.2	0.9	0.5	Stream Gradient	CI
				High	0.90	

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/6/2019	22-B	346	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.16
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at stream reach 22-B. The reach channel was marginal with areas of active erosion and frequent aggregation. The right riparian buffer consisted of 100% mature forested areas. The left riparian buffer consisted 85% mature forested areas and 15% impervious surfaces associated with State Route 220. Instream habitat was present in 10-30% of the reach. The reach showed no signs of alteration.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

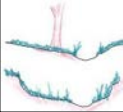
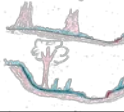
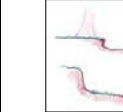


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/10/2019	23-A	698	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH/AW		Unnamed Tributary to Marrowbone Creek					S-23: B130-82/BJ12-40/BK1-24		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	1.60

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	High	Low	High	Low	High	Low	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	100%							100%
	Score >	1.5							
									CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	100%							100%
	Score >	1.5							1.50
									Rt Bank CI > 1.50
									Lt Bank CI > 1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient
					High
					CI
					1.20

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/10/2019	23-A	698	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.12
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at stream reach 23-A. The reach was incised with active erosion throughout. The right riparian buffer consisted of 100% mature tree cover. The left riparian buffer consisted of 100% mature tree cover. Instream habitat was present in 30-50% of the reach. The reach was channelized through culvert at the top of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

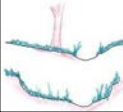
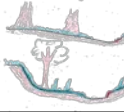
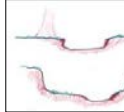

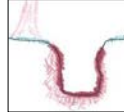
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/8/2019	24-A	186	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Marrowbone Creek					S-24: CE1-16/CG1-5/CF5-14		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			
Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	90%	10%					100%	
	Score >	1.5	0.6						
								CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	90%	10%					100%	
	Score >	1.5	0.6						
							Rt Bank CI >	1.41	CI
							Lt Bank CI >	1.41	1.41

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/8/2019	24-A	186	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.20
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at stream reach 24-A. The reach had a few areas of active erosion throughout with stable and vegetated banks. The riparian buffers consisted of 90% mature tree cover and 10% maintained area associated with a gravel farm road. Istream habitat was present in 10-30% of the reach and consisted of riffles, pools, leaf packs and substrate of various particle sizes. The channel was channelized through a culvert under a gravel road.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

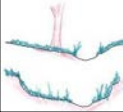
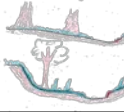
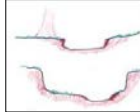
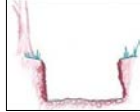
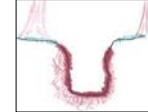
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/8/2019	24-B	185	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Marrowbone Creek					S-24: CE3-17/CF5-18		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	High	Low	High	Low	High	Low	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	100%						100%	
	Score >	1.5							
								CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	100%						100%	
	Score >	1.5							
							Rt Bank CI >	1.50	CI
							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		
Scores	1.5	1.2	0.9	0.5	Stream Gradient	
					High	CI
					1.20	

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/8/2019	24-B	185	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.24
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at stream reach 24-B. The reach was marginal with some active erosion throughout. The right riparian buffers consisted of 100% mature tree cover. Instream habitat was present in 30-50% of the reach and consisted of riffles, pools, leaf packs, substrate of varied particle sizes, and head-cuts.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

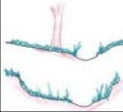
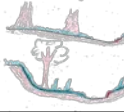
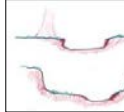

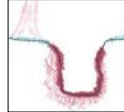
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/8/2019	25-A	275	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Marrowbone Creek					S-25: CG5-23/CF1-5/CH1-15		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	High	Low	High	Low	High	Low	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	100%						100%		
	Score >	1.5								
CI= (Sum % RA * Scores*0.01)/2										
Left Bank	% Riparian Area>	100%						100%		
	Score >	1.5								
								Rt Bank CI >	1.50	CI
								Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		
Scores	1.5	1.2	0.9	0.5	Stream Gradient	
					High	CI
					1.50	

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/8/2019	25-A	275	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >> **1.38**

RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)

COMPENSATION REQUIREMENT (CR) >> **N/A**

CR = RCI X L_i X IF

INSERT PHOTOS:



Looking upstream at stream reach 25-A. The reach had a minor area of active erosion throughout with stable and vegetated banks. The riparian buffers consisted of 100% mature tree cover. Instream habitat was present throughout the reach consisted of riffles, pools, head cuts, leaf packs and substrate of various particle sizes. The reach had no signs of alteration.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/8/2019	26-A	102	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Marrowbone Creek					S-26: CI1-13/CJ1-13		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category								NOTES>>
Riparian Buffers	Optimal	Suboptimal		Marginal		Poor		
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.		High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area>	100%					100%	
	Score >	1.5						
Left Bank	% Riparian Area>	100%					100%	
	Score >	1.5						
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH								
NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.							THE REACH CONDITION INDEX (RCI) >>	0.75
RCI= (Riparian CI)/2								
COMPENSATION REQUIREMENT (CR) >>							N/A	
CR = RCI X LF X IF								

INSERT PHOTOS:



Looking upstream at stream reach 26-A. The riparian buffers consisted of 100% mature forested areas.

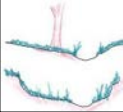
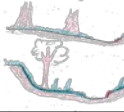
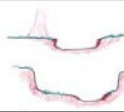
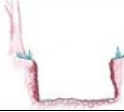
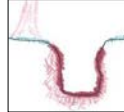
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/8/2019	27-A	136	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Marrowbone Creek					S-27: CK6-14/CL5-16		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			
Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area >	100%						100%
	Score >	1.5						
								CI = (Sum % RA * Scores * 0.01) / 2
Left Bank	% Riparian Area >	100%						100%
	Score >	1.5						
							Rt Bank CI >	1.50
							Lt Bank CI >	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/8/2019	27-A	136	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.26
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at stream reach 27-A. The reach was suboptimal with level and stable banks with minor areas of active erosion. The riparian buffers consisted of 100% mature forested areas. Instream habitat was in present in 10-30% of the reach. The channel had no signs of alteration.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/8/2019	27-B	64	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Marrowbone Creek					S-27: CK1-6/CL1-5		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category								NOTES>>
Riparian Buffers	Optimal	Suboptimal	Marginal		Poor			
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area>	100%					100%	
	Score >	1.5						
Left Bank	% Riparian Area>	100%					100%	
	Score >	1.5						
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH								
NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.							THE REACH CONDITION INDEX (RCI) >>	0.75
RCI= (Riparian CI)/2								
							COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF								

INSERT PHOTOS:



Looking upstream at stream reach 27-B. The riparian buffers consisted of 100% mature forested areas.

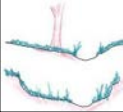
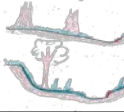
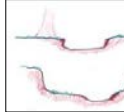

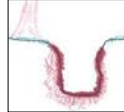
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/7/2019	28-A	125	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH		Unnamed Tributary to Marrowbone Creek					S-28: CC6-19/CD1-5		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	1.60

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category								NOTES>>
	Optimal	Suboptimal	Marginal	Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.		High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5		

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	50%	50%					100%			
	Score >	1.5	0.5								
CI= (Sum % RA * Scores*0.01)/2											
Left Bank	% Riparian Area>	70%	30%					100%	Rt Bank CI >	1.00	CI
	Score >	1.5	0.5						Lt Bank CI >	1.20	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		
Scores	1.5	1.2	0.9	0.5	Stream Gradient	CI
				High	0.90	

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/7/2019	28-A	125	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.98
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at stream reach 28-A. The reach channel had stable banks but had areas of frequent aggregation. The riparian buffers consist of 50% impervious surface associated with State Route 220, 50% mature forested areas with an unmaintained understory. Instream habitat was present in 10-30% of the reach and consisted of riffles, pools, and head-cuts. The reach was degraded by frequent aggregation. The channel was riprapped at the top of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

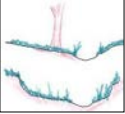
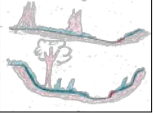
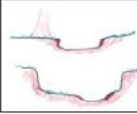
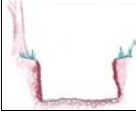
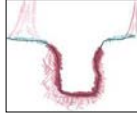
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	4/27/2019	28-B	103	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF		Unnamed Tributary to Marrowbone Creek					S-28: ZZJ1-8, ZZK1-5		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	1.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			
Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area >	100%						100%	
	Score >	1.5							
Left Bank	% Riparian Area >	95%	5%					100%	
	Score >	1.5	0.5					1.50	
								CI = (Sum % RA * Scores * 0.01) / 2	
								Rt Bank CI >	1.50
								Lt Bank CI >	1.45
								CI	1.48

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	4/27/2019	28-B	103	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.90
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at Stream Reach 28-B. The stream is deeply incised with the streambed below the average majority of banks. The left bank riparian buffer consists of mature forest with greater than 60% tree canopy cover and impervious surfaces. The right bank riparian buffer consists of mature forest with greater than 60% tree canopy cover. Instream habitat is present in less than 10% of the stream. No channel alteration is present in the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

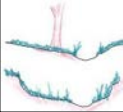
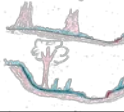
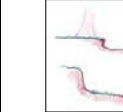


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/10/2019	29-A	149	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH/AW		Unnamed Tributary to Marrowbone Creek					S-29: CU1-11/CS1-12		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	1.60

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	High	Low	High	Low	High	Low	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area>	75%	20%	5%				100%
	Score >	0.85	0.5	1.5				
						CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	90%	10%				100%	
	Score >	0.85	1.5					
						Rt Bank CI >	0.81	CI
						Lt Bank CI >	0.92	0.86

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient
					High
					CI
					0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/10/2019	29-A	149	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>	
	Negligible	Minor	Moderate	Severe			
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.		CI
Scores	1.5	1.3	1.1	0.9	0.7		0.90

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<p><i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.</p>	THE REACH CONDITION INDEX (RCI) >>	0.77
		RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)
	COMPENSATION REQUIREMENT (CR) >>	N/A
		CR = RCI X L _i X IF

INSERT PHOTOS:



Looking upstream at stream reach 29-A. The reach channel was poor with frequent areas of active erosion throughout. The right riparian buffer consisted of 5% mature forested cover, 75% non-maintained shrub/tree layer, and 20% impervious surface associated with State Route 220. The left riparian buffer consisted of 90% non-maintained shrub/tree layer and 10% mature forested area. Instream habitat consisted of riffles, pools, leaf packs, substrate of varied particle sizes, and head-cuts, however, the reach was degraded by severe aggregation. The reach was filled in by sediment runoff associated with State Route 220.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

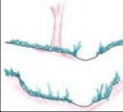
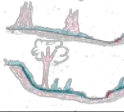
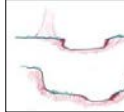

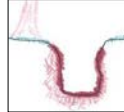
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/10/2019	30-A	39	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH/AW		Unnamed Tributary to Marrowbone Creek					S-30: CX1-11/CY1-6/DA1-3/CZ1-3		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category								NOTES>>	
	Optimal	Suboptimal	Marginal	Poor						
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			
Scores	1.5	High	Low	High	Low	High	Low	High	Low	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100					
Right Bank	% Riparian Area>	100%			100%
	Score >	1.5			
CI= (Sum % RA * Scores*0.01)/2					
Left Bank	% Riparian Area>	100%			100%
	Score >	1.5			
					Rt Bank CI > 1.50
					Lt Bank CI > 1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/10/2019	30-A	39	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.04
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking downstream at stream reach 30-A. The reach was marginal with some areas of active erosion throughout. The riparian buffer consisted of 100% mature forested cover. Instream habitat present in 30-50% of the reach and consisted of riffles, pools, leaf packs, substrate of varied particle sizes, and head-cuts. The reach was channelized through culverts and stabilized with riprap.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

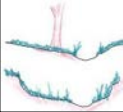
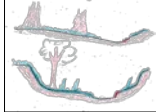
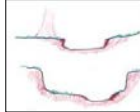
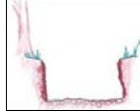
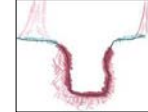
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/10/2019	31-A	32	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH/AW		Unnamed Tributary to Marrowbone Creek					S-31: DQ6-18/DR7-11		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	40%	60%				100%		
	Score >	1.5	0.5						
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area>	100%					100%		
	Score >	1.5							
							Rt Bank CI >	0.90	CI
							Lt Bank CI >	1.50	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/10/2019	31-A	32	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	1.16
RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at stream reach 31-A. The reach was suboptimal with few areas of active erosion and level vegetated banks. The right riparian buffer consisted of 40% mature forested cover and 60% impervious surfaces associated with State Route 220. The right riparian buffer consisted of 100% mature forested cover. Instream habitat was present in 10-30% of the reach and consisted of riffles, pools, and head-cuts, however, the reach was degraded by aggregation throughout. The reach was channelized through a culvert at the top of reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

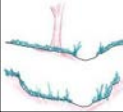
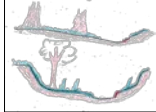
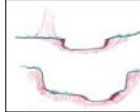
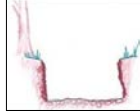
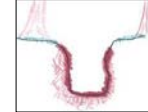
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/10/2019	31-B	290	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH/AW		Unnamed Tributary to Marrowbone Creek					S-31: DS1-17/DT1-17/DQ8-11		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	1.60

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			
Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area >	100%						100%
	Score >	1.5						
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area >	30%	70%					100%
	Score >	1.5	0.5					1.50
								0.80
								1.15

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High
					CI 0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/10/2019	31-B	290	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.99
		RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)
		COMPENSATION REQUIREMENT (CR) >>
		N/A
CR = RCI X L _i X IF		

INSERT PHOTOS:



Looking upstream at stream reach 31-B. The reach was poor with frequent areas of active erosion. The right riparian buffer consisted of 100% mature forested areas. The left riparian buffer consisted of 30% mature forested areas and 70% impervious surfaces. The in-stream habitat consisted of riffles, pools, leaf packs, and head-cuts, however, the reach was degraded by aggregation. The reach was channelized through a culvert.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

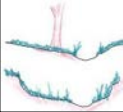
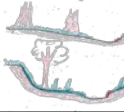
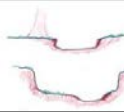
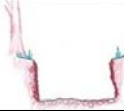
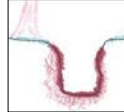
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/10/2019	32-A	26	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH/AW		Unnamed Tributary to Marrowbone Creek					S-32: DU1-11		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
Scores	1.5	High	Low	High	Low	High	Low

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	100%						100%
	Score >	1.5						
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area>	100%						100%
	Score >	1.5						
							Rt Bank CI >	1.50
							Lt Bank CI >	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient
					High
					CI
					0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/10/2019	32-A	26	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.22
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at stream reach 32-A. The reach was marginal with vegetated banks and some areas of active erosion. The riparian buffers with 100% mature forested areas. Instream habitat was present in 10-30% of the reach and consisted of riffles, pools, leaf packs, and head-cuts. The reach was channelized through a culvert at the bottom of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

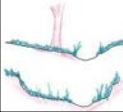
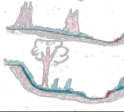
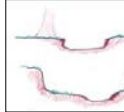

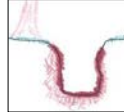
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/10/2019	33-A	8	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH/AW		Unnamed Tributary to Marrowbone Creek					S-33: DB1-6/DC1-6		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			
Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5			

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	20%	80%					100%
	Score >	0.5	1.5					
Left Bank	% Riparian Area>	20%	80%					100%
	Score >	0.5	1.5					

CI= (Sum % RA * Scores*0.01)/2

							1.30	CI
							1.30	1.30

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/10/2019	33-A	8	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	1.18
RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at stream reach 33-A. The reach was suboptimal with level and stabilized banks. The riparian buffer consisted of 80% mature forested cover and 20% impervious surfaces associated with State Route 220. Instream habitat was present in 10-30% of the reach and consisted of riffles, pools, and varied particle sizes. The reach was channelized through culverts.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

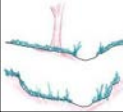
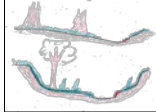
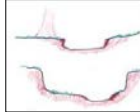
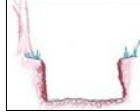
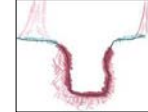
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/10/2019	34-A	52	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH/AW		Unnamed Tributary to Marrowbone Creek					S-34:DD1-4/DE1-5/DG1-4/DF1-3		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	1.00
Scores	3	2.4	2	1.6	1	

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			
Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	75%	25%					100%
	Score >	1.5	0.5					
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	75%	25%					100%
	Score >	1.5	0.5					
							Rt Bank CI >	1.25
							Lt Bank CI >	1.25

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/10/2019	34-A	52	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.10

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.77
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at stream reach 34-A. The reach was poor frequent areas of active erosion. The riparian buffers consisted of 75% mature forested cover and 25% impervious surfaces associated with State Route 220. Instream habitat was degraded by erosion and is present in less than 10% of the reach. The reach was channelized through culverts.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/10/2019	35-A	84	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH/AW		Unnamed Tributary to Marrowbone Creek					S-35: DH1-10,DI1-10		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category								NOTES>>
Riparian Buffers	Optimal	Suboptimal	Marginal		Poor			
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
							High	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area>	20%	80%				100%	
	Score >	0.5	1.5					
Left Bank	% Riparian Area>	20%	80%				100%	
	Score >	0.5	1.5					
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH								
NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.							THE REACH CONDITION INDEX (RCI) >>	0.65
$RCI = (Riparian\ CI) / 2$								
COMPENSATION REQUIREMENT (CR) >>							N/A	
$CR = RCI \times LF \times IF$								

INSERT PHOTOS:



Looking downstream at stream reach 35-A. The riparian buffers consisted of 20% impervious surfaces associated with State Route 220 and 80% forested areas with wetlands.

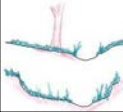
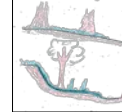
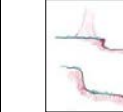


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/10/2019	36-A	13	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH/AW		Unnamed Tributary to Marrowbone Creek					S-36: DJ1-4/DK1-4		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			
Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	75%	25%					100%	
	Score >	0.85	0.5						
								CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	75%	25%					100%	
	Score >	0.85	0.5						
							Rt Bank CI >	0.76	CI
							Lt Bank CI >	0.76	0.76

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High
					CI 0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/10/2019	36-A	13	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

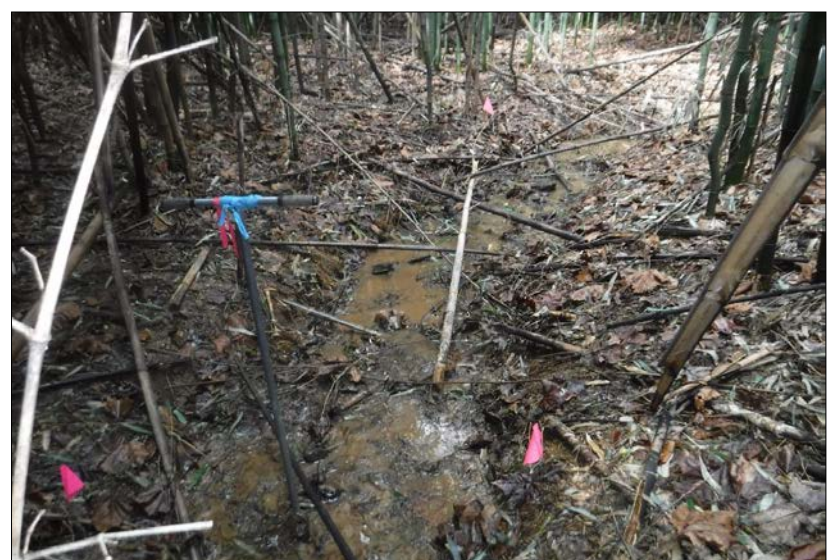
	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.10

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.87
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking downstream at stream reach 36-A. The reach was marginal with some areas of active erosion. The riparian buffers consisted of 75% non-maintained herbaceous areas and 25% impervious surfaces associated with State Route 220. Instream habitat was present in less than 10% of the reach. The reach was channelized through a culvert at the top of reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

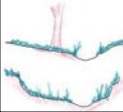
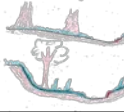
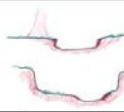
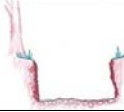
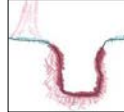
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/11/2019	37-A	106	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH/AW		Unnamed Tributary to Marrowbone Creek					S-37: DN1-15/DW1-18		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			
Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5

- Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
- Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
- Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	85%	15%				100%		
	Score >	1.5	0.75						
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area>	85%	15%				100%		
	Score >	1.1	0.75						
							Rt Bank CI >	1.39	CI
							Lt Bank CI >	1.05	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/11/2019	37-A	106	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	1.08
RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at stream reach 37-A. The reach was marginal with areas of active erosion and a large amount of sediment covering the stream bed. The right riparian buffers consisted of 85% mature forested areas and 15% non-maintained herbaceous areas. The left riparian buffer consisted of 85% mature forested with a maintained understory and 15% non-maintained herbaceous areas. Instream habitat was present 10-30% of the reach and consisted of riffles, pools, leaf packs, and head-cuts. The reach was channelized through a culvert.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

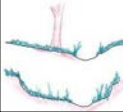
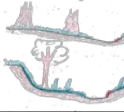
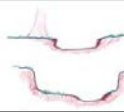
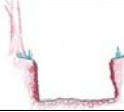
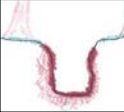
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/11/2019	38-A	75	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH/AW		Unnamed Tributary to Marrowbone Creek					S-38: DX1-24/DY1-18		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category								NOTES>>
	Optimal	Suboptimal	Marginal	Poor					
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5		

- Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
- Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
- Enter the % Riparian Area and Score for each riparian category in the blocks below.

						Ensure the sums of % Riparian Blocks equal 100			
Right Bank	% Riparian Area>	20%	40%	40%				100%	
	Score >	0.5	0.85	1.2					
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area>	20%	40%	40%				100%	
	Score >	0.5	0.85	1.5					
							Rt Bank CI >	0.92	CI
							Lt Bank CI >	1.04	0.98

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High CI 0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/11/2019	38-A	75	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Scores	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	CI 1.10
1.5	1.3	1.1	0.9	0.7	0.5	

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	1.00
RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at stream reach 38-A. The reach was marginal with vegetated banks and some areas of active erosion. The right riparian buffers consisted of 40% mature forest with less than 60% canopy cover, 40% non-maintained densely vegetated herbaceous areas, and 20% impervious areas associated with State Route 220. Instream habitat was present in less than 10% of the reach. The reach was channelized through a culvert and stabilized with riprap at the top of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

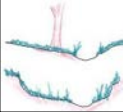
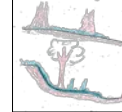
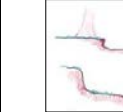


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/11/2019	39-A	28	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH/AW		Unnamed Tributary to Marrowbone Creek					S-39: EL1-3,EM1-3,EJ1-4,E		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category								
	Optimal	Suboptimal	Marginal	Poor					
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.					
Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5		

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

								Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area>	70%	20%	10%					100%	
	Score >	1.5	0.6	0.85						
								CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	70%	20%	10%					100%	
	Score >	1.5	0.6	0.85						
								Rt Bank CI >	1.26	CI
								Lt Bank CI >	1.26	1.26

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High
					CI 0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/11/2019	39-A	28	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.85
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking downstream at stream reach 39-A. The reach was poor with frequent areas of active erosion. The riparian buffers consisted of 70% mature forested areas, 20% maintained lawns, and 10% non-maintained densely vegetated herbaceous areas. Instream habitat was present in less than 10% of the reach. The reach was channelized through a culverts.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

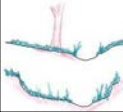
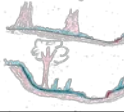
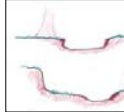

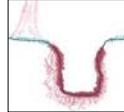
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/10/2019	39-B	445	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH/AW		Unnamed Tributary to Marrowbone Creek					S-39: DN1-53/DP1-45		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			
Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	90%	10%					100%
	Score >	1.5	0.5					
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	90%	10%					100%
	Score >	1.5	0.5					
							Rt Bank CI >	1.40
							Lt Bank CI >	1.40

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/10/2019	39-B	445	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.10

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.00
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking downstream at stream reach 39-B. The reach channel was marginal with some areas of active erosion throughout. The riparian buffers consisted of 90% mature forested cover and 10% impervious surface associated with State Route 220. Instream habitat was present in less than 10% of the reach. The reach was channelized through culverts and stabilized with riprap at the top and bottom of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER


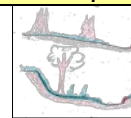
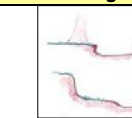


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/11/2019	39-C	176	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH/AW		Unnamed Tributary to Marrowbone Creek					S-39: DZ1-14/EA1-8		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	1.60

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
Scores	1.5	High	Low	High	Low	High	Low

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	90%	10%					100%	
	Score >	1.5	0.5						
								CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	40%	60%					100%	
	Score >	1.5	0.75						
							Rt Bank CI >	1.40	CI
							Lt Bank CI >	1.05	1.23

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		
Scores	1.5	1.2	0.9	0.5	Stream Gradient	
					High	CI
					0.50	

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/11/2019	39-C	176	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.93
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking downstream at stream reach 39-C. The reach was poor with frequent areas of active erosion. The right riparian buffers consisted of 90% mature forested areas and 10% impervious surfaces associated with State Route 220. The left riparian buffer consisted of 40% mature forested and 60% non-maintained herbaceous vegetation. Intream habitat was present in less than 10% of the reach and degraded by severe aggregation and active erosion. The reach was channelized through a culvert at the top of reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

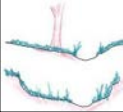
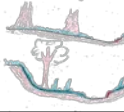
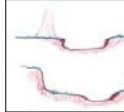

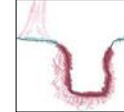
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/11/2019	39-B	39	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH/AW		Unnamed Tributary to Marrowbone Creek					S-39: DZ14-20		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	1.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
Scores	1.5	High	Low	High	Low	High	Low

- Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
- Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
- Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100						
Right Bank	% Riparian Area>	90%	10%			100%
	Score >	1.5	0.5			
CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area>	20%	80%			100%
	Score >	1.5	0.5			
Rt Bank CI > 1.40						
Lt Bank CI > 0.70						
1.05						

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/11/2019	39-B	39	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>	
	Negligible	Minor	Moderate	Severe			
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.		
Scores	1.5	1.3	1.1	0.9	0.7	0.5	1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.81
RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking downstream at stream reach 39-D. The reach was severely incised with frequent areas of active erosion. The right riparian buffers consisted of 90% mature forest and 10% impervious surfaces associated with State Route 220. The left riparian buffer consisted of 20% mature forest and 80% impervious surfaces associated with State Route 220. The in-stream habitat consisted of riffles, pools, leaf packs, and head-cuts, however, the reach was degraded by severe aggregation and active erosion. The reach was channelized through a culvert.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

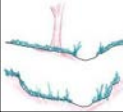
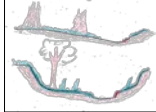
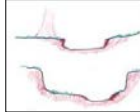
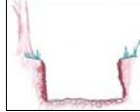
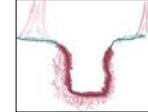
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/11/2019	40-A	182	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH/AW		Unnamed Tributary to Marrowbone Creek					S-40: EC1-17/ED5-29		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches, channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	1.60

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	High	Low	High	Low	High	Low	

- Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
- Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
- Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	25%	75%					100%	
	Score >	1.5	0.5						
								CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	25%	75%					100%	
	Score >	1.5	0.5						
							Rt Bank CI >	0.75	CI
							Lt Bank CI >	0.75	0.75

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		
Scores	1.5	1.2	0.9	0.5	Stream Gradient	
					High	CI
					0.50	

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/11/2019	40-A	182	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.70

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.71
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking downstream at stream reach 40-A. The reach was poor with frequent areas of active erosion. The riparian buffers consisted of 25% mature forested areas and 75% impervious surfaces associated with State Route 220. Instream habitat was present in less than 10% of the reach and consisted of riffles, pools, leaf packs, and head-cuts, however, the reach was degraded by severe aggregation and active erosion. The reach was channelized through a culvert.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/11/2019	40-B	323	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH/AW		Unnamed Tributary to Marrowbone Creek					S-40: EE1-6, EG1-6		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.		High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.							Ensure the sums of % Riparian Blocks equal 100	
Right Bank	% Riparian Area>	90%	10%					100%
	Score >	1.5	0.6					
Left Bank	% Riparian Area>	85%	10%	5%				100%
	Score >	1.5	0.6	0.5				
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH								
NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.								THE REACH CONDITION INDEX (RCI) >> 0.70 RCI= (Riparian CI)/2
								COMPENSATION REQUIREMENT (CR) >> N/A CR = RCI X LF X IF

INSERT PHOTOS:



Looking upstream at stream reach 40-B. The right riparian buffer consisted of 90% mature forested areas and 10% maintained ride-of-way. The left riparian buffer consisted of 85% mature forested areas, 10% maintained ride-of-way, and 5% impervious surfaces.

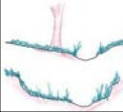
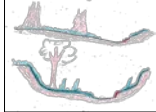
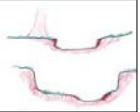
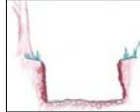
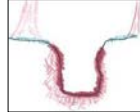
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/4/2019	41-A	520	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Matrimony Creek					S-41: DN8-26/DO10-26/DM		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>							<p>Ensure the sums of % Riparian Blocks equal 100</p>							
Right Bank	% Riparian Area>	5%	30%	65%			100%							
	Score >	0.5	0.6	1.5										
CI= (Sum % RA * Scores*0.01)/2														
Left Bank	% Riparian Area>	25%	75%				100%							
	Score >	0.6	1.5											
														1.23

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/4/2019	41-A	520	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.19
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 41-A. The reach had eroded banks with vegetation present. The right riparian buffer consisted of 65% mature tree cover, 30% maintained herbaceous vegetation and 5% impervious surface associated with State Route 220. The left buffer contained 75% mature tree cover and 25% maintained herbaceous vegetation. Instream habitat was suboptimal with stable elements in 30-50% of the reach. No channel alterations was present in the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/4/2019	41-B	94	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Matrimony Creek					S-41: DN1-8/DO1-10		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.							Ensure the sums of % Riparian Blocks equal 100	
Right Bank	% Riparian Area>	100%					100%	
	Score >	1.5						
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	50%	50%				100%	Rt Bank CI > 1.50
	Score >	0.5	1.5					Lt Bank CI > 1.00
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH								

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.63
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 41-B. The right riparian buffer consisted of 100% mature tree cover. The left riparian buffer consisted of 50% mature tree cover and 50% impervious surface associated with State Route 220.

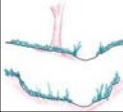
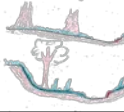
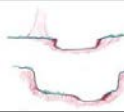
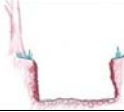
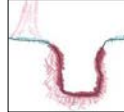
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/12/2019	42-A	28	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH/AW		Unnamed Tributary to Marrowbone Creek					S-42: ER1-3/EQ1-3		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			
Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	90%	10%					100%				
	Score >	1.5	0.5									
								CI= (Sum % RA * Scores*0.01)/2				
Left Bank	% Riparian Area>	70%	20%	10%				100%				
	Score >	1.5	0.5	0.6								
								<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">Rt Bank CI ></td> <td style="text-align: center;">1.40</td> </tr> <tr> <td>Lt Bank CI ></td> <td style="text-align: center;">1.21</td> </tr> </table>	Rt Bank CI >	1.40	Lt Bank CI >	1.21
Rt Bank CI >	1.40											
Lt Bank CI >	1.21											

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High

CI
1.31

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/12/2019	42-A	28	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.70

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.90
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking downstream stream reach 42-A. The reach was marginal with areas of active erosion. The right riparian buffer consisted of 90% mature forested areas and 10% impervious surfaces associated with the railroad. The left riparian buffer consisted of 70% mature forested areas, 20% impervious surfaces associated with the railroad, and 10% maintained lawns. Instream habitat elements were less than 10% of the reach. The reach was channelized through a culvert.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

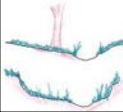
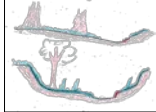
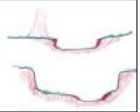
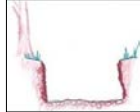
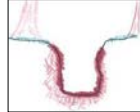
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/4/2019	43-A	832	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Matrimony Creek					S-43: DR12/DU1/DP25-87/D		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Poor	High	Low								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
<p style="text-align: center;">Ensure the sums of % Riparian Blocks equal 100</p>														
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.50
NOTES>>									
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/4/2019	43-A	832	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.26
		RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)
	COMPENSATION REQUIREMENT (CR) >>	N/A
		CR = RCI X LF X IF

INSERT PHOTOS:



Looking upstream at stream reach 43-A. The reach had incised banks with moderate erosion present. The right and left riparian buffers consisted of 100% mature forest cover. The in-stream habitat was optimal and contained leaf packs, woody debris and various substrate sizes. Channel alterations include concrete installed along less than 20% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

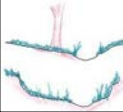
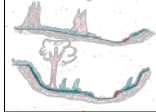
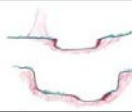
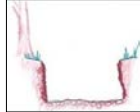
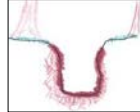
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/12/2019	43-A	119	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB / JF / WN		Tributary of Matrimony Creek					S-43: DP1-DP8A		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.00</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor	High	Low	
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>	
Right Bank	% Riparian Area >	100%					100%
	Score >	0.6					
CI= (Sum % RA * Scores*0.01)/2							
Left Bank	% Riparian Area >	100%					100%
	Score >	0.6					
						Rt Bank CI >	0.60
						Lt Bank CI >	0.60
						CI	0.60

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>Stream Gradient</p> <p>High</p>		
Score	1.5	1.2	0.9			0.5

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/12/2019	43-A	119	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.92
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking north (upstream) at Stream Reach 43-A. The reach is often incised with erosion present on 40-60% of banks. The right and left riparian buffers are composed of sparse vegetation and are not maintained. Instream habitat elements are lacking and are present in less than 10% of the reach. The channel had no known alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

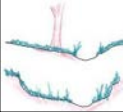
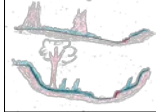
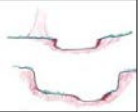
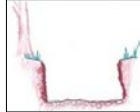
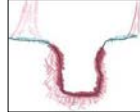
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/4/2019	43-B	481	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Matrimony Creek					S-43: DP1-25/DQ1-23/DQ1A		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>1.60</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>	
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor			
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>		<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>	
<p>Condition Scores</p>	<p>1.5</p>	<p>High</p>	<p>Low</p>	<p>High</p>	<p>Low</p>	<p>High</p>	<p>Low</p>		
	<p>1.5</p>	<p>1.2</p>	<p>1.1</p>	<p>0.85</p>	<p>0.75</p>	<p>0.6</p>	<p>0.5</p>		
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>									
<p>Right Bank</p>	<p>% Riparian Area ></p>	<p>98%</p>	<p>2%</p>				<p>100%</p>		
	<p>Score ></p>	<p>1.5</p>	<p>0.85</p>						
								<p>CI= (Sum % RA * Scores*0.01)/2</p>	
<p>Left Bank</p>	<p>% Riparian Area ></p>	<p>95%</p>	<p>5%</p>				<p>100%</p>		
	<p>Score ></p>	<p>1.5</p>	<p>0.85</p>						
							<p>Rt Bank CI ></p>	<p>1.49</p>	<p>CI</p>
							<p>Lt Bank CI ></p>	<p>1.47</p>	<p>1.48</p>

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p>Stream Gradient</p>
<p>Score</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>High</p>
					<p>CI</p>
					<p>1.20</p>

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/4/2019	43-B	481	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.12
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 43-B. The majority of the reach had severely eroded banks with little vegetative protection present. The right and left riparian buffers consisted of 98% and 95% cover by forest with greater than 60% canopy cover, respectfully, which included fringe wetlands. The remaining riparian buffers on both banks consisted of non-maintained dense herbaceous vegetation. The in-stream habitat was suboptimal with stable elements within 30-50% of the reach, and channel alterations occurred near State Route 220.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/5/2019	44-A	130	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Matrimony Creek					S-44: EA1-7/DZ1-6		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>	
	Optimal	Suboptimal		Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5		
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100			
Right Bank	% Riparian Area>	100%					100%		
	Score >	1.5							
Left Bank	% Riparian Area>	100%					100%		
	Score >	1.5							
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH									
							CI= (Sum % RA * Scores*0.01)/2		
							Rt Bank CI >	1.50	CI
							Lt Bank CI >	1.50	1.50

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.75
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 44-A. The right and left riparian buffers consisted of 100% mature forest cover.

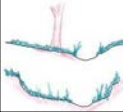
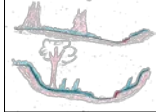
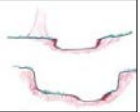

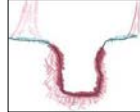
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/4/2019	45-A	121	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Matrimony Creek					S-45: DR1-12/DS1-10		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>		
	Optimal	Suboptimal	Marginal		Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5		
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100			
Right Bank	% Riparian Area >	100%					100%		
	Score >	1.5							
Left Bank	% Riparian Area >	100%					100%		
	Score >	1.5							
							CI= (Sum % RA * Scores*0.01)/2		
							Rt Bank CI >	1.50	CI
							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					1.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/4/2019	45-A	121	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.38
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 45-A. The reach had stable banks with vegetative protection present. The right and left riparian buffer consisted of 100% mature forest containing wetlands. The in-stream habitat was optimal with stable elements in greater than 50% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

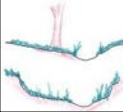
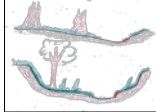
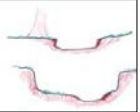

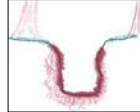
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

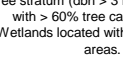
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/5/2019	45-B	214	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Matrimony Creek					S-45: DU1-25/DS10-25		

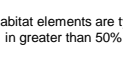
1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p> <p>2.4</p> <p>2</p> <p>1.6</p> <p>1</p>	2.00
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
 <p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6		0.5
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>								
Right Bank	% Riparian Area >	98%	2%				100%	
	Score >	1.5	1.2					
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
Rt Bank CI >							1.49	
Lt Bank CI >							1.50	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
 <p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>1.5</p> <p>1.2</p> <p>0.9</p> <p>0.5</p>	1.50
Stream Gradient					High
Score					1.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/5/2019	45-B	214	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.30
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 45-B. The reach had erosion present on 40-60% of banks. The right riparian buffer consisted of 98% mature forest cover containing wetlands, and 2% forest with 30-60% canopy cover containing a shrub and herbaceous layer. The left riparian buffer consisted of 100% mature tree cover containing wetlands. The in-stream habitat was optimal with stable elements in greater than 50% of the reach. No channel alterations were observed.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

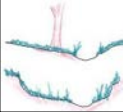
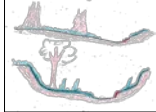
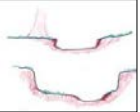

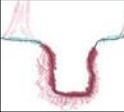
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

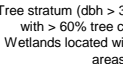
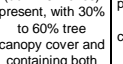
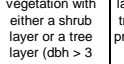
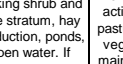
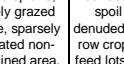
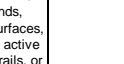
Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/5/2019	45-C	1,620	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Matrimony Creek					S-45: DS25-144/DU25-53/E		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	1.60

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal		Poor		
							
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	100%						100%
	Score >	1.5						
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area>	100%						100%
	Score >	1.5						
							Rt Bank CI >	1.50
							Lt Bank CI >	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/5/2019	45-C	1,620	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.22
		RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)
	COMPENSATION REQUIREMENT (CR) >>	N/A
		CR = RCI X LF X IF

INSERT PHOTOS:



Looking upstream at stream reach 45-C. The reach had eroded banks with little vegetative protection present. The right and left riparian buffers consisted of 100% mature forest cover containing wetlands. In-stream habitat was optimal and contained leaf packs, woody debris and various substrate sizes. No channel alteration was present within this reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/5/2019	46-A	179	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Matrimony Creek					S-46: DY1-10/DX1-11		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

		Ensure the sums of % Riparian Blocks equal 100										
Right Bank	% Riparian Area>	100%						100%				
	Score >	1.5										
										CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI	
	Score >	1.5							Lt Bank CI >	1.50	1.50	

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.75
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 46-A. The right and left riparian buffers consisted of 100% mature forest cover.

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/5/2019	46-B	106	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Matrimony Creek					S-46: EB1-7/EC1-7		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal		Marginal		Poor		
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

		Ensure the sums of % Riparian Blocks equal 100					
Right Bank	% Riparian Area>	100%					100%
	Score >	1.5					
Left Bank	% Riparian Area>	100%					100%
	Score >	1.5					

$$CI = (\text{Sum } \% RA * \text{Scores} * 0.01) / 2$$

Rt Bank CI > 1.50 CI

Lt Bank CI > 1.50 1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >> 0.75

$$RCI = (\text{Riparian CI}) / 2$$

COMPENSATION REQUIREMENT (CR) >> N/A

$$CR = RCI * LF * IF$$

INSERT PHOTOS:



Looking upstream at stream reach 46-B. The right and left riparian buffers consisted of 100% mature forest cover.

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/5/2019	46-C	79	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Matrimony Creek					S-46: EF1-5/ED1-6		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area>	100%					100%	
	Score >	1.5						
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	100%					100%	Rt Bank CI > 1.50
	Score >	1.5						Lt Bank CI > 1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.75
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 46-C. The right and left riparian buffers consisted of 100% mature forest cover.

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/6/2019	47-A	508	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Matrimony Creek					S-47: EM1-68		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

		Ensure the sums of % Riparian Blocks equal 100								
Right Bank	% Riparian Area>	100%					100%			
	Score >	1.5								
CI= (Sum % RA * Scores*0.01)/2										
Left Bank	% Riparian Area>	100%					100%	Rt Bank CI >	1.50	CI
	Score >	1.5						Lt Bank CI >	1.50	1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.75
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 47-A. The right and left riparian buffers are forested with greater than 60% canopy cover.

DESCRIBE PROPOSED IMPACT:

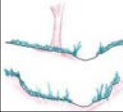
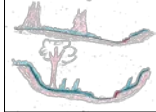
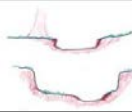
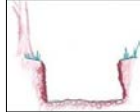
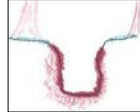
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/5/2019	48-A	265	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Matrimony Creek					S-48: E11-12/EH1-13		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	1.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>							
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor									
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>Ensure the sums of % Riparian Blocks equal 100</p>	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>															
Right Bank	% Riparian Area >	100%					100%								
	Score >	1.5													
CI= (Sum % RA * Scores*0.01)/2															
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50					CI	
	Score >	1.5						Lt Bank CI >	1.50					1.50	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.50
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/5/2019	48-A	265	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.10
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 48-A. The reach had severely eroded, unstable banks. The right and left riparian buffers consisted of 100% mature forest cover. The in-stream habitat was optimal with stable elements in greater than 50% of the reach. There are no known channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

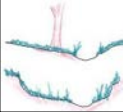
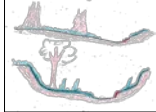
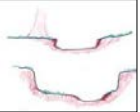

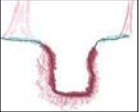
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/5/2019	48-B	467	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Matrimony Creek					S-48: EH13-33/EJ1-17/EE10		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>1.60</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>1.5</p>	<p>1.2</p>	<p>1.1</p>	<p>0.85</p>	<p>0.75</p>	<p>0.6</p>	<p>0.5</p>	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5							
<p>Ensure the sums of % Riparian Blocks equal 100</p>														
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
CI= (Sum % RA * Scores*0.01)/2														
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>					
	Optimal	Suboptimal	Marginal	Poor						
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient High</p>	<p>CI 1.20</p>
Score	1.5	1.2	0.9	0.5						

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/5/2019	48-B	467	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	1.16
RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking downstream at stream reach 48-B. The reach was poor with eroded, unstable banks. The right and left riparian buffers consisted of 100% mature forest cover with wetlands present within the right riparian buffer. The in-stream habitat was suboptimal, with stable elements within 30-50% of the reach including various substrate sizes. There are no known channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER


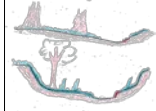
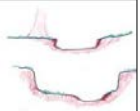
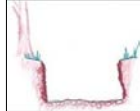
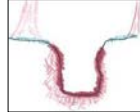
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

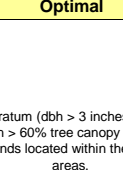
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/6/2019	48-C	245	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Matrimony Creek					S-48: EH33-45/EJ17-33		

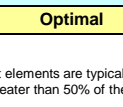
1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	3.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
 <p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							<p>Ensure the sums of % Riparian Blocks equal 100</p>							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
 <p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.50
NOTES>>									
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/6/2019	48-C	245	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.50
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 48-C. The reach had stable banks with bedrock present throughout. The right and left riparian buffers consisted of 100% mature forest cover. The in-stream habitat was optimal and contained leaf packs, shade, woody debris, and various water velocity and depths. There are no known channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

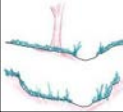
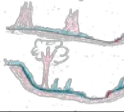
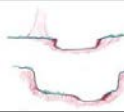
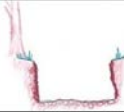
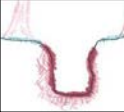
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/6/2019	48-D	702	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Matrimony Creek					S-48: EH45-98/EJ33-73		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	1.60

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p> <p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p> <p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p> <p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>			
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5			
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>	
Right Bank	% Riparian Area >	100%				100%	
	Score >	1.5					
						CI = (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area >	100%				100%	
	Score >	1.5					
						Rt Bank CI > 1.50 Lt Bank CI > 1.50	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High

CI

1.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/6/2019	48-D	702	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.22
	RCI= (Sum of all CIs)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 48-D. The reach had incised, eroded banks. The right and left riparian buffers consisted of 100% mature forest cover with wetlands within the right riparian buffer. The in-stream habitat was optimal with stable elements in greater than 50% of the reach. There are no known channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER


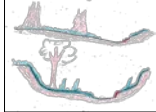
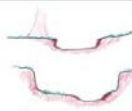
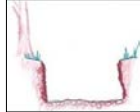
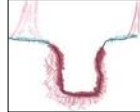
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

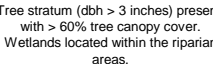
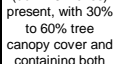
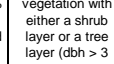
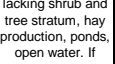
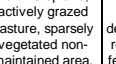
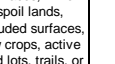
Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/6/2019	48-E	261	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Matrimony Creek					S-48: EH98-113/EJ73-107		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

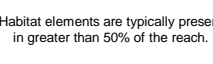
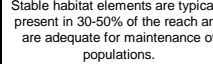
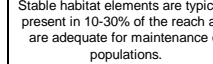
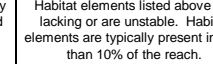
Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor		
								
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	100%					100%	CI
	Score >	1.5					1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
					
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/6/2019	48-E	261	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.38
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 48-E. The reach had stable banks with areas of active erosion present. The right and left riparian buffers consisted of 100% mature forest cover. The in-stream habitat was optimal with stable elements in greater than 50% of the reach. There are no known channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

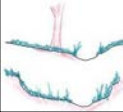
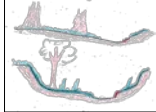
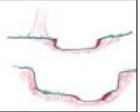

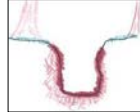
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/6/2019	48-F	238	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Matrimony Creek					S-48: EJ107-144/EO1-14		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>		
	Optimal	Suboptimal	Marginal		Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5		
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100			
Right Bank	% Riparian Area >	80%	2%	18%			100%		
	Score >	0.6	0.5	1.5					
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area >	10%	5%	85%			100%		
	Score >	0.6	0.85	1.5					
							Rt Bank CI >	0.76	
							Lt Bank CI >	1.38	1.07

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					1.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/6/2019	48-F	238	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.70

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	1.05
RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 48-F. The reach had eroded banks stabilized by riprap. The right riparian buffer consisted of 80% maintained herbaceous vegetation, 2% impervious surface and 18% mature forest cover. The left buffer consisted of 85% mature forest cover and wetlands, 5% dense shrub and herbaceous vegetation and 10% maintained herbaceous vegetation. The in-stream habitat was optimal and contained various substrate sizes. Channel alterations include riprap, culverts and debris in stream.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

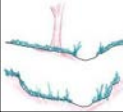
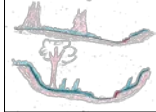
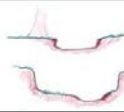
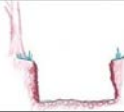
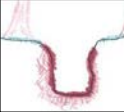
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/7/2019	48-G	584	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Matrimony Creek					S-48: EO14-53/EJ144-192		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	1.60

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Low Marginal:	Poor	Low Poor:	
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

		Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area>	45%	10%	45%				100%	
	Score >	1.5	0.85	0.6					
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area>	5%	5%	10%	80%			100%	
	Score >	1.5	0.5	0.85	0.6				
								Rt Bank CI >	1.03
								Lt Bank CI >	0.67
									CI
									0.85

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					1.20

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/7/2019	48-G	584	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.99
	RCI= (Sum of all CIs)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 46-G. The reach had eroded banks with some vegetative protection present. The right riparian buffer consisted of 45% wetland, 10% dense shrubs and 45% maintained field. The left riparian buffer consisted of 5% wetland, 5% impervious surface including gravel lots and 80% maintained lawn. The in-stream habitat was suboptimal with stable elements in 30-50% of the reach. The channel alterations included a culvert.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

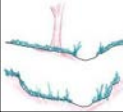
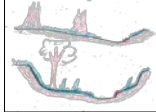
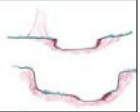
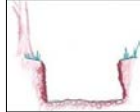
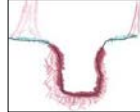
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/6/2019	48-H	400	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Matrimony Creek					S-48: EQ1-41/EO53-76		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>1.60</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>								
	Optimal	Suboptimal	Marginal	Poor	High	Low										
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>1.5</p>	<p>1.2</p>	<p>1.1</p>	<p>0.85</p>	<p>0.75</p>	<p>0.6</p>	<p>0.5</p>	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>		
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>Ensure the sums of % Riparian Blocks equal 100</p>								
Right Bank	% Riparian Area > 50%	% Riparian Area > 50%	% Riparian Area > 50%	% Riparian Area > 50%	% Riparian Area > 50%	% Riparian Area > 50%	% Riparian Area > 50%	Score > 1.5	Score > 0.6	Score > 0.6	Score > 0.6	Score > 0.6	Score > 0.6		Score > 0.6	Score > 0.6
Left Bank	% Riparian Area > 100%	% Riparian Area > 100%	% Riparian Area > 100%	% Riparian Area > 100%	% Riparian Area > 100%	% Riparian Area > 100%	% Riparian Area > 100%	Score > 1.5	Score > 1.5	Score > 1.5	Score > 1.5	Score > 1.5	Score > 1.5	Score > 1.5	Score > 1.5	Score > 1.5
<p>CI= (Sum % RA * Scores*0.01)/2</p>											<p>1.05</p>	<p>1.05</p>	<p>1.28</p>			

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>				
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient High</p>	<p>CI 1.20</p>
Score	1.5	1.2	0.9	0.5					

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/6/2019	48-H	400	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.08
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 48-H. The reach had eroded banks with vegetation present. The right riparian buffer consisted of 50% wetland and 50% maintained field. The left buffer consisted of 100% mature forest cover containing wetlands. The in-stream habitat suboptimal with stable elements in 30-50% of the reach. The channel alterations included a culvert.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/12/2019	48-I	200	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.90

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.95
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at stream reach 48-A. The reach was suboptimal with few areas of active erosion. The right riparian buffer consisted of 85% mature forested area with wetlands and 15% impervious surfaces associated with State Route 220. The left riparian buffer consisted of 70% mature forested areas, 15% impervious surfaces associated with the railroad, and 15% maintained lawns. Instream habitat was present in 30-50% of the reach and consisted of riffles, pools, and leaf packs, however, the reach was degraded by severe aggregation. The reach was channelized through a culvert.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/6/2019	49-A	76	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Matrimony Creek					S-49: EJ84-97		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category								NOTES>>
Optimal	Suboptimal		Marginal		Poor			
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area>	75%	25%				100%	
	Score >	1.5	1.2					
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area>	100%					100%	
	Score >	1.5						
Rt Bank CI > 1.43 CI								
Lt Bank CI > 1.50 1.47								

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.74
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 49-A. The right riparian buffer consisted of 75% forested with greater than 60% canopy cover, and 25% forested with 30-60% canopy cover that lacked an understory. The left buffer consisted of forest with greater than 60% canopy cover.

DESCRIBE PROPOSED IMPACT:

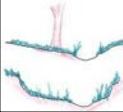
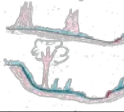
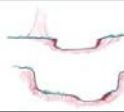

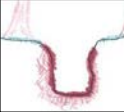
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/7/2019	50-A	654	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Matrimony Creek					S-50: EP1-45/EJ192-237		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.00</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>	
<p>Condition Scores</p>	<p>1.5</p>	<p>High 1.2</p>	<p>Low 1.1</p>	<p>High 0.85</p>	<p>Low 0.75</p>	<p>High 0.6</p>		<p>Low 0.5</p>
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>								
<p>Right Bank</p>	<p>% Riparian Area > 10%</p>	<p>90%</p>					<p>100%</p>	
	<p>Score > 0.6</p>	<p>1.5</p>						
<p>CI= (Sum % RA * Scores*0.01)/2</p>								
<p>Left Bank</p>	<p>% Riparian Area > 10%</p>	<p>90%</p>					<p>100%</p>	
	<p>Score > 1.5</p>	<p>0.6</p>						
							<p>Rt Bank CI > 1.41</p>	
							<p>Lt Bank CI > 0.69</p>	
<p>CI 1.05</p>								

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p>Stream Gradient</p>
<p>Score</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>High</p>
					<p>CI 1.20</p>

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/7/2019	50-A	654	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.15
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 50-A. The reach moderately eroded banks. The right riparian buffer consisted of 10% maintained lawn and 90% forest with >60% canopy cover. The left buffer consisted of 10% forest with >60% canopy cover and 90% maintained lawn. The instream habitat was suboptimal with stable elements in 30-50% of the reach. No channel alteration was present in this reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

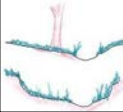
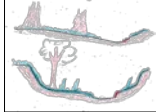
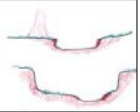
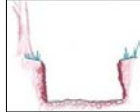
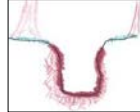
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/12/2019	51-A	139	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB / JF / WN		Tributary of Matrimony Creek					S-51: FR1-10, FQ1-12		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.00</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>					
	Optimal	Suboptimal	Marginal	Poor	High	Low							
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>1.5</p>	<p>1.2</p>	<p>1.1</p>	<p>0.85</p>	<p>0.75</p>	<p>0.6</p>	<p>0.5</p>
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>								<p>Ensure the sums of % Riparian Blocks equal 100</p>					
Right Bank	% Riparian Area >	90%	10%					100%					
	Score >	0.5	1.5										
CI= (Sum % RA * Scores*0.01)/2													
Left Bank	% Riparian Area >	75%	25%					100%	Rt Bank CI >	0.60	CI		
	Score >	0.6	1.5						Lt Bank CI >	0.83	0.71		

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>				
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient High</p>	<p>CI</p>
Score	1.5	1.2	0.9	0.5	High	0.50			

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/12/2019	51-A	139	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.90
		RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location XXXX)



Looking southwest (downstream) at Stream Reach 51-A. The reach is often incised, with erosion present on 40-60% of banks. The right bank riparian buffer is composed almost entirely of impervious surfaces (road) and has a small portion of forest with greater than 60% canopy cover. The left buffer is composed largely of maintained grass and has a portion of forest with greater than 60% canopy cover. Habitat elements are lacking and are present in less than 10% of the reach. The upstream end of the reach is fed by a culvert, disrupting less than 20% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

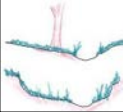
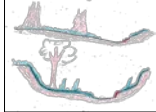
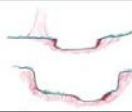
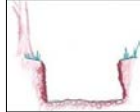
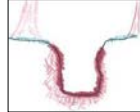
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/6/2019	52-A	212	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Matrimony Creek					S-52: EH113-122/EN1-12		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.00</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>	
<p>Condition Scores</p>	<p>1.5</p>	<p>High</p>	<p>Low</p>	<p>High</p>	<p>Low</p>	<p>High</p>		<p>Low</p>
	<p>0.85</p>	<p>0.75</p>	<p>0.6</p>	<p>0.5</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>			
<p>Right Bank</p>	<p>% Riparian Area ></p>	<p>2%</p>	<p>98%</p>	<p>100%</p>			<p>CI= (Sum % RA * Scores*0.01)/2</p>	
	<p>Score ></p>	<p>0.85</p>	<p>1.5</p>					
<p>Left Bank</p>	<p>% Riparian Area ></p>	<p>50%</p>	<p>50%</p>			<p>100%</p>	<p>Rt Bank CI ></p>	<p>1.49</p>
	<p>Score ></p>	<p>0.6</p>	<p>1.5</p>				<p>Lt Bank CI ></p>	<p>1.05</p>
<p>3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.</p>								

Instream Habitat/ Available Cover	Conditional Category				NOTES>>				
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient</p>	<p>CI</p>
<p>Score</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>High</p>	<p>0.90</p>			

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/6/2019	52-A	212	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.09
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 52-A. The reach had incised, eroded banks. The right riparian buffer consisted of 2% non-maintained, dense herbaceous vegetation and 98% forest with greater than 60% canopy cover. The left riparian buffer consisted of 50% forest with greater than 60% canopy cover and 50% maintained lawn. The in-stream habitat was marginal with stable elements in less than 30% of the reach. Channel alterations included a culvert and dumping of debris into the stream.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/12/2019	52-A	51	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH/AW		Unnamed Tributary to Matrimony Creek					S-52: EX1-6/EY1-6		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category								NOTES>>
Riparian Buffers	Optimal	Suboptimal	Marginal		Poor			
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
							High	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area>	80%	20%				100%	
	Score >	1.2	0.85					
Left Bank	% Riparian Area>	100%					100%	
	Score >	1.2						
CI= (Sum % RA * Scores*0.01)/2 Rt Bank CI > 1.13 CI Lt Bank CI > 1.20 1.17								
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH								

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.59
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 52-A. The right riparian buffer consisted of 80% mature forested area with canopy cover less than 60% and 20% non-maintained vegetation consisting of herbaceous and shrub layers. The left riparian buffer consisted of 100% mature forested area with a canopy cover less than 60%.

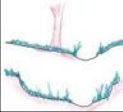
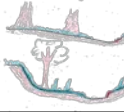
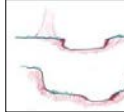

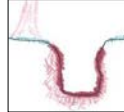
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/6/2019	52-B	193	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Matrimony Creek					S-52: EN12-30/EH122-141		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>1.00</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>			
	Optimal	Suboptimal	Marginal	Low Marginal:	Poor					
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>				
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6		0.5		
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>									
Right Bank	% Riparian Area >	50%	15%	30%			95%	<p>CI= (Sum % RA * Scores*0.01)/2</p>		
	Score >	0.6	0.5	1.5						
Left Bank	% Riparian Area >	90%	10%				100%	Rt Bank CI >	0.83	CI
	Score >	0.6	1.5					Lt Bank CI >	0.69	0.76

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>Stream Gradient</p>	<p>CI</p>	
Score	1.5	1.2	0.9	0.5	High	0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/6/2019	52-B	193	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.</i>	THE REACH CONDITION INDEX (RCI) >>	0.55
	RCI= (Sum of all CIs)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 52-B. The reach had severely eroded, unstable banks. The right riparian buffer consisted of 55% maintained pasture, 15% impervious surface and 30% wetland. The left riparian buffer consisted of 90% maintained pasture and 10% wetland. The in-stream habitat was poor and lacked stable elements. Channel alterations were severe and included multiple culverts, straightening of channel and impacts from livestock.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

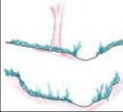
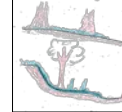
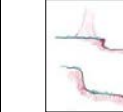


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/12/2019	52-B	108	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM/SB/MH/AW		Unnamed Tributary to Matrimony Creek					S-52: EX6-17/EY6-13		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			
Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	75%	15%	10%				100%
	Score >	1.2	0.5	0.85				
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	85%	15%				100%	1.06
	Score >	1.2	0.5				1.10	1.08

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/12/2019	52-B	108	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.10

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.94
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:



Looking upstream at stream reach 52-B. The reach was marginal with areas of active erosion. The right riparian buffer consisted of 75% mature forested area with less than 60% canopy cover, 15% impervious surfaces associated with State Route 220, and 10% densely vegetated herbaceous/shrub layer. The left riparian buffer consisted of 85% mature forested area and 15% impervious surfaces associated with State Route 220. Instream habitat was present in less than 10% of the reach. The reach was channelized through a culvert at the bottom of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

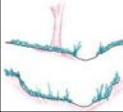
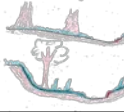
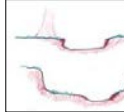


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/6/2019	52-C	112	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Matrimony Creek					S-52: EH142-149/EN131-13		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	1.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100					
Right Bank	% Riparian Area >	5%	15%	85%	105%
	Score >	1.5	0.5	0.6	
CI= (Sum % RA * Scores*0.01)/2					
Left Bank	% Riparian Area >	30%	30%	40%	100%
	Score >	1.1	0.6	1.5	
					Rt Bank CI > 0.66
					Lt Bank CI > 1.11
					CI 0.89

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI 0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/6/2019	52-C	112	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.58
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 52-C. The reach had severely eroded, unstable banks. The right riparian buffer consisted of 5% wetland, 15% impervious surface and 80% actively grazed, maintained pasture. The left riparian buffer consisted of 40% forest with greater than 60% canopy cover and wetlands, 30% actively grazed, maintained pasture and 30% forest with 30-60% canopy cover. The in-stream habitat was poor and lacked stable elements. Channel alterations were severe and included multiple culverts, straightening of channel and impacts from livestock.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

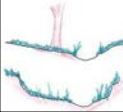
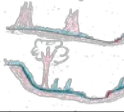
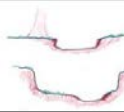

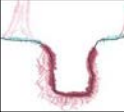
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/7/2019	52-D	408	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Matrimony Creek					S-52: EN50-71/EH163-173		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p> <p>2.4</p> <p>2</p> <p>1.6</p> <p>1</p>	1.60
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal		Poor		
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>							
Right Bank	% Riparian Area >	45%	55%				100%
	Score >	1.5	0.6				
							CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area >	20%	80%				100%
	Score >	1.5	0.6				
							Rt Bank CI > 1.01
							Lt Bank CI > 0.78
							CI 0.89

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>1.5</p> <p>1.2</p> <p>0.9</p> <p>0.5</p>	CI 0.50
Score	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/7/2019	52-D	408	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.70
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 52-D. The reach was unstable and had been channelized. The right riparian buffer consisted of 45% wetland and forest with greater than 60% canopy cover, and 55% maintained pasture. The left buffer consisted of 20% wetlands and forest with greater than 60% canopy cover, and 80% maintained pasture. The in-stream habitat lacked stable features. The channel had been greatly altered through channelization, culvert installation and livestock access.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

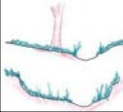
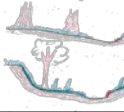
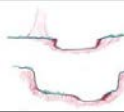

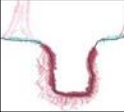
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/7/2019	52-E	531	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Matrimony Creek					S-52: EH173-206/EN71-111		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.00</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor		
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>		
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6		0.5
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>		
Right Bank	% Riparian Area >	75%	25%				100%	
	Score >	1.5	0.6					
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	15%	5%	80%			100%	
	Score >	1.5	1.1	0.6				
							Rt Bank CI >	1.28
							Lt Bank CI >	0.76
							CI	1.02

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p>Stream Gradient</p> <p>High</p>
Score	1.5	1.2	0.9	0.5	
					0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/7/2019	52-E	531	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.04
	RCI= (Sum of all CIs)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 52-E. The reach had eroded banks with moderate vegetative protection. The right riparian buffer consisted of 25% maintained pasture and 75% forest cover with greater than 60% canopy cover and wetlands. The left riparian buffer consisted of 15% wetlands, 80% maintained pasture, and 5% forest with 30-60% canopy cover and a non-maintained understory. The in-stream habitat was marginal and contained stable features in less than 30% of the reach. Channel alterations included livestock access to the stream.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

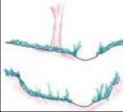
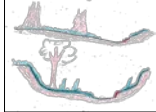
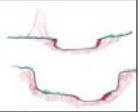


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/7/2019	52-F	223	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB		Unnamed Tributary to Matrimony Creek					S-52: EH206-216/EN111-12		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p> <p>2.4</p> <p>2</p> <p>1.6</p> <p>1</p>	1.00
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6		0.5
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>							<p>CI= (Sum % RA * Scores*0.01)/2</p>	
Right Bank	% Riparian Area >	90%	10%					100%
	Score >	1.5	1.1					
Left Bank	% Riparian Area >	55%	15%					70%
	Score >	1.5	1.1				0.99	
Rt Bank CI >							1.46	
Lt Bank CI >							0.99	
CI							1.23	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p>Stream Gradient</p> <p style="text-align: center;">High</p>
Score	1.5	1.2	0.9	0.5	
					1.20

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/7/2019	52-F	223	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.95
RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 52-E. The reach had severely incised, eroded banks. The right riparian buffer consisted of 90% forest cover with greater than 60% canopy cover and 10% forest with 30-60% canopy cover and maintained understory. The left riparian buffer consisted of 55% forest cover with greater than 60% canopy cover and 45% forest with 30-60% canopy cover and maintained understory. The in-stream habitat was suboptimal with stable features throughout 30-50% of the reach. Channel alterations included a culvert.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER


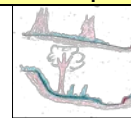
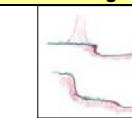


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/7/2019	53-A	179	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Matrimony Creek					S-53: EX1-22/EW1-4/EW30		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor	High	Low		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

		Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%						100%	
	Score >	1.5							
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area >	95%	5%					100%	
	Score >	1.5	0.5						
								Rt Bank CI >	1.50
								Lt Bank CI >	1.45
								CI	1.48

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					1.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/7/2019	53-A	179	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.30
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 53-A. The reach had stable banks with some erosion present. The right riparian buffer was forested with greater than 60% canopy cover containing wetlands. The left riparian buffer contained 95% forest with greater than 60% canopy cover and wetlands, and and 5% spoil pile. The in-stream habitat was optimal and contained leaf packs, root wads and various substrate sizes. The channel had no known alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

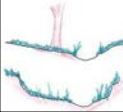
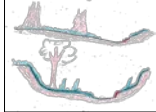
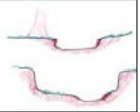

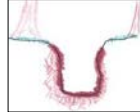
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/7/2019	53-B	115	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Matrimony Creek					S-53: EX22-30/EW40-46		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>1.60</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>		
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>		
Right Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI > 1.50
	Score >	1.5						Lt Bank CI > 1.50
								1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					1.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/7/2019	53-B	115	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.22
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 53-B. The reach had unstable, incised banks. The right and left riparian buffers were forested with greater than 60% canopy cover. The in-stream habitat was optimal with stable elements in greater than 50% of the reach. The channel had no known alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER


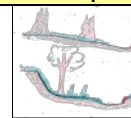
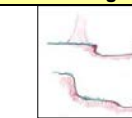


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/7/2019	53-C	116	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Matrimony Creek					S-53: EX30-49/EW4-546		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	3.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area >	100%						100%	
	Score >	1.5							
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area >	100%						100%	
	Score >	1.5							
								Rt Bank CI > 1.50	CI
								Lt Bank CI > 1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI 0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/7/2019	53-C	116	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.38
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 53-C. The reach had stable banks with little incision and active erosion. The right and left riparian buffers were forested with greater than 60% canopy cover, with a wetland located within the right riparian buffer. The in-stream habitat was marginal with 10-30% stable habitat elements within the reach. No channel alterations were observed.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/7/2019	53-D	256	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Matrimony Creek					S-53: EX40-57/EW54-72		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area>	100%					100%	
	Score >	1.5						
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	15%	20%	65%			100%	
	Score >	0.85	0.5	1.5				
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH								
THE REACH CONDITION INDEX (RCI) >>								0.68
RCI= (Riparian CI)/2								
COMPENSATION REQUIREMENT (CR) >>								N/A
CR = RCI X LF X IF								

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

INSERT PHOTOS:



Looking downstream at stream reach 53-D. The right riparian buffer was forested with greater than 60% canopy cover. The left riparian buffer was of 65% forested with greater than 60% canopy cover, 15% non-maintained dense herbaceous vegetation and 20% impervious surface.

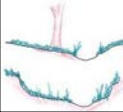
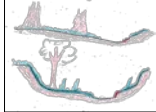
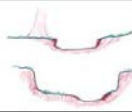
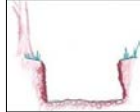
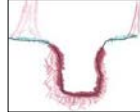
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/6/2019	54-A	80	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Matrimony Creek					S-54: EW3-30		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p> <p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>		
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>		
Right Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI > 1.50
	Score >	1.5						Lt Bank CI > 1.50
CI								

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					1.20

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/6/2019	54-A	80	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.32
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 54-A. The reach had stable banks with little erosion present. The right and left riparian buffers consisted of 100% forest cover with greater than 60% canopy cover containing wetlands. The in-stream habitat was suboptimal and contained leaf packs and woody debris. The channel had no known alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

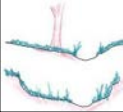
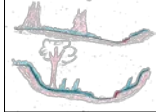
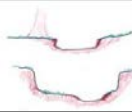
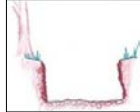
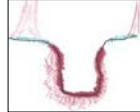
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/7/2019	55-A	185	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Matrimony Creek					S-55: EY1-22/EZ1-19		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	1.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.				
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
Left Bank	% Riparian Area >	50%	50%				100%	
	Score >	1.5	0.6					
							$CI = (\text{Sum } \% RA * \text{Scores} * 0.01) / 2$ Rt Bank CI > 1.50 Lt Bank CI > 1.05	1.28

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/7/2019	55-A	185	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.00
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 55-A. The reach had overwidened with incised, unstable banks. The right riparian buffer was forested with greater than 60% canopy cover. The left riparian buffer was 50% forested with greater than 60% canopy cover and 50% maintained lawn. The in-stream habitat was suboptimal, with stable elements in 30-50% of the reach. The channel had no known alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/7/2019	55-B	172	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Matrimony Creek					S-55: EY22-43/EZ19-35		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>	
	Optimal	Suboptimal		Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5		
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100			
Right Bank	% Riparian Area>	100%					100%		
	Score >	1.5							
							CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	40%	60%				100%		
	Score >	1.5	0.6						
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH							Rt Bank CI >	1.50	CI
							Lt Bank CI >	0.96	1.23

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.62
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 55-B. The right riparian buffer was forested with greater than 60% canopy cover. The left riparian buffer was 40% forested with greater than 60% canopy cover, and 60% mowed lawn.

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/7/2019	55-C	335	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Matrimony Creek					S-55: EZ48-67/EY52-76		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category								NOTES>>
Optimal	Suboptimal		Marginal		Poor			
Riparian Buffers Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area>	100%					100%	
	Score >	1.5						
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area>	50%	50%				100%	
	Score >	1.5	0.6					
Rt Bank CI > 1.50 CI								
Lt Bank CI > 1.05 1.28								

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.64
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 55-C. The right riparian buffer was forested with greater than 60% canopy cover. The left riparian buffer was 50% forested with greater than 60% canopy cover and 50% maintained lawn.

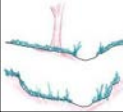
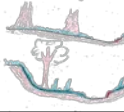
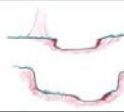
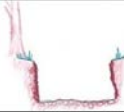
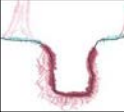
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/8/2019	56-A	331	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Matrimony Creek					S-56: FA1-23/FB1-21/FC1-4		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor	High	Low	
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p> <p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p> <p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p> <p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	100%						100%	
	Score >	1.5							
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area>	100%						100%	
	Score >	1.5							1.50
									1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/8/2019	56-A	331	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	1.32
RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 56-A. The reach had stable banks with little incision. The right and left riparian buffers were forested with greater than 60% canopy cover, with wetlands located within the left riparian buffer. The in-stream habitat was suboptimal with stable elements found within 30-50% of the reach. No channel alterations in reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

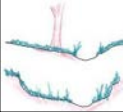
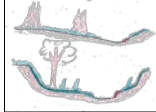
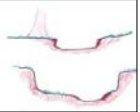

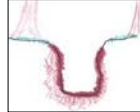
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/8/2019	56-B	85	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Matrimony Creek					S-56: FA23-32/FC4-13		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	1.60
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>Ensure the sums of % Riparian Blocks equal 100</p>
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>														
Right Bank	% Riparian Area >	5%	95%				100%							
	Score >	0.6	1.5											
CI= (Sum % RA * Scores*0.01)/2														
Left Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
														1.48

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.50
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/8/2019	56-B	85	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.22
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 56-B. The reach had incised, unstable banks. The right riparian buffer was 80% forested with greater than 60% canopy cover and 5% maintained herbaceous vegetation. The left riparian buffer was forested with greater than 60% canopy cover. The in-stream habitat was optimal and contained stable elements in greater than 50% of the reach. The channel had no known alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/8/2019	56-C	58	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Matrimony Creek					S-56: FA32-34/FC13-15		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>	
	Optimal	Suboptimal		Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5		
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.							Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area>	20%	80%				100%		
	Score >	0.85	1.5						
								CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	100%					100%		
	Score >	1.5							
							Rt Bank CI >	1.37	CI
							Lt Bank CI >	1.50	1.44

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >> 0.72

RCI= (Riparian CI)/2

COMPENSATION REQUIREMENT (CR) >> N/A

CR = RCI X LF X IF

INSERT PHOTOS:



Looking upstream at stream reach 56-C. The right riparian buffer was forested with greater than 60% canopy cover. The left riparian buffer was 65% forested with greater than 60% canopy cover, and 20% non-maintained, dense herbaceous vegetation with a shrub layer present.

DESCRIBE PROPOSED IMPACT:

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/8/2019	56-D	641	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Matrimony Creek					S-56: FC21-28/FA40-45		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.							Ensure the sums of % Riparian Blocks equal 100	
Right Bank	% Riparian Area>	10%	90%				100%	
	Score >	0.6	1.5					
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	100%					100%	
	Score >	1.5						
								Rt Bank CI > 1.41 CI
								Lt Bank CI > 1.50 1.46

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.73
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 56-D. The right riparian buffer was 90% forested with greater than 60% canopy cover and 10% herbaceous vegetation. The left riparian buffer was forested with greater than 60% canopy cover.

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/8/2019	56-E	113	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Matrimony Creek					S-56: FC43-52/FA64-73		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.							Ensure the sums of % Riparian Blocks equal 100	
Right Bank	% Riparian Area>	100%					100%	
	Score >	1.5						
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	50%	50%				100%	Rt Bank CI > 1.50 CI
	Score >	0.85	1.5					Lt Bank CI > 1.18 1.34

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.67
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 56-E. The right riparian buffer was forested with greater than 60% canopy cover. The left buffer was 50% forested with greater than 60% canopy cover, and had 50% cover of non-maintained, dense herbaceous vegetation with a shrub layer.

DESCRIBE PROPOSED IMPACT:

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/8/2019	57-A	88	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Matrimony Creek					S-57: FB21-29/FB33-38		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.							Ensure the sums of % Riparian Blocks equal 100	
Right Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area >	30%	70%				100%	Rt Bank CI > 1.50 Lt Bank CI > 1.22 CI 1.36
	Score >	1.5	1.1					

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.68
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 57-A. The right riparian buffer consisted of 100% mature forest cover. The left buffer consisted of 40% mature trees, 60% dense herbaceous and shrub layer. The right riparian buffer was forested with greater than 60% canopy cover. The left buffer was 30% forested with greater than 60% canopy cover, and had 70% cover of tree stratum with 30-60% canopy cover and a maintained understory.

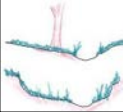
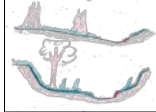
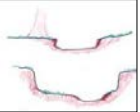

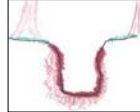
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/11/2019	58-A	96	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB / JF / WN		Tributary of Marrowbone Creek					S-58: FF1-11		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>3.00</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>						
	Optimal	Suboptimal	Marginal	Poor	High	Low								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>1.5</p>	<p>1.2</p>	<p>1.1</p>	<p>0.85</p>	<p>0.75</p>	<p>0.6</p>	<p>0.5</p>	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>Ensure the sums of % Riparian Blocks equal 100</p>						
Right Bank	% Riparian Area > 30% Score > 1.5	% Riparian Area > 70% Score > 0.5					100%	<p>CI= (Sum % RA * Scores*0.01)/2</p>						
Left Bank	% Riparian Area > 50% Score > 1.5	% Riparian Area > 50% Score > 0.6					100%	Rt Bank CI > 0.80	Lt Bank CI > 1.05	0.93	CI			

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>					
	Optimal	Suboptimal	Marginal	Poor						
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient High</p>	<p>CI</p>	<p>1.20</p>
Score	1.5	1.2	0.9	0.5						

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/11/2019	58-A	96	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.29
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location XXXX)



Looking south (downstream) at Stream Reach 58-A. The stream exhibits very little incision with 80-100% stable banks. The right bank's riparian buffer is encroached upon by impervious road surfaces but is also partly forested (>60% canopy cover). The left bank's riparian buffer is composed of maintained grass associated with the existing overhead electric easement, as well as, forest providing greater than 60% canopy cover. Instream habitat elements are present in 30-50% of the stream. The upstream end of the reach is fed by a culvert, disrupting less than 20% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

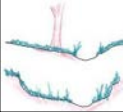
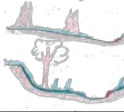
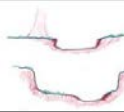
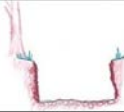
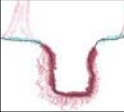
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/11/2019	58-B	79	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB / JF / WN		Tributary of Matrimony Creek					S-58: FF11-18		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	3.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
<p style="text-align: center;">Ensure the sums of % Riparian Blocks equal 100</p>														
Right Bank	% Riparian Area >	100%					100%							
	Score >	0.6												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	0.60	CI				
	Score >	0.6						Lt Bank CI >	0.60	0.60				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/11/2019	58-B	79	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.26
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location XXXX)



Looking southeast (downstream) at Stream Reach 58-B. The stream exhibits very little incision with 80-100% stable banks. The right and left banks' riparian buffers are composed of maintained grass associated with the existing overhead electric easement. Instream habitat elements are present in 30-50% of the stream. The channel had no known alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

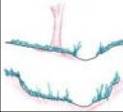
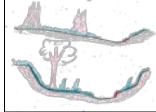
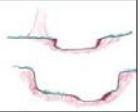
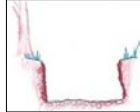
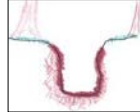
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/11/2019	58-C	1,248	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB / JF / WN		Tributary of Matrimony Creek					S-58: FF18-75		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.40</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor	High	Low	
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>	
Right Bank	% Riparian Area >	100%					100%
	Score >	1.5					
CI= (Sum % RA * Scores*0.01)/2							
Left Bank	% Riparian Area >	100%					100%
	Score >	1.5					
						Rt Bank CI >	1.50
						Lt Bank CI >	1.50
						CI	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>Stream Gradient High</p>	
Score	1.5	1.2	0.9		

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/11/2019	58-C	1,248	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.32
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location XXXX)



Looking southeast (downstream) at Stream Reach 58-C. The stream exhibits very little incision with 60-80% stable banks. The right and left banks' riparian buffers are composed of greater than 60% tree canopy cover. Instream habitat elements are present in 30-50% of the stream. The channel had no known alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

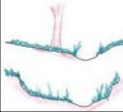
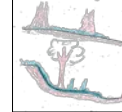
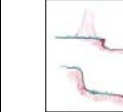


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/11/2019	59-A	150	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB / JF / WN		Tributary of Matrimony Creek					S-59: FH48-53, FG48-54		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	100%						100%	
	Score >	1.2							
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area>	100%						100%	
	Score >	1.2							1.20
									1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/11/2019	59-A	150	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.16
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location XXXX)



Looking north (upstream) at Stream Reach 59-A. The reach is slightly incised, but the majority of the banks are stable (60-80%). The right and left riparian buffers are composed of tree canopy cover between 30-60% and a non-maintained understory. Stable habitat elements are present in 10-30% of the reach. The upstream end of the reach is fed by a culvert, disrupting less than 20% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

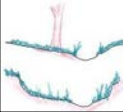
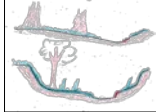
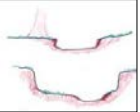

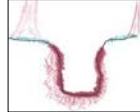
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/11/2019	59-B	164	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB / JF / WN		Tributary of Matrimony Creek					S-59: FH38-48		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.40</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor		
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>		
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6		0.5
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>								
Right Bank	% Riparian Area >	100%					100%	
	Score >	0.6						
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	100%					100%	
	Score >	0.6						
							Rt Bank CI >	0.60
							Lt Bank CI >	0.60
							CI	0.60

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p>Stream Gradient High</p>
Score	1.5	1.2	0.9	0.5	
					0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/11/2019	59-B	164	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.08
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location XXXX)



Looking northwest (upstream) at Stream Reach 59-B. The reach is slightly incised, but the majority of the banks are stable (60-80%). The right and left riparian buffers consist of a herbaceous, maintained right-of-way. Stable habitat elements are present in 10-30% of the reach. The upstream end of the reach is fed by a culvert, disrupting less than 20% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

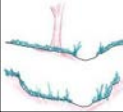
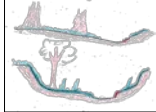
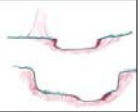

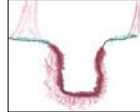
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/11/2019	59-C	733	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB / JF / WN		Tributary of Matrimony Creek					S-59: FH1-38		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.40</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>1.5</p>	<p>High</p>	<p>Low</p>	<p>High</p>	<p>Low</p>	<p>0.6</p>	<p>0.5</p>	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5							
<p>Ensure the sums of % Riparian Blocks equal 100</p>														
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
CI= (Sum % RA * Scores*0.01)/2														
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>					
	Optimal	Suboptimal	Marginal	Poor						
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient High</p>	<p>CI</p>
Score	1.5	1.2	0.9	0.5	High		1.20			

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/11/2019	59-C	733	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.32
		RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)
	COMPENSATION REQUIREMENT (CR) >>	N/A
		CR = RCI X LF X IF

INSERT PHOTOS:

(WSSI Photo Location XXXX)



Looking upstream at Stream Reach 59-C. The reach is slightly incised, but the majority of the banks are stable (60-80%). The right and left riparian buffers are composed of tree stratum with greater than 60% tree canopy cover. Stable habitat elements are present in 30-50% of the reach. No channel alteration is present within the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector	Henry	R4	3010103	2/27/2019	60-A	53	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Ephemeral Tributary to Marrowbone Creek					S-60: A1-16/B1-13		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.							Ensure the sums of % Riparian Blocks equal 100	
Right Bank	% Riparian Area>	100%					100%	
	Score >	1.5						
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	50%	50%				100%	Rt Bank CI > 1.50 Lt Bank CI > 1.05 CI 1.28
	Score >	1.5	0.6					

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.64
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 60-A. The right riparian buffer consisted of 100% mature forest cover, and the left riparian buffer consisted of 50% mature forest cover and 50% field containing herbaceous vegetation.

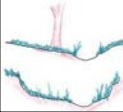
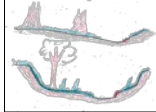
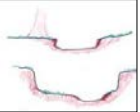

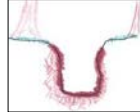
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/11/2019	61-A	424	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB / JF / WN		Unnamed Tributary to Marrowbone Creek					Exhibit #, Sheet # of #		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.00</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>		
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6		0.5
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>							
Right Bank	% Riparian Area >	90%	10%				100%	
	Score >	0.5	1.2					
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
							Rt Bank CI >	0.57
							Lt Bank CI >	1.50
							CI	1.04

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>				
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient High</p>	<p>CI</p>
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/11/2019	61-A	424	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.97
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking southwest (downstream) at Stream Reach 60-C. The reach is often incised with erosion present on 40-60% of banks. The left bank riparian buffer is heavily encroached upon by impervious surfaces (road) and has some forested areas with 30-60% canopy cover; the right bank riparian buffer is entirely forested and exhibits greater than 60% canopy cover. Habitat elements are unstable and are present in less than 10% of the reach. The reach has been significantly altered (60-80%) by the presence of a culvert at bottom of stream.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

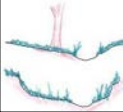
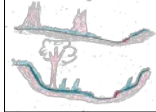
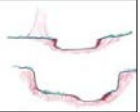

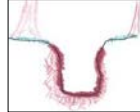
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/11/2019	61-B	104	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB / JF / WN		Tributary of Matrimony Creek					S-61: FL12-15		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.40</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>		
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6		0.5
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>								
Right Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
<p>CI= (Sum % RA * Scores*0.01)/2</p>								
Left Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
							Rt Bank CI > 1.50	
							Lt Bank CI > 1.50	
							CI	
							1.50	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>				
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient High</p>	<p>CI</p>
Score									
					1.20				

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/11/2019	61-B	104	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.32
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location XXXX)



Looking south (downstream) at Stream Reach 61-B. The reach is slightly incised, with few areas showing signs of active erosion. The right and left riparian buffers consists of greater than 60% tree canopy cover. Stable habitat elements are present in 30-50% of the reach. The reach shows no signs of alteration.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

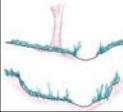
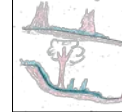
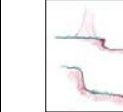


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/11/2019	61-C	76	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB / JF / WN		Tributary of Matrimony Creek					S-61: FL15-16, FK20-28		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

		Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area>	90%	10%					100%	
	Score >	0.5	1.2						
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area>	100%						100%	
	Score >	1.5							
								Rt Bank CI >	0.57
								Lt Bank CI >	1.50
									CI
									1.04

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/11/2019	61-C	76	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category						NOTES>>
	Negligible	Minor	Moderate		Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5	

CI
0.70

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.85
		RCI= (Sum of all CIs)/5, except if stream is ephemeral RCI = (Riparian CI/2)
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location XXXX)



Looking southwest (downstream) at Stream Reach 61-C. The reach is often incised with erosion present on 40-60% of banks. The left bank riparian buffer is heavily encroached upon by impervious surfaces (road) and has some forested areas with 30-60% canopy cover. The right bank riparian buffer is entirely forested and exhibits greater than 60% canopy cover. Habitat elements are unstable and are present in less than 10% of the reach. The reach has been significantly altered (60-80%) by the presence of a culvert and the adjacent road.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

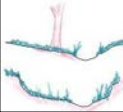
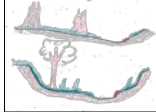
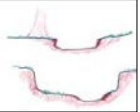
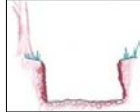
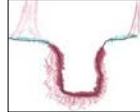
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/11/2019	62-A	92	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB / JF / WN		Tributary of Matrimony Creek					S-62: FM9-15, FN7-11		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.40</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal	High Poor	Low Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>1.5</p>	<p>1.2</p>	<p>1.1</p>	<p>0.85</p>	<p>0.75</p>	<p>0.6</p>	<p>0.5</p>	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>Ensure the sums of % Riparian Blocks equal 100</p>						
Right Bank	% Riparian Area > 90%	10%					100%	<p>CI= (Sum % RA * Scores*0.01)/2</p>						
Left Bank	% Riparian Area > 90%	10%					100%	Rt Bank CI >	1.41	CI		1.41	Lt Bank CI >	1.41

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>					
	Optimal	Suboptimal	Marginal	Poor						
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient High</p>	<p>CI</p>	<p>0.90</p>
Score	1.5	1.2	0.9	0.5	Stream Gradient High		CI		0.90	

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/11/2019	62-A	92	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.20
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location XXXX)



Looking south (upstream) at Stream Reach 62-A. The reach is slightly incised, but the majority of the banks are stable (60-80%). The right and left riparian buffers are composed largely of forest canopy cover greater than 60%, with a small area on both banks composed of maintained grass. Stable habitat elements are present in 10-30% of the reach. The upstream end of the reach is fed by a culvert, disrupting less than 20% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

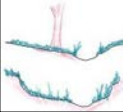
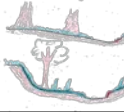
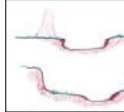

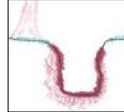
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

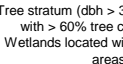
Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/10/2019	63-A	227	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Little Marrowbone Creek					S-63: BJ3-16, BK2-19		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

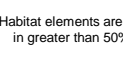
Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.40</p>
Score	3	2.4	2	1.6	1	2.40				

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
 <p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6		Low 0.5
<p>Ensure the sums of % Riparian Blocks equal 100</p>								
Right Bank	% Riparian Area >	90%	10%				100%	
	Score >	1.5	0.85					
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
							Rt Bank CI > 1.44	
							Lt Bank CI > 1.50	
							1.47	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>					
	Optimal	Suboptimal	Marginal	Poor						
 <p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>Stream Gradient</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>High</p>	<p>1.20</p>
Score	1.5	1.2	0.9	0.5	High	1.20				

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/10/2019	63-A	227	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.10

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.23
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking southwest (downstream) at Stream Reach 63-A. The banks are slightly incised with mostly stable banks (60-80%). The right bank's riparian buffer is predominantly forested, with an area of dense herbaceous vegetation and shrubs providing less than 30% tree canopy cover. The left bank's riparian buffer is composed of forest with greater than 60% tree canopy cover. Instream habitat elements are stable and present in 30-50% of the reach. The downstream end of the reach is culverted, disrupting 20-40% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

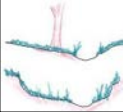
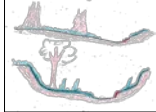
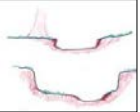

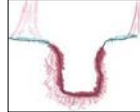
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	03/10/2019	63-B	170	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Little Marrowbone Creek					S-63: BF1-9, BG1-12		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>1.60</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>						
	Optimal	Suboptimal	Marginal	Poor	High	Low								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>1.5</p>	<p>1.2</p>	<p>1.1</p>	<p>0.85</p>	<p>0.75</p>	<p>0.6</p>	<p>0.5</p>	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
<p>Condition Scores</p>	<p>1.5</p>	<p>1.2</p>	<p>1.1</p>	<p>0.85</p>	<p>0.75</p>	<p>0.6</p>	<p>0.5</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>						
<p>Right Bank</p>	<p>% Riparian Area > 60%</p>	<p>40%</p>	<p>100%</p>						<p>CI = (Sum % RA * Scores*0.01)/2</p>					
<p>Left Bank</p>	<p>% Riparian Area > 60%</p>	<p>40%</p>	<p>100%</p>						<p>Rt Bank CI > 1.10</p> <p>Lt Bank CI > 1.10</p>					

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>				
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient High</p>	<p>CI 0.90</p>
<p>Score</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>					

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	03/10/2019	63-B	170	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.10

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.94
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking southwest (downstream) at Stream Reach 63-B. The majority of the banks are incised and overwidened (60-80%). The left and right riparian buffers are occupied by forest with greater than 60% tree canopy cover and an impervious road. Instream habitat elements are present in 10-30% of the reach. Both the downstream and upstream ends of the reach are culverted, disrupting 20-40% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

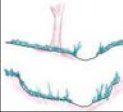
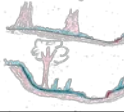
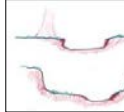

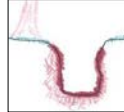
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	03/08/2019	63-C	127	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Little Marrowbone Creek					S-63: AR1-9, AQ1-9		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.00</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor		
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>	
<p>Condition Scores</p>	<p>1.5</p>	<p>High 1.2</p>	<p>Low 1.1</p>	<p>High 0.85</p>	<p>Low 0.75</p>	<p>High 0.6</p>		<p>Low 0.5</p>
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>								
<p>Right Bank</p>	<p>% Riparian Area ></p>	<p>80%</p>	<p>20%</p>	<p>100%</p>			<p>100%</p>	
	<p>Score ></p>	<p>1.5</p>	<p>0.75</p>					
<p>CI= (Sum % RA * Scores*0.01)/2</p>								
<p>Left Bank</p>	<p>% Riparian Area ></p>	<p>90%</p>	<p>10%</p>			<p>100%</p>	<p>Rt Bank CI > 1.35</p>	
	<p>Score ></p>	<p>1.5</p>	<p>0.75</p>			<p>1.43</p>	<p>1.39</p>	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p>Stream Gradient High</p>
<p>Score</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>CI 0.90</p>

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	03/08/2019	63-C	127	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.12
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking southwest (downstream) at Stream Reach 63-B. Erosion is present along both banks as a result of stormwater surges, but the majority of banks are stable. Both banks' riparian buffers are primarily forested with greater than 60% tree canopy cover but contain canopy gaps dominated by dense herbaceous vegetation. Stable habitat elements are present in 10-30% of the reach. The upstream end of the reach is fed by a culvert, disrupting less than 20% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

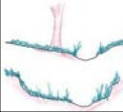
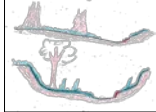
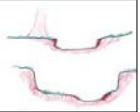

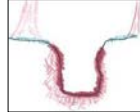
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/10/2019	64-A	30	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Little Marrowbone Creek					S-64: BM1A-4A, BL1A-4A		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.00</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor	High	Low		
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>	
<p>Condition Scores</p>	<p>1.5</p>	<p>1.2</p>	<p>1.1</p>	<p>0.85</p>	<p>0.75</p>	<p>0.6</p>		<p>0.5</p>
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>							<p>CI= (Sum % RA * Scores*0.01)/2</p>	
Right Bank	% Riparian Area>	90%	10%					100%
	Score >	0.85	0.5					
Left Bank	% Riparian Area>	90%	10%					100%
	Score >	0.85	0.5				0.82	
							<p>Rt Bank CI > 0.82</p> <p>Lt Bank CI > 0.82</p>	<p>CI</p> <p>0.82</p>

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>				
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient High</p>	<p>CI</p> <p>0.50</p>
<p>Score</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>					

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/10/2019	64-A	30	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.92
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking northeast (upstream) at Stream Reach 64-A. The banks are often incised with relatively low bank slopes. Both banks' riparian buffers are dominated by dense herbaceous vegetation and tree and shrub layers occupying less than 30% of the canopy. Impervious surfaces are present on the outer third of each bank's riparian area. Instream habitat elements are unstable and occupy less than 10% of the reach. This stream reach flows into a culvert, disrupting less than 20% of the total reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

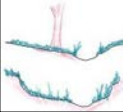
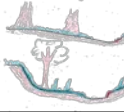
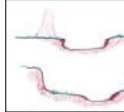

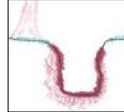
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/10/2019	64-B	317	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Little Marrowbone Creek					S-64: BM1-14, BL1-12		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	

- Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
- Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
- Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	100%					100%		
	Score >	1.5							
Left Bank	% Riparian Area>	100%					100%		
	Score >	1.5							
CI= (Sum % RA * Scores*0.01)/2								CI	
Rt Bank CI >								1.50	CI
Lt Bank CI >								1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI 0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/10/2019	64-B	317	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.22
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking southwest (downstream) at Stream Reach 64-B. The channel is slightly incised with mostly stable banks (60-80%). Both the left and right banks' riparian buffers are composed of forest providing greater than 60% tree canopy cover. Instream habitat elements are present in 10-30% of the reach. The downstream and upstream ends of the reach are culverted, disrupting less than 20% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

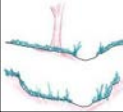
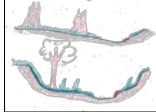
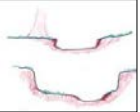
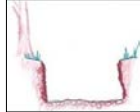
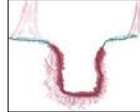
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/10/2019	64-C	59	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Little Marrowbone Creek					S-64: BH1-6, B11-6		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p> <p>2.4</p> <p>2</p> <p>1.6</p> <p>1</p>	2.00
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor	High	Low	
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	
<p>Condition Scores</p> <p>1.5</p>	<p>High</p> <p>1.2</p>	<p>Low</p> <p>1.1</p>	<p>High</p> <p>0.85</p>	<p>Low</p> <p>0.75</p>	<p>High</p> <p>0.6</p>	<p>Low</p> <p>0.5</p>	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>	
Right Bank	% Riparian Area >	40%	60%				100%
	Score >	0.5	0.85				
CI= (Sum % RA * Scores*0.01)/2							
Left Bank	% Riparian Area >	40%	60%				100%
	Score >	0.5	0.85				
						Rt Bank CI >	0.71
						Lt Bank CI >	0.71
CI							

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p>Stream Gradient</p> <p>High</p>
<p>Score</p> <p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>		
0.50					

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/10/2019	64-C	59	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category						NOTES>>
	Negligible	Minor	Moderate		Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5	CI
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH							1.10

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.86
RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking southwest (downstream) at Stream Reach 64-C. The channel is often incised with relatively low bank slopes. Impervious surfaces are in the immediate vicinity of both banks; non-impervious areas are dominated by dense herbaceous vegetation, with shrub and tree cover providing less than 30% tree canopy. Instream habitat elements are unstable and are present in less than 10% of the reach. The downstream and upstream ends of the reach are fed by a culvert, disrupting 20-40% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER


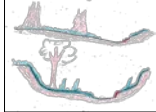
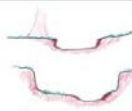
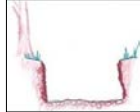
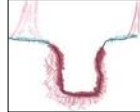
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/08/2019	64-D	187	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Little Marrowbone Creek					S-64: AO12-AK80, AP11-AK81		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	

- Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
- Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
- Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	100%					100%	
	Score >	0.6						
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area>	100%					100%	Rt Bank CI > 0.60
	Score >	0.6						Lt Bank CI > 0.60

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High CI 0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/08/2019	64-D	187	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category						NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.		
SCORE	1.5	1.3	1.1	0.9	0.7	0.5	

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.96
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking south (downstream) at Stream Reach 64-D. Both banks' riparian buffers consist of actively grazed pasture. Instream habitat elements are lacking, and are present in less than 10% of the reach. The upstream end of the reach is fed by a culvert, disrupting less than 20% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

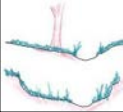
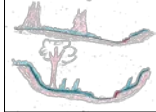
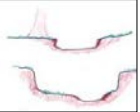

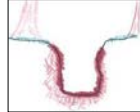
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	03/11/2019	65-A	43	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Marrowbone Creek					S-65: BU11-13		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	High Marginal	Low Marginal	Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
<p style="text-align: center;">Ensure the sums of % Riparian Blocks equal 100</p>														
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	03/11/2019	65-A	43	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.32
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking southeast (downstream) at Stream Reach 65-A. The channel is slightly incised with mostly stable banks (60-80%). Both riparian buffers are composed of forest providing greater than 60% tree canopy cover. Stable habitat elements are present in 30-50% of the reach. There is no evidence of channel alteration within the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

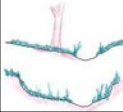
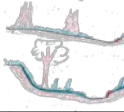
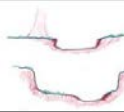
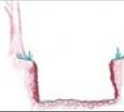
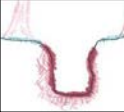
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/11/2019	66-A	107	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Marrowbone Creek					S-66: BU1-9, BT1-9		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>1.00</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>	
<p>Condition Scores</p>	<p>1.5</p>	<p>High</p>	<p>Low</p>	<p>High</p>	<p>Low</p>	<p>High</p>		<p>Low</p>
<p>Right Bank</p>	<p>% Riparian Area > 100%</p>	<p>Score > 1.5</p>	<p>Score > 1.5</p>	<p>Score > 1.5</p>	<p>Score > 1.5</p>	<p>Score > 1.5</p>		<p>Score > 1.5</p>
<p>Left Bank</p>	<p>% Riparian Area > 100%</p>	<p>Score > 1.5</p>	<p>Score > 1.5</p>	<p>Score > 1.5</p>	<p>Score > 1.5</p>	<p>Score > 1.5</p>	<p>Score > 1.5</p>	
							<p>CI = (Sum % RA * Scores*0.01)/2</p>	<p>CI</p>
							<p>Rt Bank CI > 1.50</p>	<p>CI</p>
							<p>Lt Bank CI > 1.50</p>	<p>1.50</p>

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>				
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient High</p>	<p>CI</p>
<p>Score</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>High</p>	<p>0.50</p>	<p>0.50</p>	<p>0.50</p>	<p>0.50</p>

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/11/2019	66-A	107	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.86
RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking east (downstream) at Stream Reach 66-A. The channel is deeply incised, restricting flow to within the banks. Both riparian buffers are composed of forest providing greater than 60% tree canopy cover. Habitat elements are unstable and are present in less than 10% of the reach. A culvert is disrupting less than 20% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

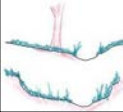
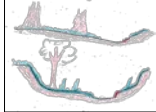
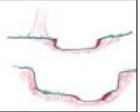

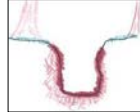
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/11/2019	67-A	214	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Marrowbone Creek					S-67: BQ1-12, BP1-12		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area >	70%	10%	20%			100%	
	Score >	1.5	0.5	0.6				
Left Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
$CI = (\text{Sum } \% RA * \text{Scores} * 0.01) / 2$								
							Rt Bank CI >	1.22
							Lt Bank CI >	1.50
								CI
								CI

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/11/2019	67-A	214	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category						NOTES>>
	Negligible	Minor	Moderate		Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5	CI

1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.03
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking northwest (upstream) at Stream Reach 67-A. The channel is often incised, with erosion present on both banks. The right bank's riparian buffer is composed largely of forest providing greater than 60% tree canopy cover, with a bit of encroachment by impervious roadway and maintained grass. The left bank's riparian buffer is composed entirely of forest providing greater than 60% canopy cover. Habitat elements are present in less than 10% of the reach. There is a culvert at the upstream end of the reach is disrupting less than 20% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

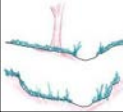
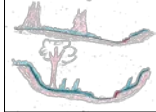
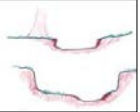

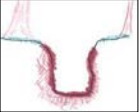
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/11/2019	67-B	32	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Marrowbone Creek					S-67: BQ12-15, BP18-21		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	1.60

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High	Low	High	Low	High	Low	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area >	90%	10%					100%	
	Score >	1.5	0.6						
Left Bank	% Riparian Area >	100%						100%	
	Score >	1.5							

CI = (Sum % RA * Scores * 0.01) / 2

	Rt Bank CI >	1.41							CI
	Lt Bank CI >	1.50							1.46

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/11/2019	67-B	32	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.</i>	THE REACH CONDITION INDEX (RCI) >>	1.01
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking northeast (downstream) at Stream Reach 67-B. The channel is incised and the majority of both banks are nearly vertical. The right bank's riparian buffer is largely composed of forest providing greater than 60% canopy cover, with some encroachment by maintained grass. The left bank's riparian buffer is composed entirely of forest providing greater than 60% tree canopy cover. Habitat elements are present in less than 10% of the reach. There is no evidence of channel alteration within the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

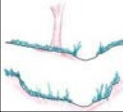
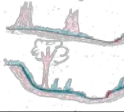
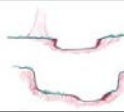
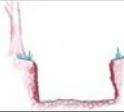
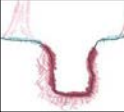
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/11/2019	67-C	24	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Marrowbone Creek					S-67: BP13-18		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>1.00</p>
Score	3	2.4	2	1.6	1	1.00				
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal		Poor		
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>	
Right Bank	% Riparian Area >	30%	50%	20%			100%
	Score >	1.5	0.5	0.6			
CI= (Sum % RA * Scores*0.01)/2							
Left Bank	% Riparian Area >	100%					100%
	Score >	1.5					
							<p>Rt Bank CI > 0.82</p> <p>Lt Bank CI > 1.50</p>
							<p>CI</p> <p>1.16</p>

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>Stream Gradient</p> <p>High</p>	<p>CI</p> <p>0.50</p>
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/11/2019	67-C	24	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.83
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking east (downstream) at Stream Reach 67-C. The channel is deeply incised, restricting flow to within the banks. The right bank's riparian buffer is composed of impervious surface, maintained grass associated with the impervious surface, and forest with greater than 60% tree canopy cover. The left bank's riparian buffer is composed entirely of forest with greater than 60% tree canopy cover. Habitat elements are present in less than 10% of the reach. There is no evidence of channel alteration within the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

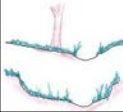
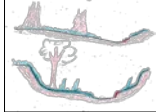
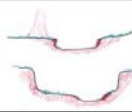
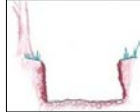
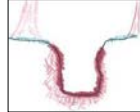
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/10/2019	68-A	189	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Marrowbone Creek					68-A, BA1-9; AZ1-12, BC1-3		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	1.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor	
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100	
Right Bank	% Riparian Area >	15%	65%	20%			100%
	Score >	0.85	0.6	0.5			
							CI = (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area >	100%					100%
	Score >	1.5					
							Rt Bank CI > 0.62
							Lt Bank CI > 1.50
							CI
							1.06

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/10/2019	68-A	189	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.77
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking east (downstream) at Stream Reach 68-A. Severe incision restricts flow to within the banks. The right bank's riparian buffer is occupied by impervious surfaces, mowed lawns associated with the impervious area, and non-maintained herbaceous vegetation with less than 30% tree canopy cover. The left bank's riparian is forested with greater than 60% tree canopy cover. Habitat elements are present in less than 10% of the reach. The upstream end of the reach is fed by a culvert, disrupting less than 20% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

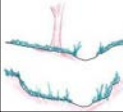
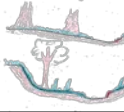
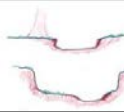
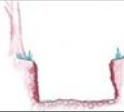
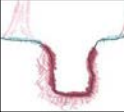
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/10/2019	69-A	35	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Marrowbone Creek					69-A: AZ12-15, BC1-3		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal	Poor									
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
<p style="text-align: center;">Ensure the sums of % Riparian Blocks equal 100</p>														
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5						CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	0.50
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/10/2019	69-A	35	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.18
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking northeast (upstream) at Stream Reach 69-A. The banks show areas of erosion, but vegetative protection is present along 60-80% of the reach. Both banks' riparian buffers are fully forested (>60% tree canopy cover). Habitat elements are unstable and are present in less than 10% of the reach. No channel alteration present within the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

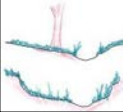
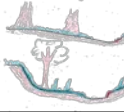
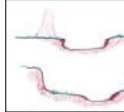

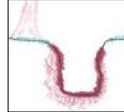
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/10/2019	70-A	58	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Marrowbone Creek					70-A: BB1-4		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	100%					100%	CI
	Score >	1.5					Rt Bank CI > 1.50 Lt Bank CI > 1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI 0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/10/2019	70-A	58	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category						NOTES>>
	Negligible	Minor	Moderate		Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5	CI

CI
0.90

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.14
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking south (downstream) at Stream Reach 70-A. The stream shows signs of erosion but the banks are mostly stable (60-80%). Both banks' riparian buffers are fully forested (>60% canopy cover). Instream habitat elements are present in 10-30% of the reach. The upstream end of the reach is fed by a culvert and rip rap is present immediately below; channel alteration effects 40-60% of the stream reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

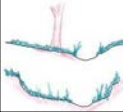
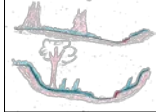
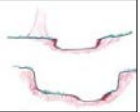

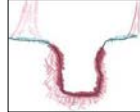
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/10/2019	71-A	76	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Marrowbone Creek					71-A: BB3-BE1-6, BB2-BD1-6		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	30%	35%	25%	10%		100%	Rt Bank CI > 1.50
	Score >	1.5	0.75	0.5	0.6			Lt Bank CI > 0.90
CI = 1.20								

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High CI 0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/10/2019	71-A	76	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.08
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking northwest (upstream) at Stream Reach 71-A. The stream is slightly incised but the majority of banks are stable (60-80%). The left bank riparian buffer has impervious surface, mowed grass associated with the impervious surface, riparian areas lacking shrub and tree cover, and minimal tree canopy cover. The right bank's riparian buffer is fully forested (>60% canopy cover). Instream habitat is present in less than 10% of the reach. The upstream end of the reach is fed by a culvert, disrupting less than 20% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

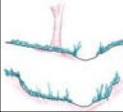
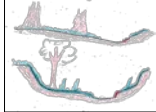
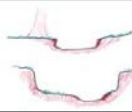
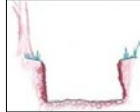
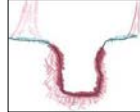
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/10/2019	72-A	516	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Little Marrowbone Creek					72-A: AU1-21, AV1-21		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.00</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor		
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>		<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>
<p>Condition Scores</p>	<p>1.5</p>	<p>High 1.2</p>	<p>Low 1.1</p>	<p>High 0.85</p>	<p>Low 0.75</p>	<p>High 0.6</p>	<p>Low 0.5</p>	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>							<p>CI= (Sum % RA * Scores*0.01)/2</p>	
<p>Right Bank</p>	<p>% Riparian Area> 40%</p>	<p>60%</p>	<p>100%</p>					<p>100%</p>
	<p>Score > 0.5</p>	<p>0.85</p>						
<p>Left Bank</p>	<p>% Riparian Area> 40%</p>	<p>60%</p>				<p>100%</p>		
	<p>Score > 0.5</p>	<p>0.85</p>				<p>Rt Bank CI > 0.71</p>	<p>CI</p>	
						<p>Lt Bank CI > 0.71</p>	<p>0.71</p>	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p>Stream Gradient High</p>
<p>Score</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>CI 0.90</p>

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/10/2019	72-A	516	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.10

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.94
		RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking north (upstream) at Stream Reach 72-A. Active erosion is occurring, with vegetative protection on 40-60% of the banks within the reach. Both riparian buffers are encroached upon by paved asphalt, with dense herbaceous vegetation occupying the space between the stream and pavement. Stable habitat elements are present in 10-30% of the reach. The reach is culverted across Joseph Martin Highway (Rt. 641) and the upstream end of the reach is fed by a culvert, disrupting 20-40% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER


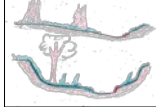
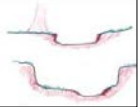


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/10/2019	72-B	352	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Little Marrowbone Creek					72-B: AV21-42, AU21-37		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>1.60</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor		
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>		
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6		0.5
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>								
Right Bank	% Riparian Area >	5%	30%	20%	45%	100%	Ensure the sums of % Riparian Blocks equal 100	
	Score >	1.5	0.75	0.5	0.6			
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	10%	90%			100%	Rt Bank CI >	
	Score >	1.5	0.6				0.67	
							Lt Bank CI >	
							0.69	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>Stream Gradient</p>	<p>CI</p>
Score	1.5	1.2	0.9	0.5	High
					0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/10/2019	72-B	352	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.90
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking north (upstream) at Stream Reach 72-B. The right bank's riparian buffer contains impervious surfaces, maintained grass associated with the impervious surfaces, non-maintained herbaceous vegetation, and a minimal amount of tree canopy cover. The left bank's riparian buffer is occupied by mowed grass and areas of forest with greater than 60% tree canopy cover. Stable habitat elements are present in 10-30% of the reach. The downstream and upstream ends of the reach are culverted, disrupting less than 20% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

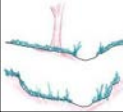
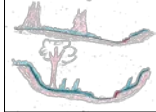
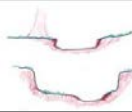
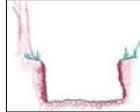
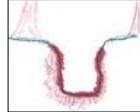
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/11/2019	72-C	67	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Marrowbone Creek					S-72: BY1-5, BZ4-10		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	1.60

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High	Low	High	Low	High	Low	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area >	100%						100%	
	Score >	1.5							
Left Bank	% Riparian Area >	100%						100%	
	Score >	1.5							

CI = (Sum % RA * Scores * 0.01) / 2

Rt Bank CI > **1.50** Lt Bank CI > **1.50** **CI**

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/11/2019	72-C	67	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.90

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.90
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking east (upstream) at Stream Reach 72-C. The channel exhibits vertical banks and is overwidened. The left and right banks' riparian buffers are composed of forest providing greater than 60% tree canopy cover. Habitat elements are lacking and are present in less than 10% of the reach. The reach has culverts at both ends, disrupting 40-60% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

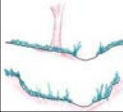
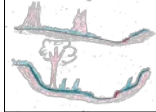
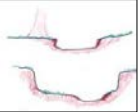

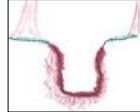
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	03/07/2019	73-A	421	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Little Marrowbone Creek					S-73: AK1A-36, AJ1-33		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.00</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>	
Right Bank	% Riparian Area >	20%	80%				100%
	Score >	0.85	0.6				
CI= (Sum % RA * Scores*0.01)/2							
Left Bank	% Riparian Area >	100%					100%
	Score >	1.5					
						Rt Bank CI >	0.65
						Lt Bank CI >	1.50
						CI	1.08

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p>Stream Gradient</p> <p>High</p>
Score	1.5	1.2	0.9	0.5	
<p>1.20</p>					

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	03/07/2019	73-A	421	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.12
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking south (downstream) at Stream Reach 73-A. The banks are often incised and there erosion is present on 40-60% of both banks. The left bank's riparian buffer is forested with greater than 60% tree canopy cover; the right bank's riparian buffer is covered largely by dense shrubbery, with maintained lawn encroaching the riparian buffer in some areas. Stable habitat elements are present in 30-50% of the reach. A road exists at the downstream end of the reach, disrupting less than 20% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

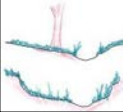
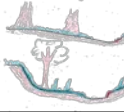
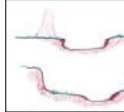

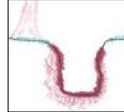
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	03/08/2019	73-B	397	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Little Marrowbone Creek					S-73: AK49-64, AN1-4, AK77-82; AJ34-48, AM5-9, AM12-14		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.40</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>		
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>		
Right Bank	% Riparian Area >	10%	90%				100%	
	Score >	1.5	0.75					
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	2%	98%				100%	Rt Bank CI > 0.83
	Score >	1.5	0.75					Lt Bank CI > 0.77
								0.80

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI 1.20

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	03/08/2019	73-B	397	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.14
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking north (upstream) at Stream Reach 73-B. There are a few areas of erosion within the reach but the majority of the banks are stable. The riparian buffers are largely lacking tree and shrub strata and consists of maintained lawn. The right bank riparian buffer contains a wetland. Stable habitat elements are present within 30-50% of the reach. The downstream end of the reach contains a culvert, disrupting less than 20% of the stream.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

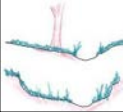
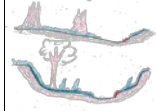
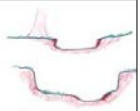

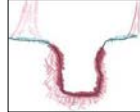
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	03/07/2019	74-A	378	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Little Marrowbone Creek					S-74: AF1-24; AE1-15, AG4-15		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>																																					
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor																																							
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>																															
							High	Low	High	Low	High	Low																																	
<p>Right Bank</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">% Riparian Area ></td> <td style="width: 15%;">100%</td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> </tr> <tr> <td>Score ></td> <td>1.5</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>							% Riparian Area >	100%													Score >	1.5													<p>Ensure the sums of % Riparian Blocks equal 100</p>							100%	<p>CI= (Sum % RA * Scores*0.01)/2</p>		
% Riparian Area >	100%																																												
Score >	1.5																																												
<p>Left Bank</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">% Riparian Area ></td> <td style="width: 15%;">100%</td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> </tr> <tr> <td>Score ></td> <td>1.5</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>							% Riparian Area >	100%													Score >	1.5																				100%	Rt Bank CI > 1.50	Lt Bank CI > 1.50	1.50
% Riparian Area >	100%																																												
Score >	1.5																																												

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	03/07/2019	74-A	378	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.32
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking southeast (downstream) at Stream Reach 74-A. The reach exhibits a few incised and/or undercut banks but the majority of the streambank is stable. Both banks' riparian buffers are forested with greater than 60% tree canopy cover. Stable habitat elements are present and occupy 30-50% of the reach. The stream shows no signs of alteration.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

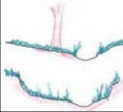
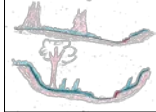
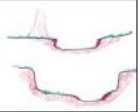

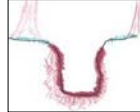
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	03/07/2019	75-A	87	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Little Marrowbone Creek					S-75: AC1-9, AD8-9; AB1-7		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p> <p>2.4</p> <p>2</p> <p>1.6</p> <p>1</p>	3.00
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor	
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>		<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>	
Right Bank	% Riparian Area>	99%	1%				100%
	Score >	1.5	0.5				
							CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	99%	1%				100%
	Score >	1.5	0.5				
							Rt Bank CI > 1.49
							Lt Bank CI > 1.49
							CI
							1.49

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p>Stream Gradient</p> <p>High</p>
Score	1.5	1.2	0.9	0.5	CI
					1.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	03/07/2019	75-A	87	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category						NOTES>>
	Negligible	Minor	Moderate		Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5	CI

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >> **1.46**

RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)

COMPENSATION REQUIREMENT (CR) >> **N/A**

CR = RCI X LF X IF

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking west (downstream) at Stream Reach 75-A. The majority of the banks are stable (>80%). Both banks' riparian buffers are fully forested. Stable habitat elements are present in greater than 50% of the reach. A road exists at the downstream end of the reach, disrupting less than 20% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

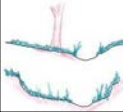
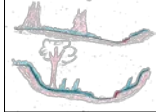
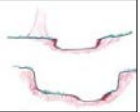

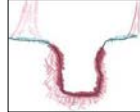
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	03/07/2019	75-B	421	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Little Marrowbone Creek					S-75: AB8-40, AD10-42		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.40</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>	
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor			
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>		<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>	
<p>Condition Scores</p>	<p>1.5</p>	<p>High</p>	<p>Low</p>	<p>High</p>	<p>Low</p>	<p>High</p>	<p>Low</p>		
	<p>1.5</p>	<p>1.2</p>	<p>1.1</p>	<p>0.85</p>	<p>0.75</p>	<p>0.6</p>	<p>0.5</p>		
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>									
<p>Right Bank</p>	<p>% Riparian Area ></p>	<p>95%</p>	<p>5%</p>				<p>100%</p>		
	<p>Score ></p>	<p>1.5</p>	<p>0.75</p>						
								<p>CI= (Sum % RA * Scores*0.01)/2</p>	
<p>Left Bank</p>	<p>% Riparian Area ></p>	<p>100%</p>					<p>100%</p>		
	<p>Score ></p>	<p>1.5</p>							
							<p>Rt Bank CI ></p>	<p>1.46</p>	
							<p>Lt Bank CI ></p>	<p>1.50</p>	
<p>3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.</p>									

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p>Stream Gradient</p>
<p>Score</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	
					<p>CI</p>
					<p>1.20</p>

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	03/07/2019	75-B	421	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.28
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking southwest (upstream) at Stream Reach 75-B. The banks are slightly incised but mostly stable. Both banks' riparian buffers are forested (>60% canopy cover); a canopy gap on the right bank is occupied by dense herbaceous vegetation. Stable habitat elements are present in 30-50% of the reach. The upstream end of the reach is fed by a culvert, disrupting less than 20% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER


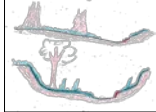
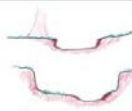
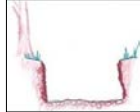
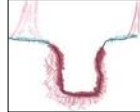
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	03/07/2019	75-C	217	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Little Marrowbone Creek					S-75: AD42-58, AB40-55		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.40</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>	
Right Bank	% Riparian Area >	70%	20%	10%			100%
	Score >	1.5	0.75	0.6			
							CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area >	90%	10%				100%
	Score >	1.5	0.6				
							Rt Bank CI > 1.26
							Lt Bank CI > 1.41
							1.34

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>Stream Gradient</p>	<p>CI</p>
Score	1.5	1.2	0.9	0.5	High
					1.20

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	03/07/2019	75-C	217	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.</i>	THE REACH CONDITION INDEX (RCI) >>	1.29
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking southwest (upstream) at Stream Reach 75-C. The banks are slightly incised but largely stable. The right bank's riparian buffer is predominantly forested (>60% canopy cover), though there are areas of dense herbaceous vegetation and maintained lawn. The left bank's riparian buffer is predominantly forested (>60% canopy cover) but contains some maintained lawn. Stable habitat elements are present in 30-50% of the reach. The stream shows no signs of alteration.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

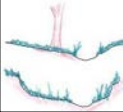
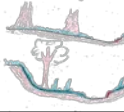
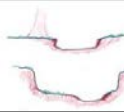
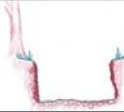
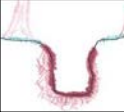
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/07/2019	76-A	124	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Little Marrowbone Creek					S-76: AC9-15, AD1-8		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	

- Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
- Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
- Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area >	60%	40%				100%		
	Score >	0.75	1.5						
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area >	100%					100%		
	Score >	1.5							
Rt Bank CI >								1.05	
Lt Bank CI >								1.50	1.28

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI 1.20

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/07/2019	76-A	124	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.28
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking southwest (upstream) at Stream Reach 76-A. The reach has some areas of erosion but the majority of the banks are stable. The right bank's riparian buffer has greater than 60% canopy cover with maintained herbaceous vegetation, while the left bank's riparian buffer is entirely forested with greater than 60% canopy cover. Stable habitat elements are present in 30-50% of the reach. The stream shows no signs of channel alteration.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	2/27/2019	77-A	208	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-77: A1-12, B1-12		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>	
	Optimal	Suboptimal		Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5		
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.							Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area>	95%	5%				100%		
	Score >	1.2	0.6						
							CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	90%	10%				100%		
	Score >	1.2	0.6						
							Rt Bank CI >	1.17	CI
							Lt Bank CI >	1.14	1.16

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.58
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at Stream Reach 77-A. The right and left riparian buffers consist of 100% optimal canopy cover.

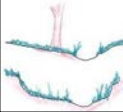
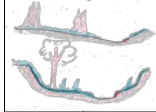
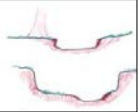

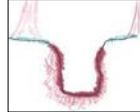
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	03/06/2019	78-A	650	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Marrowbone Creek					S-78: AA9-21, X5-17; Z25-31		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.00</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>		
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6		0.5
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>		
Right Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	90%	10%				100%	Rt Bank CI > 1.50
	Score >	1.5	0.85					Lt Bank CI > 1.44
								1.47

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p>Stream Gradient High</p>
Score	1.5	1.2	0.9	0.5	

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	03/06/2019	78-A	650	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.23
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking southwest (downstream) at Stream Reach 78-A. Active erosion is present on both banks; vegetative protection is present on 40-60% of the reach. There is some maintained lawn in the vicinity of the left bank, but both banks' riparian buffers are largely forested with greater than 60% tree canopy cover. Stable habitat elements are present and occupies 30-50% of the stream. There is no evidence of channel alteration.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

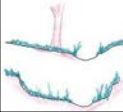
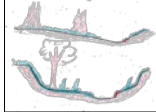
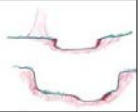

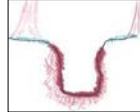
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/06/2019	79-A	200	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Marrowbone Creek					S-79: V1-10, W1-10		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p> <p>2.4</p> <p>2</p> <p>1.6</p> <p>1</p>	2.40
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal		Poor		
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	
<p>Condition Scores</p>	1.5	1.2	1.1	0.85	0.75	0.6	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>	
Right Bank	% Riparian Area >	50%	50%				100%
	Score >	1.5	0.75				
CI= (Sum % RA * Scores*0.01)/2							
Left Bank	% Riparian Area >	100%					100%
	Score >	1.5					
							<p>Rt Bank CI > 1.13</p> <p>Lt Bank CI > 1.50</p>
CI							

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p style="text-align: center;">Stream Gradient</p> <p style="text-align: center;">High</p>	
<p>Score</p>	1.5	1.2	0.9	0.5	CI
					0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/06/2019	79-A	200	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.10
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking north (downstream) at Stream Reach 79-A, an intermittent tributary of Marrowbone Creek. The stream is slightly incised but banks are stable. The right bank's riparian buffer is made up of forest providing greater than 60% tree canopy cover and maintained lawn, while the left bank's riparian buffer is entirely forested with greater than 60% tree canopy cover. Habitat elements are unstable and are present in less than 10% of the reach. The upstream end of the reach is fed by a culvert, disrupting less than 20% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

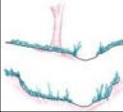
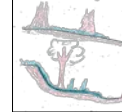
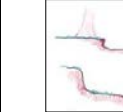


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/06/2019	80-A	470	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Marrowbone Creek					S-80: U1-18		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.40
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							
	Optimal	Suboptimal	Marginal		Poor			
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High	Low	High	Low	High	Low	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area >	100%						100%
	Score >	1.5						
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area >	100%						100%
	Score >	0.75						
							Rt Bank CI >	1.50
							Lt Bank CI >	0.75
								CI
								1.13

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/06/2019	80-A	470	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.19
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking southeast (downstream) at Stream Reach 80-A. There are a few areas of active erosion but the banks are generally stable. The left bank's riparian buffer is composed entirely of maintained lawn while the right bank's buffer is composed entirely of forest providing greater than 60% tree canopy cover. Habitat elements are stable and are present in 10-30% of the reach. The stream reach shows no signs of channel alteration.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

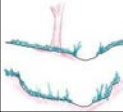
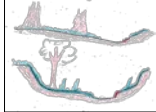
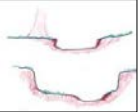

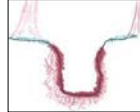
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/06/2019	81-A	11	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Marrowbone Creek					S-81: O10-11, S1-2		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.40</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>						
	Optimal	Suboptimal	Marginal	Poor	High	Low								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>1.5</p>	<p>1.2</p>	<p>1.1</p>	<p>0.85</p>	<p>0.75</p>	<p>0.6</p>	<p>0.5</p>	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
<p>Condition Scores</p>	<p>1.5</p>	<p>1.2</p>	<p>1.1</p>	<p>0.85</p>	<p>0.75</p>	<p>0.6</p>	<p>0.5</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>						
<p>Right Bank</p>	<p>% Riparian Area ></p>	<p>50%</p>	<p>50%</p>	<p>100%</p>								<p>100%</p>		
	<p>Score ></p>	<p>1.5</p>	<p>0.75</p>								<p>CI= (Sum % RA * Scores*0.01)/2</p>			
<p>Left Bank</p>	<p>% Riparian Area ></p>	<p>70%</p>	<p>30%</p>								<p>100%</p>			
	<p>Score ></p>	<p>1.5</p>	<p>0.75</p>								<p>Rt Bank CI ></p>	<p>1.13</p>		
										<p>Lt Bank CI ></p>	<p>1.28</p>	<p>CI</p>		

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>					
	Optimal	Suboptimal	Marginal	Poor						
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient</p>	<p>CI</p>
<p>Score</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>High</p>		<p>1.20</p>			

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/06/2019	81-A	11	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.22
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking southwest (upstream) at Stream Reach 81-A. Vegetative protection is prominent within the reach and the stream has access to bankfull benches. Both the right and left bank riparian buffers are partly forested (>60% tree canopy cover) and partly composed of maintained lawn. Instream habitat elements are present within 30-50% of the reach. The upstream end of the reach is fed by a culvert, disrupting less than 20% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

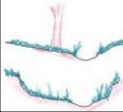
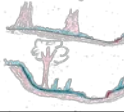
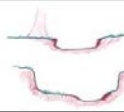
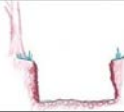
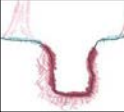
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	03/06/2019	82-A	455	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Marrowbone Creek					S-82: O1-10, S2-3; N2-10		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High	Low	High	Low	High	Low	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	100%						100%	
	Score >	1.5							
Left Bank	% Riparian Area>	20%	80%					100%	
	Score >	1.5	0.85						

CI= (Sum % RA * Scores*0.01)/2

Rt Bank CI > **1.50**

Lt Bank CI > **0.98**

CI 1.24

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	03/06/2019	82-A	455	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.19
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking south (upstream) at Stream Reach 82-A. Erosion is present on both banks with some areas being undercut. The right bank's riparian buffer is fully forested (>60% canopy cover). The left bank's riparian buffer is forested adjacent to the stream but then gives way to herbaceous ground cover. Instream habitat elements are adequate for the maintenance of populations and are present in 30-50% of the reach. The stream shows no evidence of channel alteration.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER


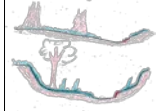
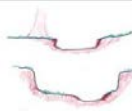
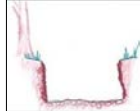

Stream Assessment Form (Form 1)

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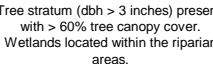
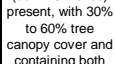
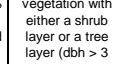
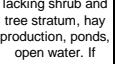
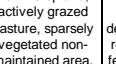
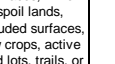
Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/06/2019	83-A	456	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Marrowbone Creek					S-83: K1-7, J1-7		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

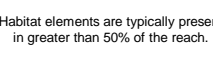
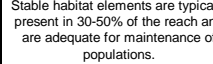
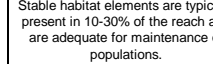
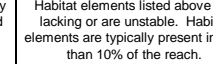
Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor	
							
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100	
Right Bank	% Riparian Area >	100%					100%
	Score >	1.5					
CI= (Sum % RA * Scores*0.01)/2							
Left Bank	% Riparian Area >	100%					100%
	Score >	1.5					
						Rt Bank CI >	1.50
						Lt Bank CI >	1.50
							CI
							1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
					
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/06/2019	83-A	456	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.26
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\19999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking northeast (upstream) at Stream Reach 83-A. The stream is slightly incised but the banks are generally stable. The left and right bank riparian buffers have greater than 60% tree canopy cover. Habitat elements are present in 10-30% of the reach. The stream shows no signs of alteration.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

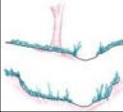
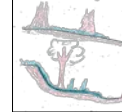
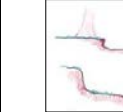


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/06/2019	84-A	43	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Marrowbone Creek					S-84: I5-7, L1-3		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.40</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor	High	Low		
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>		
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6		0.5
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>		
Right Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
							Rt Bank CI >	1.50
							Lt Bank CI >	1.50
							CI	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>				
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient High</p>	<p>CI</p>
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/06/2019	84-A	43	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.38
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\19999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking northwest (downstream) at Stream Reach 84-A. There are a few areas of active erosion but the banks are generally stable. The left and right bank riparian buffer have greater than 60% tree canopy cover. Instream habitat elements are present in greater than 50% of the reach. This reach shows no signs of channel alteration.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

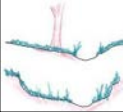
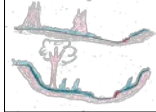
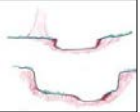

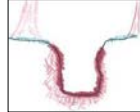
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/06/2019	85-A	477	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Marrowbone Creek					S-85: I5-7, L1-3		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.40</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor	High	Low	
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>	
Right Bank	% Riparian Area >	100%					100%
	Score >	1.5					
CI= (Sum % RA * Scores*0.01)/2							
Left Bank	% Riparian Area >	100%					100%
	Score >	1.5					
						Rt Bank CI >	1.50
						Lt Bank CI >	1.50
						CI	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>				
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient High</p>	<p>CI</p>
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/06/2019	85-A	477	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.32
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking northwest (downstream) at Stream Reach 84-A. The reach had vegetation cover on 60 to 80% of the banks and the stream has access to bankfull benches. The left and right bank riparian buffer have greater than 60% tree canopy cover. Instream habitat elements are present in 30 to 50% of the reach. This reach shows no signs of channel alteration.

DESCRIBE PROPOSED IMPACT:

<p>PROVIDED UNDER SEPARATE COVER</p>

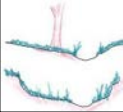
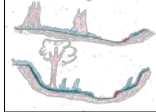
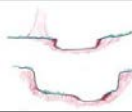
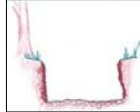
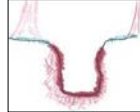
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/05/2019	86-A	67	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF, JB, WN		Tributary of Marrowbone Creek					S-86: C1-5, D1-4		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.40</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>						
	Optimal	Suboptimal	Marginal	Poor	High	Low								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>1.5</p>	<p>1.2</p>	<p>1.1</p>	<p>0.85</p>	<p>0.75</p>	<p>0.6</p>	<p>0.5</p>	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
<p>Condition Scores</p>	<p>1.5</p>	<p>1.2</p>	<p>1.1</p>	<p>0.85</p>	<p>0.75</p>	<p>0.6</p>	<p>0.5</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>						
<p>Right Bank</p>	<p>% Riparian Area ></p>	<p>40%</p>	<p>60%</p>	<p>100%</p>						<p>100%</p>	<p>CI = (Sum % RA * Scores*0.01)/2</p>			
		<p>Score ></p>	<p>1.5</p>	<p>0.6</p>						<p>100%</p>				
<p>Left Bank</p>	<p>% Riparian Area ></p>	<p>70%</p>	<p>30%</p>						<p>100%</p>	<p>Rt Bank CI ></p>	<p>0.96</p>	<p>CI</p>		
		<p>Score ></p>	<p>1.5</p>	<p>0.6</p>						<p>Lt Bank CI ></p>	<p>1.23</p>		<p>1.10</p>	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>					
	Optimal	Suboptimal	Marginal	Poor						
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient</p>	<p>CI</p>
<p>Score</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>High</p>		<p>0.90</p>			

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/05/2019	86-A	67	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>> Alteration due to erosional storm water gully.
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.18
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking southeast (upstream) at Stream Reach 86-A. Both left and right banks' riparian buffers have greater than 60% tree canopy cover and contain minimal maintained lawn. Habitat elements are present in 10-30% of the reach. There are no signs of channel alteration.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

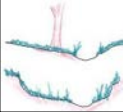
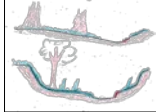
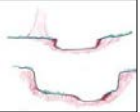

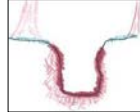
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/05/2019	86-B	514	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF, JB, WN		Tributary of Marrowbone Creek					S-86: C5-22, D4-25		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>1.60</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6		Low 0.5
<p>Ensure the sums of % Riparian Blocks equal 100</p>								
Right Bank	% Riparian Area >	70%	30%				100%	
	Score >	0.6	1.5					
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	40%	60%				100%	
	Score >	1.5	0.6					
							Rt Bank CI > 0.87	
							Lt Bank CI > 0.96	
CI 0.92								

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p style="text-align: center;">Stream Gradient</p> <p style="text-align: center;">High</p>	
Score	1.5	1.2	0.9	0.5		CI
						0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/05/2019	86-B	514	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>> .
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.86
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking northwest (downstream) at Stream Reach 86-B. This reach exhibits heavy sedimentation and is overwidened. The left and right banks' riparian buffers are forested (>60% canopy cover) and contain minimal maintained lawn. Habitat elements are generally lacking and are present in less than 10% of the reach. The channel is slightly altered in less than 20% of the reach by the presence of an erosional storm water feature.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

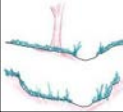
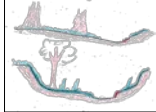
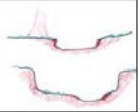
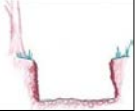
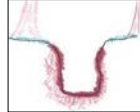
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/05/2019	87-A	109	N/A	
Name(s) of Evaluator(s)		Stream Name and Information							
JF / JB / WN		Tributary of Marrowbone Creek						S-87: A9-13, B7-12	

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
Scores	1.5	High	Low	High	Low	High	Low

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	5%	95%				100%
	Score >	0.5	0.85				
Left Bank	% Riparian Area>	10%	90%				100%
	Score >	1.1	0.85				

CI= (Sum % RA * Scores*0.01)/2

	Rt Bank CI >	0.83						CI
	Lt Bank CI >	0.88						0.85

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	Stream Gradient
Scores	1.5	1.2	0.9	0.5	High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/05/2019	87-A	109	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.93
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking east (upstream) at Stream Reach 87-A. The channel is often incised and much of the streambank is undercut. The left and right riparian buffers are covered by non-maintained herbaceous vegetation; a parking lot is adjacent to the right bank and sparse tree cover (<30% canopy cover) is present on the left bank. Instream habitat is present in less than 10% of the reach. A culvert is present at the upstream end of the reach, disrupting less than 20% of the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

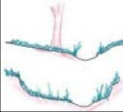
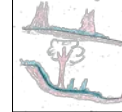
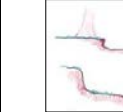


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/05/2019	87-B	119	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Marrowbone Creek					S-87: A5-9, B4-7		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	1.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor	High	Low		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area >	80%	20%					100%
	Score >	1.5	0.85					
Left Bank	% Riparian Area >	100%						100%
	Score >	1.5						

CI = (Sum % RA * Scores*0.01)/2
 Rt Bank CI > **1.37**
 Lt Bank CI > **1.50**
1.44

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/05/2019	87-B	119	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.89
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking east (upstream) at Stream Reach 87-B. The channel is deeply incised and flow is contained within the banks. The left bank riparian buffer is entirely forested with greater than 60% tree canopy cover; the right bank riparian buffer is largely forested with greater than 60% tree canopy cover and has some canopy gaps occupied by dense herbaceous vegetation and shrubs. Instream habitat elements are unstable and are present in less than 10% of the reach. This stream reach shows no signs of alteration.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER


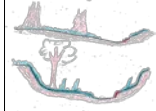
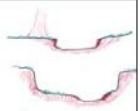


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

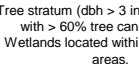
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/05/2019	87-C	78	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF / JB / WN		Tributary of Marrowbone Creek					S-87: A1-5, B1-4		

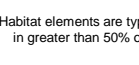
1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.00</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>			
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor				
 <p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>				
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6		0.5		
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>									
Right Bank	% Riparian Area >	70%	30%				100%	<p>CI= (Sum % RA * Scores*0.01)/2</p>		
	Score >	0.6	1.5							
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	0.87	<p>CI</p>
	Score >	1.5						Lt Bank CI >	1.50	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>				
	Optimal	Suboptimal	Marginal	Poor					
 <p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient High</p>	<p>CI</p>
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	03/05/2019	87-C	78	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.04
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking west (downstream) at Stream Reach 87-C. The stream banks are relatively stable and exhibit lower bank slopes than other reaches within this stream. The left bank riparian buffer is entirely forested with greater than 60% canopy cover. The right bank riparian buffer has a forested riparian buffer but is mostly comprised of maintained lawn. Instream habitat elements are present in less than 10% of the reach. There are no signs of channel alteration within this reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

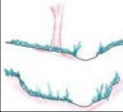
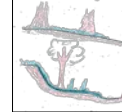
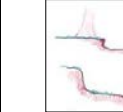


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	4/26/2019	87-D	12	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF		Tributary of Marrowbone Creek					S-87: ZF1-3, ZG1-3		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	1.60
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>		
	Optimal	Suboptimal	Marginal	Poor					
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High	Low	High	Low	High	Low		
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100			
Right Bank	% Riparian Area >	85%	15%				100%		
	Score >	0.6	1.5						
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area >	100%					100%		
	Score >	1.5							
							Rt Bank CI >	0.74	
							Lt Bank CI >	1.50	CI
							1.12		

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	4/26/2019	87-D	12	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.94
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking downstream at Stream Reach 87-D. The stream is mostly incised and likely to widen further. The left bank riparian buffer consists of mature forest with greater than 60% tree canopy cover. The right bank riparian buffer consists of mature forest with greater than 60% tree canopy cover and maintained lawn. Instream habitat is present in less than 10% of the stream. Channel alteration is not present in this reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

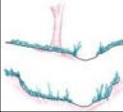
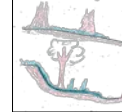
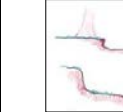


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/27/2019	88-A	405	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Marrowbone Creek					S-88: I1-17/F1-8/J1-9/K1-13		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100					
Right Bank	% Riparian Area>	98%	2%		100%
	Score >	1.5	0.6		
CI= (Sum % RA * Scores*0.01)/2					
Left Bank	% Riparian Area>	88%	10%	2%	100%
	Score >	1.5	0.6	0.85	
		Rt Bank CI >		1.48	CI
		Lt Bank CI >		1.40	1.44

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High CI 1.20

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/27/2019	88-A	405	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.31
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 88-A. The reach was slightly incised with majority of banks stable. The right riparian buffer consisted of 98% mature forest cover and 2% herbaceous field. The left riparian buffer contained 88% mature forest cover, 2% non-maintained dense vegetation, and 10% herbaceous field. The in-stream habitat was suboptimal with stable elements in 30-50% of the reach, and the channel had no alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

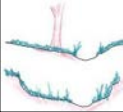
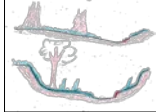
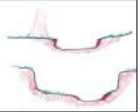

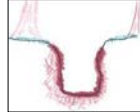
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/27/2019	89-A	505	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Marrowbone Creek					S-89: M1-8/N1-3/L1-8		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.40</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>						
	Optimal	Suboptimal	Marginal	Poor	High	Low								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>1.5</p>	<p>1.2</p>	<p>1.1</p>	<p>0.85</p>	<p>0.75</p>	<p>0.6</p>	<p>0.5</p>	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
<p>Condition Scores</p>	<p>1.5</p>	<p>1.2</p>	<p>1.1</p>	<p>0.85</p>	<p>0.75</p>	<p>0.6</p>	<p>0.5</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>						
<p>Right Bank</p>	<p>% Riparian Area > 100%</p>						<p>100%</p>	<p>CI= (Sum % RA * Scores*0.01)/2</p>						
<p>Left Bank</p>	<p>% Riparian Area > 95%</p>	<p>5%</p>					<p>100%</p>	<p>Rt Bank CI > 1.50</p>	<p>1.50</p>	<p>CI</p>	<p>1.48</p>	<p>1.48</p>		

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>					
	Optimal	Suboptimal	Marginal	Poor						
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient High</p>	<p>CI</p>	<p>1.20</p>
<p>Score</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>						

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/27/2019	89-A	505	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.32
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 89-A. The reach had stable bed and banks with vegetative protection and some erosion. The right riparian buffer consisted of 100% mature forest cover. The left riparian buffer consisted of 95% mature forest cover and 5% sparsely vegetated area. The in-stream habitat was suboptimal with stable elements in 30-50% of the reach. There are no channel alterations within the evaluated reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER


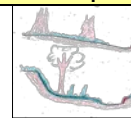
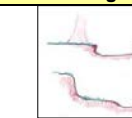


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/27/2019	90-A	273	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Marrowbone Creek					S-90: Q1-20/R1-17/T24-29		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5			

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

		Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area>	50%	50%					100%	
	Score >	1.5	1.1						
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area>	75%	25%					100%	
	Score >	1.5	1.1						
								Rt Bank CI >	1.30
								Lt Bank CI >	1.40
								CI	1.35

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/27/2019	90-A	273	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.07
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 90-A. The reach had 40-60% vegetative protection on both banks with transient sediment. The right riparian buffer consisted of 50% mature forest cover and 50% mature forest cover with 30 to 60% canopy cover. The left buffer consisted of 75% mature forest cover and 25% mature forest cover with 30 to 60% canopy cover. In-stream habitat elements were lacking, and no channel alterations were observed.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

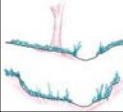
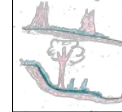
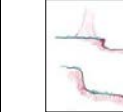


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/27/2019	90-B	174	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Marrowbone Creek					S-90: Q20-31/T14-24		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Low Marginal:	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

		Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area>	75%	25%					100%	
	Score >	1.5	1.1						
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area>	90%	10%					100%	
	Score >	1.5	1.1						
								Rt Bank CI >	1.40
								Lt Bank CI >	1.46
								CI	1.43

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/27/2019	90-B	174	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.17
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 90-B. The reach had 40-60% vegetative protection on both banks with transient sediment and moderate erosion. The right riparian buffer consisted of 75% mature forest with 60% or greater canopy cover and 25% mature forest cover with 30 to 60% canopy cover. The left buffer consisted of 90% mature forest cover and 10% mature forest cover with 30 to 60% canopy cover. In-stream habitat elements were lacking, and no channel alterations were observed.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

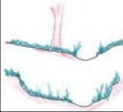
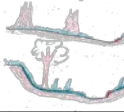
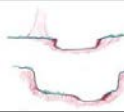

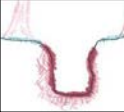
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/27/2019	90-C	217	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Marrowbone Creek					S-90: Q31-36/T1-14/U1-10		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>1.60</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal		Poor		
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>	
Right Bank	% Riparian Area >	75%	25%				100%
	Score >	1.5	1.1				
CI= (Sum % RA * Scores*0.01)/2							
Left Bank	% Riparian Area >	80%	20%				100%
	Score >	1.5	1.1				
						Rt Bank CI >	1.40
						Lt Bank CI >	1.42
						CI	1.41

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>Stream Gradient</p>	
Score	1.5	1.2	0.9	0.5	High
					CI
					0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/27/2019	90-C	217	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.00
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 90-C. The reach had 40-60% vegetative protection on both banks with transient sediment and moderate erosion. The right riparian buffer consisted of 75% mature forest cover and 25% mature forest cover with 30 to 60% canopy cover. The left buffer consisted of 80% mature forest cover and 20% mature forest cover with 30 to 60% canopy cover. In-stream habitat elements were lacking, and no channel alterations were observed.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER


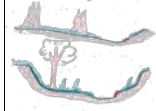
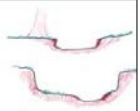
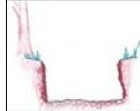

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

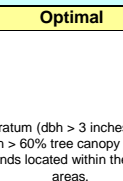
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/27/2019	91-A	206	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM		Marrowbone Creek					S-91: W1-9/X1-7		

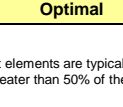
1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>1.60</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor	
 <p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>	
Right Bank	% Riparian Area >	60%	40%				100%
	Score >	1.5	0.5				
CI= (Sum % RA * Scores*0.01)/2							
Left Bank	% Riparian Area >	60%	40%				100%
	Score >	1.5	0.5				
						Rt Bank CI >	1.10
						Lt Bank CI >	1.10
						CI	1.10

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>				
	Optimal	Suboptimal	Marginal	Poor					
 <p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient High</p>	<p>CI</p>
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/27/2019	91-A	206	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.90

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.90
	RCI= (Sum of all CIs)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 91-A. The reach had eroded banks and was overwidened, with little vegetative protection present. The right and left riparian buffers consisted of 60% mature forest cover and 40% impervious surfaces associated with Soapstone Road. The in-stream habitat was suboptimal with stable elements in 30-50% of the reach, and channel alterations included road and brige installation.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER


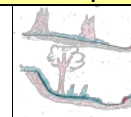
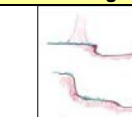

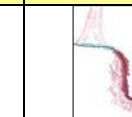
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

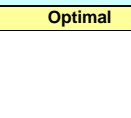
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/27/2019	92-A	119	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Marrowbone Creek					S-92: Y1-7N/42-44/Z1-7		

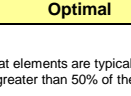
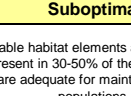
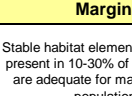
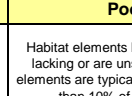
1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p> <p>2.4</p> <p>2</p> <p>1.6</p> <p>1</p>	2.40
Score						
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor	
 <p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>	
Right Bank	% Riparian Area>	95%	5%				100%
	Score >	1.1	1.5				
							CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	97%	3%				100%
	Score >	1.2	1.1				
							Rt Bank CI > 1.12
							Lt Bank CI > 1.20
							CI 1.16

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
 <p>Habitat elements are typically present in greater than 50% of the reach.</p>	 <p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	 <p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	 <p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>1.5</p> <p>1.2</p> <p>0.9</p> <p>0.5</p>	<p>Stream Gradient High</p> <p>CI 0.50</p>
Score					

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/27/2019	92-A	119	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.11
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 92-A. The reach had banks with little erosion and vegetative protection present. The right riparian buffer consisted of 5% mature forest cover and 95% mature forest with 30-60% canopy cover that lacked an understory. The left riparian buffer consisted of 97% mature forest with 30-60% canopy cover that lacked an understory, and 3% mature forest cover. The reach lacked in-stream habitat elements and did not have any channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

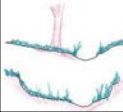
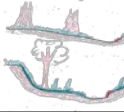
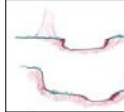

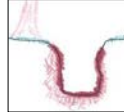
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/28/2019	92-B	141	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Marrowbone Creek					S-92: V32-42		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>		
	Optimal	Suboptimal	Marginal		Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p> <p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>			
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5		
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>			
Right Bank	% Riparian Area >	98%	2%				100%		
	Score >	1.1	1.5						
Left Bank	% Riparian Area >	100%					100%		
	Score >	1.5							
							CI = (Sum % RA * Scores*0.01)/2		
							Rt Bank CI >	1.11	
							Lt Bank CI >	1.50	1.30

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient Low
					CI
					0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/28/2019	92-B	141	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.06
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 92-B. The reach had banks with moderate erosion and some vegetative protection present. The right riparian buffer consisted of 2% mature forest cover and 95% mature forest with 30-60% canopy cover that lacked an understory. The left buffer consisted of 100% mature forest cover. The reach lacked in-stream habitat elements and did not have any channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

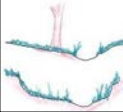
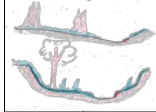
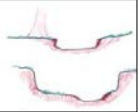

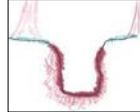
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/28/2019	92-C	495	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Marrowbone Creek					S-92: AA5-16/AB5-8/V-32		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal	High Poor	Low Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>							<p>Ensure the sums of % Riparian Blocks equal 100</p>							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.2												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	75%	25%				100%	Rt Bank CI >	1.20				CI	
	Score >	0.5	1.5					Lt Bank CI >	0.75				0.98	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	0.50
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/28/2019	92-C	495	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.00
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 92-C. The reach had moderate erosion along the banks with some vegetative protection present. The right riparian buffer consisted of 100% mature forest cover. The left buffer consisted of 25% mature forest cover and 75% impervious surface associated with Soapstone Road. The reach lacked in-stream habitat elements and did not have any channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

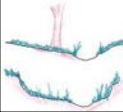
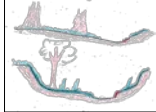
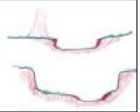
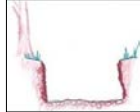
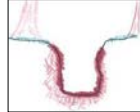
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/28/2019	92-D	138	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Marrowbone Creek					S-92: AA1-5/AB1-5/W3/W4		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>							<p>Ensure the sums of % Riparian Blocks equal 100</p>							
Right Bank	% Riparian Area >	75%	20%	5%			100%							
	Score >	1.2	1.5	0.6				CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	50%	50%				100%	Rt Bank CI >	1.23	CI				
	Score >	0.5	1.5					Lt Bank CI >	1.00	1.12				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/28/2019	92-D	138	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.90
		RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 92-D. The reach had banks with some erosion and vegetation present. The right riparian buffer consisted of 20% mature forest cover, 75% mature forest with 30-60% cover containing shrub and herb layers, and 5% impervious surface. The left buffer consisted of 50% mature forest cover and 50% impervious surface. The in-stream habitat was marginal with stable elements in 10-30% of the reach. Channel alterations include rip-rap throughout the length of the reach and culverts.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	2/27/2019	93-A	186	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Marrowbone Creek					S-93: V3-28		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area>	90%	10%				100%	
	Score >	1.1	1.5					
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	90%	10%				100%	
	Score >	1.1	1.5					
								Rt Bank CI > 1.14 Lt Bank CI > 1.14

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.57
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 93-A. The right and left riparian buffers consisted of 10% mature forest cover and 90% mature forest cover with 30 to 60% canopy cover.

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	2/28/2019	94-A	83	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Marrowbone Creek					S-94: Z21-36		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.							Ensure the sums of % Riparian Blocks equal 100	
Right Bank	% Riparian Area>	100%					100%	
	Score >	1.5						
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	75%	25%				100%	Rt Bank CI > 1.50 CI
	Score >	1.5	0.5					Lt Bank CI > 1.25 1.38

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.69
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 94-A. The right riparian buffer consisted of 100% mature forest cover. The left riparian buffer consisted of 75% mature forest cover and 25% impervious surfaces associated with Soapstone Road.

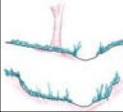
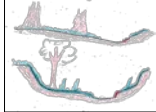
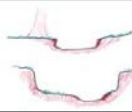
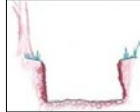
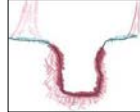
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/28/2019	94-B	15	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Marrowbone Creek					S-94: Z20-Z21		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5			
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100	
Right Bank	% Riparian Area >	100%				100%	
	Score >	1.1					
							CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area >	75%	25%			100%	Rt Bank CI > 1.10
	Score >	1.5	0.5				Lt Bank CI > 1.25
							CI

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient Low
					CI
					0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/28/2019	94-B	15	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.</i>	THE REACH CONDITION INDEX (RCI) >>	1.04
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking downstream at stream reach 94-B. The reach had banks with moderate erosion and some vegetative protection present. The right riparian buffer consisted of 100% mature forest with 30-60% canopy cover. The left riparian buffer consisted of 75% mature forest cover and 25% impervious surfaces associated with Soapstone Road. The reach lacked in-stream habitat elements and did not have any channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	2/28/2019	95-A	30	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Marrowbone Creek					S-95: AI1-3		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

		Ensure the sums of % Riparian Blocks equal 100						
Right Bank	% Riparian Area>	95%	5%					100%
	Score >	1.5	0.6					
		CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area>	100%						100%
	Score >	1.5						
		Rt Bank CI >	1.46					CI
		Lt Bank CI >	1.50					1.48

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.74
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 95-A. The right riparian buffer consisted of 95% mature forest cover and 5% sparse herbaceous vegetation. The left riparian buffer consisted of 100% mature forest cover.


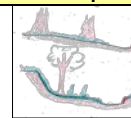
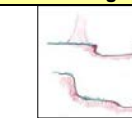


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/28/2019	96-A	469	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Marrowbone Creek					S-96: AH21-80		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High	Low	High	Low	High	Low	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	100%						100%	
	Score >	1.5							
Left Bank	% Riparian Area>	100%						100%	
	Score >	1.5							

CI= (Sum % RA * Scores*0.01)/2
Rt Bank CI > 1.50
Lt Bank CI > 1.50
CI 1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/28/2019	96-A	469	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.30
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 96-A. The reach had moderately incised banks with little vegetative protection. The right and left riparian buffers consisted of 100% mature forested cover. The in-stream habitat contained leaf packs, undercut banks, woody debris and shade. No channel alteration in reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

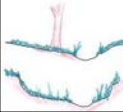
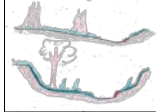
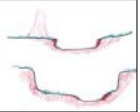

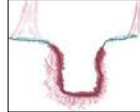
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/28/2019	97-A	239	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM		Unnamed Tributary to Marrowbone Creek					S-97: AH1-16/AG1-15		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	3.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal		Poor									
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/28/2019	97-A	239	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.44
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 97-A. The reach had stable banks with little erosion. The right and left riparian buffers consisted of 100% mature forest cover containing wetlands. The in-stream habitat was suboptimal with stable elements in 30-50% of the reach, including contained leaf packs and woody debris. The reach lacked channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

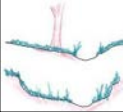
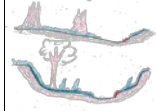
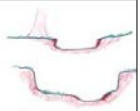

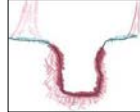
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/28/2019	97-B	77	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM		Unnamed Tributary to Marrowbone Creek					S-97: AH16-21/AG15-17		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.40</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor	High	Low	
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>	
Right Bank	% Riparian Area>	100%					100%
	Score >	1.5					
CI= (Sum % RA * Scores*0.01)/2							
Left Bank	% Riparian Area>	100%					100%
	Score >	1.5					
						Rt Bank CI >	1.50
						Lt Bank CI >	1.50
CI							

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>				
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient High</p>	<p>CI</p>
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/28/2019	97-B	77	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH						
						CI
						1.50

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	1.38
RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 97-B. The reach was slightly incised with few areas of erosion. The right and left riparian buffers consisted of 100% mature forest cover. The in-stream habitat contained leaf packs, root wads, woody debris and varied substrate sizes. The reach lacked channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

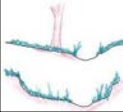
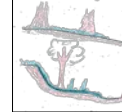
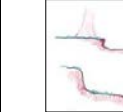


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/28/2019	97-C	545	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Marrowbone Creek					S-97: AG17-46/AH80-91/AK		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:	Poor	High Poor:								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>							<p>Ensure the sums of % Riparian Blocks equal 100</p>							
Right Bank	% Riparian Area>	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area>	100%					100%	Rt Bank CI >	1.50			CI		
	Score >	1.5						Lt Bank CI >	1.50			1.50		

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/28/2019	97-C	545	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.24
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 97-C. The reach had incised banks with some active erosion. The right and left riparian buffers consisted of 100% mature forest cover. The in-stream habitat was suboptimal with stable elements in 30-50% of the reach. The reach lacked channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

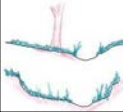
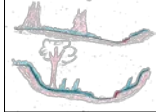
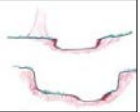

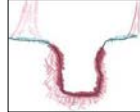
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/28/2019	97-D	68	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Marrowbone Creek					S-97: AG46-50/AJ2-6		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>Ensure the sums of % Riparian Blocks equal 100</p>
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>														
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.50
NOTES>>									
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/28/2019	97-D	68	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.38
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 97-D. The reach was slightly incised with few areas of erosion. The right and left riparian buffers consisted of 100% mature forest cover. The in-stream habitat was optimal with stable elements in greater than 50% of the reach, including varied water velocity and depths, riffle pool complexes and varied substrate sizes. The reach lacked channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	2/28/2019	98-A	26	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM		Unnamed Tributary to Marrowbone Creek					S-98: AL1-4/AM1-4		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

		Ensure the sums of % Riparian Blocks equal 100						
Right Bank	% Riparian Area>	100%						100%
	Score >	1.5						
Left Bank	% Riparian Area>	100%						100%
	Score >	1.5						

CI= (Sum % RA * Scores*0.01)/2

Rt Bank CI > 1.50 CI

Lt Bank CI > 1.50 1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >> 0.75

RCI= (Riparian CI)/2

COMPENSATION REQUIREMENT (CR) >> N/A

CR = RCI X LF X IF

INSERT PHOTOS:



Looking upstream at stream reach 98-A. The right and left riparian buffer consisted of 100% mature forested cover.

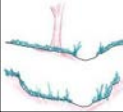
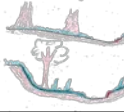
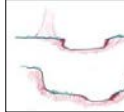

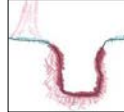
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/28/2019	98-B	308	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM		Unnamed Tributary to Marrowbone Creek					S-98: AL4-26/AM4-19		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.00</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6		Low 0.5
<p>Ensure the sums of % Riparian Blocks equal 100</p>								
Right Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
							Rt Bank CI >	1.50
							Lt Bank CI >	1.50
CI								

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p style="text-align: center;">Stream Gradient</p> <p style="text-align: center;">High</p>
Score	1.5	1.2	0.9	0.5	
					0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/28/2019	98-B	308	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.10
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 98-B. The reach moderate areas of erosion. The right and left riparian buffers consisted of 100% mature forest cover. The reach lacked in-stream habitat elements and did not have any channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	2/28/2019	99-A	53	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Marrowbone Creek					S-99: AP1-4/AQ1-4		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

		Ensure the sums of % Riparian Blocks equal 100					
Right Bank	% Riparian Area>	100%					100%
	Score >	1.5					
Left Bank	% Riparian Area>	100%					100%
	Score >	1.5					

CI= (Sum % RA * Scores*0.01)/2

Rt Bank CI > 1.50 CI

Lt Bank CI > 1.50 1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >> 0.75

RCI= (Riparian CI)/2

COMPENSATION REQUIREMENT (CR) >> N/A

CR = RCI X LF X IF

INSERT PHOTOS:



Looking upstream at stream reach 99-A. The right and left riparian buffers consisted of 100% mature forest cover.

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	2/28/2019	99-B	330	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Marrowbone Creek					S-99: AQ9-10/AP9-11/AN1		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.							Ensure the sums of % Riparian Blocks equal 100	
Right Bank	% Riparian Area>	100%					100%	
	Score >	1.5						
Left Bank	% Riparian Area>	100%					100%	
	Score >	1.5						
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH								CI= (Sum % RA * Scores*0.01)/2 Rt Bank CI > 1.50 Lt Bank CI > 1.50 CI

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.75
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 99-B. The right and left riparian buffers consisted of 100% mature forest cover.

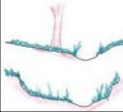
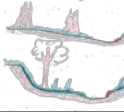
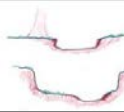
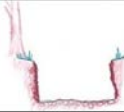
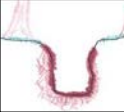
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/28/2019	100-A	258	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM		Unnamed Tributary to Marrowbone Creek					S-100: AR15-20/AU16-20/A		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area >	100%						100%	
	Score >	1.5							
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area >	100%						100%	
	Score >	1.5							
								Rt Bank CI >	1.50
								Lt Bank CI >	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/28/2019	100-A	258	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.26
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 100-A. The reach had slightly incised banks with vegetative protection present. The right and left riparian buffers consisted of 100% mature forest cover containing wetlands. The in-stream habitat was marginal with stable elements in 10-30% of the reach. No channel alterations were observed.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

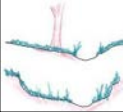
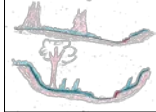
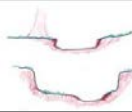
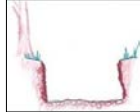
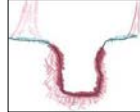
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/28/2019	100-B	278	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM		Unnamed Tributary to Marrowbone Creek					S-100: AR-15/AU1-16		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor	
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100	
Right Bank	% Riparian Area >	100%					100%
	Score >	1.5					
CI= (Sum % RA * Scores*0.01)/2							
Left Bank	% Riparian Area >	100%					100%
	Score >	1.5					
						Rt Bank CI >	1.50
						Lt Bank CI >	1.50
CI							

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					1.20

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/28/2019	100-B	278	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.24
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 100-B. The reach had unstable, eroded banks and a cobble substrate. The right and left riparian buffers consisted of 100% mature forest cover with wetlands. The in-stream habitat contained undercut banks, woody debris and various substrate sizes. No channel alterations were observed.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

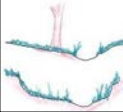
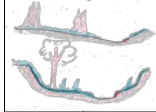
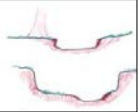

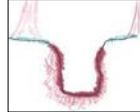
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/1/2019	101-A	237	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Marrowbone Creek					S-101: BA1-21/AZ15/BB1-1		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p> <p>2.4</p> <p>2</p> <p>1.6</p> <p>1</p>	2.00
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6		0.5
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>							<p>CI= (Sum % RA * Scores*0.01)/2</p>	
Right Bank	% Riparian Area>	100%						100%
	Score >	1.5						
Left Bank	% Riparian Area>	100%						100%
	Score >	1.5						
							CI	
							1.50	
							1.50	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p>Stream Gradient</p> <p>High</p>
Score	1.5	1.2	0.9	0.5	
					1.20

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/1/2019	101-A	237	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.24
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 101-A. The reach had erosion on the banks with moderate vegetative protection present. The right and left riparian buffers consisted of 100% mature forest cover. The in-stream habitat was suboptimal with stable elements in 30-50% of the reach. No channel alterations were observed.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

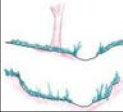
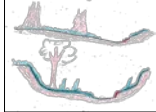
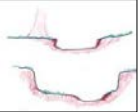

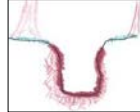
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/1/2019	101-B	232	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM		Unnamed Tributary to Marrowbone Creek					S-101: AY1-20/BB21/AZ1-1		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	3.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>							
	Optimal	Suboptimal	Marginal	Low Marginal:	Poor										
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5		
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>							<p>Ensure the sums of % Riparian Blocks equal 100</p>								
Right Bank	% Riparian Area >	100%					100%								
	Score >	1.5													
CI= (Sum % RA * Scores*0.01)/2															
Left Bank	% Riparian Area >	100%					100%								
	Score >	1.5													

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/1/2019	101-B	232	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.44
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 101-B. The reach had little incision and vegetative protection present. The right and left riparian buffers consisted of 100% mature forest cover. The in-stream habitat contained root wads and leaf packs. No channel alterations were observed.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/1/2019	102-A	271	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Matrimony Creek					S-102: BD1-17/BC1-14		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

		Ensure the sums of % Riparian Blocks equal 100								
Right Bank	% Riparian Area>	100%					100%			
	Score >	1.5								
CI= (Sum % RA * Scores*0.01)/2										
Left Bank	% Riparian Area>	100%					100%	Rt Bank CI >	1.50	CI
	Score >	1.5						Lt Bank CI >	1.50	1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.75
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 102-A. The right and left riparian buffers consisted of 100% mature forest cover.

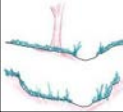
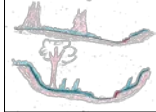
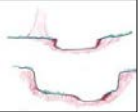

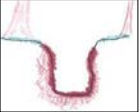
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/1/2019	102-B	109	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to to Matrimony Creek					S-102: BD17-24/BC14-21		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	0.90
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/1/2019	102-B	109	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.26
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 102-B. The reach had slightly eroded banks with vegetative protection present. The right and left riparian buffers consisted of 100% mature forest cover. The in-stream habitat was marginal and contained leaf packs. No channel alterations were observed.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/1/2019	103-A	50	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Marrowbone Creek					S-103: BD13/BD14/BK1-12		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

		Ensure the sums of % Riparian Blocks equal 100					
Right Bank	% Riparian Area>	100%					100%
	Score >	1.5					
CI= (Sum % RA * Scores*0.01)/2							
Left Bank	% Riparian Area>	100%					100%
	Score >	1.5					
		Rt Bank CI >	1.50			CI	
		Lt Bank CI >	1.50			1.50	

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.75
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 103-A. The right and left riparian buffers consisted of 100% mature forest cover.

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/1/2019	104-A	119	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Marrowbone Creek					S-104: B11-5/BJ1-6		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

		Ensure the sums of % Riparian Blocks equal 100									
Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
CI= (Sum % RA * Scores*0.01)/2											
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.75
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 104-A. The right and left riparian buffers consisted of 100% mature forest cover.

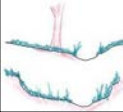
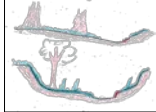
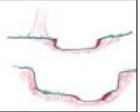

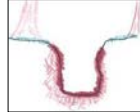
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/1/2019	105-A	457	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM		Unnamed Tributary to Marrowbone Creek					S-105: BE1-39/BF1-37		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>		
	Optimal	Suboptimal	Marginal		Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5		
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100			
Right Bank	% Riparian Area >	5%	95%				100%		
	Score >	1.5	0.5						
Left Bank	% Riparian Area >	10%	90%				100%		
	Score >	1.5	0.5						
								CI= (Sum % RA * Scores*0.01)/2	
							Rt Bank CI >	0.55	CI
							Lt Bank CI >	0.60	0.58

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/1/2019	105-A	457	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.10

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.84
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 21-A. The reach had incised, eroding banks with some vegetative protection present. The right riparian buffer consisted of 5% mature forest cover, and 95% denuded land from logging. The left riparian buffer consisted of 90% denuded land from logging, and 10% PSS wetland. The in-stream habitat was poor with stable elements in less than 10% of the reach. Channel alterations include fill at the top of the stream deposited to construct a logging road.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

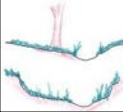
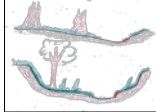
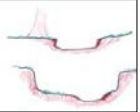

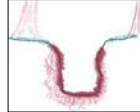
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/1/2019	106-A	651	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM		Unnamed Tributary to Marrowbone Creek					S-106: BO1-35/BN1-33		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor	High	Low		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p> <p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p> <p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p> <p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	High	Low	High	Low
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>		
Right Bank	% Riparian Area >	25%	5%	70%			100%	
	Score >	1.5	0.85	0.5				
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	20%	10%	70%			100%	
	Score >	1.5	0.85	0.5				
							Rt Bank CI >	0.77
							Lt Bank CI >	0.74
							CI	0.75

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		
Score	1.5	1.2	0.9	0.5	Stream Gradient High	
					CI	0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/1/2019	106-A	651	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.03
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking downstream at stream reach 106-A. The reach was incised with some erosion and vegetative protection present. The right riparian buffer consisted of 25% mature forest cover, 5% maintained vegetation, and 70% denuded clear cut land. The left riparian buffer contained 20% mature forest cover, 10% maintained vegetation, and 70% denuded clear cut land. The in-stream habitat was marginal with stable elements in 10-30% of the reach, including cobbles, undercut banks and shade. No channel alterations were observed.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

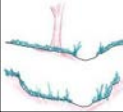
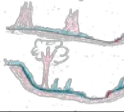
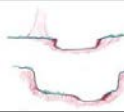
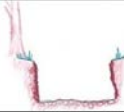
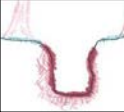
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/1/2019	107-A	308	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM		Unnamed Tributary to Marrowbone Creek					S-107: AT1-8, AS1-8, BH1-9, BQ1-9		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	1.60

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area >	100%					100%	
	Score >	0.5						
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI > 0.50
	Score >	0.5						Lt Bank CI > 0.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/1/2019	107-A	308	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.82
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking downstream at Stream Reach 107-A. The reach was overwidened and incised with unstable banks. The right and left riparian buffer consisted of 100% poor canopy cover and had denuded surfaces due to logging activity. There is less than 10% in-stream habitat present within this reach. There are no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER


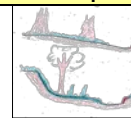
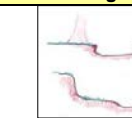


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/1/2019	108-A	230	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Marrowbone Creek					S-108: BR1-13/BS1-14		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>1.00</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>						
	Optimal	Suboptimal	Marginal	Poor	High	Low								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>1.5</p>	<p>1.2</p>	<p>1.1</p>	<p>0.85</p>	<p>0.75</p>	<p>0.6</p>	<p>0.5</p>	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
<p>Condition Scores</p>	<p>1.5</p>	<p>1.2</p>	<p>1.1</p>	<p>0.85</p>	<p>0.75</p>	<p>0.6</p>	<p>0.5</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>						
<p>Right Bank</p>	<p>% Riparian Area > 20%</p>	<p>75%</p>	<p>5%</p>	<p>100%</p>						<p>100%</p>	<p>CI = (Sum % RA * Scores*0.01)/2</p>			
<p>Score ></p>	<p>1.5</p>	<p>0.75</p>	<p>0.5</p>						<p>0.89</p>					
<p>Left Bank</p>	<p>% Riparian Area > 5%</p>	<p>20%</p>	<p>75%</p>	<p>100%</p>						<p>0.67</p>	<p>0.78</p>			
<p>Score ></p>	<p>1.5</p>	<p>1.1</p>	<p>0.5</p>						<p>0.67</p>	<p>0.78</p>				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>				
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient High</p>	<p>CI 1.20</p>
<p>Score</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>					

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/1/2019	108-A	230	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.90
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 108-A. The reach severely incised and unstable banks. The right riparian buffer consisted of 20% mature tree cover, 75% herbaceous vegetation, and 5% lack of vegetation. The left buffer contained 5% mature tree cover, 20% mature tree cover with no understory, and 75% logged land. The in-stream habitat was suboptimal with stable elements in 30-50% of the reach. No channel alterations were observed.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

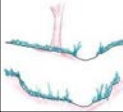
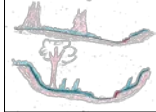
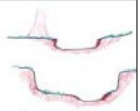

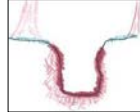
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/02/2019	108-A	1,635	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-108: AL1-68, AM1-68		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.40</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>			
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor				
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>				
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6		0.5		
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>									
Right Bank	% Riparian Area >	60%	40%				100%	<p>CI= (Sum % RA * Scores*0.01)/2</p>		
	Score >	1.5	1.1							
Left Bank	% Riparian Area >	90%	10%				100%	Rt Bank CI >	1.34	<p>CI</p>
	Score >	1.5	0.5					Lt Bank CI >	1.40	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>Stream Gradient</p>	<p>CI</p>	
Score	1.5	1.2	0.9	0.5	High	0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/02/2019	108-A	1,635	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.23
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking upstream at Stream Reach 108-A. The reach was incised with areas of active erosion. The right riparian buffer consisted of 60% of canopy cover and 40% of marginal canopy cover that had a non-maintained herbaceous cover with denuded surfaces due to logging activity. The left riparian buffer consisted of 90% canopy cover and 10% of poor canopy cover with denuded surfaces due to logging activity. The instream habitat consisted of riffles, pools, leaf packs and substrate of various particle size but had excess sediment and silt due to active erosion. There reach had no channel alterations

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

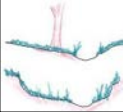
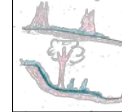
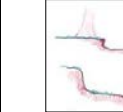


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/02/2019	108-B	651	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-108: AL68-89, AM68-92		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High	Low	High	Low	High	Low	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	100%						100%	
	Score >	1.5							
Left Bank	% Riparian Area>	10%	90%					100%	
	Score >	1.5	0.75						

CI= (Sum % RA * Scores*0.01)/2

Rt Bank CI > **1.50**

Lt Bank CI > **0.83**

CI 1.16

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High

CI 0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/02/2019	108-B	651	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.11
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking down stream. The right riparian buffer consisted of 100% optimal canopy cover. The left riparian buffer consisted of 10% optimal canopy cover and 90% non-maintained herbaceous ground cover with marginal canopy cover due to recent logging activity. The instream habitat consisted of riffles, pools, leaf packs and substrate of various particle size but had excess sediment and silt due to active erosion. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

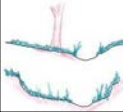
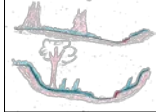
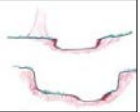

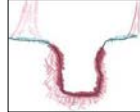
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	109-A	18	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM		Unnamed Tributary to Marrowbone Creek					S-109: BY1-3/BX1-3		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p> <p>2.4</p> <p>2</p> <p>1.6</p> <p>1</p>	2.40
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor	High	Low		
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>	
<p>Condition Scores</p>	1.5	1.2	1.1	0.85	0.75	0.6		0.5
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>							<p>CI= (Sum % RA * Scores*0.01)/2</p>	
Right Bank	% Riparian Area>	80%	20%					100%
	Score >	1.2	0.75					
Left Bank	% Riparian Area>	100%						100%
	Score >	1.2						
							Rt Bank CI >	1.11
							Lt Bank CI >	1.20
							CI	1.16

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>1.5</p> <p>1.2</p> <p>0.9</p> <p>0.5</p>	<p>Stream Gradient</p> <p>High</p>	CI
Score	1.5	1.2	0.9	0.5	High	1.20

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	109-A	18	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	1.25
RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 109-A. The reach had stable banks with little erosion. The right riparian buffer consisted of 80% mature forest cover with 30-60% canopy cover and a non-maintained understory, and 20% dense herbaceous vegetation. The left buffer contains 100% mature forest cover with 30-60% canopy cover and a non-maintained understory. The in-stream habitat contained varied substrate sizes and leaf packs. No channel alterations were observed.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

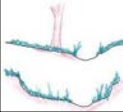
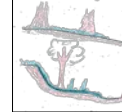
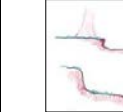


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	109-B	40	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Marrowbone Creek					S-109: BY3-8/BX3-8		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area >	100%					100%		
	Score >	0.75							
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area >	100%					100%		
	Score >	0.75							
							Rt Bank CI >	0.75	CI
							Lt Bank CI >	0.75	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	109-B	40	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.03
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 109-B. The reach had eroded banks with vegetative protection present. The right and left riparian buffers consisted of 100% dense herbaceous vegetation with <30% canopy cover. The in-stream habitat was marginal with stable elements in 10-30% of the reach. No channel alterations were observed. This reach was within a maintained utility right of way.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

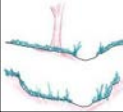
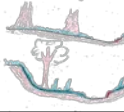
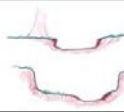

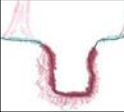
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	109-C	479	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Marrowbone Creek					S-109: BY8-31/BX8-31/CA3		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>1.00</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>								
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor										
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>Condition Scores</p>	<p>1.5</p>	<p>High</p>	<p>Low</p>	<p>High</p>	<p>Low</p>	<p>High</p>	<p>Low</p>	<p>0.6</p>	<p>0.5</p>
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>								<p>Ensure the sums of % Riparian Blocks equal 100</p>								
Right Bank	% Riparian Area >	10%	20%	70%				100%								
	Score >	0.5	1.1	0.85												
										CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	20%	80%					100%	Rt Bank CI >	0.87						
	Score >	1.1	1.5						Lt Bank CI >	1.42						
										CI	1.14					

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p>Stream Gradient</p>
Score	1.5	1.2	0.9	0.5	High
					CI
					1.20

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	109-C	479	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.93
RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 109-C. The reach has deeply incised, unstable banks. The right riparian buffer consisted of 70% dense shrub and herbaceous vegetation, 20% mature forest cover with 30-60% canopy cover, and 10% logged land. The left buffer contained 20% mature forest cover with 30-60% canopy cover and 80% mature forest cover. The in-stream habitat was marginal with stable elements in 10-30% of the reach. Channel alterations include a spoil pile at the headwaters from logging activities.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/2/2019	109-D	37	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Marrowbone Creek					S-109:BZ1-3/CA1-3		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area>	30%	60%	10%			100%	
	Score >	1.5	0.85	0.5				
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	100%					100%	Rt Bank CI > 1.01
	Score >	1.5						Lt Bank CI > 1.50
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH								

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.63
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 109-D. The right riparian buffer consisted of 30% mature trees cover, 60% non-maintained dense shrub and herbaceous vegetation, and 10% non-vegetated land. The left riparian buffer consisted of 100% mature forest cover cover.

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/2/2019	110-A	161	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM		Unnamed Tributary to Marrowbone Creek					S-110: CE1-8/CD1-8		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100					
Right Bank	% Riparian Area>	100%			100%
	Score >	1.5			
Left Bank	% Riparian Area>	100%			100%
	Score >	1.5			

CI= (Sum % RA * Scores*0.01)/2

Rt Bank CI > 1.50 CI

Lt Bank CI > 1.50 1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >> 0.75

RCI= (Riparian CI)/2

COMPENSATION REQUIREMENT (CR) >> N/A

CR = RCI X LF X IF

INSERT PHOTOS:



Looking upstream at stream reach 110-A. The right and left riparian buffers consisted of 100% mature forest cover.

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/2/2019	111-A	83	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM		Unnamed Tributary to Marrowbone Creek					S-111: CB1-9/CC1-11		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal		Marginal		Poor	
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5			
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100	
Right Bank	% Riparian Area> 100%					100%	
	Score > 1.5						
							CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area> 100%					100%	Rt Bank CI > 1.50 CI
	Score > 1.5						Lt Bank CI > 1.50 1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.75
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 111-A. The right and left riparian buffers consisted of 100% mature forest cover.

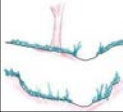
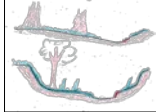
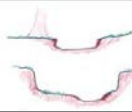
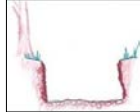
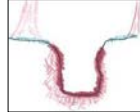
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

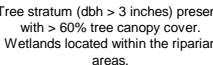
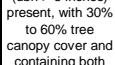
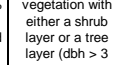
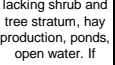
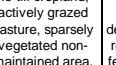
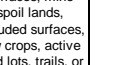
Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/2/2019	112-A	35	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Marrowbone Creek					S-112: CG1-5/CF1-3		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.00

NOTES>>

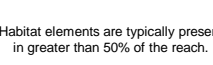
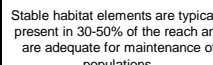
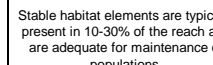
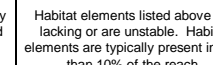
2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
								
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area >	100%					100%		
	Score >	1.5							
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area >	100%					100%		
	Score >	1.5							
							Rt Bank CI >	1.50	CI
							Lt Bank CI >	1.50	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
					
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					1.20

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/2/2019	112-A	35	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.24
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 112-A. The channel is slightly incised with some erosion along the banks. The right and left riparian buffers consisted of 100% mature forest cover, with wetlands along the left bank. The in-stream habitat was suboptimal with stable elements in 30-50% of the reach. No channel alterations were observed.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

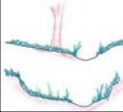
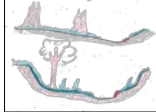
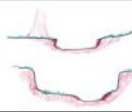
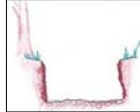
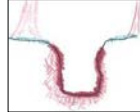
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	113-A	81	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Marrowbone Creek					S-113: CG5-14/CH8-15		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	1.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>		
	Optimal	Suboptimal	Marginal		Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5		
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100			
Right Bank	% Riparian Area >	100%					100%		
	Score >	1.5							
Left Bank	% Riparian Area >	60%	40%				100%		
	Score >	1.5	0.6						
							CI= (Sum % RA * Scores*0.01)/2		
							Rt Bank CI >	1.50	
							Lt Bank CI >	1.14	1.32

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	113-A	81	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.94
		RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 113-A. The reach had severely incised and eroded banks. The right riparian buffer consisted of 100% mature forest cover. The left buffer contained 60% mature forest cover and 40% maintained vegetation with kudzu cover. The in-stream habitat was poor, containing leaves and few pools. No channel alterations were observed.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

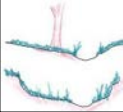
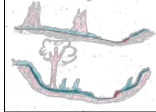
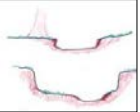

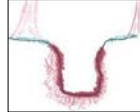
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	113-B	109	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Marrowbone Creek					S-113: CF3-15/CH8-15		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>1.00</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>										
	Optimal	Suboptimal	Marginal	Low Marginal:		High Poor:	Low Poor:											
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>Condition Scores</p>	<p>1.5</p>	<p>High</p>	<p>Low</p>	<p>High</p>	<p>Low</p>	<p>High</p>	<p>Low</p>	<p>0.6</p>	<p>0.5</p>	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>
Right Bank	% Riparian Area >	100%						100%										
	Score >	1.5																
Left Bank	% Riparian Area >	30%	70%					100%	CI= (Sum % RA * Scores*0.01)/2	Rt Bank CI >	1.50	CI						
	Score >	1.5	0.6						Lt Bank CI >	0.87	1.19	CI						

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>						
	Optimal	Suboptimal	Marginal	Poor							
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>Stream Gradient</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>High</p>	<p>CI</p>	<p>0.90</p>
Score	1.5	1.2	0.9	0.5	High	CI	0.90				

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	113-B	109	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.92
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 113-B. The reach had severely incised and eroded banks. The right riparian buffer consisted of 100% mature forested cover. The left buffer contained 30% mature forest cover and 70% maintained vegetation with kudzu cover. The in-stream habitat was poor, containing leaves and few pools. No channel alterations were observed.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

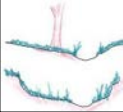
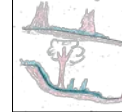
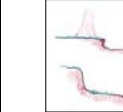


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	113-C	537	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Marrowbone Creek					S-113: CF15-31/CH15-30CI		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	1.60

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

		Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area>	40%	60%					100%	
	Score >	1.5	0.6						
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area>	98%	2%					100%	
	Score >	0.6	1.5						
								Rt Bank CI >	0.96
								Lt Bank CI >	0.62
									CI
									0.79

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	113-C	537	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.88
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 113-C. The reach had incised and eroded banks. The right riparian buffer consisted of 40% mature forested cover and 60% maintained vegetation. The left buffer contained 98% maintained vegetation with kudzu cover and 2% PEM wetland cover. The in-stream habitat was poor, containing leaves and few pools. No channel alterations were observed.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

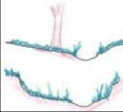
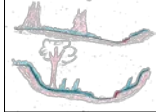
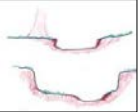

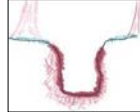
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	114-A	156	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Marrowbone Creek					S-114: CL1-12/CK1-11		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>		
	Optimal	Suboptimal	Marginal		Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5		
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100			
Right Bank	% Riparian Area >	50%	50%				100%		
	Score >	1.5	0.6						
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area >	100%					100%		
	Score >	1.5							
							Rt Bank CI >	1.05	
							Lt Bank CI >	1.50	1.28

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	114-A	156	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.10
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 114-A. The reach has areas of erosion with natural rock present. The right riparian buffer consisted of 50% mature forest cover and 50% herbaceous vegetation. The left buffer consisted of 100% mature forest cover. The in-stream habitat was marginal with stable elements in 10-30% of the reach, including varied water velocity and depths, shade and undercut banks. Channel alterations include an ATV stream crossing.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

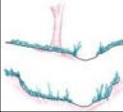
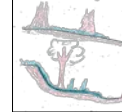
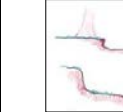


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	114-B	416	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Marrowbone Creek					S-114: CK11-25/CL11-22/C		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p> <p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p> <p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p> <p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>			
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	5%	95%					100%
	Score >	0.6	1.5					
Left Bank	% Riparian Area>	100%						100%
	Score >	1.5						

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High

CI = (Sum % RA * Scores*0.01)/2

Rt Bank CI > 1.46
Lt Bank CI > 1.50

CI 1.48

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	114-B	416	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.32
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 114-B. The reach has stable banks with few areas of erosion present. The right riparian buffer consisted of 95% mature forest cover and 5% maintained herbaceous vegetation. The left buffer consisted of 100% mature forest cover. The in-stream habitat included shade and riffles. No channel alterations were observed.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

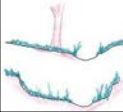
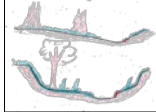
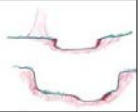
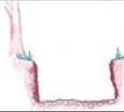
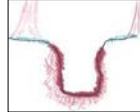
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

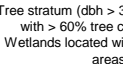
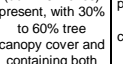
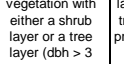
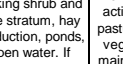
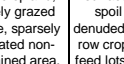
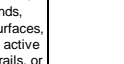
Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	115-A	533	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Marrowbone Creek					S-115: CO1-24/CP1-22/CR1		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.40

NOTES>>

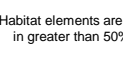
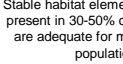
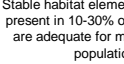
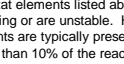
2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
								
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
CI= (Sum % RA * Scores*0.01)/2											
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
						
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		
Score	1.5	1.2	0.9	0.5	Stream Gradient High	CI 1.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	115-A	533	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.38
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 115-A. The reach has slightly incised banks, with no channel alterations observed. The right and left riparian buffers consisted 100% mature forest cover. The in-stream habit was optimal and contained varied substrate sizes and shade. No channel alteration was present within this reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

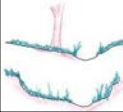
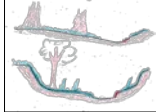
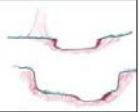

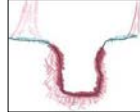
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/2/2019	116-A	105	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Marrowbone Creek					S-116: CT1-9/CS3-9		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	0.50
NOTES>>									
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/2/2019	116-A	105	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.18
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking downstream at stream reach 116-A. The reach had stable banks with some active erosion. The right and left riparian buffers consisted of 100% mature forest cover. The in-stream habitat was poor with stable elements in less than 10% of the reach. There are no known channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/2/2019	116-B	163	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Marrowbone Creek					S-116: CT9-16/CS9-16		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>	
	Optimal	Suboptimal		Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5					
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100			
Right Bank	% Riparian Area>	100%					100%		
	Score >	1.5							
Left Bank	% Riparian Area>	100%					100%		
	Score >	1.5							
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH									
							CI= (Sum % RA * Scores*0.01)/2		
							Rt Bank CI >	1.50	CI
							Lt Bank CI >	1.50	1.50

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.75
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking downstream at stream reach 116-B. The right and left riparian buffers consisted of 100% mature forest cover.

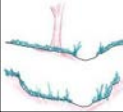
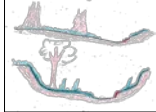
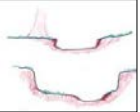

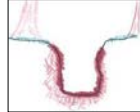
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	117-A	350	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM		Unnamed Tributary to Marrowbone Creek					S-117: CU1-9/CV1-8		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>1.60</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6		0.5
<p>Ensure the sums of % Riparian Blocks equal 100</p>								
Right Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
							Rt Bank CI >	1.50
							Lt Bank CI >	1.50
CI								

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p style="text-align: center;">Stream Gradient</p> <p style="text-align: center;">High</p>
Score	1.5	1.2	0.9	0.5	
					1.20

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	117-A	350	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	1.16
RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 117-A. The reach had overwidened, unstable banks. The right and left riparian buffers consisted of 100% mature forest cover. The in-stream habitat was suboptimal and contained woody debris, undercut banks and various substrate sizes. There are no known channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

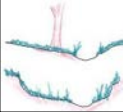
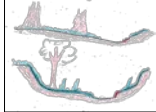
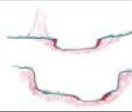
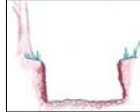
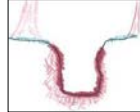
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	117-B	544	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM		Unnamed Tributary to Marrowbone Creek					S-117: CU9-57/CY1-32		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>1.60</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>	
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor			
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>		<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>	
<p>Condition Scores</p>	<p>1.5</p>	<p>High 1.2</p>	<p>Low 1.1</p>	<p>High 0.85</p>	<p>Low 0.75</p>	<p>High 0.6</p>	<p>Low 0.5</p>		
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>									
<p>Right Bank</p>	<p>% Riparian Area > 100%</p>						<p>100%</p>	<p>CI= (Sum % RA * Scores*0.01)/2</p>	
	<p>Score > 1.5</p>								
<p>Left Bank</p>	<p>% Riparian Area > 100%</p>						<p>100%</p>	<p>Rt Bank CI > 1.50</p>	<p>CI</p>
	<p>Score > 1.5</p>							<p>Lt Bank CI > 1.50</p>	<p>1.50</p>

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p style="text-align: center;">Stream Gradient</p> <p style="text-align: center;">High</p>
<p>Score</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	117-B	544	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH						

CI
1.50

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >> **1.16**

RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)

COMPENSATION REQUIREMENT (CR) >> **N/A**

CR = RCI X LF X IF

INSERT PHOTOS:



Looking upstream at stream reach 117-B. The reach had incised banks that have overwidened. The right and left riparian buffers consisted of 100% mature forest cover with wetlands within the left riparian buffer. The in-stream habitat was suboptimal with stable elements in 30-50% of the reach. There are no known channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

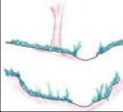
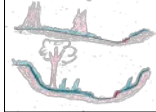
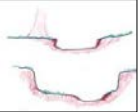

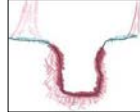
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	117-C	435	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AM		Unnamed Tributary to Marrowbone Creek					S-117: CU57-106-/CY32-62/		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Poor	High	Low								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
<p style="text-align: center;">Ensure the sums of % Riparian Blocks equal 100</p>														
Right Bank	% Riparian Area >	100%				100%								
	Score >	1.5												
CI= (Sum % RA * Scores*0.01)/2														
Left Bank	% Riparian Area >	100%				100%	Rt Bank CI >	1.50	CI					
	Score >	1.5					Lt Bank CI >	1.50	1.50					

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	117-C	435	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.32
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 117-C. The reach had little incision and erosion present. The right and left riparian buffers consisted of 100% mature forest cover with wetlands. The in-stream habitat was suboptimal and contained various substrate sizes. There are no known channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

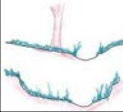
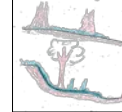
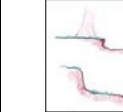


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/4/2019	117-D	161	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Marrowbone Creek					S-117: DD32-38/DA12-17/C		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor	High	Low		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area >	100%						100%	
	Score >	1.5							
Left Bank	% Riparian Area >	100%						100%	
	Score >	1.5							

CI= (Sum % RA * Scores*0.01)/2

Rt Bank CI >	1.50	CI
Lt Bank CI >	1.50	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High

CI	1.50
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Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/4/2019	117-D	161	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.38
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 117-D. The reach had stable banks with few areas of erosion present. The right and left riparian buffers consisted of 100% mature forest cover with wetlands. The in-stream habitat was optimal with stable elements in greater than 50% of the reach. No channel alterations were observed.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

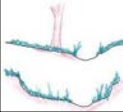
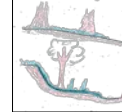
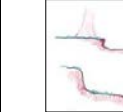


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

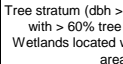
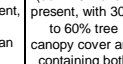
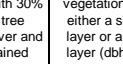
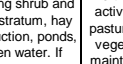
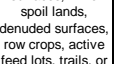

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/4/2019	117-E	419	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Marrowbone Creek					S-117: DB1-25/DD1-31/DC1		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.00

NOTES>>

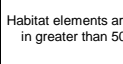
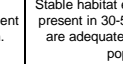
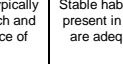
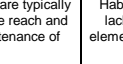
2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
								
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	100%						100%	
	Score >	1.5							
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area>	100%						100%	
	Score >	1.5							
							Rt Bank CI >	1.50	CI
							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
					
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/4/2019	117-E	419	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.30
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 117-E. The reach had incised banks with areas of active erosion. The right and left riparian buffers consisted of 100% mature forest cover with wetlands. The in-stream habitat was optimal with stable elements in greater than 50% of the reach. There are no known channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

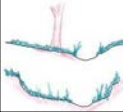
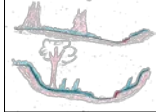
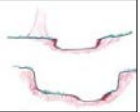

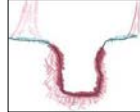
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	4/27/2019	117-F	82	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF		Unnamed Tributary to Marrowbone Creek					S-117: ZZA1-6		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal	Poor									
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
<p style="text-align: center;">Ensure the sums of % Riparian Blocks equal 100</p>														
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	4/27/2019	117-F	82	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.32
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking downstream at Stream Reach 117-F. The stream is slightly incised with few areas of active erosion and 60-80% vegetative surface protection. The left and right bank riparian buffers consist of mature forest with greater than 60% tree canopy cover. Instream habitat was present in 30- 50% of the stream. No channel alteration was present in the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

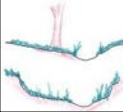
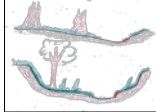
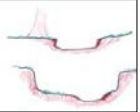

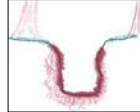
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	118-A	564	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Marrowbone Creek					S-118: CW1-38/CX1-35		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.00</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>	
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor			
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>		<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>	
<p>Condition Scores</p>	<p>1.5</p>	<p>High</p>	<p>Low</p>	<p>High</p>	<p>Low</p>	<p>High</p>	<p>Low</p>		
	<p>1.5</p>	<p>1.2</p>	<p>1.1</p>	<p>0.85</p>	<p>0.75</p>	<p>0.6</p>	<p>0.5</p>		
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>							<p>Ensure the sums of % Riparian Blocks equal 100</p>		
<p>Right Bank</p>	<p>% Riparian Area ></p>	<p>100%</p>					<p>100%</p>		
	<p>Score ></p>	<p>1.5</p>							
								<p>CI= (Sum % RA * Scores*0.01)/2</p>	
<p>Left Bank</p>	<p>% Riparian Area ></p>	<p>100%</p>					<p>100%</p>	<p>Rt Bank CI ></p>	<p>1.50</p>
	<p>Score ></p>	<p>1.5</p>						<p>Lt Bank CI ></p>	<p>1.50</p>
<p>3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.</p>									

Instream Habitat/ Available Cover	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p>Stream Gradient</p>	
<p>Score</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>		<p>High</p>
	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>		<p>CI</p>

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	3/2/2019	118-A	564	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.30
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 118-A. The reach has incised banks with moderate erosion present. The right and left riparian buffers consisted of 100% mature forest cover. The in-stream habitat was optimal with stable elements in greater than 50% of the reach. There are no known channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/2/2019	119-A	55	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AO		Unnamed Tributary to Marrowbone Creek					S-119: CZ7-10/DA8-11		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.							Ensure the sums of % Riparian Blocks equal 100	
Right Bank	% Riparian Area>	100%					100%	
	Score >	1.5						
Left Bank	% Riparian Area>	100%					100%	
	Score >	1.5						
CI= (Sum % RA * Scores*0.01)/2 Rt Bank CI > 1.50 Lt Bank CI > 1.50								CI

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.75
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 119-A. The right and left riparian buffers consisted of 100% mature forest cover.


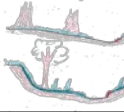
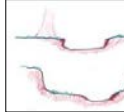

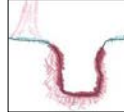
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/2/2019	119-B	93	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Marrowbone Creek					S-119: DA1-8/CZ1-7		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.40</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>1.5</p>	<p>1.2</p>	<p>1.1</p>	<p>0.85</p>	<p>0.75</p>	<p>0.6</p>	<p>0.5</p>	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5							
<p>Ensure the sums of % Riparian Blocks equal 100</p>														
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
CI= (Sum % RA * Scores*0.01)/2														
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>					
	Optimal	Suboptimal	Marginal	Poor						
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient High</p>	<p>CI</p>
Score	1.5	1.2	0.9	0.5	High		0.50			

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	3/2/2019	119-B	93	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.18
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 119-B. The reach had few areas of erosion. The right and left riparian buffers consisted of 100% mature forest cover. The reach lacked habitat elements. No channel alteration in this reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

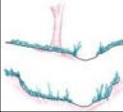
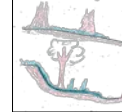
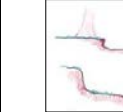


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/27/2019	121-A	45	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
AW		Unnamed Tributary to Marrowbone Creek					S-121: C1-C/D1-3/G1-3/H1-		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

		Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area>	95%	5%					100%	
	Score >	1.5	0.6						
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area>	100%						100%	
	Score >	1.5							
								Rt Bank CI >	1.46
								Lt Bank CI >	1.50
								CI	1.48

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/27/2019	121-A	45	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.26
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:



Looking upstream at stream reach 121-A. The reach had stable bed and banks with vegetative protection and minor erosion. The right riparian buffer consisted of 95% mature forest cover and 5% herbaceous field, and the left riparian buffer consisted of 100% mature forest cover. The in-stream habitat was marginal, and no channel alterations were observed.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

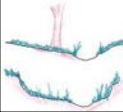
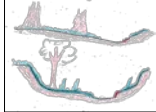
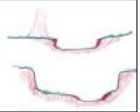
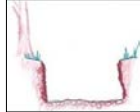
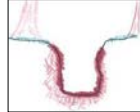
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/27/2019	122-A	152	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB, WN, JF		Unnamed Tributary to Marrowbone Creek					S-122: E1-22		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.00</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>						
	Optimal	Suboptimal	Marginal	Poor	High	Low								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>1.5</p>	<p>1.2</p>	<p>1.1</p>	<p>0.85</p>	<p>0.75</p>	<p>0.6</p>	<p>0.5</p>	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>Ensure the sums of % Riparian Blocks equal 100</p>						
Right Bank	% Riparian Area > 100%	Score > 1.5					100%	<p>CI= (Sum % RA * Scores*0.01)/2</p>						
Left Bank	% Riparian Area > 100%	Score > 1.2					100%	Rt Bank CI > 1.50	Lt Bank CI > 1.20	<p>CI</p>		<p>1.35</p>		

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>					
	Optimal	Suboptimal	Marginal	Poor						
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient High</p>	<p>CI</p>	<p>0.90</p>
Score	1.5	1.2	0.9	0.5	<p>Stream Gradient High</p>		<p>CI</p>	<p>0.90</p>		

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/27/2019	122-A	152	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.11
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking up stream bank, and had active deposition. The left bank consisted of 60% suboptimal canopy cover and the right bank consisted of 100% optimal canopy cover. The instream habitat was poor throughout the reach, lacking riffles, pools, leaf packs and substrate of various particle sizes. The reach had channel alterations due to active livestock.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

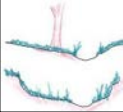
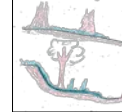
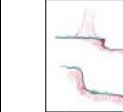


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/27/2019	123-A	292	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-123: C1-17, G 1-11		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Scores	1.5	High	Low	High	Low	High	Low	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	100%						100%
	Score >	1.2						
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	100%						100%
	Score >	1.5						
							Rt Bank CI >	1.20
							Lt Bank CI >	1.50
								CI

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient
					High
					CI
					1.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/27/2019	123-A	292	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.31
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Photos\01-Ex Conditions\Alignment 4BVB)



Looking upstream from the survey point. The riparian zone consists of 100% optimal canopy cover. The instream habitat throughout the reach consisted of riffles, pools, leaf packs and substrate of various particle size. The reach had channel alterations due to active livestock.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

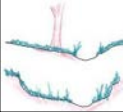
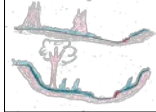
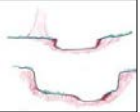

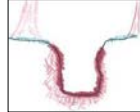
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/27/2018	123-B	541	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB, WN, JF		Unnamed Tributary to Marrowbone Creek					S-123: G11-45, C16-40		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.40</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>			
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor				
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>				
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6		0.5		
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>									
Right Bank	% Riparian Area >	95%	5%				100%	<p>CI= (Sum % RA * Scores*0.01)/2</p>		
	Score >	0.6	1.5							
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	0.65	<p>CI</p>
	Score >	1.5						Lt Bank CI >	1.50	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p style="text-align: center;">Stream Gradient</p> <p style="text-align: center;">High</p>	
Score	1.5	1.2	0.9	0.5		CI
						0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/27/2018	123-B	541	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.90

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.</i>	THE REACH CONDITION INDEX (RCI) >>	1.05
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking [direction] riparian buffer consisted of 100% optimal canopy cover. The right riparian buffer consisted of 95% open active livestock pasture and 5% optimal canopy cover. The instream habitat consisted of riffles, pools and substrate of various particle sizes, but had excess sediment and silt due to active erosion. The reach had channel alterations due to active livestock.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

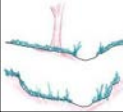
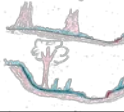
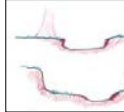

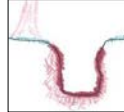
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/27/2019	124-A	105	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB, WN, JF		Unnamed Tributary to Marrowbone Creek					S-124: G19-24, G30-32, I6-8		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	1.60
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>							<p>Ensure the sums of % Riparian Blocks equal 100</p>							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50				CI	
	Score >	1.5						Lt Bank CI >	1.50				1.50	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/27/2019	124-A	105	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.12
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Lookin upstream. Stream consists of 100% optimal canopy cover. In-stream habitat elements are present in 30-50% of the reach. The reach is altered by livestock.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	03010103	125-A	14	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					125: C41-44		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

		Ensure the sums of % Riparian Blocks equal 100						
Right Bank	% Riparian Area>	95%	5%					100%
	Score >	0.6	1.2					
Left Bank	% Riparian Area>	100%						100%
	Score >	0.6						

CI= (Sum % RA * Scores*0.01)/2

Rt Bank CI > 0.63 CI

Lt Bank CI > 0.60 0.62

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >> 0.31

RCI= (Riparian CI)/2

COMPENSATION REQUIREMENT (CR) >> N/A

CR = RCI X LF X IF

INSERT PHOTOS:



and 5% suboptimal canopy cover. The left riparian buffer is 100% open active cattle pasture.

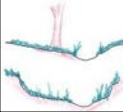
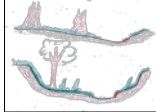
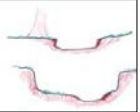

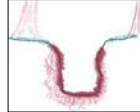
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/27/2019	126-A	145	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-126: H32-39, J24-30		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>Ensure the sums of % Riparian Blocks equal 100</p>
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>														
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/27/2019	126-A	145	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.24
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking riparian buffer consisted of 100% optimal canopy cover. The instream habitat throughout the reach consisted of riffles, pools, and leaf packs. The channel had no alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

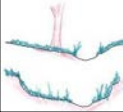
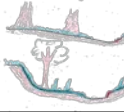
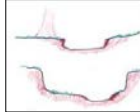
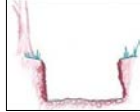
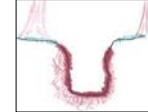
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

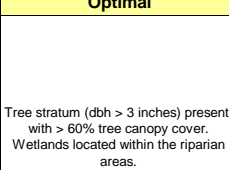
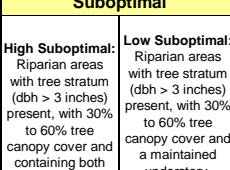
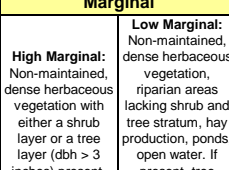
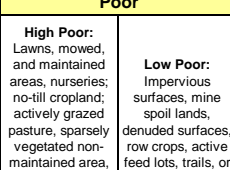
Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/27/2019	126-B	310	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-126: H17-32, J2-15		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

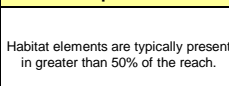
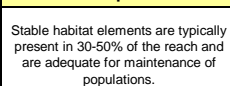
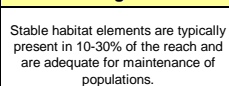
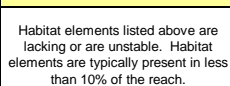
2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
							
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			
Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
CI= (Sum % RA * Scores*0.01)/2											
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
						
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		
Scores	1.5	1.2	0.9	0.5	Stream Gradient	CI
					High	1.20

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/27/2019	126-B	310	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.24
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking uffer consisted of 100% optimal canopy cover. The instream habitat was poor throughout the reach, lacking riffles, pools, leaf packs and substrate of various particle sizes. The channel had no alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

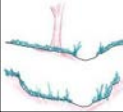
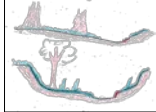
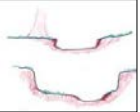
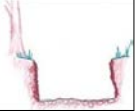
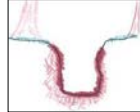
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	4/26/2019	126-C	89	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF		Unnamed Tributary to Marrowbone Creek					S-126: Approximate		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category								NOTES>>		
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Scores	1.5	High	Low	High	Low	High	Low	High	Low		

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area >	100%							100%		
	Score >	1.5									
CI= (Sum % RA * Scores*0.01)/2											
Left Bank	% Riparian Area >	100%							100%		
	Score >	1.5									
									Rt Bank CI >	1.50	CI
									Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		
Scores	1.5	1.2	0.9	0.5	Stream Gradient	
					High	CI
					0.90	

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	4/26/2019	126-C	89	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
0.90

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.06
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking down the stream banks with moderate sediment deposits. The left and right bank riparian buffers consist of wetlands. Instream habitat is present in 10-30% of the reach. Livestock alters 40-60% of the channel for this stream reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

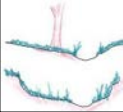
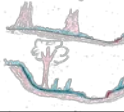
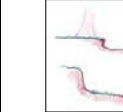


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/27/2019	127-A	75	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-127: J15-25		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	1.60

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			
Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	100%						100%	CI= (Sum % RA * Scores*0.01)/2
	Score >	1.5							
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI > 1.50
	Score >	1.5							Lt Bank CI > 1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	2/27/2019	127-A	75	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.02
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking [direction] offers consisted of 100% optimal canopy cover. The instream habitat was poor throughout the reach, lacking riffles, pools, leaf packs and substrate of various particle sizes. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

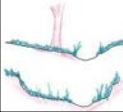
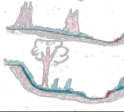
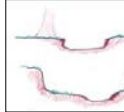

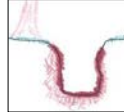
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/28/2019	128-A	539	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-128: L1-28, K9-37		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Scores	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			
Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	100%						100%	
	Score >	1.5							
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area>	100%						100%	
	Score >	1.5							
							Rt Bank CI >	1.50	CI
							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Scores	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/28/2019	128-A	539	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.38
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PHI



Looking upstream at Stream Reach 128-A. The reach had optimal channel condition. The right and left riparian buffer consisted of 100% optimal canopy cover. The instream habitat throughout the reach consisted of riffles, pools, leaf packs and substrate of various particle size. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

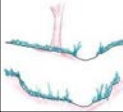
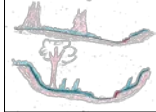
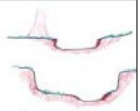

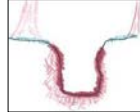
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	2/28/2019	129-A	55	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-129: K1-9		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	80%	20%					100%		
	Score >	1.5	1.1							
CI= (Sum % RA * Scores*0.01)/2										
Left Bank	% Riparian Area>	100%						100%		
	Score >	1.5								
								Rt Bank CI >	1.42	CI
								Lt Bank CI >	1.50	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	2/28/2019	129-A	55	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.25
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looker consisted of 80% optimal canopy cover and 20% of non-maintained herbaceous cover with suboptimal canopy cover. The left riparian buffer consisted of 100% optimal canopy cover. The instream habitat consisted of leaf packs and substrate of various particle size but lacked riffle pool complexes. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER


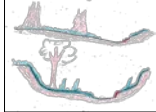
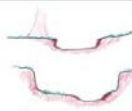
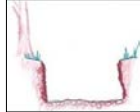
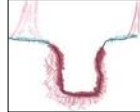
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

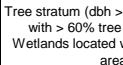
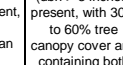
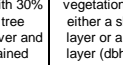
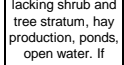
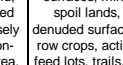

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	2/28/2019	130-A	61	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-130: M4-8, N5-12		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.40

NOTES>>

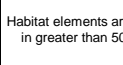
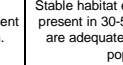
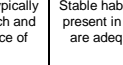
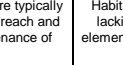
2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
								
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	

- Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
- Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
- Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area >	100%					100%		
	Score >	1.5							
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50
	Score >	1.5						Lt Bank CI >	1.50
CI									
1.50									

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
					
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	2/28/2019	130-A	61	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.26
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking downstream at Stream Reach 130-A. The reach was moderately incised with areas of active erosion. The right and left riparian buffer consisted of 100% optimal canopy cover. The instream habitat consisted of leaf packs and substrate of various particle size but lacked riffle and pool complexes and had excess sediment and silt due to active erosion. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

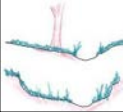
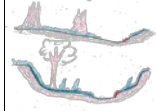
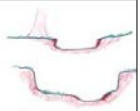

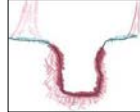
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	2/28/2019	130-B	421	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-130: N12-24, M8-29		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50					CI
	Score >	1.5						Lt Bank CI >	1.50					1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	0.90
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	2/28/2019	130-B	421	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.26
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking downstream at Stream Reach 130-B. The reach was moderately incised with areas of active erosion. The right and left riparian buffer consisted of 100% optimal canopy cover. The instream habitat consisted of leaf packs and substrate of various particle size but had excess sediment and silt due to active erosion. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

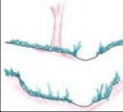
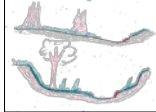
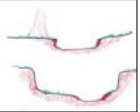
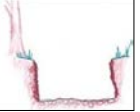
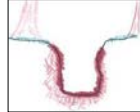
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/28/2019	131-A	35	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-131: O1, P6-8		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Scores	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	 Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	3	2.4	2	1.6	1	2.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category								Scores	NOTES>>					
	Optimal	Suboptimal	Marginal	Marginal		Poor									
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		1.5	1.2	1.1	0.85	0.75	0.6	0.5	
								1.5	1.2	1.1	0.85	0.75	0.6	0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.								Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%													
	Score >	1.5													
CI= (Sum % RA * Scores*0.01)/2															
Left Bank	% Riparian Area >	100%											100%	1.50	CI
	Score >	1.5											1.50	1.50	CI

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Scores	Stream Gradient	CI		
	Optimal	Suboptimal	Marginal	Poor					
Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	1.5	1.2	0.9	0.5	High	1.50
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/28/2019	131-A	35	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.30
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PHI



Looking throughout. The right and left riparian buffers consisted of 100% optimal canopy cover. The instream habitat throughout the reach consisted of riffles, pools, leaf packs and substrate of various particle size. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

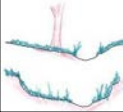
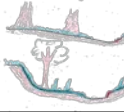
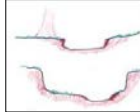
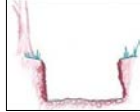
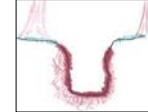
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/28/2019	132-A	587	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-132: T8-43, S6-35		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Scores	CI				
	Optimal	Suboptimal	Marginal	Poor	Severe						
											
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	3	2.4	2	1.6	1	2.00
NOTES>>											

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Poor										
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			1.5	1.2	1.1	0.85	0.75	0.6	0.5	
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%												
	Score >	1.5												
CI= (Sum % RA * Scores*0.01)/2														
Left Bank	% Riparian Area >	100%										100%		
	Score >	1.5											1.50	1.50
3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.														

Instream Habitat/ Available Cover	Conditional Category				Scores	Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor						
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	1.5	1.2	0.9	0.5	High	1.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	03010103	2/28/2019	132-A	587	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.30
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X L _i X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PHI



Looking throughout. The right and left riparian buffer consisted of 100% optimal canopy cover. The instream habitat throughout the reach consisted of riffles, pools, leaf packs and substrate of various particle size. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

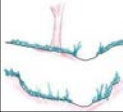
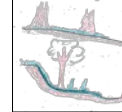
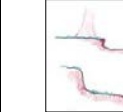


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	2/28/2019	132-B	160	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-132: T1-8, S1-6		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.00
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5			
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100	
Right Bank	% Riparian Area >	100%					100%
	Score >	1.5					
							CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area >	100%					100%
	Score >	1.5					
							Rt Bank CI > 1.50 Lt Bank CI > 1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI 0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	2/28/2019	132-B	160	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.18
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking up right and left riparian buffer consisted of 100% optimal canopy cover. The instream habitat consisted of leaf packs and substrate of various particle size but lacked riffle pool complexes and had excess sediment and silt due to active erosion. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/1/2019	133-A	203	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-133: U1-9, V1-9		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.							Ensure the sums of % Riparian Blocks equal 100	
Right Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
								CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI > 1.50 Lt Bank CI > 1.50
	Score >	1.5						CI 1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >> 0.75

RCI= (Riparian CI)/2

COMPENSATION REQUIREMENT (CR) >> N/A

CR = RCI X LF X IF

INSERT PHOTOS:



canopy cover.

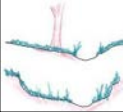
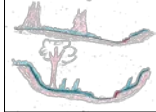
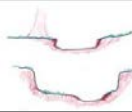
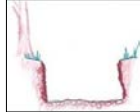
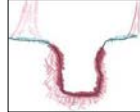
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/01/2019	133-B	144	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-133: U9-15, V9-13		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor	High	Low		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	100%						100%	
	Score >	1.5							
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area>	100%						100%	
	Score >	1.5							
								Rt Bank CI >	1.50
								Lt Bank CI >	1.50
									CI
									1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					1.20

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/01/2019	133-B	144	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.24
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking upstream at Stream Reach 133-B. The reach was moderately incised with areas of active erosion. The right and left riparian buffer consisted of 100% optimal canopy cover. The instream habitat consisted of riffles, pools, leaf packs and substrate of various particle size but had excess sediment and silt due to active erosion. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER


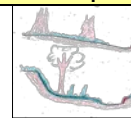
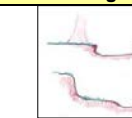


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	134-A	1,487	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-134: W1-79, X161A		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal	Poor									
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
<p style="text-align: center;">Ensure the sums of % Riparian Blocks equal 100</p>														
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
CI= (Sum % RA * Scores*0.01)/2														
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	134-A	1,487	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.24
	RCI= (Sum of all CIs)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking down the stream channel. The right and left riparian buffer consisted of 100% optimal canopy cover. The instream habitat consisted of riffles, pools, leaf packs and substrate of various particle size but had excess sediment and silt due to active erosion. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

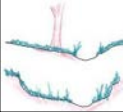
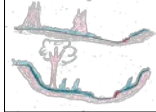
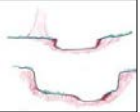

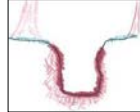
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	134-B	500	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-134: X63-71, Z13-21		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>							<p>Ensure the sums of % Riparian Blocks equal 100</p>							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
CI= (Sum % RA * Scores*0.01)/2														
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50				CI	
	Score >	1.5						Lt Bank CI >	1.50				1.50	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	134-B	500	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.32
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking [direction] buffer consisted of 100% optimal canopy cover. The instream habitat consisted of riffles, pools, leaf packs and substrate of various particle size but had excess sediment and silt due to active erosion. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

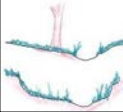
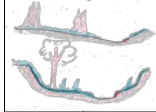
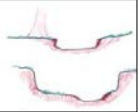

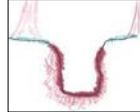
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/01/2019	135-A	16	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-135: X2-5		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>		
	Optimal	Suboptimal	Marginal		Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p> <p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p> <p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>		<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p> <p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>				
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5		
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>			
Right Bank	% Riparian Area >	100%					100%		
	Score >	1.5							
Left Bank	% Riparian Area >	100%					100%		
	Score >	1.5							
							CI= (Sum % RA * Scores*0.01)/2		
							Rt Bank CI >	1.50	CI
							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/01/2019	135-A	16	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.18
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking upstream at Stream Reach 135-A. The reach was moderately incised with areas of active erosion. The right and left riparian buffer consisted of 100% optimal canopy cover. The instream habitat had leaf packs and substrate of various particle size but lacked riffle and pool complexes. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

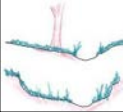
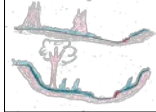
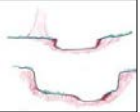

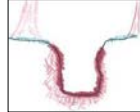
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/01/2019	136-A	7	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-136: X39-42		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal		Poor									
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
<p style="text-align: center;">Ensure the sums of % Riparian Blocks equal 100</p>														
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5						CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	0.90
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/01/2019	136-A	7	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category						NOTES>>
	Negligible	Minor	Moderate		Severe		
	Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5	CI 1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	1.26
RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking [direction] consisted of 100% optimal canopy cover. The instream habitat was marginal throughout the reach, lacking riffles, pools and leaf packs. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

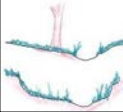
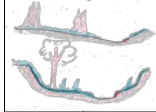
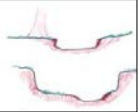

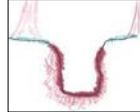
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

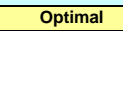
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/01/2019	137-A	68	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-137: W52-59		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
 <p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	0.90
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/01/2019	137-A	68	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.18
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking consisted of 100% optimal canopy cover. The instream habitat was marginal throughout the reach, lacking riffles, pools and leaf packs. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

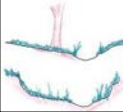
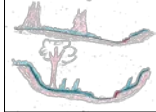
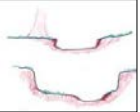

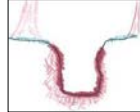
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/01/2019	138-A	53	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-138: W69-75		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>1.00</p>
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6		Low 0.5
<p>Ensure the sums of % Riparian Blocks equal 100</p>								
Right Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
							Rt Bank CI > 1.50	
							Lt Bank CI > 1.50	
CI								

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		<p style="text-align: center;">Stream Gradient</p> <p style="text-align: center;">High</p>	
Score	1.5	1.2	0.9	0.5		CI
						0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/01/2019	138-A	53	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	0.90
		RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking downstream at Stream Reach 138-A. The reach was severely incised with active erosion throughout. The right and left riparian buffer consisted of 100% optimal canopy cover. The instream habitat was poor throughout the reach, lacking riffles, pools and leaf packs. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

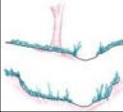
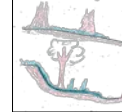
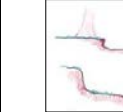


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	139-A	160	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-139: X71-91, Z1-13		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.40

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High	Low	High	Low	High	Low	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area >	100%						100%	
	Score >	1.5							
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area >	100%						100%	
	Score >	1.5							
Rt Bank CI > 1.50 Lt Bank CI > 1.50									

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	139-A	160	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.32
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking [] buffer consisted of 100% optimal canopy cover. The instream habitat consisted of riffles, pools, leaf packs and substrate of various particle size but had excess sediment and silt due to active erosion. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

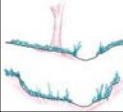
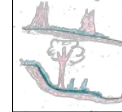
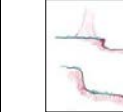


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/01/2019	140-A	14	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-140: AC13-10		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	100%						100%	
	Score >	1.5							
Left Bank	% Riparian Area>	100%						100%	
	Score >	1.5							

CI= (Sum % RA * Scores*0.01)/2
 Rt Bank CI > 1.50
 Lt Bank CI > 1.50
CI 1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High

CI 0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/01/2019	140-A	14	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.10
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking [direction] and left riparian buffer consisted of 100% optimal canopy cover. The instream habitat was poor throughout the reach, lacking riffles, pools, substrate of various particle sizes and leaf packs. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

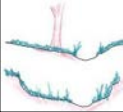
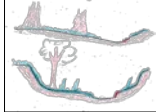
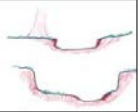

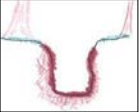
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	141-A	439	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Marrowbone Creek??					S-141: AC1-121, AD1-8		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
<p style="text-align: center;">Ensure the sums of % Riparian Blocks equal 100</p>														
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/01/2019	141-A	439	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	1.32
RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking downstream at Stream Reach 141-A. The reach was incised with areas of active erosion. The right and left riparian buffer consisted of 100% optimal canopy cover. The instream habitat consisted of leaf packs and substrate of various particle size but lacked riffle and pool complexes and had excess sediment and silt due to active erosion. The reach had no channel alterations

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

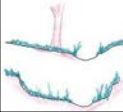
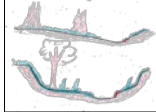
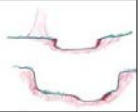
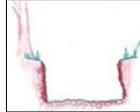
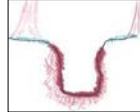
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/04/2019	142-A	343	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-142: AV1-22, AW1-14		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.40</p>
Score	3	2.4	2	1.6	1	2.40				
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>		
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6		Low 0.5
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>	<p>Ensure the sums of % Riparian Blocks equal 100</p>							
Right Bank	% Riparian Area>	100%					100%	<p>CI= (Sum % RA * Scores*0.01)/2</p>
	Score >	1.2						
Left Bank	% Riparian Area>	100%					100%	Rt Bank CI > 1.20
	Score >	1.1						Lt Bank CI > 1.10
<p>3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.</p>								

Instream Habitat/ Available Cover	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>Stream Gradient</p>	<p>CI</p>	
Score	1.5	1.2	0.9	0.5	<p>High</p>	<p>0.90</p>

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/04/2019	142-A	343	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.19
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENV\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking upstream at Stream Reach 142-A. The reach had areas of active erosion. The right and left riparian buffer consisted of 100% suboptimal canopy cover due to recent logging activity. The instream habitat was marginal throughout the reach, lacking riffles, pools and leaf packs. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

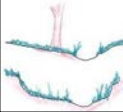
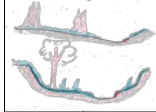
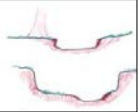

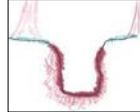
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/04/2019	143-A	303	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-143: AX1-17		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.00</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>		
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>		
Right Bank	% Riparian Area >	50%	50%				100%	
	Score >	1.2	0.85					
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	60%	40%				100%	Rt Bank CI > 1.03
	Score >	1.1	0.85					Lt Bank CI > 1.00
								1.01

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>		
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI 0.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/04/2019	143-A	303	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.00
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking [left] The right riparian buffer consisted of 30-60% subpotimal canopy cover with a non-maintained understory. The left riparian buffer consisted of 30-60% subpotimal canopy cover with a non-maintained herbaceous understory and areas of denuded land due to recent logging activity. The instream habitat was marginal throughout the reach, lacking riffles, pools and leaf packs. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

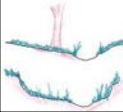
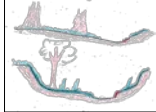
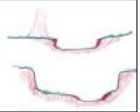
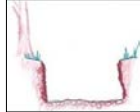
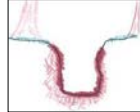
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

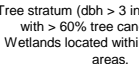
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/04/2019	144-A	120	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					144-A: AY11-24, AX17-20		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
 <p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>							<p>Ensure the sums of % Riparian Blocks equal 100</p>							
Right Bank	% Riparian Area >	70%	30%				100%							
	Score >	1.5	1.1											
CI= (Sum % RA * Scores*0.01)/2														
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.38				CI	
	Score >	1.5						Lt Bank CI >	1.50				1.44	

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI
	Optimal	Suboptimal	Marginal	Poor		
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	High	0.50	
Score	1.5	1.2	0.9	0.5		

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/04/2019	144-A	120	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.09
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking up... in buffer consisted of 30-60% suboptimal canopy cover with a non-maintained understory and areas of denuded surfaces due to recent logging activity. The left riparian buffer consisted of 100% optimal canopy cover. The instream habitat was marginal throughout the reach, lacking riffles, pools and leaf packs. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

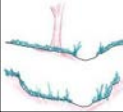
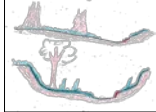
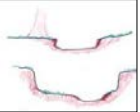
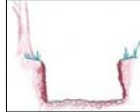
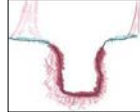
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/04/2019	145-A	626	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-145: BA1-36, BC1-25, BB1-7		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:	Poor									
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>							<p>Ensure the sums of % Riparian Blocks equal 100</p>							
Right Bank	% Riparian Area>	85%	15%				100%							
	Score >	1.5	1.1											
CI= (Sum % RA * Scores*0.01)/2														
Left Bank	% Riparian Area>	95%	5%				100%	Rt Bank CI >	1.44					
	Score >	1.5	1.1					Lt Bank CI >	1.48					1.46

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/04/2019	145-A	626	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.37
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking [] and left riparian buffer consisted of 100% optimal canopy cover. The instream habitat consisted of leaf packs, riffle, pools and substrate of various particle size. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	3/04/2019	146-A	23	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-146: AZ2-4, BA2-4		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

		Ensure the sums of % Riparian Blocks equal 100						
Right Bank	% Riparian Area>	40%	60%					100%
	Score >	1.5	0.85					
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area>	100%						100%
	Score >	1.5						
		Rt Bank CI >	1.11	CI				
		Lt Bank CI >	1.50	1.31				

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.66
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



cover and 60% of non-maintained herbaceous understory with marginal canopy cover. The left riparian buffer consisted of 100% canopy cover.


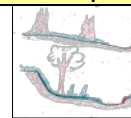
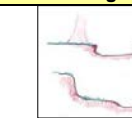


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/04/2019	146-B	64	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-146 AZ 4-6, BA 4-7		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	1.60

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p> <p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p> <p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p> <p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>			
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Right Bank	% Riparian Area>	30%	70%					100%
	Score >	1.5	0.85					
Left Bank	% Riparian Area>	100%						100%
	Score >	1.5						

CI= (Sum % RA * Scores*0.01)/2
 Rt Bank CI > 1.05
 Lt Bank CI > 1.50
CI 1.27

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High

CI 0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/04/2019	146-B	64	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.05
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking [direction] incision. The right riparian buffer consisted of 30% optimal canopy cover and 70% of non-maintained dense herbaceous understory with marginal canopy cover. The left riparian buffer consisted of 100% optimal canopy cover. The instream habitat was marginal throughout the reach and had substrate of various particle sizes and leaf packs. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER


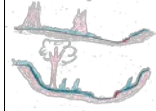
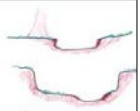


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

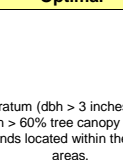
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/04/2019	147-A	410	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-147: BB7-23, BC25-41		

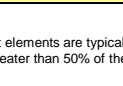
1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.00</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor	
 <p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>	
Right Bank	% Riparian Area >	65%	35%				100%
	Score >	1.5	0.85				
CI= (Sum % RA * Scores*0.01)/2							
Left Bank	% Riparian Area >	15%	85%				100%
	Score >	1.5	0.85				
						Rt Bank CI >	1.27
						Lt Bank CI >	0.95
						CI	1.11

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>				
	Optimal	Suboptimal	Marginal	Poor					
 <p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient High</p>	<p>CI</p>
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/04/2019	147-A	410	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.58

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.12
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking ups... buffer consisted of 65% optimal canopy cover and 35% non-maintained herbaceous understory with marginal canopy cover due to recent logging activity. The left riparian buffer consisted of 15% canopy cover and 85% non-maintained understory with marginal canopy cover due to recent logging activity. The instream habitat was marginal throughout the reach, lacking substrate of various particle sizes, leaf packs and shade. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

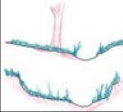
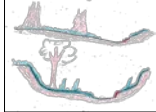
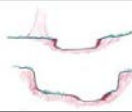
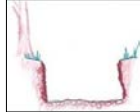
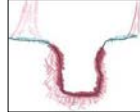
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/01/2019	148-A	196	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-148: BD1-10, BE1-10		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	3.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>		
	Optimal	Suboptimal	Marginal		Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5		
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100			
Right Bank	% Riparian Area >	100%					100%		
	Score >	1.5							
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area >	100%					100%		
	Score >	1.5							
							Rt Bank CI >	1.50	
							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/01/2019	148-A	196	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	1.38
RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking the right and left
riparian buffer consisted of 100% optimal canopy cover. The instream habitat was marginal throughout the reach, lacking riffles, pools complexes. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

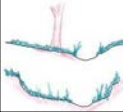
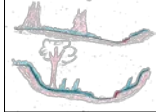
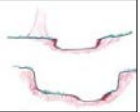

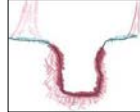
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	4/26/2019	148-B	60	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF		Unnamed Tributary to Marrowbone Creek					S-148: XK1-6, XL1-5		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	0.90
NOTES>>									
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	4/26/2019	148-B	60	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.26
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking and right bank
riparian buffers consist of mature forests with greater than 60% tree canopy cover. Instream habitat present in 10-30% of the reach. No channel alteration present within the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

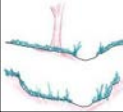
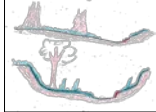
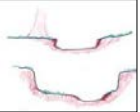

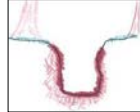
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/04/2019	149-A	340	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-149: BG-21, BF1-28		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	1.60

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>		
	Optimal	Suboptimal	Marginal		Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5		
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100			
Right Bank	% Riparian Area >	100%					100%		
	Score >	1.5							
CI= (Sum % RA * Scores*0.01)/2									
Left Bank	% Riparian Area >	100%					100%		
	Score >	1.5							
							Rt Bank CI >	1.50	
							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/04/2019	149-A	340	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.06
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking downstream at Stream Reach 149-A. The reach was moderately incised with areas of active erosion. The right and left riparian buffer consisted of 100% optimal canopy cover. The instream habitat was marginal throughout the reach, lacking riffles, pools complexes. The reach had minor channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

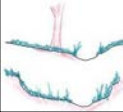
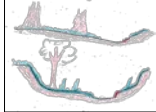
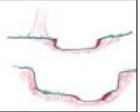

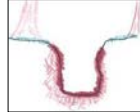
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	4/26/2019	149-B	54	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF		Unnamed Tributary to Marrowbone Creek					S-149: XM1-3, XN1-3		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal		Poor									
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	4/26/2019	149-B	54	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.24
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking downstream at Stream Reach 149-B. The stream is often incised with vegetative protection on 40-60% of the banks. The left and right riparian buffers consist of mature forest with greater than 60% tree canopy cover. Instream habitat is present in 30-50% of the stream reach. No channel alteration is present within the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

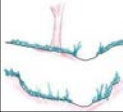
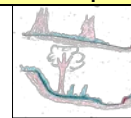
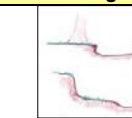


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/04/2019	150-A	484	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-150: BK1-10, BO1-6, BN1-5		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>																																					
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor																																							
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>																															
							High	Low	High	Low	High	Low																																	
<p>Right Bank</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">% Riparian Area ></td> <td style="width: 15%;">100%</td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> </tr> <tr> <td>Score ></td> <td>1.5</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>							% Riparian Area >	100%													Score >	1.5													<p>Ensure the sums of % Riparian Blocks equal 100</p>							100%	<p>CI= (Sum % RA * Scores*0.01)/2</p>		
% Riparian Area >	100%																																												
Score >	1.5																																												
<p>Left Bank</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">% Riparian Area ></td> <td style="width: 15%;">80%</td> <td style="width: 15%;">20%</td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> </tr> <tr> <td>Score ></td> <td>1.5</td> <td>1.2</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>							% Riparian Area >	80%	20%												Score >	1.5	1.2																			100%	Rt Bank CI > 1.50	Lt Bank CI > 1.44	1.47
% Riparian Area >	80%	20%																																											
Score >	1.5	1.2																																											

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.50
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/04/2019	150-A	484	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.29
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENV\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking up... buffer consisted of 100% optimal canopy cover. The left riparian buffer consisted of 80% canopy cover and 20% of less dense canopy cover. The instream habitat consisted of riffles, pools, leaf packs and substrate of various particle size. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

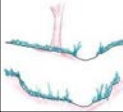
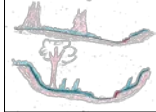
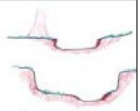

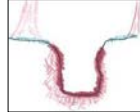
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

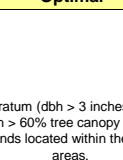
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/04/2019	151-A	63	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-151: BQ1-4, BR1-4		

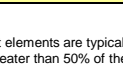
1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	<p>3</p>	<p>2.4</p>	<p>2</p>	<p>1.6</p>	<p>1</p>	<p>2.40</p>
Score										
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal	Poor			
 <p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>	
Right Bank	% Riparian Area >	10%	90%				100%
	Score >	1.5	1.1				
							CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area >	95%	5%				100%
	Score >	1.5	1.1				
							Rt Bank CI > 1.14
							Lt Bank CI > 1.48
							CI 1.31

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>				
	Optimal	Suboptimal	Marginal	Poor					
 <p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	<p>1.5</p>	<p>1.2</p>	<p>0.9</p>	<p>0.5</p>	<p>Stream Gradient High</p>	<p>CI 0.90</p>
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/04/2019	151-A	63	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.18
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENV\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking upstream at reach 151-A. The reach was incised with areas of active erosion. The right riparian buffer consisted of 10% optimal canopy cover and 90% suboptimal tree cover. The left riparian buffer consisted of 95% optimal canopy cover and 5% suboptimal suboptimal canopy cover. The instream habitat was marginal throughout the reach due to excess sediment and silt. The reach had minor channel alterations due to a culvert and an impundment created online above this reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

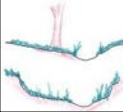
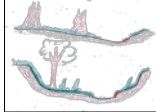
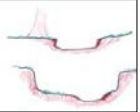

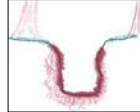
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/04/2019	151-B	168	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-151: BT7-16, BS7-16		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>
	Optimal	Suboptimal	Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	High 1.2	Low 1.1	High 0.85	Low 0.75	High 0.6	Low 0.5
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100	
Right Bank	% Riparian Area >	100%					100%
	Score >	1.5					
CI= (Sum % RA * Scores*0.01)/2							
Left Bank	% Riparian Area >	100%					100%
	Score >	1.5					
						Rt Bank CI >	1.50
						Lt Bank CI >	1.50
CI							

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High
					CI
					1.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/04/2019	151-B	168	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	1.30
RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking upstream at Stream Reach 151-B. The reach had optimal channel condition. The right and left riparian buffer consisted of 100% optimal canopy cover. The instream habitat throughout the reach consisted of riffles, pools, leaf packs and substrate of various particle size. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

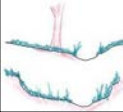
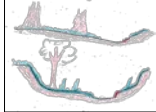
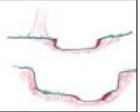

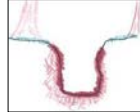
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	4/26/2019	151-C	63	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF		Unnamed Tributary to Marrowbone Creek					S-151: XO1-5, XP1-5		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%					100%							
							Score >	1.5						CI = (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
							Score >	1.5	Lt Bank CI >	1.50	1.50			

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	0.90
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	4/26/2019	151-C	63	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.18
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking downstream at Stream Reach 151-C. The stream is incised with erosion occurring on both stream banks. The left and right bank riparian buffers consist of mature forest with greater than 60% tree canopy cover. Instream habitat is present in 10-30% of the reach. No channel alteration is present with the stream reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER


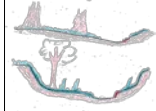
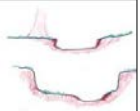
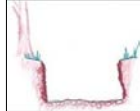
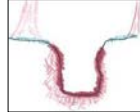
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	4/26/2019	151-D	130	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF		Unnamed Tributary to Marrowbone Creek					S-151: BT7-16, BS7-16		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	3.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:	Poor									
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	10%	45%	45%			100%							
	Score >	1.5	0.6	1.1										
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	10%	90%				100%	Rt Bank CI > 0.92						
	Score >	1.5	0.6					Lt Bank CI > 0.69						
								0.80						

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	4/26/2019	151-D	130	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.26
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking downstream at Stream Reach 151-D. The stream has minimal incision and erosion with 80-100% vegetative surface protection. The left bank riparian buffer consists of a wetland and maintained lawn. The right bank riparian buffer consists of a wetland, maintained lawn, and forest with 30-60% tree canopy cover and maintained understory. Instream habitat is present in in 30-50% of the reach. Channel alteration is present in less than 20% of the reach due to a bridge.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

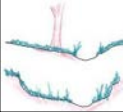
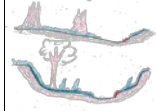
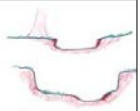

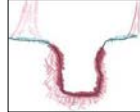
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

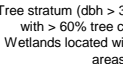
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/05/2019	152-A	414	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-152: BV4-28, BW 3-25		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
 <p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
<p style="text-align: center;">Ensure the sums of % Riparian Blocks equal 100</p>														
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5						CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/05/2019	152-A	414	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.32
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking down stream. The stream bed consisted of 100% optimal canopy cover. The instream habitat throughout the reach consisted of leaf packs and substrate of various particle size but lacked riffle and pool complexes. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

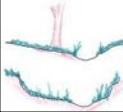
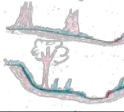
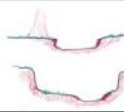
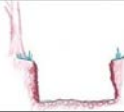
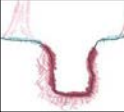
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/05/2019	152-B	210	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-152: BV28-33, BW30-35		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score				
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	3.00
NOTES>>						CI				

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Poor	High	Low								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	
<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>						<p>Ensure the sums of % Riparian Blocks equal 100</p>								
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	Score			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	High	1.5	1.2	0.9	0.5	0.90

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/05/2019	152-B	210	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.38
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking in buffer consisted of 100% optimal canopy cover. The instream habitat throughout the reach consisted of leaf packs but lacked substrate of various particle size and riffle and pool complexes. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER


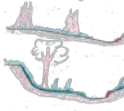
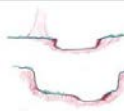
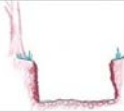

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

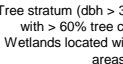
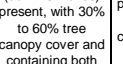
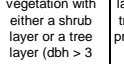
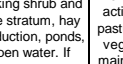
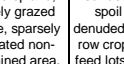
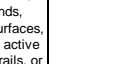
Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	4/26/2019	152-C	56	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF		Unnamed Tributary to Marrowbone Creek					S-152: XU10-12		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

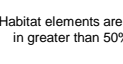
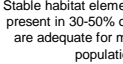
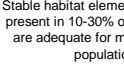
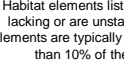
Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	3.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal		Poor			
								
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
CI= (Sum % RA * Scores*0.01)/2								
Left Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
							Rt Bank CI >	1.50
							Lt Bank CI >	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
					
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	4/26/2019	152-C	56	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.44
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking down stream. The left and right bank riparian buffers consist of mature forest with greater than 60% tree canopy cover. Instream habitat is present in 30-50% of the stream. No channel alteration is present in this reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

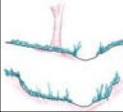
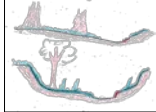
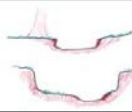
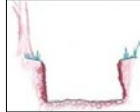
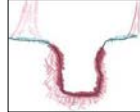
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	4/26/2019	152-D	40	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF		Unnamed Tributary to Marrowbone Creek					S-152: XU1-10		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					CI
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	
Score	3	2.4	2	1.6	1	2.00

NOTES>>

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						NOTES>>	
	Optimal	Suboptimal	Marginal	Poor				
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.				
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Ensure the sums of % Riparian Blocks equal 100		
Right Bank	% Riparian Area >	100%					100%	
	Score >	1.5						
Left Bank	% Riparian Area >	80%	20%				100%	
	Score >	1.5	1.1					
							$CI = (\text{Sum } \% RA * \text{Scores} * 0.01) / 2$ Rt Bank CI > 1.50 Lt Bank CI > 1.42	CI 1.46

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	Stream Gradient High

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	4/26/2019	152-D	40	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.23
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking upstream. The left bank riparian buffer consists of mature forest with greater than 60% tree canopy cover. The right bank riparian buffer consists of mature forest with greater than 60% tree canopy cover and portions of mature forest with a maintained understory. Instream habitat is present in 30-50% of the stream. No channel alteration is present in this reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

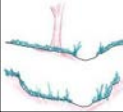
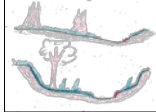
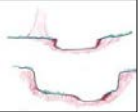

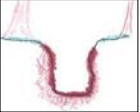
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/05/2019	153-A	37	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-153: BW25-30		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>									
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor											
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>			
							Ensure the sums of % Riparian Blocks equal 100										
Right Bank	% Riparian Area >	100%				100%											
							Score >	1.5							CI = (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area >	100%				100%								Rt Bank CI >	1.50	CI	
							Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	0.90
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/05/2019	153-A	37	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH						
						CI
						1.10

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	1.10
RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking right and left riparian buffer consisted of 100% optimal canopy cover. The instream habitat throughout the reach consisted of leaf packs but lacked substrate of various particle size and riffle and pool complexes. The reach had concrete blocks and metal in streambed.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER


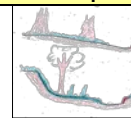
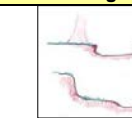


Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/05/2019	154-A	367	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JB/ WN/ JF		Unnamed Tributary to Marrowbone Creek					S-154: BX1-27, BY1-15		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	3/05/2019	154-A	367	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.32
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking up stream in buffer consisted of 100% optimal canopy cover. The instream habitat throughout the reach consisted of leaf packs and substrate of various particle size but lacked riffle and pool complexes. The reach had no channel alterations.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

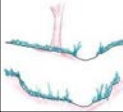
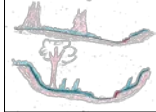
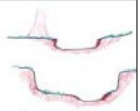

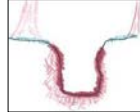
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/05/2019	154-B	64	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF		Unnamed Tributary to Marrowbone Creek					S-154: XF1-6, XG1-6		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal:		Poor								
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.50
NOTES>>									
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R3	02070010	3/05/2019	154-B	64	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe	Severe	
Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.38
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking down the stream. The left and right bank riparian buffers consist of mature forests with greater than 60% tree canopy cover. Instream habitat is present in greater than 60% of the reach. No channel alteration is present within this reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R6	03010103	4/26/2019	155-A	291	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF		Unnamed Tributary to Marrowbone Creek					S-155: XD1-13, XE1-13		

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
Condition Scores	1.5	High 1.2 Low 1.1	High 0.85 Low 0.75	High 0.6 Low 0.5				

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

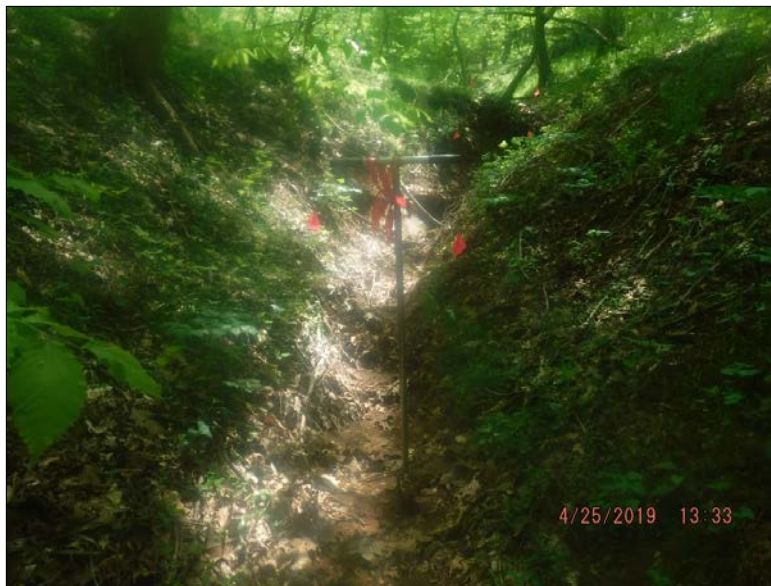
		Ensure the sums of % Riparian Blocks equal 100										
Right Bank	% Riparian Area>	100%						100%				
	Score >	1.5										
											CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI	
	Score >	1.5							Lt Bank CI >	1.50	1.50	

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.75
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF	

INSERT PHOTOS:



forests with greater than 60% tree canopy cover.

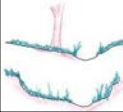
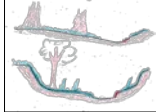
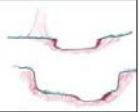

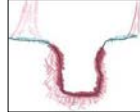
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	4/26/2019	156-A	29	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF		Unnamed Tributary to Marrowbone Creek					S-156: XJ1-7		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal	Low Marginal	Poor									
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
<p style="text-align: center;">Ensure the sums of % Riparian Blocks equal 100</p>														
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	4/26/2019	156-A	29	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category						NOTES>>
	Negligible	Minor	Moderate		Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5	

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

<i>NOTE:</i> The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.32
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking down stream. The left and right bank riparian buffers consist of mature forests with greater than 60% tree canopy cover. Instream habitat is present in 30-50% of the reach. No channel alteration is present within this reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

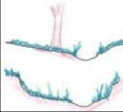
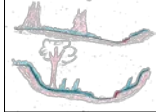
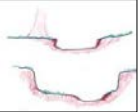

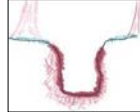
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	4/26/2019	157-A	39	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF		Unnamed Tributary to Marrowbone Creek					S-157: XQ1-3, XR1-3		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.00
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal		Poor									
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
							Ensure the sums of % Riparian Blocks equal 100							
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	02070010	4/26/2019	157-A	39	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.24
	COMPENSATION REQUIREMENT (CR) >>	N/A
CR = RCI X LF X IF		

INSERT PHOTOS:

(WSSI Photo Location L:\30000s\30500\30544.01\Admin\05-ENVR\TEMPLATE-UPLOADS\TEAM #1\ALIGNMENT 4B\PH



Looking down stream from right bank. riparian buffers consist of mature forests with greater than 60% tree canopy cover. Instream habitat is present in 30-50% of the reach. No channel alteration is present within this reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

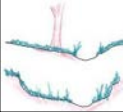
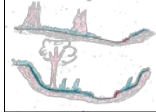
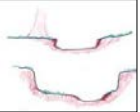

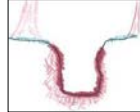
Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact/SAR Length	Impact Factor	
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	04/26/2019	158-A	262	N/A	
Name(s) of Evaluator(s)		Stream Name and Information					Stream Map		
JF		Tributary of Marrowbone Creek					S-158: Approximate		

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition	Conditional Category					Score	CI			
	Optimal	Suboptimal	Marginal	Poor	Severe					
 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	3	2.4	2	1.6	1	2.40
NOTES>>										

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Riparian Buffers	Conditional Category						Condition Scores	NOTES>>						
	Optimal	Suboptimal	Marginal		Poor									
<p>Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.</p>	<p>High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.</p>	<p>Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).</p>	<p>High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.</p>	<p>Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.</p>	<p>High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.</p>	<p>Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.</p>	1.5	1.2	1.1	0.85	0.75	0.6	0.5	<p>1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.</p> <p>2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.</p> <p>3. Enter the % Riparian Area and Score for each riparian category in the blocks below.</p>
<p style="text-align: center;">Ensure the sums of % Riparian Blocks equal 100</p>														
Right Bank	% Riparian Area >	100%					100%							
	Score >	1.5												
								CI= (Sum % RA * Scores*0.01)/2						
Left Bank	% Riparian Area >	100%					100%	Rt Bank CI >	1.50	CI				
	Score >	1.5						Lt Bank CI >	1.50	1.50				

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.

Instream Habitat/ Available Cover	Conditional Category				Stream Gradient	CI			
	Optimal	Suboptimal	Marginal	Poor					
<p>Habitat elements are typically present in greater than 50% of the reach.</p>	<p>Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.</p>	<p>Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.</p>	<p>Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.</p>	1.5	1.2	0.9	0.5	High	1.20
NOTES>>									
Score									

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR # / Data Point	Impact / SAR length	Impact Factor
30544.01	Martinsville Connector (VDOT)	Henry	R4	03010103	04/26/2019	158-A	262	N/A

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Conditional Category					NOTES>>
	Negligible	Minor	Moderate	Severe		
	Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

CI
1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.	THE REACH CONDITION INDEX (RCI) >>	1.32
	RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)	
	COMPENSATION REQUIREMENT (CR) >>	N/A
	CR = RCI X LF X IF	

INSERT PHOTOS:

(WSSI Photo Location L:\9999.01\Images\Stream Assessment\IMG_2733.jpg)



Looking downstream at Stream Reach 158-A. The stream has slight incision with 60-80% vegetative surface protection on the banks. The left and right bank riparian buffers consist of wetlands and mature forest with greater than 60% tree canopy cover. Instream habitat is present in 30-50% of the stream. Channel alteration is not present in the reach.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER