

## Baseline Assessment – Stream Attributes

**Reach S-KL38 (Pipeline ROW)**

**Perennial**

**Spread I**

**Franklin County, Virginia**

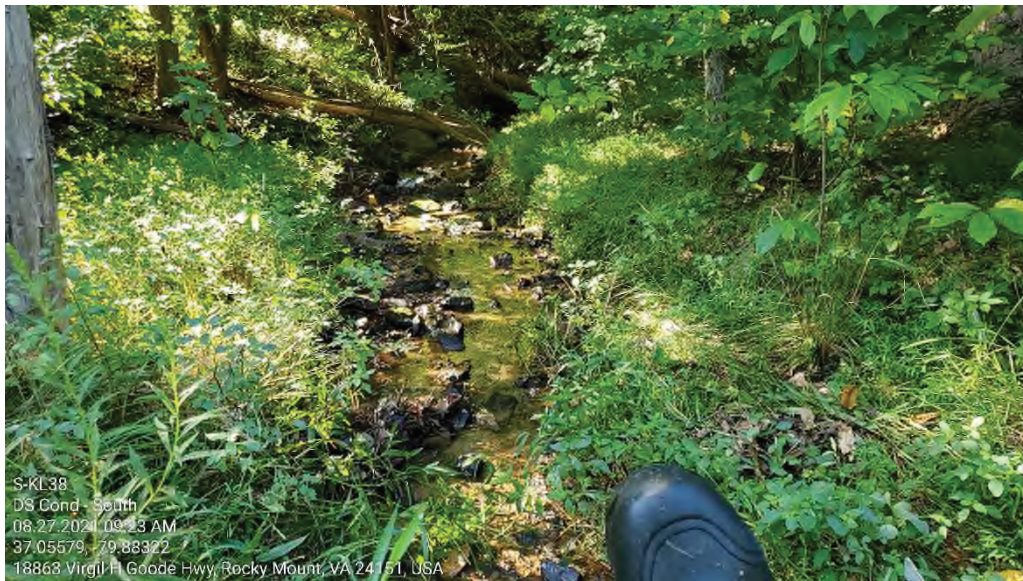
<b>Data</b>	<b>Included</b>
Photos	✓
SWVM Form	✓
FCI Calculator and HGM Form	N/A—Perennial stream (Not shadeable)
RBP Physical Characteristics Form	✓
Water Quality Data	✓
RBP Habitat Form	✓
RBP Benthic Form	✓
Benthic Identification Sheet	✓
Wolman Pebble Count	✓
RiverMorph Data Sheet	✓
USM Form (Virginia Only)	✓
Longitudinal Profile and Cross Sections	✓



S-KL38  
US View - North  
08.27.2021 09:44 AM  
37.05609, -79.88324  
18863 Virgil H. Goode Hwy, Rocky Mount, VA 24151, USA

Photo Type: US VIEW

Location, Orientation, Photographer Initials: Downstream at ROW/LOD looking N upstream, DW



S-KL38  
DS Cond - South  
08.27.2021 09:43 AM  
37.05579, -79.88322  
18863 Virgil H. Goode Hwy, Rocky Mount, VA 24151, USA

Photo Type: DS COND

Location, Orientation, Photographer Initials: Downstream at ROW/LOD looking S downstream, DW





Photo Type: LB CL

Location, Orientation, Photographer Initials: On thalweg at pipe centerline looking W at right streambank, DW



Photo Type: RB CL

Location, Orientation, Photographer Initials: On thalweg at pipe centerline looking E at left streambank, DW





Photo Type: US COND

Location, Orientation, Photographer Initials: Upstream at ROW/LOD looking N upstream, DW



Photo Type: DS VIEW

Location, Orientation, Photographer Initials: Upstream at ROW/LOD looking S downstream, DW

USACE FILE NO./ Project Name: <small>(v2.1, Sept 2019)</small>			Mountain Valley Pipeline			IMPACT COORDINATES: (in Decimal Degrees)		Lat.	37.055912		Lon.	-79.883177		WEATHER:		Sunny		DATE:		8/27/2021							
IMPACT STREAM/SITE ID AND SITE DESCRIPTION: <small>(watershed size (acreage), unaltered or impairments)</small>					S-KL38; 42.16 Acres					MITIGATION STREAM CLASS./SITE ID AND SITE DESCRIPTION: <small>(watershed size (acreage), unaltered or impairments)</small>										Comments:							
STREAM IMPACT LENGTH:			78		FORM OF MITIGATION:		RESTORATION (Levels I-III)		MIT COORDINATES: (in Decimal Degrees)		Lat.			Lon.			PRECIPITATION PAST 48 HRS:		No		Mitigation Length:						
Column No. 1- Impact Existing Condition (Debit)					Column No. 2- Mitigation Existing Condition - Baseline (Credit)					Column No. 3- Mitigation Projected at Five Years Post Completion (Credit)					Column No. 4- Mitigation Projected at Ten Years Post Completion (Credit)					Column No. 5- Mitigation Projected at Maturity (Credit)							
Stream Classification:			Perennial		Stream Classification:					Stream Classification:			0		Stream Classification:			0		Stream Classification:			0				
Percent Stream Channel Slope			5.51		Percent Stream Channel Slope					Percent Stream Channel Slope			0		Percent Stream Channel Slope			0		Percent Stream Channel Slope			0				
HGM Score (attach data forms):					HGM Score (attach data forms):					HGM Score (attach data forms):					HGM Score (attach data forms):					HGM Score (attach data forms):							
				Average					Average					Average					Average								
Hydrology					Hydrology					Hydrology					Hydrology					Hydrology							
Biogeochemical Cycling					Biogeochemical Cycling					Biogeochemical Cycling					Biogeochemical Cycling					Biogeochemical Cycling							
Habitat					Habitat					Habitat					Habitat					Habitat							
PART I - Physical, Chemical and Biological Indicators					PART I - Physical, Chemical and Biological Indicators					PART I - Physical, Chemical and Biological Indicators					PART I - Physical, Chemical and Biological Indicators					PART I - Physical, Chemical and Biological Indicators							
				Points Scale	Range	Site Score						Points Scale	Range	Site Score						Points Scale	Range	Site Score					
PHYSICAL INDICATOR (Applies to all streams classifications)					PHYSICAL INDICATOR (Applies to all streams classifications)					PHYSICAL INDICATOR (Applies to all streams classifications)					PHYSICAL INDICATOR (Applies to all streams classifications)					PHYSICAL INDICATOR (Applies to all streams classifications)							
USEPA RBP (High Gradient Data Sheet)					USEPA RBP (Low Gradient Data Sheet)					USEPA RBP (High Gradient Data Sheet)					USEPA RBP (High Gradient Data Sheet)					USEPA RBP (High Gradient Data Sheet)							
1. Epifaunal Substrate/Available Cover			0-20		0-1				1. Epifaunal Substrate/Available Cover			0-20		0-1				1. Epifaunal Substrate/Available Cover			0-20		0-1				
2. Embeddedness			0-20						2. Embeddedness			0-20						2. Embeddedness			0-20						
3. Velocity/ Depth Regime			0-20						3. Velocity/ Depth Regime			0-20						3. Velocity/ Depth Regime			0-20						
4. Sediment Deposition			0-20						4. Sediment Deposition			0-20						4. Sediment Deposition			0-20						
5. Channel Flow Status			0-20						5. Channel Flow Status			0-20						5. Channel Flow Status			0-20						
6. Channel Alteration			0-20						6. Channel Alteration			0-20						6. Channel Alteration			0-20						
7. Frequency of Riffles (or bends)			0-20						7. Frequency of Riffles (or bends)			0-20						7. Frequency of Riffles (or bends)			0-20						
8. Bank Stability (LB & RB)			0-20						8. Bank Stability (LB & RB)			0-20						8. Bank Stability (LB & RB)			0-20						
9. Vegetative Protection (LB & RB)			0-20						9. Vegetative Protection (LB & RB)			0-20						9. Vegetative Protection (LB & RB)			0-20						
10. Riparian Vegetative Zone Width (LB & RB)			0-20						10. Riparian Vegetative Zone Width (LB & RB)			0-20						10. Riparian Vegetative Zone Width (LB & RB)			0-20						
Total RBP Score			Marginal				98		Total RBP Score			Poor				0		Total RBP Score			Poor				0		
Sub-Total							0.49		Sub-Total							0		Sub-Total							0		
CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)					CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)					CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)					CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)					CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)							
WVDEP Water Quality Indicators (General)					WVDEP Water Quality Indicators (General)					WVDEP Water Quality Indicators (General)					WVDEP Water Quality Indicators (General)					WVDEP Water Quality Indicators (General)							
Specific Conductivity			0-90		0-1				Specific Conductivity			0-90		0-1				Specific Conductivity			0-90		0-1				
100-199 - 85 points							100-199 - 85 points					100-199 - 85 points						100-199 - 85 points									
pH							pH					pH						pH									
6.0-8.0 = 80 points			0-80						6.0-8.0 = 80 points			0-80						6.0-8.0 = 80 points			0-80						
DO									DO									DO									
>5.0 = 30 points			10-30				5.49		>5.0 = 30 points			10-30				0		>5.0 = 30 points			10-30				0		
Sub-Total							0.975		Sub-Total							0		Sub-Total							0		
BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)					BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)					BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)					BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)					BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)							
WV Stream Condition Index (WVSCI)					WV Stream Condition Index (WVSCI)					WV Stream Condition Index (WVSCI)					WV Stream Condition Index (WVSCI)					WV Stream Condition Index (WVSCI)							
Very Good			0-100		0-1		81.3		Very Good			0-100		0-1		0		Very Good			0-100		0-1		0		
Sub-Total							0.813		Sub-Total							0		Sub-Total							0		
PART II - Index and Unit Score					PART II - Index and Unit Score					PART II - Index and Unit Score					PART II - Index and Unit Score					PART II - Index and Unit Score							
Index			Linear Feet		Unit Score		Index			Linear Feet		Unit Score		Index			Linear Feet		Unit Score		Index			Linear Feet		Unit Score	
0.759			78		59.228		0			0		0		0			0		0		0			0		0	



## PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME <b>S-KL38</b>		LOCATION <b>Franklin County</b>	
STATION # _____ RIVERMILE _____		STREAM CLASS <b>Perennial</b>	
LAT <u>37.055912</u> LONG <u>-79.883177</u>		RIVER BASIN <b>Upper Roanoke</b>	
STORET # _____		AGENCY <b>VADEQ</b>	
INVESTIGATORS <b>DW, JM</b>			
FORM COMPLETED BY <b>JM</b>		DATE <u>8/27/2021</u> TIME <u>1630</u>	REASON FOR SURVEY <b>Baseline Assessment</b>

<b>WEATHER CONDITIONS</b>	<p><b>Now</b></p> <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input checked="" type="checkbox"/> </div> <div>             storm (heavy rain)              rain (steady rain)              showers (intermittent)           </div> </div> <p>% cloud cover _____ clear/sunny</p> <p><b>Past 24 hours</b></p> <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input checked="" type="checkbox"/> </div> <div>             storm (heavy rain)              rain (steady rain)              showers (intermittent)           </div> </div> <p>% cloud cover _____ clear/sunny</p> <p><b>Has there been a heavy rain in the last 7 days?</b>  <input type="checkbox"/> Yes    <input checked="" type="checkbox"/> No         </p> <p>Air Temperature <u>23.8</u> °C</p> <p>Other _____</p>
<b>SITE LOCATION/MAP</b>	<p><b>Draw a map of the site and indicate the areas sampled (or attach a photograph)</b></p> <p>The hand-drawn map shows a rectangular area representing the study site. A blue line representing a stream flows from the top left towards the bottom right. To the left of the stream is a green-shaded area labeled "Dense veg. / shrub/grass". To the right of the stream is another green-shaded area labeled "Grass Herbaceous". A red arrow labeled "Pipe" points from the top left towards the stream. Another red arrow labeled "Pipe" points from the top right towards the stream. A hatched square is located below the grassy area. At the bottom of the site is a white rectangle labeled "Timber Mat". To the right of the timber mat is a white rectangle labeled "ROAD". The entire site is bounded by a dashed line on the top and bottom, and solid lines on the left and right. The left boundary is labeled "Chainlink Fence" and the right boundary is labeled "Highway". There are two "ROW" labels at the corners: one at the top left and one at the bottom left.</p>
<b>STREAM CHARACTERIZATION</b>	<p><b>Stream Subsystem</b></p> <p><input checked="" type="checkbox"/> Perennial    <input type="checkbox"/> Intermittent    <input type="checkbox"/> Tidal</p> <p><b>Stream Origin</b></p> <p> <input type="checkbox"/> Glacial  <input type="checkbox"/> Non-glacial montane  <input type="checkbox"/> Swamp and bog         </p> <p> <input checked="" type="checkbox"/> Spring-fed  <input checked="" type="checkbox"/> Mixture of origins  <input type="checkbox"/> Other _____         </p> <p><b>Stream Type</b></p> <p><input checked="" type="checkbox"/> Coldwater    <input type="checkbox"/> Warmwater</p> <p>Catchment Area _____ km²</p>






# PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

<b>WATERSHED FEATURES</b>	<b>Predominant Surrounding Landuse</b> <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Commercial <input type="checkbox"/> Field/Pasture <input type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input checked="" type="checkbox"/> Other <small>Near Highway</small> <input type="checkbox"/> Residential	<b>Local Watershed NPS Pollution</b> <input checked="" type="checkbox"/> No evidence <input type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources <b>Local Watershed Erosion</b> <input checked="" type="checkbox"/> None <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy
<b>RIPARIAN VEGETATION (18 meter buffer)</b>	<b>Indicate the dominant type and record the dominant species present</b> <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Shrubs <input checked="" type="checkbox"/> Grasses <input checked="" type="checkbox"/> Herbaceous Dominant species present _____	
<b>INSTREAM FEATURES</b>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <b>Estimated Reach Length</b> _____ m  <b>Estimated Stream Width</b> <small>.03</small> _____ m  <b>Sampling Reach Area</b> _____ m<sup>2</sup>  <b>Area in km<sup>2</sup> (m<sup>2</sup>x1000)</b> _____ km<sup>2</sup>  <b>Estimated Stream Depth</b> _____ m  <b>Surface Velocity (at thalweg)</b> _____ m/sec           </div> <div style="width: 45%;"> <b>Canopy Cover</b>  <input type="checkbox"/> Partly open    <input checked="" type="checkbox"/> Partly shaded    <input type="checkbox"/> Shaded  <b>High Water Mark</b> _____ m  <b>Proportion of Reach Represented by Stream Morphology Types</b>              Riffle _____ %      Run _____ %              Pool _____ %  <b>Channelized</b>    <input type="checkbox"/> Yes    <input checked="" type="checkbox"/> No  <b>Dam Present</b>    <input type="checkbox"/> Yes    <input checked="" type="checkbox"/> No           </div> </div>	
<b>LARGE WOODY DEBRIS</b>	<b>LWD</b> _____ m <sup>2</sup> <b>Density of LWD</b> _____ m <sup>2</sup> /km <sup>2</sup> (LWD/ reach area)	
<b>AQUATIC VEGETATION</b>	<b>Indicate the dominant type and record the dominant species present</b> <input type="checkbox"/> Rooted emergent <input type="checkbox"/> Rooted submergent <input type="checkbox"/> Rooted floating <input type="checkbox"/> Free floating <input type="checkbox"/> Floating Algae <input type="checkbox"/> Attached Algae Dominant species present _____ Portion of the reach with aquatic vegetation <small>0</small> _____ %	
<b>WATER QUALITY</b>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <b>Temperature</b> <small>19.6 D</small> _____ °C  <b>Specific Conductance</b> <small>167.5 D</small> _____ ms/cm  <b>Dissolved Oxygen</b> <small>5.49 D</small> _____ mg/L  <b>pH</b> <small>7.29 D</small> _____ SU  <b>Turbidity</b> <small>N/A</small> _____  <b>WQ Instrument Used</b> <small>YSI</small> _____           </div> <div style="width: 45%;"> <b>Water Odors</b>  <input type="checkbox"/> Normal/None    <input type="checkbox"/> Sewage  <input type="checkbox"/> Petroleum      <input type="checkbox"/> Chemical  <input type="checkbox"/> Fishy            <input type="checkbox"/> Other _____  <b>Water Surface Oils</b>  <input type="checkbox"/> Slick    <input type="checkbox"/> Sheen    <input type="checkbox"/> Globs    Flecks  <input type="checkbox"/> None    <input type="checkbox"/> Other _____  <b>Turbidity (if not measured)</b>  <input checked="" type="checkbox"/> Clear    <input type="checkbox"/> Slightly turbid    <input type="checkbox"/> Turbid  <input type="checkbox"/> Opaque    <input type="checkbox"/> Stained    <input type="checkbox"/> Other _____           </div> </div>	
<b>SEDIMENT/SUBSTRATE</b>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <b>Odors</b>  <input type="checkbox"/> Normal    <input type="checkbox"/> Sewage    <input type="checkbox"/> Petroleum  <input type="checkbox"/> Chemical    <input type="checkbox"/> Anaerobic    <input type="checkbox"/> None  <input type="checkbox"/> Other _____  <b>Oils</b>  <input type="checkbox"/> Absent    <input type="checkbox"/> Slight    <input type="checkbox"/> Moderate    <input type="checkbox"/> Profuse           </div> <div style="width: 45%;"> <b>Deposits</b>  <input type="checkbox"/> Sludge    <input type="checkbox"/> Sawdust    <input type="checkbox"/> Paper fiber    <input type="checkbox"/> Sand  <input type="checkbox"/> Relict shells    <input type="checkbox"/> Other _____  <b>Looking at stones which are not deeply embedded, are the undersides black in color?</b>  <input type="checkbox"/> Yes    <input type="checkbox"/> No           </div> </div>	

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock		0	Detritus	sticks, wood, coarse plant materials (CPOM)	
Boulder	> 256 mm (10")	0			
Cobble	64-256 mm (2.5"-10")	37	Muck-Mud	black, very fine organic (FPOM)	
Gravel	2-64 mm (0.1"-2.5")	57			
Sand	0.06-2mm (gritty)	6	Marl	grey, shell fragments	
Silt	0.004-0.06 mm	0			
Clay	< 0.004 mm (slick)	0			

# HABITAT ASSESSMENT FIELD DATA SHEET - HG - USE ON ALL STREAMS (FRONT)

STREAM NAME <b>S-KL38</b>		LOCATION <b>Franklin County</b>	
STATION # _____ RIVERMILE _____		STREAM CLASS <b>Perennial</b>	
LAT <b>37.055912</b> LONG <b>-79.883177</b>		RIVER BASIN <b>Upper Roanoke</b>	
STORET # _____		AGENCY <b>VADEQ</b>	
INVESTIGATORS <b>DW, JM</b>			
FORM COMPLETED BY <b>JM</b>		DATE <b>08/27/21</b> TIME <b>1630</b> AM PM	REASON FOR SURVEY <b>Baseline Assessment</b>

	Habitat Parameter	Condition Category			
		Optimal	Suboptimal	Marginal	Poor
Parameters to be evaluated in sampling reach	<b>1. Epifaunal Substrate/ Available Cover</b>	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	SCORE <b>16</b> 	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	<b>2. Embeddedness</b>	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
	SCORE <b>2</b> 	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	<b>3. Velocity/Depth Regime</b>	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/depth regime (usually slow-deep).
	SCORE <b>4</b> 	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	<b>4. Sediment Deposition</b>	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	SCORE <b>3</b> 	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	<b>5. Channel Flow Status</b>	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	SCORE <b>17</b> 	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0



# HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
<b>6. Channel Alteration</b>  SCORE <u>18</u>	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
<b>7. Frequency of Riffles (or bends)</b>  SCORE <u>6</u>	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
<b>8. Bank Stability (score each bank)</b>  Note: determine left or right side by facing downstream. SCORE <u>2</u> SCORE <u>2</u>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
<b>9. Vegetative Protection (score each bank)</b>  SCORE <u>5</u> SCORE <u>10</u>	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
<b>10. Riparian Vegetative Zone Width (score each bank riparian zone)</b>  SCORE <u>3</u> SCORE <u>10</u>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score 98

## BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME S-KL38		LOCATION Franklin County
STATION # _____ RIVERMILE _____		STREAM CLASS Perennial
LAT <u>37.055912</u>	LONG <u>-79.883177</u>	RIVER BASIN Upper Roanoke
STORET # _____		AGENCY VADEQ
INVESTIGATORS DW, ES		LOT NUMBER _____
FORM COMPLETED BY <b>ES</b>	DATE <u>8/31/2021</u> TIME <u>1630</u>	REASON FOR SURVEY Baseline Assessment

<b>HABITAT TYPES</b>	<b>Indicate the percentage of each habitat type present</b> <input checked="" type="checkbox"/> Cobble <u>50</u> % <input type="checkbox"/> Snags _____ % <input checked="" type="checkbox"/> Vegetated Banks <u>100</u> % <input checked="" type="checkbox"/> Sand <u>50</u> % <input type="checkbox"/> Submerged Macrophytes _____ % <input type="checkbox"/> Other ( _____ ) _____ %
<b>SAMPLE COLLECTION</b>	<b>Gear used</b> <input type="checkbox"/> D-frame <input checked="" type="checkbox"/> kick-net <input type="checkbox"/> Other _____  <b>How were the samples collected?</b> <input checked="" type="checkbox"/> wading <input type="checkbox"/> from bank <input type="checkbox"/> from boat  <b>Indicate the number of jabs/kicks taken in each habitat type.</b> <input checked="" type="checkbox"/> Cobble <u>4</u> <input type="checkbox"/> Snags _____ <input type="checkbox"/> Vegetated Banks _____ <input type="checkbox"/> Sand _____ <input type="checkbox"/> Submerged Macrophytes _____ <input type="checkbox"/> Other ( _____ ) _____
<b>GENERAL COMMENTS</b>	4 kicks done in riffle habitats.

### QUALITATIVE LISTING OF AQUATIC BIOTA

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare, 2 = Common, 3= Abundant, 4 = Dominant

Periphyton	0	1	2	3	4	Slimes	0	1	2	3	4
Filamentous Algae	0	1	2	3	4	Macroinvertebrates	0	1	2	3	4
Macrophytes	0	1	2	3	4	Fish	0	1	2	3	4

### FIELD OBSERVATIONS OF MACROBENTHOS

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3= Abundant (>10 organisms), 4 = Dominant (>50 organisms)

Porifera	0	1	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	1	2	3	4
Hydrozoa	0	1	2	3	4	Zygoptera	0	1	2	3	4	Ephemeroptera	0	1	2	3	4
Platyhelminthes	0	1	2	3	4	Hemiptera	0	1	2	3	4	Trichoptera	0	1	2	3	4
Turbellaria	0	1	2	3	4	Coleoptera	0	1	2	3	4	Other	0	1	2	3	4
Hirudinea	0	1	2	3	4	Lepidoptera	0	1	2	3	4						
Oligochaeta	0	1	2	3	4	Sialidae	0	1	2	3	4						
Isopoda	0	1	2	3	4	Corydalidae	0	1	2	3	4						
Amphipoda	0	1	2	3	4	Tipulidae	0	1	2	3	4						
Decapoda	0	1	2	3	4	Empididae	0	1	2	3	4						
Gastropoda	0	1	2	3	4	Simuliidae	0	1	2	3	4						
Bivalvia	0	1	2	3	4	Tabinidae	0	1	2	3	4						
						Culcidae	0	1	2	3	4						

Mountain Valley Pipeline  
Data are not adjusted for subsampling



Sample ID Collection Date		S-KL38 08-31-2021
ORDER	GENUS/SPECIES	COUNT
Ephemeroptera	Baetis sp.	5
Ephemeroptera	Dipheter hageni	1
Ephemeroptera	Eurylophella sp.	6
Ephemeroptera	Maccaffertium sp.	1
Plecoptera	Eccopectura xanthenes	25
Plecoptera	Leuctra sp.	15
Trichoptera	Diplectrona sp.	53
Trichoptera	Hydropsyche sp.	8
Trichoptera	Neophylax sp.	1
Trichoptera	Rhyacophila sp.	4
Odonata	Cordulegaster sp.	2
Coleoptera	Ectopria sp.	15
Coleoptera	Optioservus sp.	3
Coleoptera	Psephenus sp.	1
Coleoptera	Stenelmis sp.	1
Megaloptera	Nigronia sp.	9
Diptera-Chironomidae	Cricotopus/Orthocladus sp.	2
Diptera-Chironomidae	Eukiefferiella sp.	1
Diptera-Chironomidae	Micropsectra sp.	4
Diptera-Chironomidae	Parametriochnemus sp.	7
Diptera-Chironomidae	Polypedilum sp.	1
Diptera-Chironomidae	Psilometriochnemus triannulatus	2
Diptera-Chironomidae	Rheosmittia sp.	2
Diptera-Chironomidae	Thienemannimyia gr. sp.	2
Diptera-Chironomidae	Tvetenia sp.	1
Diptera	Antocha sp.	4
Diptera	Atrichopogon sp.	1
Diptera	Dicranota sp.	4
Diptera	Ephydriidae	1
Diptera	Hemerodromia sp.	1
Diptera	Molophilus sp.	2
Diptera	Pseudolimnophila sp.	6
Diptera	Simulium sp.	1
Diptera	Tipula sp.	1
Lepidoptera	Lepidoptera	1
Annelida	Lumbricina	3
Annelida	Naididae	1
Annelida	tubificoid Naididae w/o cap setae	1
Crustacea	Cambarus sp.	2
Crustacea	Gammarus sp.	2
Other Organisms	Prostoma sp.	2
TOTAL		205

Mountain Valley Pipeline  
WV SCI Metrics



Sample ID Collection Date		S-KL38 08-31-2021
<b>WVSCI Metric Values</b>		
Total taxa		24
EPT taxa		8
% EPT		58.0
% Chironomidae		10.7
% 2 Dominant		42.0
HBI		4.15
<b>WVSCI Metric Scores</b>		
Total taxa		114.3
EPT taxa		61.5
% EPT		63.2
% Chironomidae		90.2
% 2 Dominant		90.7
HBI		82.4
<b>WVSCI Metric Scores</b>		
Total taxa		100.0
EPT taxa		61.5
% EPT		63.2
% Chironomidae		90.2
% 2 Dominant		90.7
HBI		82.4
<b>WVSCI Total Score</b>		<b>81.3</b>

#### WVSCI Thresholds

Unimpaired = > 68.00

Gray Zone = 60.61 to 68.00

Impaired = <60.61



# WOLMAN PEBBLE COUNT FORM

County: Franklin County

Stream ID: S-KL38

Stream Name: UNT to Blackwater River

HUC Code: 03010101

Basin: Upper Roanoke

Survey Date: 8/27/2021

Surveyors: J. M., D. W.  
Type: Representative

PEBBLE COUNT							
Inches	PARTICLE	Millimeters		Particle Count	Total #	Item %	% Cum
	Silt/Clay	< .062	S/C	<div><div></div><div></div></div>	0	0.00	0.00
	Very Fine	.062-.125	S A N D	<div><div></div><div></div></div>	2	2.00	2.00
	Fine	.125-.25		<div><div></div><div></div></div>	1	1.00	3.00
	Medium	.25-.5		<div><div></div><div></div></div>	0	0.00	3.00
	Coarse	.50-1.0		<div><div></div><div></div></div>	0	0.00	3.00
.04-.08	Very Coarse	1.0-2		<div><div></div><div></div></div>	3	3.00	6.00
.08-.16	Very Fine	2 -4		G R A V E L	<div><div></div><div></div></div>	2	2.00
.16 - .22	Fine	4 -5.7	<div><div></div><div></div></div>		4	4.00	12.00
.22 - .31	Fine	5.7 - 8	<div><div></div><div></div></div>		6	6.00	18.00
.31 - .44	Medium	8 -11.3	<div><div></div><div></div></div>		3	3.00	21.00
.44 - .63	Medium	11.3 - 16	<div><div></div><div></div></div>		6	6.00	27.00
.63 - .89	Coarse	16 -22.6	<div><div></div><div></div></div>		7	7.00	34.00
.89 - 1.26	Coarse	22.6 - 32	<div><div></div><div></div></div>		8	8.00	42.00
1.26 - 1.77	Vry Coarse	32 - 45	<div><div></div><div></div></div>		9	9.00	51.00
1.77 -2.5	Vry Coarse	45 - 64	C O B B L E	<div><div></div><div></div></div>	12	12.00	63.00
2.5 - 3.5	Small	64 - 90		<div><div></div><div></div></div>	15	15.00	78.00
3.5 - 5.0	Small	90 - 128		<div><div></div><div></div></div>	10	10.00	88.00
5.0 - 7.1	Large	128 - 180		<div><div></div><div></div></div>	9	9.00	97.00
7.1 - 10.1	Large	180 - 256	B O U L D E R	<div><div></div><div></div></div>	3	3.00	100.00
10.1 - 14.3	Small	256 - 362		<div><div></div><div></div></div>	0	0.00	100.00
14.3 - 20	Small	362 - 512		<div><div></div><div></div></div>	0	0.00	100.00
20 - 40	Medium	512 - 1024		<div><div></div><div></div></div>	0	0.00	100.00
40 - 80	Large	1024 -2048		<div><div></div><div></div></div>	0	0.00	100.00
80 - 160	Vry Large	2048 -4096	BDRK	<div><div></div><div></div></div>	0	0.00	100.00
	Bedrock			<div><div></div><div></div></div>	0	0.00	100.00
				Totals:	100		
	Total Tally:						

## RIVERMORPH PARTICLE SUMMARY

River Name: UNT to Blackwater River  
 Reach Name: S-KL38  
 Sample Name: Representative  
 Survey Date: 08/27/2021

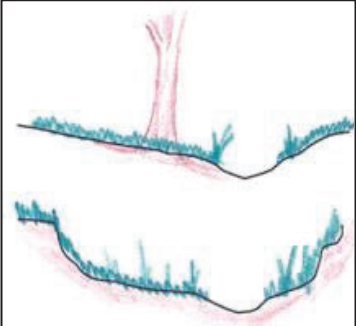
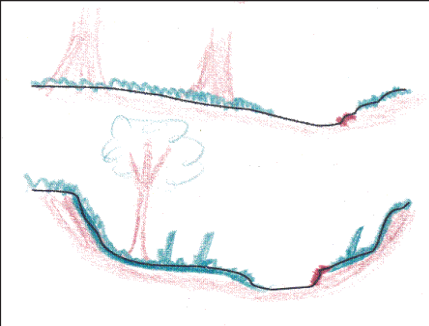
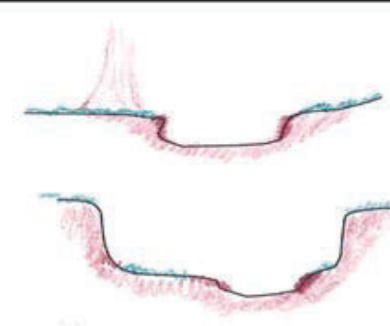
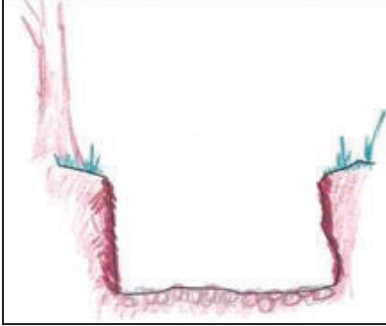
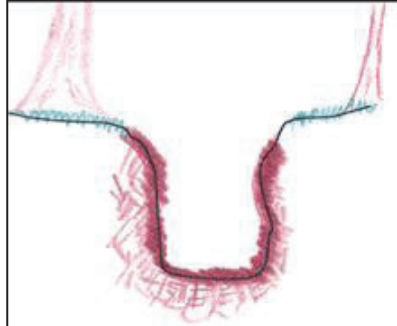
Size (mm)	TOT #	ITEM %	CUM %
0 - 0.062	0	0.00	0.00
0.062 - 0.125	2	2.00	2.00
0.125 - 0.25	1	1.00	3.00
0.25 - 0.50	0	0.00	3.00
0.50 - 1.0	0	0.00	3.00
1.0 - 2.0	3	3.00	6.00
2.0 - 4.0	2	2.00	8.00
4.0 - 5.7	4	4.00	12.00
5.7 - 8.0	6	6.00	18.00
8.0 - 11.3	3	3.00	21.00
11.3 - 16.0	6	6.00	27.00
16.0 - 22.6	7	7.00	34.00
22.6 - 32.0	8	8.00	42.00
32 - 45	9	9.00	51.00
45 - 64	12	12.00	63.00
64 - 90	15	15.00	78.00
90 - 128	10	10.00	88.00
128 - 180	9	9.00	97.00
180 - 256	3	3.00	100.00
256 - 362	0	0.00	100.00
362 - 512	0	0.00	100.00
512 - 1024	0	0.00	100.00
1024 - 2048	0	0.00	100.00
Bedrock	0	0.00	100.00
D16 (mm)	7.23		
D35 (mm)	23.78		
D50 (mm)	43.56		
D84 (mm)	112.8		
D95 (mm)	168.44		
D100 (mm)	256		
Silt/Clay (%)	0		
Sand (%)	6		
Gravel (%)	57		
Cobble (%)	37		
Boulder (%)	0		
Bedrock (%)	0		

Total Particles = 100.

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR #	Impact Length	Impact Factor			
22865.06	Mountain Valley Pipeline (Mountain Valley Pipeline, LLC)	Franklin County	R3	03010101	8/27/21	S-KL38	78	1			
Name(s) of Evaluator(s)		Stream Name and Information					SAR Length				
DW, JM		UNT to Blackwater River					78				
1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)											
Conditional Category											
Channel Condition	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 point bars / bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-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 floodplains along 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 &gt; 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 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on &gt; 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 rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>			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								NOTES>>			
Riparian Buffers	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.				
			High	Low	High	Low	High	Low			
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.						Ensure the sums					
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.						of % Riparian					
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Blocks equal 100					
Right Bank	% Riparian Area>	60%	20%	20%				100%			
	Score >	1.1	0.5	0.6							
								CI= (Sum % RA * Scores*0.01)/2			
Left Bank	% Riparian Area>	50%	40%	10%				100%	Rt Bank CI >	0.88	CI
	Score >	0.5	0.75	1.1					Lt Bank CI >	0.66	0.77
3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody 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 / Low		0.90

Reach R3-R4

File: [https://tetrathecinc.sharepoint.com/teams/MVPStreamWetlandAssessment/Shared Documents/General/01. Virginia Field Data Management/04. 1\\_QAQC \(Complete for review\)/0 Ready for Oct 15 Submittal/S-KL38 -20211002DLP\\_KEH/10. S-KL38\\_USM\\_MVP\\_20](https://tetrathecinc.sharepoint.com/teams/MVPStreamWetlandAssessment/Shared Documents/General/01. Virginia Field Data Management/04. 1_QAQC (Complete for review)/0 Ready for Oct 15 Submittal/S-KL38 -20211002DLP_KEH/10. S-KL38_USM_MVP_20)



Stream Impact Assessment Form Page 2								
Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR #	Impact Length	Impact Factor
22865.06	Mountain Valley Pipeline (Mountain Valley Pipeline, LLC)	Franklin County	R3	03010101	8/27/21	S-KL38	78	1
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
								1.50
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) >>		80
						CR = RCI X L <sub>1</sub> X IF		

INSERT PHOTOS:

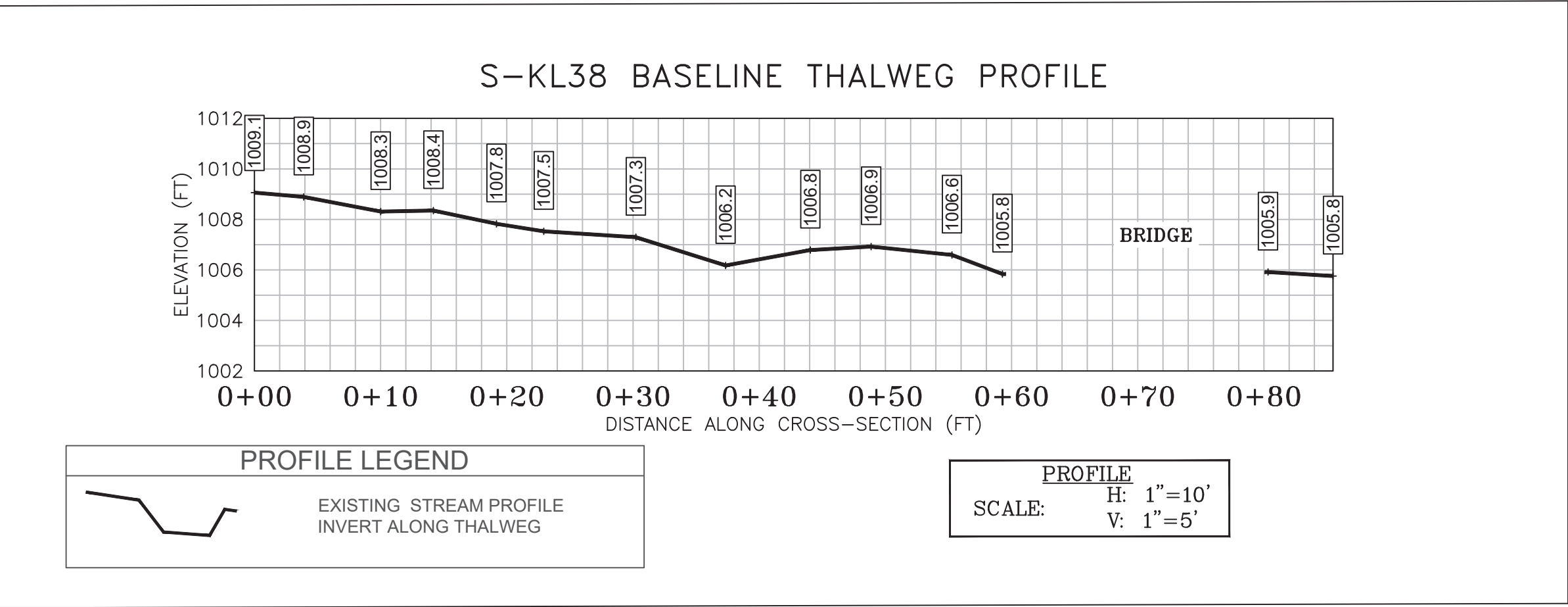


CAPTION. Assessment is limited to areas within the temporary ROW.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER





TYPICAL 5-POINT CROSS-SECTION





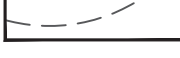
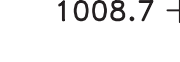

TS-L TS-R

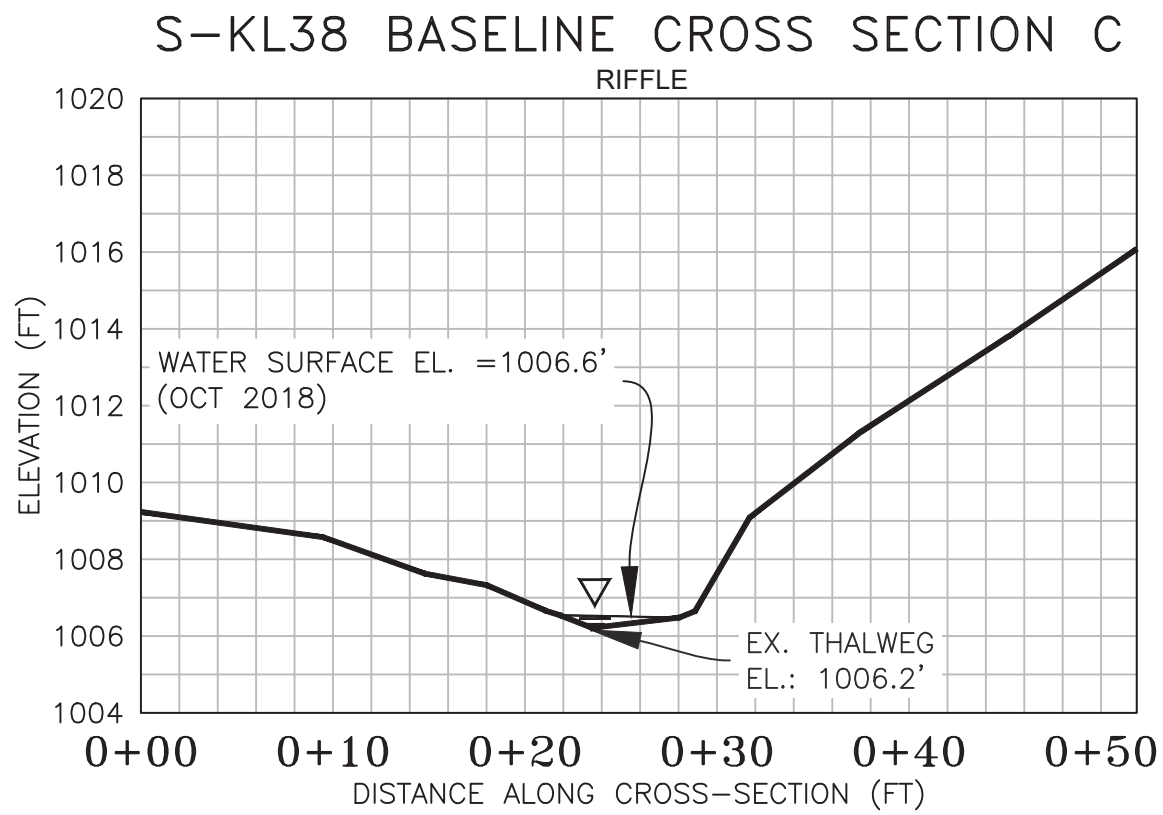
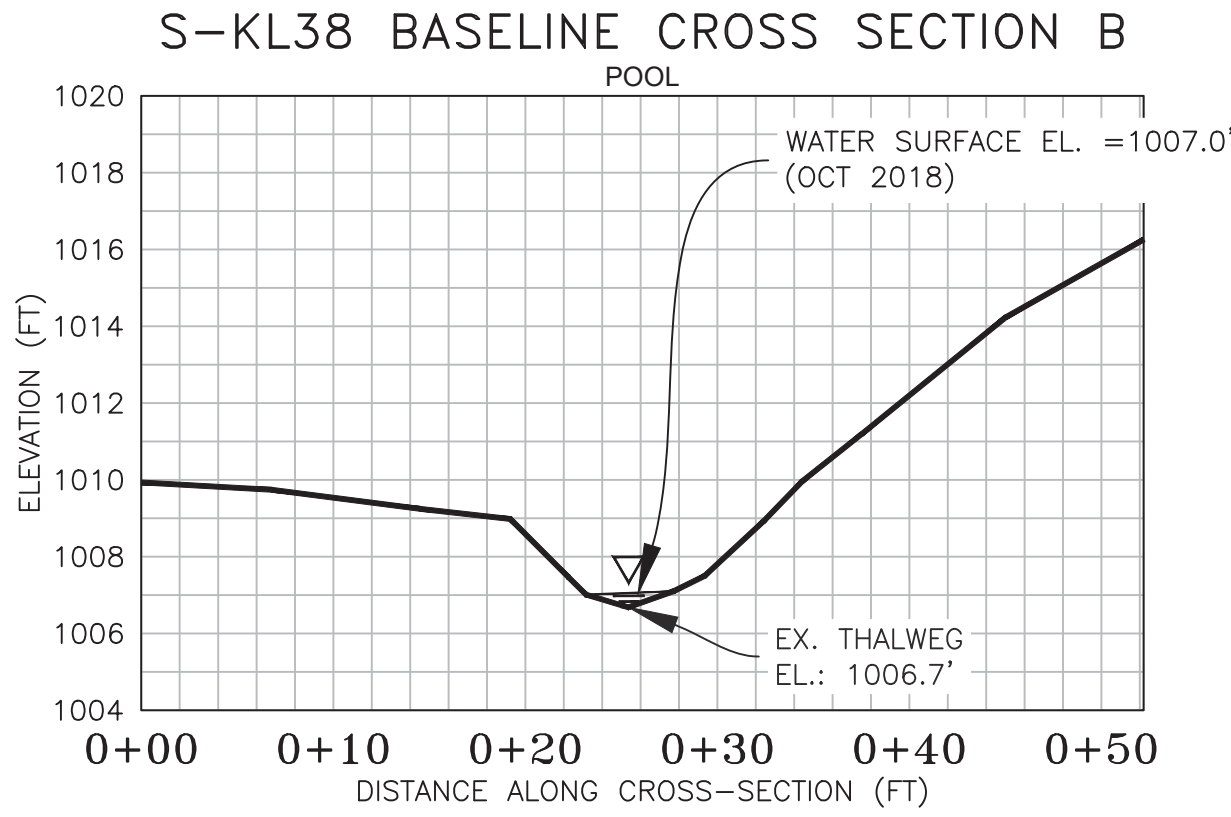
BS-L BS-R

THW

TS: TOP OF SLOPE  
BS: BOTTOM OF SLOPE  
THW: THALWEG (INVERT)

# LEGEND

	STUDY AREA (EASEMENT)
	EXISTING SURVEY—LOCATED THALWEG
	EXISTING SURVEY—LOCATED EDGE OF WATER (AS NECESSARY)
	EXISTING CONTOUR LINE (MAJOR)
	EXISTING CONTOUR LINE (MINOR)
	EXISTING SURVEYED GROUND SHOT ELEVATION
	BENCHMARK POINT (WSSI)



PRE-CROSSING PHOTOS

NE W E SE S SW NW N  
146°SE (T) LAT: 37.055538 LON: -79.883247 +98.4ft ▲ 1029ft  
05 VIEW S-KL-38  
05 Apr 2015 06:26

PHOTO TAKEN LOOKING DOWNSTREAM  
FROM RIGHT BANK ON 04/05/2018

SW W NW N  
314°NW (T) LAT: 37.055862 LON: -79.883072 +32.8ft ▲ 1065ft  
US VIEW S-KL-38  
05 Apr 2015 08:28

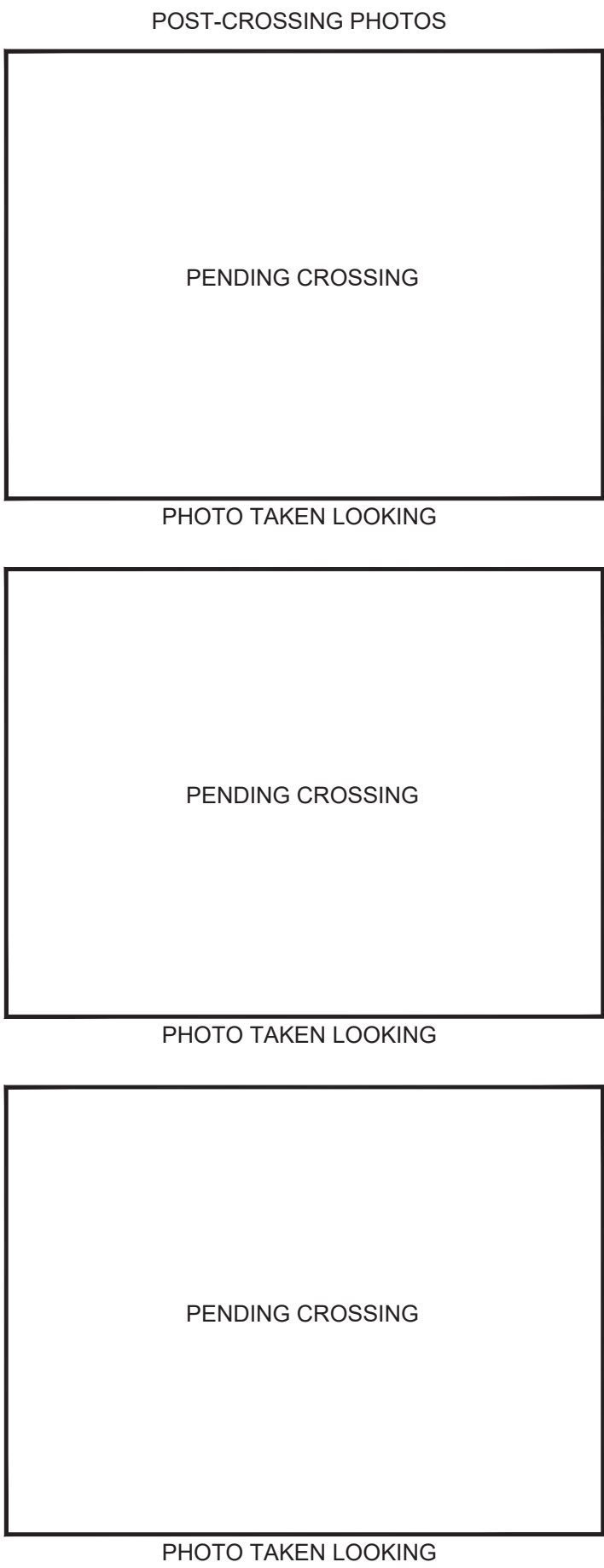
PHOTO TAKEN LOOKING UPSTREAM  
FROM RIGHT BANK ON 04/05/2018

SE S SW W NW N  
233°SW (T) LAT: 37.055954 LON: -79.883171 +32.8ft ▲ 1041ft  
LB CL S-KL-38  
05 Apr 2015 08:27

PHOTO TAKEN LOOKING AT CENTERLINE  
FROM LEFT BANK ON 04/05/2018

N NE E SE S SW W NW N  
97°E (T) LAT: 37.055759 LON: -79.883278 +98.4ft ▲ 1031ft  
05 VIEW S-KL-38  
05 Apr 2015 08:27

PHOTO TAKEN LOOKING AT CENTERLINE  
FROM RIGHT BANK ON 04/05/2018



Prepared For: MVP

---

Crossing S-KL38 - UNT to Blackwater River (MP 264.8)

**Wetland**  
Soil and Solutions, Inc.

a DAVEY  company

5300 Wellington Branch Drive • Suite 100  
Gainesville, Virginia 20155  
Phone: 703-679-5600 • Fax: 703-679-5601  
[www.wetlands.com](http://www.wetlands.com)



Copyright © 2021 Wetland Studies and Solutions, Inc.