

Baseline Assessment – Stream Attributes

Reach S-T29 (Pipeline ROW)
Perennial
Spread C
Webster County, West Virginia

Data	Included
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	✓ Benthic sample taken on 09/08/21
Wolman Pebble Count	✓
Reference Reach Software Pebble Count Data	✓
Longitudinal Profile and Cross Sections	✓

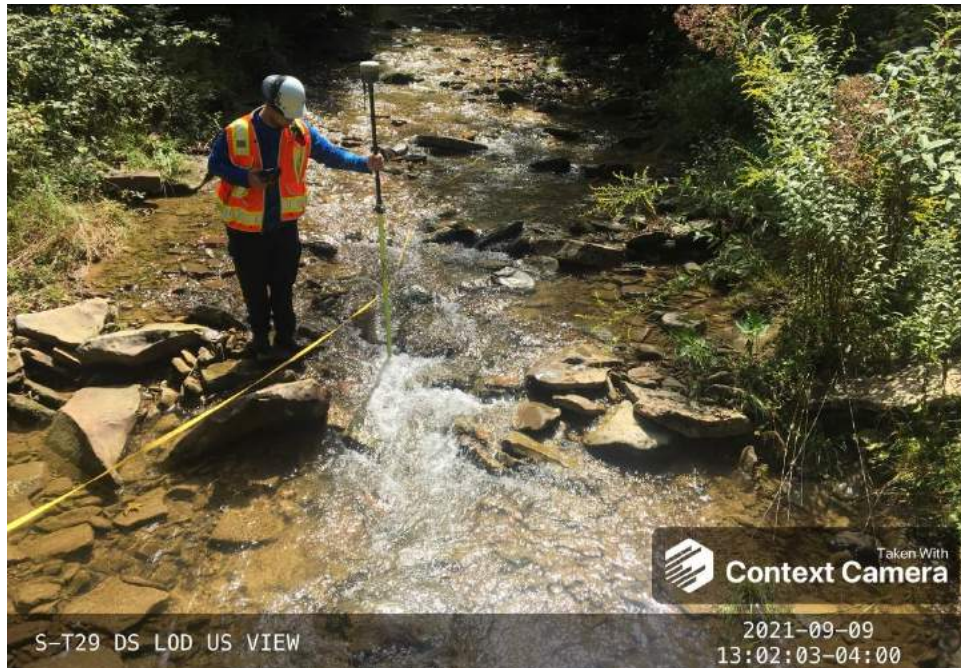


Photo Type: DS, US View

Location, Orientation, Photographer Initials: Downstream at ROW Upstream View, VM, HK, DPF, VM
Latitude, Longitude: 38.579092, -80.5262



Photo Type: DS, DS View

Location, Orientation, Photographer Initials: Downstream at ROW Downstream View, VM, HK, DPF, VM
Latitude, Longitude: 38.579092, -80.5262



Photo Type: CL US

Location, Orientation, Photographer Initials: On thalweg at pipe centerline Upstream View, VM, HK, DPF, VM
Latitude, Longitude: 38.579092, -80.5262



Photo Type: DS View from Center

Location, Orientation, Photographer Initials: On thalweg at pipe centerline Downstream View, VM, HK, DPF, VM
Latitude, Longitude: 38.579092, -80.5262



Photo Type: US, US View

Location, Orientation, Photographer Initials: Upstream at ROW Upstream, VM, HK, DPF, VM
Latitude, Longitude: 38.579092, -80.5262

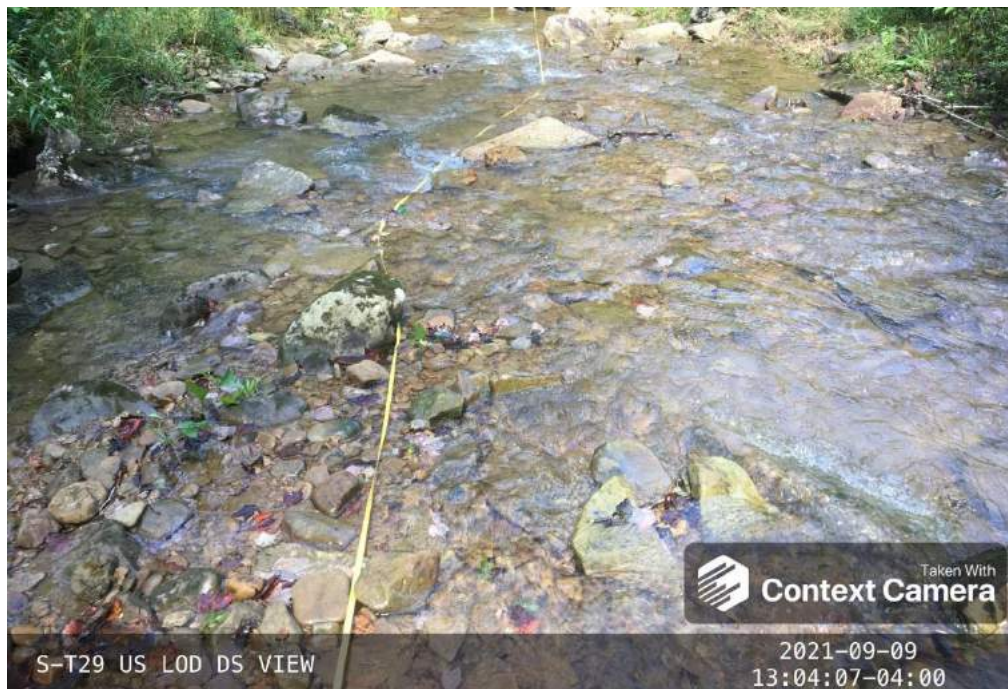


Photo Type: US, DS View

Location, Orientation, Photographer Initials: Upstream at ROW Downstream, VM, HK, DPF, VM
Latitude, Longitude: 38.579092, -80.5262



Photo Type: Riffle, DS View

Location, Orientation, Photographer Initials: Upstream at ROW looking downstream, VM, HK, DPF, VM
Latitude, Longitude: 38.579092, -80.5262

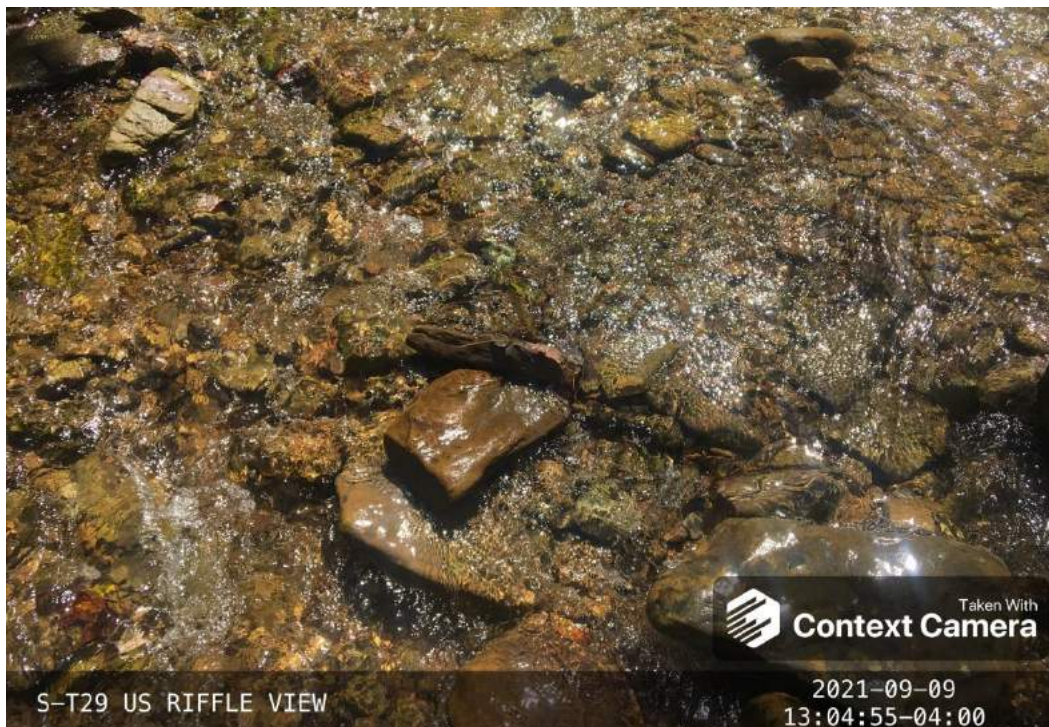


Photo Type: Riffle, US View

Location, Orientation, Photographer Initials: Upstream at ROW looking downstream, VM, HK, DPF, VM
Latitude, Longitude: 38.579092, -80.5262

USACE FILE NO./ Project Name: (v2.1, Sept 2016)			Mountain Valley Pipeline			IMPACT COORDINATES: (in Decimal Degrees)			Lat.	38.579092	Lon.	-80.52562	WEATHER:			Partly Cloudy			DATE:			09/08/21													
IMPACT STREAM/SITE ID AND SITE DESCRIPTION: (watershed size (acres), unaltered or impairments)						S-T29						MITIGATION STREAM CLASS./SITE ID AND SITE DESCRIPTION: (watershed size (acres), unaltered or impairments)						Comments:						Date used from benthic sample											
STREAM IMPACT LENGTH:			76			FORM OF MITIGATION:			RESTORATION (Levels I-III)			MIT COORDINATES: (in Decimal Degrees)			Lat.		Lon.		PRECIPITATION PAST 48 HRS:			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:						0						Stream Classification:						0					
Percent Stream Channel Slope						6.3						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):											
Average												Average												Average											
Hydrology												Hydrology												Hydrology											
Biogeochemical Cycling						0						Biogeochemical Cycling						0						Biogeochemical Cycling						0					
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						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 14						1. Epifaunal Substrate/Available Cover 0-20 14						1. Epifaunal Substrate/Available Cover 0-20 14						1. Epifaunal Substrate/Available Cover 0-20 14						1. Epifaunal Substrate/Available Cover 0-20 14											
2. Embeddedness 0-20 18						2. Embeddedness 0-20 18						2. Embeddedness 0-20 18						2. Embeddedness 0-20 18						2. Embeddedness 0-20 18											
3. Velocity/ Depth Regime 0-20 18						3. Velocity/ Depth Regime 0-20 18						3. Velocity/ Depth Regime 0-20 18						3. Velocity/ Depth Regime 0-20 18						3. Velocity/ Depth Regime 0-20 18											
4. Sediment Deposition 0-20 18						4. Sediment Deposition 0-20 18						4. Sediment Deposition 0-20 18						4. Sediment Deposition 0-20 18						4. Sediment Deposition 0-20 18											
5. Channel Flow Status 0-20 15						5. Channel Flow Status 0-20 15						5. Channel Flow Status 0-20 15						5. Channel Flow Status 0-20 15						5. Channel Flow Status 0-20 15											
6. Channel Alteration 0-20 18						6. Channel Alteration 0-20 18						6. Channel Alteration 0-20 18						6. Channel Alteration 0-20 18						6. Channel Alteration 0-20 18											
7. Frequency of Riffles (or bends) 0-20 18						7. Frequency of Riffles (or bends) 0-20 18						7. Frequency of Riffles (or bends) 0-20 18						7. Frequency of Riffles (or bends) 0-20 18						7. Frequency of Riffles (or bends) 0-20 18											
8. Bank Stability (LB & RB) 0-20 18						8. Bank Stability (LB & RB) 0-20 18						8. Bank Stability (LB & RB) 0-20 18						8. Bank Stability (LB & RB) 0-20 18						8. Bank Stability (LB & RB) 0-20 18											
9. Vegetative Protection (LB & RB) 0-20 18						9. Vegetative Protection (LB & RB) 0-20 18						9. Vegetative Protection (LB & RB) 0-20 18						9. Vegetative Protection (LB & RB) 0-20 18						9. Vegetative Protection (LB & RB) 0-20 18											
10. Riparian Vegetative Zone Width (LB & RB) 0-20 8						10. Riparian Vegetative Zone Width (LB & RB) 0-20 8						10. Riparian Vegetative Zone Width (LB & RB) 0-20 8						10. Riparian Vegetative Zone Width (LB & RB) 0-20 8						10. Riparian Vegetative Zone Width (LB & RB) 0-20 8											
Total RBP Score Suboptimal 159						Total RBP Score Poor 0						Total RBP Score Poor 0						Total RBP Score Poor 0						Total RBP Score Poor 0											
Sub-Total 0.795						Sub-Total 0						Sub-Total 0						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 750-999 - 30 points 0-90 851						Specific Conductivity 0-90						Specific Conductivity 0-90						Specific Conductivity 0-90						Specific Conductivity 0-90											
pH 6.0-8.0 = 80 points 0-60 6.4						pH 5-90 0-1						pH 5-90 0-1						pH 5-90 0-1						pH 5-90 0-1											
DO >5.0 = 30 points 10-30 8.63						DO 10-30						DO 10-30						DO 10-30						DO 10-30											
Sub-Total 0.7						Sub-Total 0						Sub-Total 0						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)											
Fair 0-100 0-1 58.5						0-100 0-1						0-100 0-1						0-100 0-1						0-100 0-1											
Sub-Total 0.485						Sub-Total 0						Sub-Total 0						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						Index Linear Feet Unit Score											
0.660 76 50.16						0 0 0						0 0 0						0 0 0						0 0 0											

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME S-T29		LOCATION Webster County	
STATION # _____ RIVERMILE _____		STREAM CLASS Perennial	
LAT 38.579092 LONG -80.52562		RIVER BASIN None	
STORET # _____		AGENCY WVDEP	
INVESTIGATORS VM HL DF			
FORM COMPLETED BY HK		DATE 09-09-21 TIME 1230	REASON FOR SURVEY Baseline Assessment

WEATHER CONDITIONS	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Now</p> <div style="display: flex; align-items: center;"> <div style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> </div> <div> <p>storm (heavy rain) rain (steady rain) showers (intermittent) %cloud cover clear/sunny</p> </div> </div> <p>30 %</p> </div> <div style="width: 45%;"> <p>Past 24 hours</p> <div style="display: flex; align-items: center;"> <div style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> </div> <div> <p>storm (heavy rain) rain (steady rain) showers (intermittent) %cloud cover clear/sunny</p> </div> </div> <p>20 %</p> </div> </div> <div style="margin-top: 10px;"> <p>Has there been a heavy rain in the last 7 days? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Air Temperature 22 °C</p> <p>Other _____</p> </div>		
SITE LOCATION/MAP	<p>Draw a map of the site and indicate the areas sampled (or attach a photograph)</p>		
STREAM CHARACTERIZATION	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Stream Subsystem <input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Tidal</p> <p>Stream Origin <input type="checkbox"/> Glacial <input type="checkbox"/> Spring-fed <input type="checkbox"/> Non-glacial montane <input checked="" type="checkbox"/> Mixture of origins <input type="checkbox"/> Swamp and bog <input type="checkbox"/> Other _____</p> </div> <div style="width: 45%;"> <p>Stream Type <input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater</p> <p>Catchment Area _____ km²</p> </div> </div>		

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

WATERSHED FEATURES	Predominant Surrounding Landuse <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Commercial <input type="checkbox"/> Field/Pasture <input type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input type="checkbox"/> Other _____ <input type="checkbox"/> Residential	Local Watershed NPS Pollution <input checked="" type="checkbox"/> No evidence <input type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources Local Watershed Erosion <input checked="" type="checkbox"/> None <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present <input type="checkbox"/> Trees <input checked="" type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous Dominant species present <u>Goldenrod, Jewelweed</u>	
INSTREAM FEATURES	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Estimated Reach Length <u>22</u> m Estimated Stream Width <u>5.2</u> m Sampling Reach Area <u>114.4</u> m² Area in km² (m²x1000) <u>-</u> km² Estimated Stream Depth <u>0.15</u> m Surface Velocity (at thalweg) <u>0.15</u> m/sec </div> <div style="width: 45%;"> Canopy Cover <input checked="" type="checkbox"/> Partly open <input type="checkbox"/> Partly shaded <input type="checkbox"/> Shaded High Water Mark <u>0.1</u> m Proportion of Reach Represented by Stream Morphology Types Riffle <u>80</u> % Run <u>20</u> % Pool <u>0</u> % Channelized <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Dam Present <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No </div> </div>	
LARGE WOODY DEBRIS	LWD <u>0</u> m ² Density of LWD <u>0</u> m ² /km ² (LWD/ reach area)	
AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present <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 <u>NA</u> Portion of the reach with aquatic vegetation <u>0</u> %	
WATER QUALITY (DS, US)	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Temperature <u>D17.6 U17.6</u> °C Specific Conductance <u>D26 U27</u> us/cm Dissolved Oxygen <u>D8.5 U8.5</u> pH <u>D6.3 U6.3</u> Turbidity <u>-</u> WQ Instrument Used <u>YSI</u> </div> <div style="width: 45%;"> Water Odors <input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Fishy <input type="checkbox"/> Other _____ Water Surface Oils <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globs <input type="checkbox"/> Flecks <input checked="" type="checkbox"/> None <input type="checkbox"/> Other _____ Turbidity (if not measured) <input type="checkbox"/> Clear <input checked="" type="checkbox"/> Slightly turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other _____ </div> </div>	
SEDIMENT/SUBSTRATE	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Odors <input checked="" 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 _____ Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse </div> <div style="width: 45%;"> Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relict shells <input checked="" type="checkbox"/> Other <u>NA</u> Looking at stones which are not deeply embedded, are the undersides black in color? <input type="checkbox"/> Yes <input checked="" 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)	0
Boulder	> 256 mm (10")	25			
Cobble	64-256 mm (2.5"-10")	18	Muck-Mud	black, very fine organic (FPOM)	0
Gravel	2-64 mm (0.1"-2.5")	49			
Sand	0.06-2mm (gritty)	8	Marl	grey, shell fragments	0
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 S-T29		LOCATION Webster County	
STATION # _____ RIVERMILE _____		STREAM CLASS Perennial	
LAT 38.579092 LONG -80.52562		RIVER BASIN None	
STORET # _____		AGENCY WVDEP	
INVESTIGATORS VM HL DF			
FORM COMPLETED BY HK		DATE 09-09-21 TIME 1230 AM PM	REASON FOR SURVEY Baseline Assessment

	Habitat Parameter	Condition Category			
		Optimal	Suboptimal	Marginal	Poor
Parameters to be evaluated in sampling reach	1. Epifaunal Substrate/ Available Cover	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 14	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	2. Embeddedness	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 14	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	3. Velocity/Depth Regime	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 18	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	4. Sediment Deposition	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 18	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	5. Channel Flow Status	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 15	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Notes:

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

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
6. Channel Alteration SCORE 18	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
7. Frequency of Riffles (or bends) SCORE 18	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
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream. SCORE 9 SCORE 9	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			
9. Vegetative Protection (score each bank) SCORE 9 SCORE 9	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			
10. Riparian Vegetative Zone Width (score each bank riparian zone) SCORE 4 SCORE 4	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			

Parameters to be evaluated broader than sampling reach

Total Score **159** Notes:

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME S-T29		LOCATION Webster County	
STATION # _____ RIVERMILE _____		STREAM CLASS Perennial	
LAT <u>38.579092</u> LONG <u>-80.52562</u>		RIVER BASIN	
STORET #		AGENCY WVDEP	
INVESTIGATORS BD LF		LOT NUMBER	
FORM COMPLETED BY BD		DATE <u>09-08-21</u> TIME <u>1320</u>	REASON FOR SURVEY Baseline Assessment

HABITAT TYPES	Indicate the percentage of each habitat type present <input checked="" type="checkbox"/> Cobble <u>50</u> % <input type="checkbox"/> Snags _____ % <input type="checkbox"/> Vegetated Banks _____ % <input type="checkbox"/> Sand _____ % <input type="checkbox"/> Submerged Macrophytes _____ % <input type="checkbox"/> Other (_____) _____ %
SAMPLE COLLECTION	Gear used <input type="checkbox"/> D-frame <input checked="" type="checkbox"/> kick-net <input type="checkbox"/> Other _____ How were the samples collected? <input checked="" type="checkbox"/> wading <input type="checkbox"/> from bank <input type="checkbox"/> from boat Indicate the number of jabs/kicks taken in each habitat type. <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 (_____) _____
GENERAL COMMENTS	DS: Temp: 18C, pH: 6.4, SPC: 851 us/cm, DO: 8.63mg/L US: Temp: 18C, pH: 6.4, SPC: 806 us/cm, DO: 8.61mg/L

QUALITATIVE LISTING OF AQUATIC BIOTA

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

Periphyton	<u>0</u>	1	2	3	4	Slimes	<u>0</u>	1	2	3	4
Filamentous Algae	<u>0</u>	1	2	3	4	Macroinvertebrates	<u>0</u>	1	2	3	4
Macrophytes	<u>0</u>	1	2	3	4	Fish	<u>0</u>	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						

ORG ID REIC2513

WVSCI Family	Count	TV
Corydalidae	1	5
Heptageniidae	1	4
Perlidae	2	1

ORG ID REIC2513

Benthic Density

Total IBI Individuals	4
# of Organisms per Grid	0.04
Organisms per Sq cm	0.0004
Organisms per Sq m	4.00

WVSCI Category	Impaired-Slightly
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WVSCI Thresholds
Unimpaired = >68.00
Gray Zone = 60.61 to 68.00
Impaired = <60.61

WOLMAN PEBBLE COUNT FORM

County:	Webster
Stream Name:	Houston Run
HUC Code:	
Survey Date:	9/9/2021
Surveyors:	HK VM DF
Type:	Bankfull Channel

Stream ID: S-T29

HUC Code: Basin:

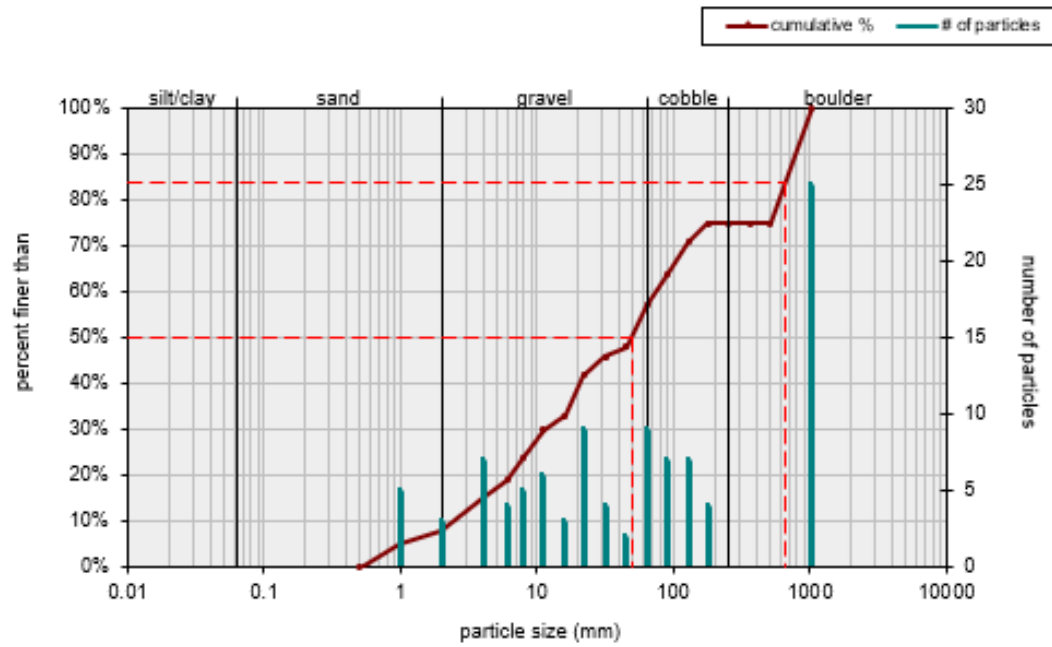
Survey Date: 9/9/2021

Surveyors: HK VM DF

Type: Bankfull Channel

PEBBLE COUNT							
Inches	PARTICLE	Millimeters		Particle Count	Total #	Item %	% Cum
	Silt/Clay	< .062	S/C	<div><div></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></div></div>	0	0.00	0.00
	Fine	.125-.25		<div><div></div><div></div><div></div></div>	0	0.00	0.00
	Medium	.25-.5		<div><div></div><div></div><div></div></div>	0	0.00	0.00
	Coarse	.50-1.0		<div><div></div><div></div><div></div></div>	5	5.00	5.00
.04-.08	Very Coarse	1.0-2		<div><div></div><div></div><div></div></div>	3	3.00	8.00
.08 -.16	Very Fine	2 -4		G R A V E L	<div><div></div><div></div><div></div></div>	7	7.00
.16 - .22	Fine	4 -5.7	<div><div></div><div></div><div></div></div>		4	4.00	19.00
.22 - .31	Fine	5.7 - 8	<div><div></div><div></div><div></div></div>		5	5.00	24.00
.31 - .44	Medium	8 -11.3	<div><div></div><div></div><div></div></div>		6	6.00	30.00
.44 - .63	Medium	11.3 - 16	<div><div></div><div></div><div></div></div>		3	3.00	33.00
.63 - .89	Coarse	16 -22.6	<div><div></div><div></div><div></div></div>		9	9.00	42.00
.89 - 1.26	Coarse	22.6 - 32	<div><div></div><div></div><div></div></div>		4	4.00	46.00
1.26 - 1.77	Vry Coarse	32 - 45	<div><div></div><div></div><div></div></div>		2	2.00	48.00
1.77 -2.5	Vry Coarse	45 - 64	<div><div></div><div></div><div></div></div>		9	9.00	57.00
2.5 - 3.5	Small	64 - 90	C O B B L E		<div><div></div><div></div><div></div></div>	7	7.00
3.5 - 5.0	Small	90 - 128		<div><div></div><div></div><div></div></div>	7	7.00	71.00
5.0 - 7.1	Large	128 - 180		<div><div></div><div></div><div></div></div>	4	4.00	75.00
7.1 - 10.1	Large	180 - 256		<div><div></div><div></div><div></div></div>	0	0.00	75.00
10.1 - 14.3	Small	256 - 362	B O U L D E R	<div><div></div><div></div><div></div></div>	0	0.00	75.00
14.3 - 20	Small	362 - 512		<div><div></div><div></div><div></div></div>	0	0.00	75.00
20 - 40	Medium	512 - 1024		<div><div></div><div></div><div></div></div>	25	25.00	100.00
40 - 80	Large	1024 -2048		<div><div></div><div></div><div></div></div>	0	0.00	100.00
80 - 160	Vry Large	2048 -4096		<div><div></div><div></div><div></div></div>	0	0.00	100.00
	Bedrock		BDRK	<div><div></div><div></div><div></div></div>	0	0.00	100.00
				Totals:	100		
	Total Tally:						

Bankfull Channel Pebble Count, S-T29



Size (mm)		Size Distribution		Type	
D16	4.4	mean	53.9	silt/clay	0%
D35	17	dispersion	12.3	sand	8%
D50	49	skewness	0.03	gravel	49%
D65	95			cobble	18%
D84	660			boulder	25%
D95	890				



— — — — —	STUDY AREA (EASEMENT)
— . — . —	EXISTING SURVEY—LOCATED THALWEG
1176.87 +	EXISTING SURVEYED GROUND SHOT ELEVATION

1. THIS MAP HAS BEEN ORIENTED TO NAD 1983 UTM ZONE 17N, AND VERTICALLY TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), USING REAL TIME DGPS. FIELD LOCATIONS WERE COMPLETED ON SEPTEMBER 9, 2021.
2. EASEMENT LINES SHOWN ON PLAN VIEW WERE PROVIDED BY MOUNTAIN VALLEY PIPELINE.
3. SURVEY POINTS FOR CROSS SECTIONS AND THALWEG PROFILES COLLECTED IN 2021 HAVE BEEN USED IN COMBINATION WITH SURVEY POINTS COLLECTED PREVIOUSLY IN 2020 IN ORDER TO GENERATE THE PRE-CROSSING SURFACE SHOWN IN PLAN. DUE TO NATURAL EROSIONAL STREAM PROCESSES THAT CAN OCCUR OVER TIME, MINOR ADJUSTMENTS TO THE PROFILE ALIGNMENTS MAY HAVE BEEN REQUIRED IN ORDER TO GENERATE A CLEAN PRE-CROSSING SURFACE.
4. ALL SECTION VIEWS SHOWN LEFT TO RIGHT FACING DOWNSTREAM.
5. POST-CROSSING SURVEY INFORMATION SHOWN IN RED. DATA PENDING.
6. POST-CROSSING SURVEY POINTS FOR CROSS SECTIONS AND THALWEG ARE PROJECTED ONTO PRE-CROSSING SECTION AND PROFILE VIEWS FOR COMPARISON.

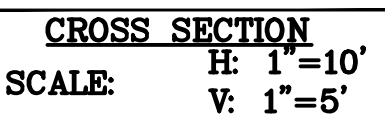
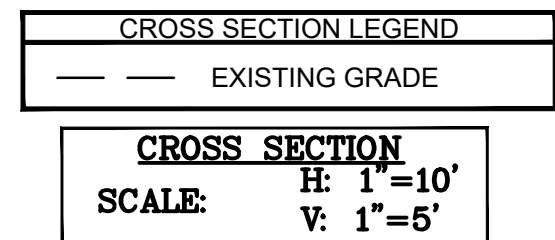
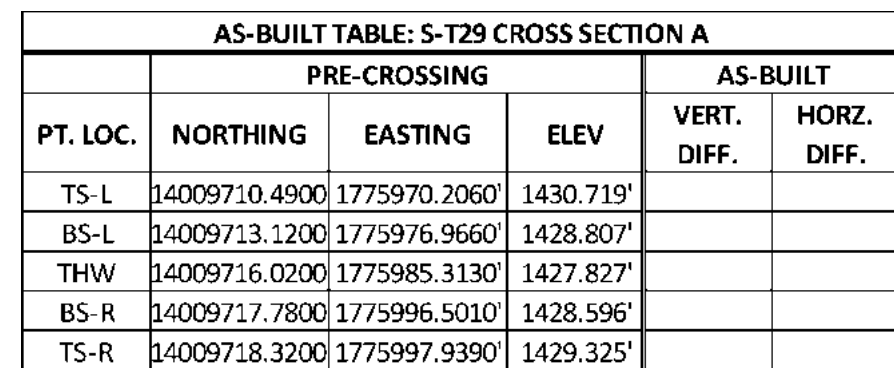


PHOTO TAKEN LOOKING DOWNSTREAM
FROM UPSTREAM IMPACT LIMITS



PHOTO TAKEN LOOKING UPSTREAM FROM
DOWNSTREAM IMPACT LIMITS

PENDING CROSSING

PHOTO TAKEN LOOKING DOWNSTREAM
FROM UPSTREAM IMPACT LIMITS

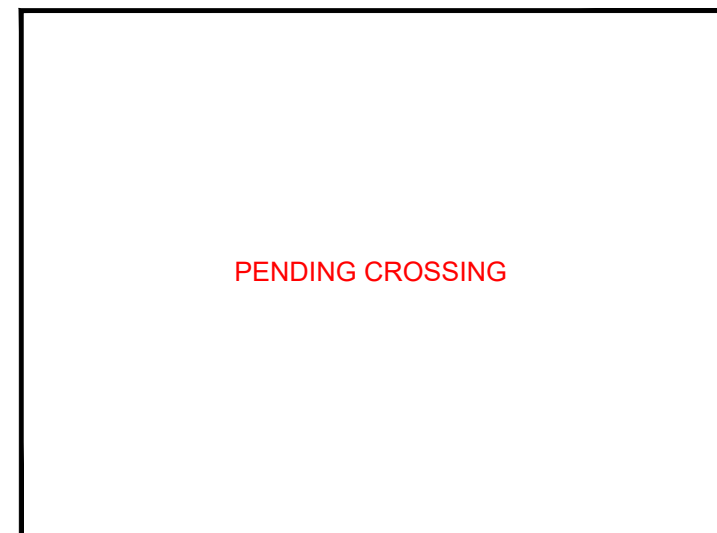


PHOTO TAKEN LOOKING UPSTREAM FROM
DOWNSTREAM IMPACT LIMITS

CAD File No.
 JZ
 Drawn
 GH
 Checked
 DW
 Approved
 NOTED
 Scale:
 SEPT. 2021
 Date:
 112IC07157
 Project No.

TETRA TECH, INC.
661 ANDERSEN DRIVE FOSTER PLAZA 7
PITTSBURGH, PA 15220
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O ENERGY DRIVE, 2ND FLOOR
CANONSBURG, PA 15317

FILE AND CROSS-SECTIONS BASELINE SURVEY ING S-129 - HOUSTON RUN (MP 90.67) WEBSTER COUNTY, WV	Client MC 222
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1
Drawing No.

PRELIMINARY

[illegible]