

Baseline Assessment – Stream Attributes

**Reach S-C39 (Pipeline ROW)
Perennial
Spread F
Monroe 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	✓
Wolman Pebble Count	✓
Reference Reach Software Pebble Count Data	✓
Longitudinal Profile and Cross Sections	✓



Photo Type: DS, US View

Location, Orientation, Photographer Initials: Downstream Edge of ROW, Upstream View, AK/TF/TA/WP



Photo Type: DS, DS View

Location, Orientation, Photographer Initials: Downstream Edge of ROW, Downstream View, AK/TF/TA/WP



Photo Type: CP, US View
Location, Orientation, Photographer Initials: Center ROW, Upstream View, AK/TF/TA/WP



Photo Type: CP, DS View
Location, Orientation, Photographer Initials: ROW Center, Downstream View, AK/TF/TA/WP

37.426686° N, -80.694499° W



Photo Type: US, US View, US Riffle Cross-Section, US View
Location, Orientation, Photographer Initials: Upstream Edge of ROW, Upstream View, Upstream Riffle Cross-Section, Upstream View, AK/TF/TA/WP

37.426686° N, -80.694499° W



Photo Type: US, DS View, US Riffle Cross-Section, DS View
Location, Orientation, Photographer Initials: Upstream Edge of ROW, Downstream View, Upstream Riffle Cross-Section, Downstream View, AK/TF/TA/WP



Photo Type: US Pool Cross Section, US View

Location, Orientation, Photographer Initials: Upstream Pool Cross Section, Upstream View, AK/TF/TA/WP



Photo Type: US Pool Cross Section, Downstream View

Location, Orientation, Photographer Initials: Upstream Pool Cross Section, Downstream View, AK/TF/TA/WP



Photo Type: DS Pool Cross Section, US View

Location, Orientation, Photographer Initials: Downstream Pool Cross Section, Upstream View, AK/TF/TA/WP



Photo Type: DS Pool Cross Section, DS View

Location, Orientation, Photographer Initials: Downstream Pool Cross Section, Downstream View, AK/TF/TA/WP



Photo Type: DS Riffle Cross Section, US View

Location, Orientation, Photographer Initials: Downstream Riffle Cross Section, Upstream View, AK/TF/TA/WP



Photo Type: DS Riffle Cross Section, DS View

Location, Orientation, Photographer Initials: Downstream Riffle Cross Section, Downstream View, AK/TF/TA/WP

37.426686° N, -80.694499° W



Photo Type: ROW N

Location, Orientation, Photographer Initials: ROW, Facing North, AK/TF/TA/WP

37.426686° N, -80.694499° W



Photo Type: ROW S

Location, Orientation, Photographer Initials: ROW, Facing South, AK/TF/TA/WP

"Q:\Charleston\2021 Projects\21-0244- MVP- STREAM AND WETLAND CONDITIONS ASSESSMENT AND SURVEY PLAN\002 - Pre-Crossing Monitoring\Spread F\S-C39"

USACE FILE NO./ Project Name: (v2.1, Sept 2015)	Mountain Valley Pipeline	IMPACT COORDINATES: (in Decimal Degrees)	Lat.	37.426886	Lon.	-80.694499	WEATHER:	Storm/Heavy Rain 78 °F	DATE:	8/17/21
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IMPACT STREAM/SITE ID AND SITE DESCRIPTION: (watershed size (acreage), unaltered or impairments)	S-C39 Painter Run					MITIGATION STREAM CLASS/SITE ID AND SITE DESCRIPTION: (watershed size (acreage), unaltered or impairments)	Comments:				
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STREAM IMPACT LENGTH:	109	FORM OF MITIGATION:	RESTORATION (Levels I-III)	MIT COORDINATES: (in Decimal Degrees)	Lat.		Lon.		PRECIPITATION PAST 48 HRS:		Mitigation Length:
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Column No. 1- Impact Existing Condition (Debit)			
Stream Classification:	Perennial		
Percent Stream Channel Slope	2.8		
HGM Score (attach data forms):			
		Average	
Hydrology			
Biogeochemical Cycling	0		
Habitat			
PART I - Physical, Chemical and Biological Indicators			
	Points Scale	Range	Site Score
PHYSICAL INDICATOR (Applies to all streams classifications)			
USEPA RBP (High Gradient Data Sheet)			
1. Epifaunal Substrate/Available Cover	0-20		14
2. Embeddedness	0-20		14
3. Velocity/ Depth Regime	0-20		16
4. Sediment Deposition	0-20		15
5. Channel Flow Status	0-20		16
6. Channel Alteration	0-20	0-1	14
7. Frequency of Riffles (or bends)	0-20		15
8. Bank Stability (LB & RB)	0-20		13
9. Vegetative Protection (LB & RB)	0-20		16
10. Riparian Vegetative Zone Width (LB & RB)	0-20		14
Total RBP Score	Suboptimal		147
Sub-Total			0.735
CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WVDEP Water Quality Indicators (General)			
Specific Conductivity	100-199 - 85 points	0-90	193.3
pH	6.0-8.0 = 80 points	0-80	7.48
DO	>5.0 = 30 points	10-30	8.1
Sub-Total			0.975
BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WV Stream Condition Index (WVSCI)			
	Very Good	0-100 0-1	85
Sub-Total			0.85

PART II - Index and Unit Score		
Index	Linear Feet	Unit Score
0.853	109	93.0133333

Column No. 2- Mitigation Existing Condition - Baseline (Credit)			
Stream Classification:			
Percent Stream Channel Slope			
HGM Score (attach data forms):			
		Average	
Hydrology			
Biogeochemical Cycling	0		
Habitat			
PART I - Physical, Chemical and Biological Indicators			
	Points Scale	Range	Site Score
PHYSICAL INDICATOR (Applies to all streams classifications)			
USEPA RBP (Low Gradient Data Sheet)			
1. Epifaunal Substrate/Available Cover	0-20		
2. Pool Substrate Characterization	0-20		
3. Pool Variability	0-20		
4. Sediment Deposition	0-20		
5. Channel Flow Status	0-20		
6. Channel Alteration	0-20	0-1	
7. Channel Sinuosity	0-20		
8. Bank Stability (LB & RB)	0-20		
9. Vegetative Protection (LB & RB)	0-20		
10. Riparian Vegetative Zone Width (LB & RB)	0-20		
Total RBP Score	Poor		0
Sub-Total			0
CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WVDEP Water Quality Indicators (General)			
Specific Conductivity	0-90		
pH	5-90	0-1	
DO	10-30		
Sub-Total			0
BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WV Stream Condition Index (WVSCI)			
	0-100 0-1		
Sub-Total			0

PART II - Index and Unit Score		
Index	Linear Feet	Unit Score
0	0	0

Column No. 3- Mitigation Projected at Five Years Post Completion (Credit)			
Stream Classification:	0		
Percent Stream Channel Slope	0		
HGM Score (attach data forms):			
		Average	
Hydrology			
Biogeochemical Cycling	0		
Habitat			
PART I - Physical, Chemical and Biological Indicators			
	Points Scale	Range	Site Score
PHYSICAL INDICATOR (Applies to all streams classifications)			
USEPA RBP (High Gradient Data Sheet)			
1. Epifaunal Substrate/Available Cover	0-20		
2. Embeddedness	0-20		
3. Velocity/ Depth Regime	0-20		
4. Sediment Deposition	0-20		
5. Channel Flow Status	0-20		
6. Channel Alteration	0-20	0-1	
7. Frequency of Riffles (or bends)	0-20		
8. Bank Stability (LB & RB)	0-20		
9. Vegetative Protection (LB & RB)	0-20		
10. Riparian Vegetative Zone Width (LB & RB)	0-20		
Total RBP Score	Poor		0
Sub-Total			0
CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WVDEP Water Quality Indicators (General)			
Specific Conductivity	0-90		
pH	5-90	0-1	
DO	10-30		
Sub-Total			0
BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WV Stream Condition Index (WVSCI)			
	0-100 0-1		
Sub-Total			0

PART II - Index and Unit Score		
Index	Linear Feet	Unit Score
0	0	0

Column No. 4- Mitigation Projected at Ten Years Post Completion (Credit)			
Stream Classification:	0		
Percent Stream Channel Slope	0		
HGM Score (attach data forms):			
		Average	
Hydrology			
Biogeochemical Cycling	0		
Habitat			
PART I - Physical, Chemical and Biological Indicators			
	Points Scale	Range	Site Score
PHYSICAL INDICATOR (Applies to all streams classifications)			
USEPA RBP (High Gradient Data Sheet)			
1. Epifaunal Substrate/Available Cover	0-20		
2. Embeddedness	0-20		
3. Velocity/ Depth Regime	0-20		
4. Sediment Deposition	0-20		
5. Channel Flow Status	0-20		
6. Channel Alteration	0-20	0-1	
7. Frequency of Riffles (or bends)	0-20		
8. Bank Stability (LB & RB)	0-20		
9. Vegetative Protection (LB & RB)	0-20		
10. Riparian Vegetative Zone Width (LB & RB)	0-20		
Total RBP Score	Poor		0
Sub-Total			0
CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WVDEP Water Quality Indicators (General)			
Specific Conductivity	0-90		
pH	5-90	0-1	
DO	10-30		
Sub-Total			0
BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WV Stream Condition Index (WVSCI)			
	0-100 0-1		
Sub-Total			0

PART II - Index and Unit Score		
Index	Linear Feet	Unit Score
0	0	0

Column No. 5- Mitigation Projected at Maturity (Credit)			
Stream Classification:	0		
Percent Stream Channel Slope	0		
HGM Score (attach data forms):			
		Average	
Hydrology			
Biogeochemical Cycling	0		
Habitat			
PART I - Physical, Chemical and Biological Indicators			
	Points Scale	Range	Site Score
PHYSICAL INDICATOR (Applies to all streams classifications)			
USEPA RBP (High Gradient Data Sheet)			
1. Epifaunal Substrate/Available Cover	0-20		
2. Embeddedness	0-20		
3. Velocity/ Depth Regime	0-20		
4. Sediment Deposition	0-20		
5. Channel Flow Status	0-20		
6. Channel Alteration	0-20	0-1	
7. Frequency of Riffles (or bends)	0-20		
8. Bank Stability (LB & RB)	0-20		
9. Vegetative Protection (LB & RB)	0-20		
10. Riparian Vegetative Zone Width (LB & RB)	0-20		
Total RBP Score	Poor		0
Sub-Total			0
CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WVDEP Water Quality Indicators (General)			
Specific Conductivity	0-90		
pH	5-90	0-1	
DO	10-30		
Sub-Total			0
BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WV Stream Condition Index (WVSCI)			
	0-100 0-1		
Sub-Total			0

PART II - Index and Unit Score		
Index	Linear Feet	Unit Score
0	0	0

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME Painter Run	LOCATION S-C39 Monroe/F	
STATION # _____ RIVERMILE _____	STREAM CLASS Perennial <input type="checkbox"/>	
LAT 37.426686 LONG -80.694499	COUNTY Monroe <input type="checkbox"/>	
STORET # _____	AGENCY Potesta	
INVESTIGATOR STim Ferguson/Allyson Kincaid		
FORM COMPLETED BY Tim Ferguson/Allyson Kincaid	DATE 8/18/2021 TIME 14:20 PM	REASON FOR SURVEY Preliminary Assessment

WEATHER CONDITIONS	<p>Now</p> <input checked="" type="checkbox"/> storm (heavy rain) <input type="checkbox"/> rain (steady rain) <input type="checkbox"/> showers (intermittent) <input type="checkbox"/> %cloud cover _____ <input type="checkbox"/> clear/sunny	<p>Past 24 hours</p> <input checked="" type="checkbox"/> storm (heavy rain) <input type="checkbox"/> rain (steady rain) <input type="checkbox"/> showers (intermittent) <input type="checkbox"/> %cloud cover _____ <input type="checkbox"/> clear/sunny	<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 78 °F °C</p> <p>Other _____</p>
SITE LOCATION/MAP	<p>Draw a map of the site and indicate the areas sampled (or attach a photograph)</p> <p>The map shows a stream channel with flow direction indicated by arrows pointing left. Key features include: - A 'Pool' at the top center. - A 'Plunge Pool' below the first pool. - A 'Side Channel' on the left side. - A 'Plunge Pool' on the right side. - A circled 'B54' label near the bottom right. - A 'Bridge' at the bottom center. - 'Tall Herb Coverage' on the left bank. - 'Shrubs' on the right bank. - A 'COD' label with an arrow pointing right at the top right.</p>		
STREAM CHARACTERIZATION	<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"/> Non-glacial montane <input type="checkbox"/> Swamp and bog <input type="checkbox"/> Spring-fed <input checked="" type="checkbox"/> Mixture of origins <input type="checkbox"/> Other _____</p> <p>Stream Type <input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater</p> <p>Catchment Area _____ km²</p>		

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

WATERSHED FEATURES	Predominant Surrounding Landuse <input type="checkbox"/> Forest <input type="checkbox"/> Commercial <input type="checkbox"/> Field/Pasture <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Agricultural <input checked="" type="checkbox"/> Other <small>Located in Pipeline ROW</small> <input type="checkbox"/> Residential		Local Watershed NPS Pollution <input 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 type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input checked="" type="checkbox"/> Herbaceous Dominant species present _____			
INSTREAM FEATURES	Estimated Reach Length <u>60 ft</u> m Estimated Stream Width <u>6 ft</u> m Sampling Reach Area <u>300 ft²</u> m ² Area in km ² (m ² x1000) _____ km ² Estimated Stream Depth <u>0.5 ft</u> m Surface Velocity <small>See Field Note</small> _____ m/sec Stream Dry <input type="checkbox"/>		Canopy Cover <input checked="" type="checkbox"/> Partly open <input type="checkbox"/> Partly shaded <input type="checkbox"/> Shaded High Water Mark <u>1.5 ft</u> m Proportion of Reach Represented by Stream Morphology Types Riffle ⁴⁰ _____ % Run ³⁰ _____ % Pool ³⁰ _____ % Channelized <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Dam Present <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
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 <small>None Present</small> _____ Portion of the reach with aquatic vegetation _____ %			
WATER QUALITY	Temperature <u>20.7</u> °C Specific Conductance <u>193.3</u> us/cm Dissolved Oxygen <u>8.10</u> mg/L pH <u>7.48</u> su Turbidity <u>39.3</u> ntu WQ Instrument Used _____		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 _____	
SEDIMENT/SUBSTRATE	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		Deposits <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 <small>none</small> _____ Looking at stones which are not deeply embedded, are the undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

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")	10			
Cobble	64-256 mm (2.5"-10")	20	Muck-Mud	black, very fine organic (FPOM)	0
Gravel	2-64 mm (0.1"-2.5")	50			
Sand	0.06-2mm (gritty)	15	Marl	grey, shell fragments	0
Silt	0.004-0.06 mm	2			
Clay	< 0.004 mm (slick)	3			

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

STREAM NAME Painter Run		LOCATION S-C39	
STATION # _____ RIVERMILE _____		STREAM CLASS Perennial <input type="checkbox"/>	
LAT 37.426686 LONG -80.694499		COUNTY Monroe <input type="checkbox"/>	
STORET # _____		AGENCY Potesta	
INVESTIGATORS Tim Ferguson/Allyson Kincaid			
FORM COMPLETED BY Tim Ferguson/Allyson Kincaid		DATE 8/18/2021 TIME 1420 PM AM PM	REASON FOR SURVEY Preliminary Assessment

	Habitat Parameter	Condition Category			
		Optimal	Suboptimal	Marginal	Poor
Parameters to be evaluated in sampling reach	1. Epifaunal Substrate/ Available Cover <input type="checkbox"/> N/A SCORE 14 <input type="checkbox"/>	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 not 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.
		20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	2. Embeddedness SCORE 14 <input type="checkbox"/>	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.
		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 <input type="checkbox"/> N/A SCORE 16 <input type="checkbox"/>	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).
		20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition SCORE 15 <input type="checkbox"/>	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.	
	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 <input type="checkbox"/> N/A SCORE 16 <input type="checkbox"/>	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.	
	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
6. Channel Alteration Channelization or dredging absent or minimal; stream with normal pattern. SCORE <u>14</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
7. Frequency of Riffles (or bends) <input type="checkbox"/> N/A SCORE <u>15</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
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream. SCORE <u>7</u> SCORE <u>6</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
9. Vegetative Protection (score each bank) SCORE <u>8</u> SCORE <u>8</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
10. Riparian Vegetative Zone Width (score each bank riparian zone) SCORE <u>7</u> SCORE <u>7</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 147

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME Painter Run		LOCATION	
STATION # _____ RIVERMILE _____	STREAM CLASS Perennial <input type="checkbox"/>		
LAT <u>37.426686</u> LONG <u>-80.694499</u>	COUNTY Monroe <input type="checkbox"/>		
STORET # _____	AGENCY Potesta		
INVESTIGATOR Tim Ferguson/Allyson Kincaid		LOT NUMBER	
FORM COMPLETED BY Tim Ferguson/Allyson Kincaid	DATE 8/18/2021 TIME 1420 PM	REASON FOR SURVEY Preliminary Assessment	

HABITAT TYPES	Indicate the percentage of each habitat type present <input checked="" type="checkbox"/> Cobble <u>30</u> % <input type="checkbox"/> Snags _____% <input type="checkbox"/> Vegetated Banks _____% <input checked="" type="checkbox"/> Sand <u>20</u> % <input type="checkbox"/> Submerged Macrophytes _____% <input checked="" type="checkbox"/> Other (gravel) <u>50</u> %
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>2</u> <input type="checkbox"/> Snags _____ <input type="checkbox"/> Vegetated Banks _____ <input type="checkbox"/> Sand _____ <input type="checkbox"/> Submerged Macrophytes _____ <input checked="" type="checkbox"/> Other (gravel) <u>2</u>
GENERAL COMMENTS	Water level is up. 4 kicks taken in one large riffle approx. 20 ft US from bridge

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	Caddisfly, water penny, Salamander, Fish, Crayfish					
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						

S-C39 Painter Run

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME <u>Painter Run</u>	LOCATION <u>S-C39</u> <u>Monroe F</u>
STATION # _____ RIVERMILE _____	STREAM CLASS <u>Perennial</u>
LAT _____ LONG _____	RIVER BASIN _____
STORET # _____	AGENCY <u>Potesta</u>
INVESTIGATORS <u>TF/AK</u>	LOT NUMBER _____
FORM COMPLETED BY <u>TF/AK</u>	DATE <u>8/18/21</u> TIME <u>1430</u> AM <input checked="" type="radio"/> PM
	REASON FOR SURVEY <u>Pre-Construction Survey</u>

HABITAT TYPES	Indicate the percentage of each habitat type present <input checked="" type="checkbox"/> Cobble <u>30</u> % <input type="checkbox"/> Snags _____ % <input type="checkbox"/> Vegetated Banks _____ % <input checked="" type="checkbox"/> Sand <u>20</u> % <input type="checkbox"/> Submerged Macrophytes _____ % <input checked="" type="checkbox"/> Other (<u>gravel</u>) <u>50</u> %
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>2</u> <input type="checkbox"/> Snags _____ <input type="checkbox"/> Vegetated Banks _____ <input type="checkbox"/> Sand _____ <input type="checkbox"/> Submerged Macrophytes _____ <input checked="" type="checkbox"/> Other (<u>gravel</u>) <u>2</u>
GENERAL COMMENTS	<u>Water level is up. 4 Kicks taken in one large riffle approx 20 ft, 45 from bridge</u>

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	0	1	2	<u>3</u>	4
Macrophytes	<u>0</u>	1	2	3	4	Fish	0	1	<u>2</u>	3	4

FIELD OBSERVATIONS OF MACROBENTHOS

Unknown

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						

*Caddisfly
Water penny
Salamander
Fish
(rayfish)*

Benthic WVSCI
Sample ID 1
ORG ID REIC2513

West Virginia Stream Condition Index (WVSCI)

IMPORTANT: A blank screen below means that you have not entered the Benthic Identifications correctly! All individuals that are part of the 200-count subsample must be designated as such in the Sample Methodolgy column on the Benthic ID forms (Family or Genus)!

WVSCI Family	Count	TV
Baetidae	21	4
Caenidae	11	7
Chironomidae	11	6
Corydalidae	7	5
Dryopidae	1	5
Elmidae	25	4
Empididae	2	6
Ephemerellidae	3	3
Gomphidae	5	3
Heptageniidae	15	4
Hydrachnidae	1	6
Hydropsychidae	42	5
Isorychiidae	5	2
Leuctridae	8	3
Odontoceridae	3	0
Perlidae	7	1
Philopotamidae	2	3
Psephenidae	24	4
Simuliidae	1	6
Tabanidae	1	6
Tipulidae	2	3

WVSCI Metrics and Scores

	Metrics	BSV	WVSCI Standardized Score w BSV 1996-2001
% 2 Dominant Taxa (Family)	34.01	37.3	105.25
% Chironomidae	5.58	1.7	96.05
% EPT (Family)	59.39	89.3	66.51
HBI (Family)	4.26	2.61	77.62
# EPT Taxa (Family)	10	13	76.92
# Total Taxa (Family)	21	22	95.45
WVSCI Score w/ BSV 1996-2001			85.43

WVSCI Category Unimpaired Very Good

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

Benthic Density

# of grids Picked	32	Total # of grids	100
Total IBI Individuals		197	
# of Organisms per Grid		6.16	
Organisms per Sq cm		0.0616	
Organisms per Sq m		615.63	

SITE ID: S-C39 (Painter Run)

DATE: 8/18/21

COLLECTOR(S): TF/AK

Wolman Pebble Count (Reach Wide)									
33	48	53	12	67	10	66	30	42	20
40	83	76	17	0.1	6	66	42	45	36
47	10	13	70	0.1	0.1	31	22	90	6.1
54	12	0.1	49	16	7	2125	45	60	35
70	.25	8	30	65	60	55	26	65	82
35	.10	12	0.1	0.1	45	45	12	31	60
19	.25	15	0.1	40	0.1	20	20	30	0.1
12	57	1	0.1	45	0.1	61	40	21	55
55	62	12	55	0.12	0.1	65	56	35	0.1
18	6	25	7	10	30	0.1	12	30	12

NOTES:
 @channel is filled with water. Some erosion on LDB + RDB.

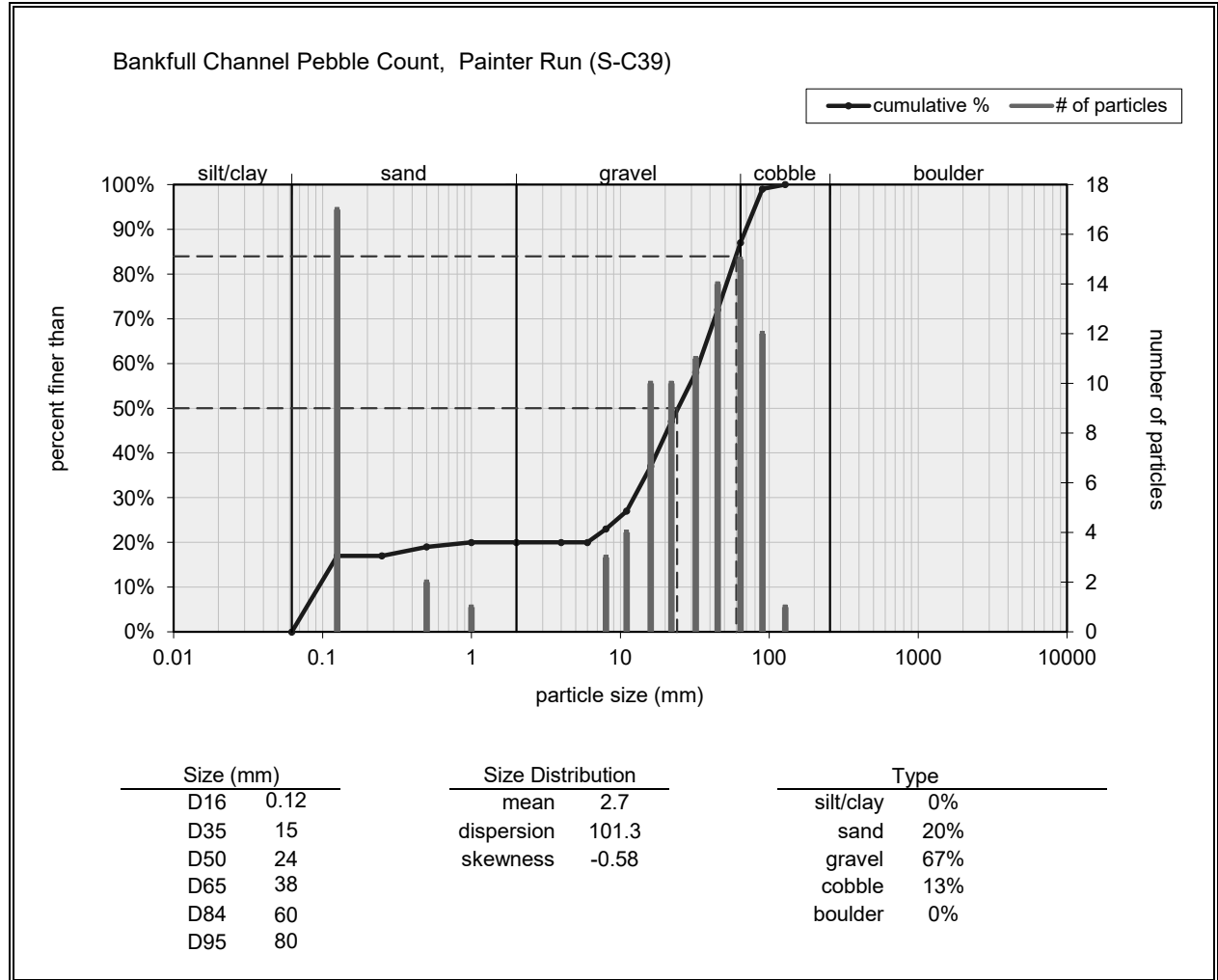
~~Riffle Pebble Count~~

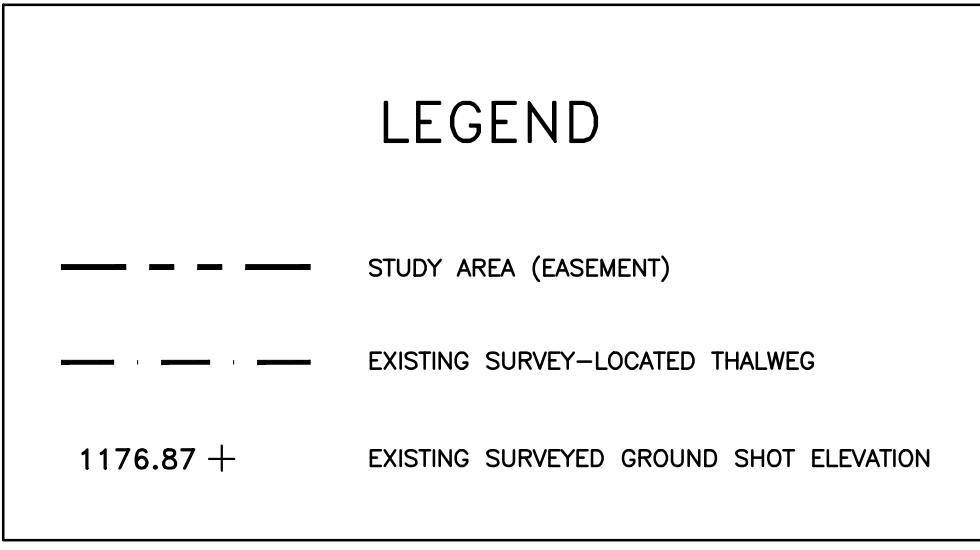
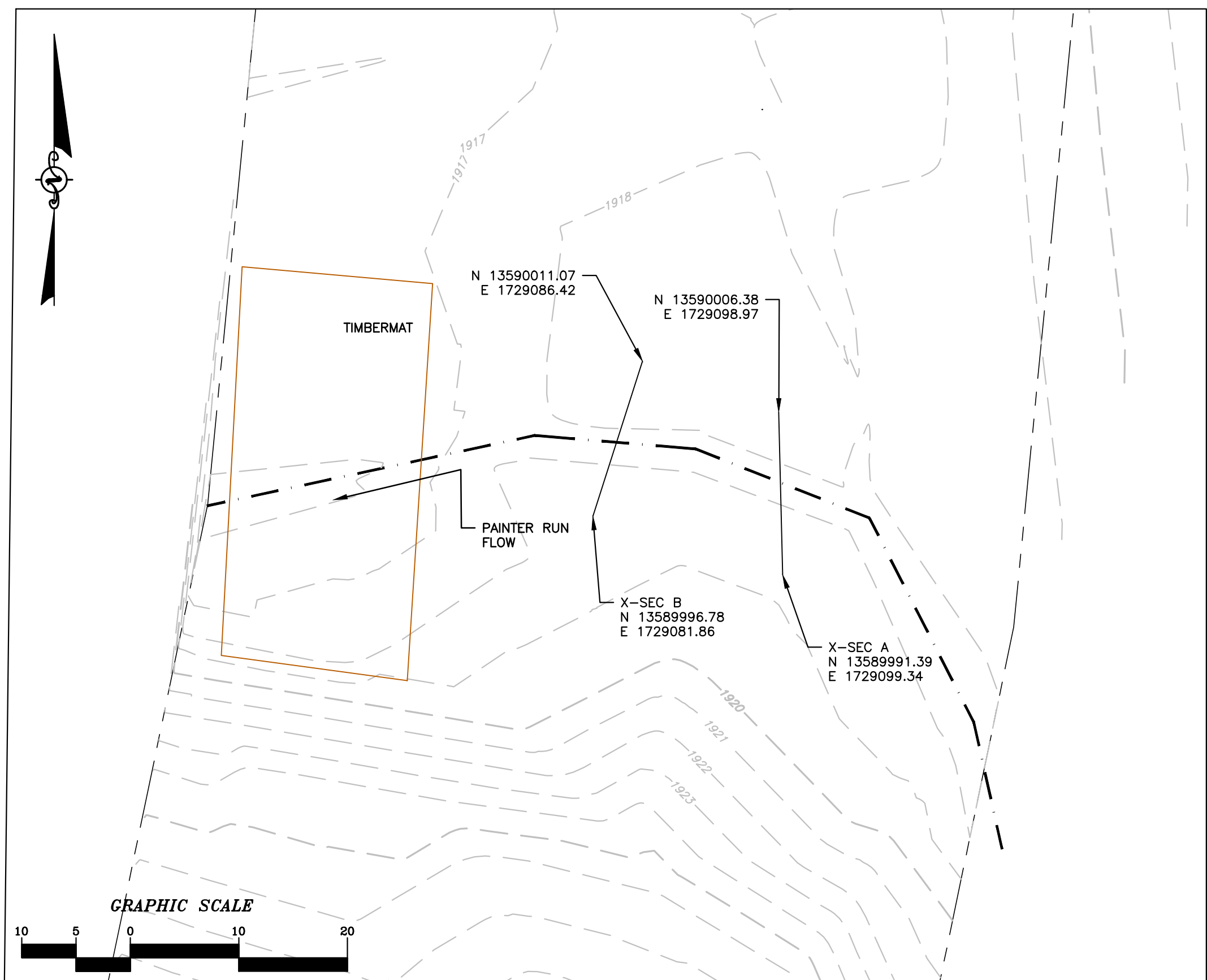
NOTES:

NOTES:

Inches	PARTICLE	Millimeters	S/C
	Silt/Clay	< .062	
	Very Fine	.062 - .125	SAND
	Fine	.125 - .25	
	Medium	.25 - .50	
	Coarse	.50 - 1.0	
.04 - .08	Very Coarse	1.0 - 2	GRAVEL
.08 - .16	Very Fine	2 - 4	
.16 - .22	Fine	4 - 5.7	
.22 - .31	Fine	5.7 - 8	
.31 - .44	Medium	8 - 11.3	
.44 - .53	Medium	11.3 - 16	COBBLE
.53 - .89	Coarse	16 - 22.6	
.89 - 1.3	Coarse	22.6 - 32	
1.3 - 1.8	Very Coarse	32 - 45	BOULDER
1.8 - 2.5	Very Coarse	45 - 64	
2.5 - 3.5	Small	64 - 90	
3.5 - 5.0	Small	90 - 128	BDRK
5.0 - 7.1	Large	128 - 180	
7.1 - 10.1	Large	180 - 256	
10.1 - 14.3	Small	256 - 362	
14.3 - 20	Small	362 - 512	
20 - 40	Medium	512 - 1024	
40 - 80	Large-Vry Large	1024 - 2048	
	Bedrock		

Bankfull Channel		
Material	Size Range (mm)	Count
silt/clay	0 - 0.062	
very fine sand	0.062 - 0.125	17
fine sand	0.125 - 0.25	
medium sand	0.25 - 0.5	2
coarse sand	0.5 - 1	1
very coarse sand	1 - 2	
very fine gravel	2 - 4	
fine gravel	4 - 6	
fine gravel	6 - 8	3
medium gravel	8 - 11	4
medium gravel	11 - 16	10
coarse gravel	16 - 22	10
coarse gravel	22 - 32	11
very coarse gravel	32 - 45	14
very coarse gravel	45 - 64	15
small cobble	64 - 90	12
medium cobble	90 - 128	1
large cobble	128 - 180	
very large cobble	180 - 256	
small boulder	256 - 362	
small boulder	362 - 512	
medium boulder	512 - 1024	
large boulder	1024 - 2048	
very large boulder	2048 - 4096	
total particle count:		100
bedrock -----		
clay hardpan -----		
detritus/wood -----		
artificial -----		
total count:		100
Note: <input type="text"/>		

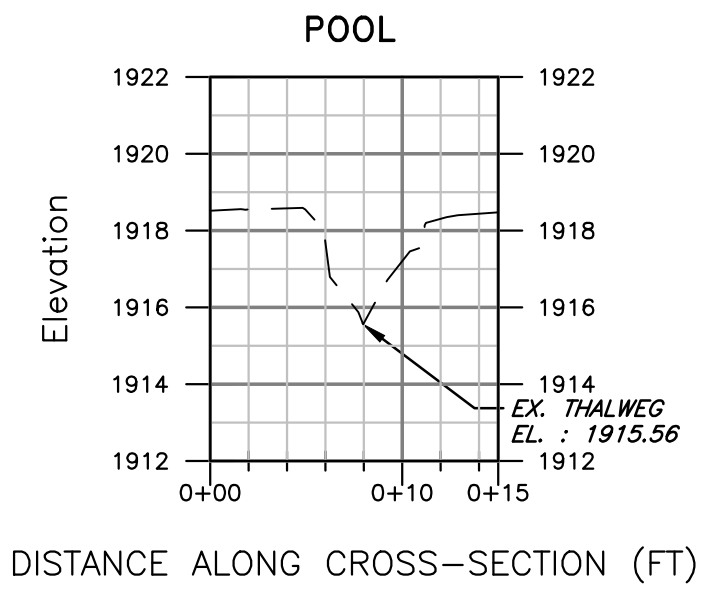




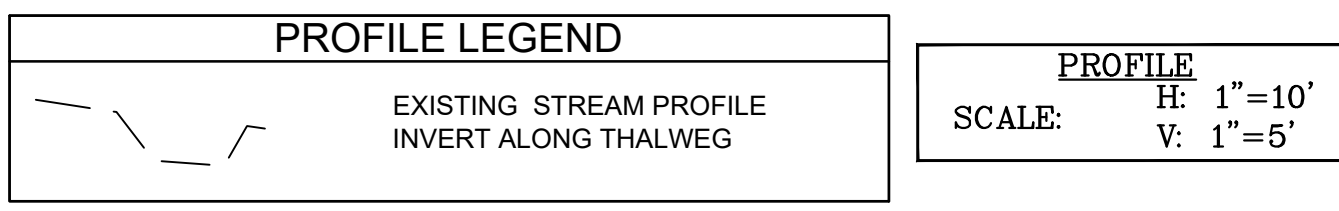
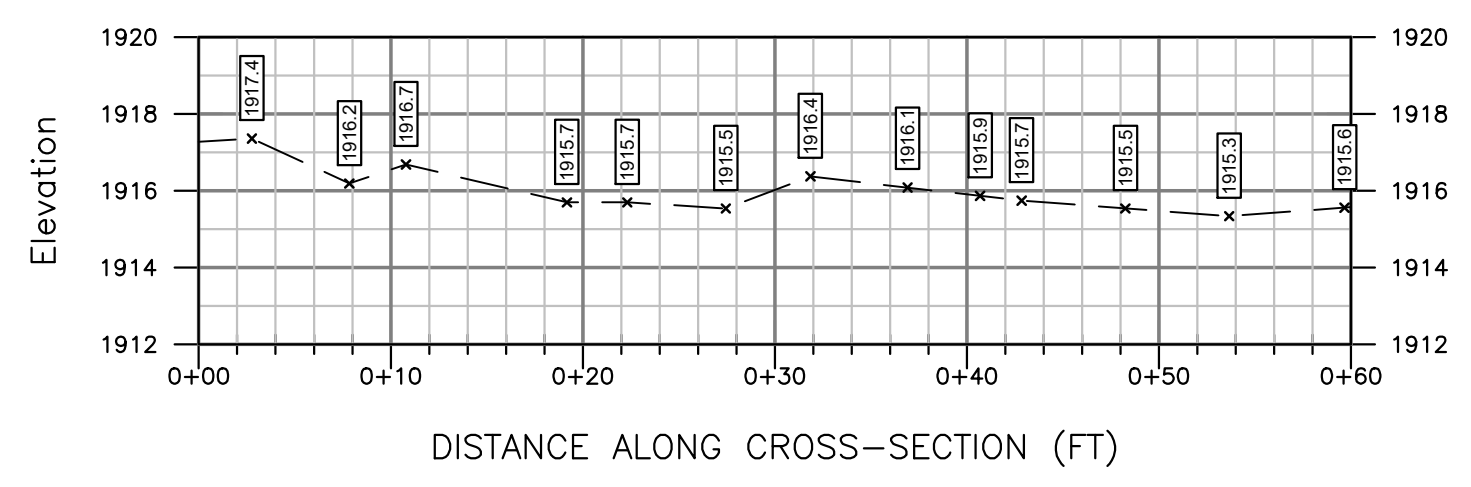
- SURVEY NOTES:**
- THIS MAP HAS BEEN ORIENTED TO NAD 1983 UTM ZONE 17N, AND VERTICALLY TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), USING REAL TIME DGPS. FIELD LOCATIONS WERE COMPLETED ON 8-17-2021.
 - EASEMENT LINES SHOWN ON PLAN VIEW WERE PROVIDED BY MOUNTAIN VALLEY PIPELINE.
 - SURVEY POINTS FOR CROSS SECTIONS AND THALWEG PROFILES COLLECTED IN 2021 HAVE BEEN USED IN COMBINATION WITH SURVEY POINTS AND COLLECTED PREVIOUSLY IN 2020 IN ORDER TO GENERATE THE PRE-CROSSING SURFACE SHOWN IN PLAN. DUE TO NATURAL EROSIONAL STREAM PROCESSES THAT OCCUR OVER TIME, MINOR ADJUSTMENTS TO THE PROFILE ALIGNMENTS MAY HAVE BEEN REQUIRED IN ORDER TO GENERATE A CLEAN PRE-CROSSING SURFACE.
 - ALL SECTION VIEWS SHOWN LEFT TO RIGHT FACING DOWNSTREAM.
 - POST-CROSSING SURVEY INFORMATION SHOWN IN RED. DATA PENDING.
 - POST-CROSSING SURVEY POINTS FOR CROSS SECTIONS AND THALWEG ARE PROJECTED ONTO PRE-CROSSING SECTION AND PROFILE VIEWS FOR COMPARISON.

S-C39

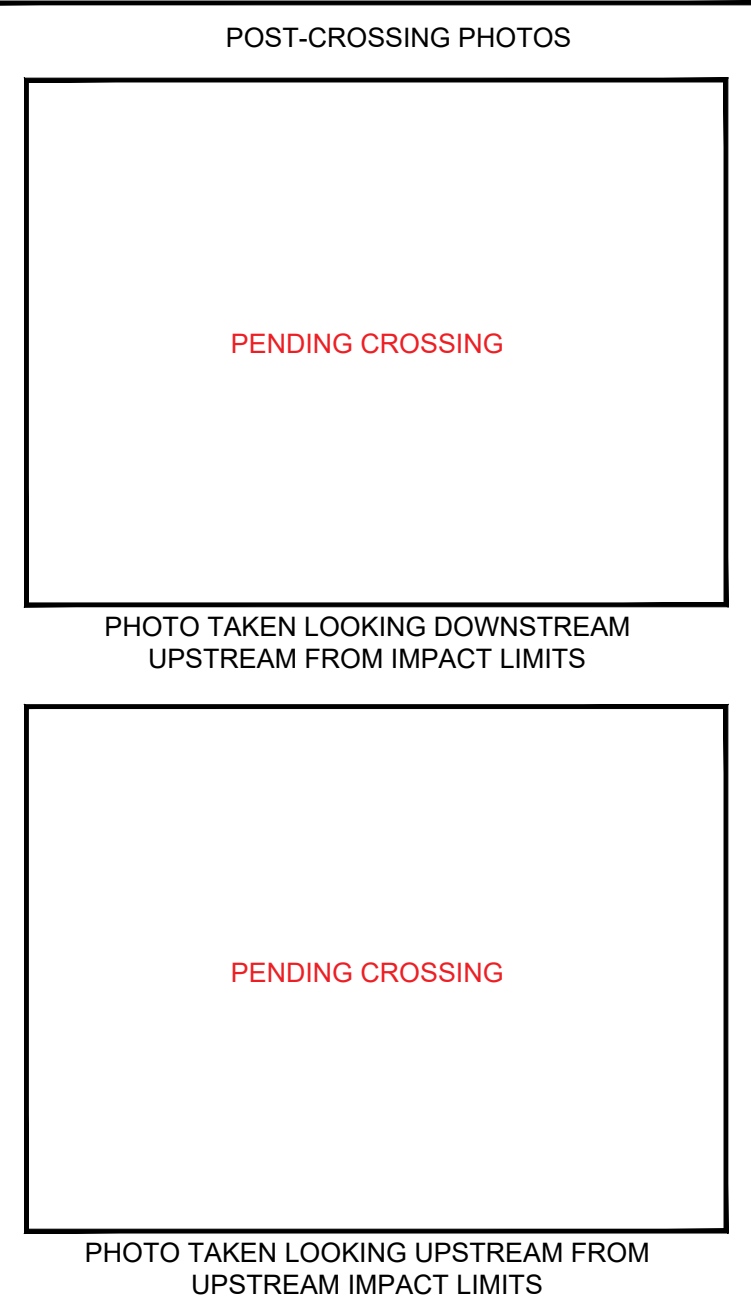
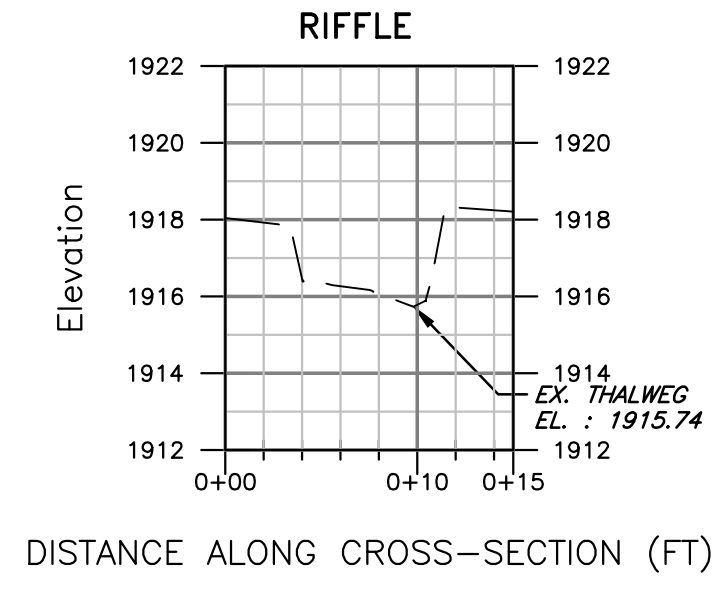
S-C39 BASELINE CROSS-SECTION A



S-C39 BASELINE THALWEG PROFILE

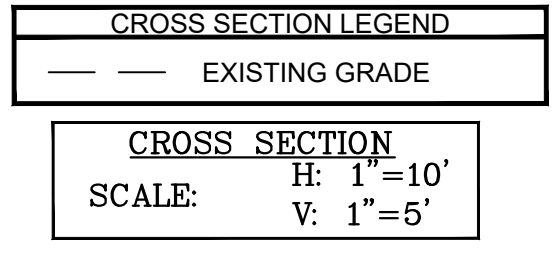
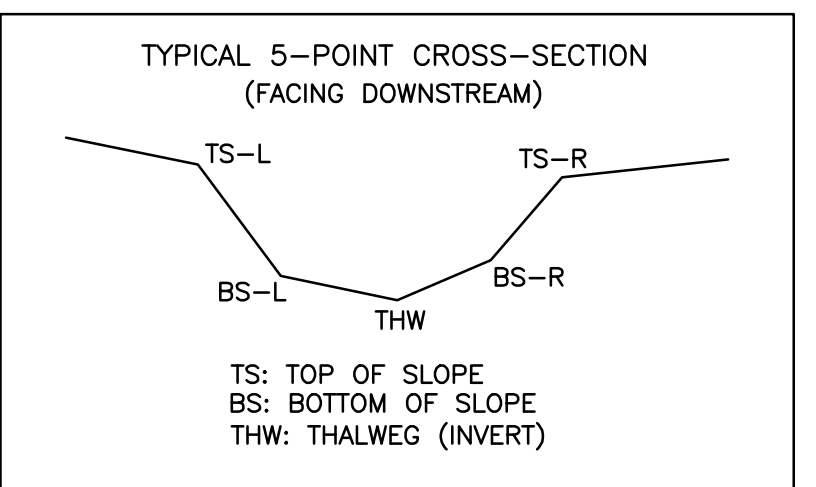


S-C39 BASELINE CROSS-SECTION B



AS-BUILT TABLE: S-C39 CROSS SECTION B

PT. LOC.	PRE-CROSSING			AS-BUILT	
	NORTHING	EASTING	ELEV.	VERT. DIFF.	HORZ. DIFF.
TS-L	13590000.17	1729082.28	1917.82		
BS-L	13590000.69	1729082.81	1916.34		
THW	13590006.17	1729085.20	1915.74		
BS-R	13590006.74	1729085.21	1915.88		
TS-R	13590007.90	1729084.96	1918.39		



NOTE: ALL SECTION VIEWS SHOWN LEFT TO RIGHT FACING DOWNSTREAM.

S-C39
 CAD File No.
 MBS
 Drawn
 CHH
 Checked
 BB/JLY
 Approved
 NOTED
 Scale:
 SEPT. 2021
 Date:
 21-0244-005
 Project No.

POTESTA

POTESTA & ASSOCIATES, INC.
 ENGINEERS AND ENVIRONMENTAL CONSULTANTS
 7012 MacCorkle Avenue SE, Charleston, WV 25304
 TEL: (304) 342-1400 FAX: (304) 343-9031
 E-Mail: Address: potesta@potesta.com

DATE ISSUED 9/27/21

Client:
 MOUNTAIN VALLEY PIPELINE, LLC
 2200 ENERGY DRIVE, 2ND FLOOR
 CANONSBURG, PA 15317

Title:
 PROFILE AND CROSS-SECTIONS
 BASELINE SURVEY
 CROSSING S-C39
 PAINTER RUN, (MP 194.57)
 MONROE COUNTY, WV

File: S:\C39-Pre\21-0244-MVA\21-0244-S-C39.dwg
 Date: 9/27/21
 Plot: 9/27/21 10:58 AM

PRE-CROSSING