Baseline Assessment – Stream Attributes

Reach S-I57 (Pipeline ROW)
Perennial
Spread C
Braxton County, West Virginia

Data	Included
Photos	✓
SWVM Form	✓
FCI Calculator and HGM Form	N/A – Perennial stream (not shadeable, slope >4%)
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 Right of Way, Upstream View, ABK/TF/WP

Photo Type: DS, DS View
Location, Orientation, Photographer Initials: Downstream Edge of Right of Way, Downstream View, ABK/TF/WP

Photo Type: CP, US View
Location, Orientation, Photographer Initials: Center of Right of Way, Upstream View, ABK/TF/WP

Photo Type: CP, DS View
Location, Orientation, Photographer Initials: Center of Right of Way, Downstream View, ABK/TF/WP

Photo Type: DS, US View
Location, Orientation, Photographer Initials: Downstream Edge of Right of Way, Upstream View, ABK/TF/WP

Photo Type: US, DS View
Location, Orientation, Photographer Initials: Upstream Edge of Right of Way, Downstream View, ABK/TF/WP

Photo Type: ROW, N
Location, Orientation, Photographer Initials: Right of Way, Facing North, ABK/TF/WP

Photo Type: ROW, S
Location, Orientation, Photographer Initials: Right of Way, Facing South, ABK/TF/WP

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

West Virginia Stream and Wetland Valuation Metric (SWVM)
Version 2.1, September 2017

USACE FILE NO./ Project Name: (v2.1, Sept 2015)	MOUNTAIN VALLEY PIPELINE	IMPACT COORDINATES: (in Decimal Degrees)	Lat.	38.697413	Lon.	-80.48956	WEATHER:	clear/sunny	DATE:	9/26/2021
IMPACT STREAM/SITE ID AND SITE DESCRIPTION: (watershed size {acreage}, unaltered or impairments)	Mudlick Run (S-I57)	MITIGATION STREAM CLASS./SITE ID AND SITE DESCRIPTION: (watershed size {acreage}, unaltered or impairments)							Comments:	
STREAM IMPACT LENGTH:	77	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:				Stream Classification:	0			Stream Classification:	0			Stream Classification:	0		
Percent Stream Channel Slope				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				Average
Hydrology				Hydrology				Hydrology				Hydrology				Hydrology			
Biogeochemical Cycling			0	Biogeochemical Cycling			0	Biogeochemical Cycling			0	Biogeochemical Cycling			0	Biogeochemical Cycling			0
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		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	15	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		1. Epifaunal Substrate/Available Cover	0-20	0-1	
2. Embeddedness	0-20		13	2. Pool Substrate Characterization	0-20			2. Embeddedness	0-20			2. Embeddedness	0-20			2. Embeddedness	0-20		
3. Velocity/ Depth Regime	0-20		9	3. Pool Variability	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		11	4. Sediment Deposition	0-20			4. Sediment Deposition	0-20			4. Sediment Deposition	0-20			4. Sediment Deposition	0-20		
5. Channel Flow Status	0-20		8	5. Channel Flow Status	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		20	6. Channel Alteration	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		10	7. Channel Sinuosity	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		13	8. Bank Stability (LB & RB)	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		17	9. Vegetative Protection (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		12	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			10. Riparian Vegetative Zone Width (LB & RB)	0-20		
Total RBP Score	Suboptimal		128	Total RBP Score	Poor		0	Total RBP Score	Poor		0	Total RBP Score	Poor		0	Total RBP Score	Poor		0
Sub-Total			0.64	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				Specific Conductivity				Specific Conductivity				Specific Conductivity				Specific Conductivity			
<=99 - 90 points	0-90	0-1	31.4		0-90	0-1			0-90	0-1			0-90	0-1			0-90	0-1	
pH				pH				pH				pH				pH			
6.0-8.0 = 80 points	0-80		6.55		5-90				5-90				5-90				5-90		
DO				DO				DO				DO				DO			
>5.0 = 30 points	10-30		8.95		10-30				10-30				10-30				10-30		
Sub-Total			1	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)			
Very Good	0-100	0-1	77.61		0-100	0-1			0-100	0-1			0-100	0-1			0-100	0-1	
Sub-Total			0.7761	Sub-Total			0	Sub-Total			0	Sub-Total			0	Sub-Total			0

PART II - Index and Unit Score		
Index	Linear Feet	Unit Score
0.805	77	62.01323333

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

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

PART II - Index and Unit Score		
Index	Linear Feet	Unit Score
0	0	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 S-I57	LOCATION Mudlick Run	
STATION # _____ RIVERMILE _____	STREAM CLASS Perennial	
LAT 38.697413 LONG -80.48956	COUNTY Braxton	
STORET #	AGENCY Potesta	
INVESTIGATORS ABK/TF		
FORM COMPLETED BY ABK	DATE 9-29-2021 TIME 1100	REASON FOR SURVEY Preliminary Assessment

WEATHER CONDITIONS

Now

____%

- ☐ storm (heavy rain)
- ☐ rain (steady rain)
- ☐ showers (intermittent)
- ☐ %cloud cover
- ☑ clear/sunny

Past 24 hours

- ☐ storm (heavy rain)
- ☐ rain (steady rain)
- ☐ showers (intermittent)
- ☐ %cloud cover
- ☑ clear/sunny

____%

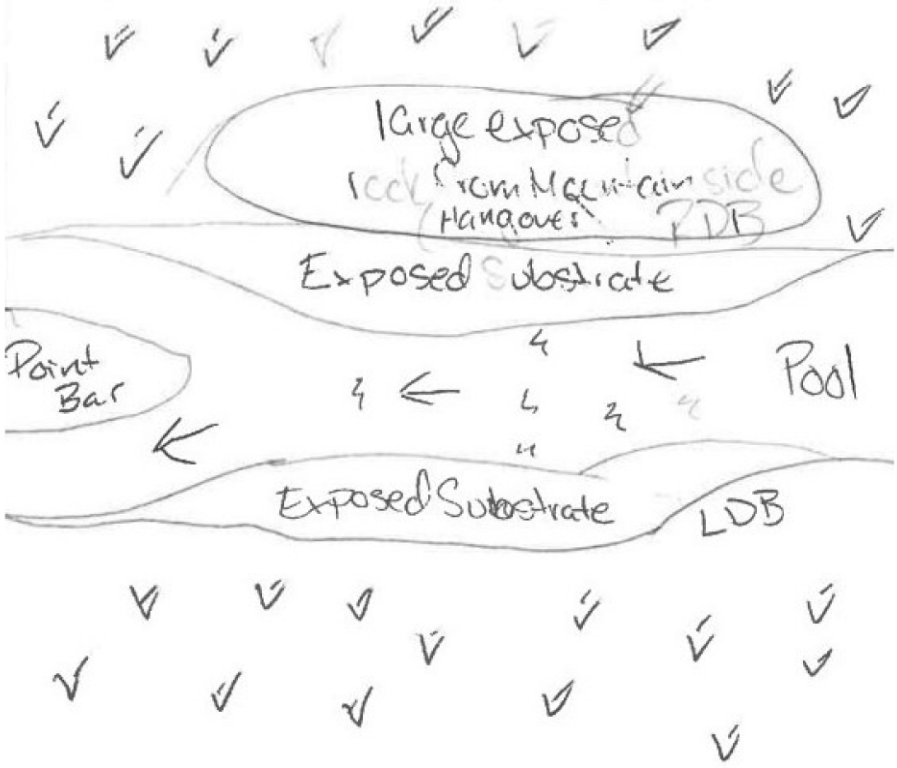
Has there been a heavy rain in the last 7 days?
☐ Yes ☑ No

Air Temperature 70 F ° C

Other _____

SITE LOCATION/MAP

Draw a map of the site and indicate the areas sampled (or attach a photograph)



STREAM CHARACTERIZATION

Stream Subsystem
☑ Perennial ☐ Intermittent ☐ Tidal

Stream Type
☐ Coldwater ☑ Warmwater

Stream Origin
- ☐ Glacial
- ☐ Non-glacial montane
- ☐ Swamp and bog
- ☐ Spring-fed
- ☑ Mixture of origins
- ☐ Other _____

Catchment Area _____ km^2

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

WATERSHED FEATURES

Predominant Surrounding Landuse
☑ Forest ☐ Commercial
☐ Field/Pasture ☐ Industrial
☐ Agricultural ☑ Other Pipeline ROW
☐ Residential

Local Watershed NPS Pollution
☐ No evidence ☑ Some potential sources
☐ Obvious sources

Local Watershed Erosion
☑ None ☐ Moderate ☐ Heavy

RIPARIAN VEGETATION (18 meter buffer)

Indicate the dominant type and record the dominant species present
☐ Trees ☐ Shrubs ☐ Grasses ☑ Herbaceous

Dominant species present _____

INSTREAM FEATURES

Estimated Reach Length 75 ft m
Estimated Stream Width 30 ft m
Sampling Reach Area 2250 ft^2 m²
Area in km² (m²x1000) _____ km²
Estimated Stream Depth 0.3 ft m
Surface Velocity (at thalweg) _____ m/sec
Stream Dry ☐

Canopy Cover
☑ Partly open ☐ Partly shaded ☐ Shaded

High Water Mark 2 ft m

Proportion of Reach Represented by Stream Morphology Types
Riffle 30 % Run 55 %
Pool 15 %

Channelized ☐ Yes ☑ No
Dam Present ☐ Yes ☑ No

LARGE WOODY DEBRIS

LWD N/A m²
Density of LWD N/A m²/km² **(LWD/ reach area)**

AQUATIC VEGETATION

Indicate the dominant type and record the dominant species present
☐ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free floating
☐ Floating Algae ☐ Attached Algae

Dominant species present N/A

Portion of the reach with aquatic vegetation 0 %

WATER QUALITY

Temperature 16.5 °C
Specific Conductance 31.4 us/cm
Dissolved Oxygen 8.95 mg/L
pH 6.55 su
Turbidity 6.6 ntu
WQ Instrument Used YSI

Water Odors
☑ Normal/None ☐ Sewage
☐ Petroleum ☐ Chemical
☐ Fishy ☐ Other

Water Surface Oils
☐ Slick ☐ Sheen ☐ Globs Flecks
☑ None ☐ Other

Turbidity (if not measured)
☐ Clear ☑ Slightly turbid ☐ Turbid
☐ Opaque ☐ Stained ☐ Other

SEDIMENT/ SUBSTRATE

Odors
☑ Normal ☐ Sewage ☐ Petroleum
☐ Chemical ☐ Anaerobic ☐ None
☐ Other

Oils
☑ Absent ☐ Slight ☐ Moderate ☐ Profuse

Deposits
☐ Sludge ☐ Sawdust ☐ Paper fiber ☐ Sand
☐ Relict shells ☑ Other silt

Looking at stones which are not deeply embedded, are the undersides black in color?
☐ Yes ☐ 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		5	Detritus	sticks, wood, coarse plant materials (CPOM)	15
Boulder	> 256 mm (10")	10			
Cobble	64-256 mm (2.5"-10")	40	Muck-Mud	black, very fine organic (FPOM)	-
Gravel	2-64 mm (0.1"-2.5")	30			
Sand	0.06-2mm (gritty)	10	Marl	grey, shell fragments	-
Silt	0.004-0.06 mm	5			
Clay	< 0.004 mm (slick)	0			

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

STREAM NAME S-157	LOCATION Mudlick Run
STATION # _____ RIVERMILE _____	STREAM CLASS Perennial
LAT 38.697413 LONG -80.48956	COUNTY Braxton
STORET #	AGENCY Potesta
INVESTIGATORS ABK/TF	
FORM COMPLETED BY ABK	DATE 9-29-2021 TIME 1100 AM PM — REASON FOR SURVEY Preliminary Assessment

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover ☐ N/A	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 not 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.
SCORE 15	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 13	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 ☐ N/A	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 9	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 11	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 ☐ N/A	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 8	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)

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
6. Channel Alteration	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.
SCORE 20	**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) ☐ N/A	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.
SCORE 10	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.	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.
SCORE 6	Left Bank 10 9	8 7 **6**	5 4 3	2 1 0
SCORE 7	Right Bank 10 9	8 **7** 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	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.
SCORE 9	Left Bank 10 **9**	8 7 6	5 4 3	2 1 0
SCORE 8	Right Bank 10 9	**8** 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	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.
SCORE 6	Left Bank 10 9	8 7 **6**	5 4 3	2 1 0
SCORE 6	Right Bank 10 9	8 7 **6**	5 4 3	2 1 0

Total Score 128

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME S-I57	LOCATION Mudlick Run	
STATION # _____ RIVERMILE _____	STREAM CLASS Perennial	
LAT 38.697413 LONG -80.48956	COUNTY Braxton	
STORET #	AGENCY Potesta	
INVESTIGATORS ABK/TF		LOT NUMBER
FORM COMPLETED BY ABK	DATE 9-29-2021 TIME 1100	REASON FOR SURVEY Preliminary Assessment

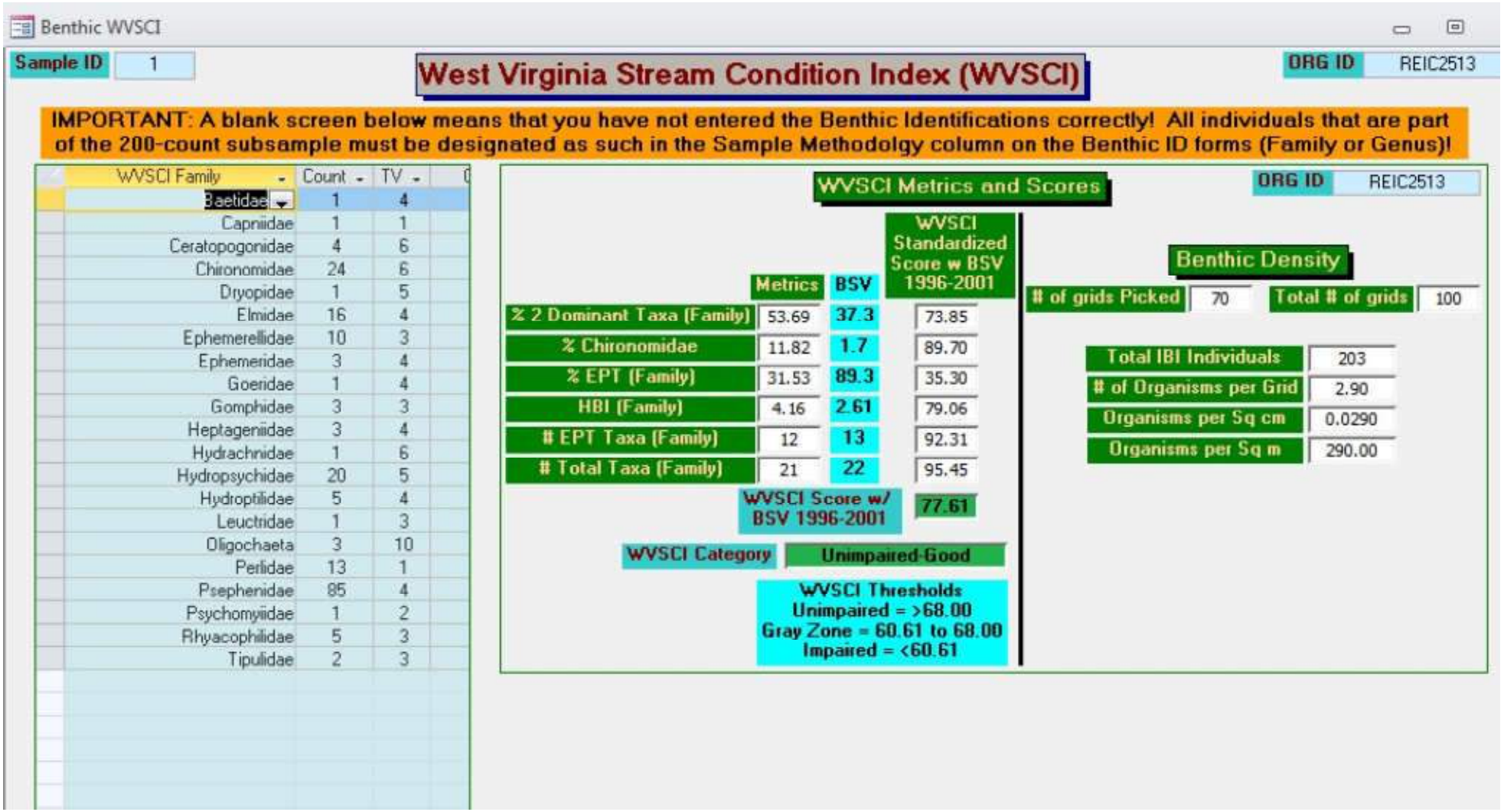
HABITAT TYPES	**Indicate the percentage of each habitat type present** ☑ Cobble 40 % ☐ Snags ____% ☐ Vegetated Banks ____% ☐ Sand ____% ☐ Submerged Macrophytes ____% ☑ Other (gravel) 30 %
SAMPLE COLLECTION	**Gear used** ☐ D-frame ☑ kick-net ☐ Other _____ **How were the samples collected?** ☑ wading ☐ from bank ☐ from boat **Indicate the number of jabs/kicks taken in each habitat type.** ☑ Cobble 4 ☐ Snags ____ ☐ Vegetated Banks ____ ☐ Sand ____ ☐ Submerged Macrophytes ____ ☐ Other ( ) ____
GENERAL COMMENTS	If water levels were lower, kicks could not be completed. Fish and Cray fish spotted.

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	Water pennies, stoneflies					
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						


Benthic WVSCI
Sample ID 1
West Virginia Stream Condition Index (WVSCI)
ORG ID REIC2513
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 1 4
Capniidae 1 1
Ceratopogonidae 4 6
Chironomidae 24 6
Dryopidae 1 5
Elmidae 16 4
Ephemerellidae 10 3
Ephemeridae 3 4
Goeridae 1 4
Gomphidae 3 3
Heptageniidae 3 4
Hydrachnidae 1 6
Hydropsychidae 20 5
Hydroptilidae 5 4
Leuctridae 1 3
Oligochaeta 3 10
Perlidae 13 1
Psephenidae 85 4
Psychomyiidae 1 2
Rhyacophilidae 5 3
Tipulidae 2 3
WVSCI Metrics and Scores
ORG ID REIC2513
Metrics BSV WVSCI Standardized Score w BSV 1996-2001
% 2 Dominant Taxa (Family) 53.69 37.3 73.85
% Chironomidae 11.82 1.7 89.70
% EPT (Family) 31.53 89.3 35.30
HBI (Family) 4.16 2.61 79.06
EPT Taxa (Family) 12 13 92.31
Total Taxa (Family) 21 22 95.45
WVSCI Score w/ BSV 1996-2001 77.61
WVSCI Category Unimpaired-Good
WVSCI Thresholds
Unimpaired = >68.00
Gray Zone = 60.61 to 68.00
Impaired = <60.61
Benthic Density
# of grids Picked 70
Total # of grids 100
Total IBI Individuals 203
# of Organisms per Grid 2.90
Organisms per Sq cm 0.0290
Organisms per Sq m 290.00

SITE ID: S-I57 Mud Lick Run

DATE: 9/29/21

COLLECTOR(S): TF / AK

Wolman Pebble Count (Reach Wide)

210	21	70	122	SA	60	11	62	130	35
98	85	138	135	15	22	65	106	145	12
65	150	110	85	7	230	70	320	85	70
85	275	100	70	32	135	165	120	120	145
92	265	110	65	180	28	108	85	35	72
90	160	52	85	92	110	SA	98	38	38
SA	35	20	68	SA	35	1,200	76	60	100
42	42	50	70	15	60	57	55	58	12
10	70	25	SA	6	42	7	140	22	80
15	130	86	SA	25	250	12	130	31	56

NOTES:

Riffle Pebble Count

NOTES:

NOTES:

Inches	Millimeters	
	Silt/Clay	< 0.062
	Very Fine	0.062 - 0.125
	Fine	0.125 - 0.25
	Medium	0.25 - 0.5
	Coarse	0.5 - 1.0
0.1 - 0.2	Very Coarse	1.0 - 2.0
0.2 - 0.3	Very Fine	2 - 4
0.3 - 0.4	Fine	4 - 5.7
0.4 - 0.5	Fine	5.7 - 8
0.5 - 0.6	Medium	8 - 11.3
0.6 - 0.8	Medium	11.3 - 16
0.8 - 1.0	Coarse	16 - 22.6
1.0 - 1.3	Coarse	22.6 - 32
1.3 - 1.8	Very Coarse	32 - 45
1.8 - 2.5	Very Coarse	45 - 64
2.5 - 3.5	Small	64 - 90
3.5 - 5.0	Small	90 - 128
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/Very Large	1024 - 2048
	Bedrock	

SAND

GRAVEL

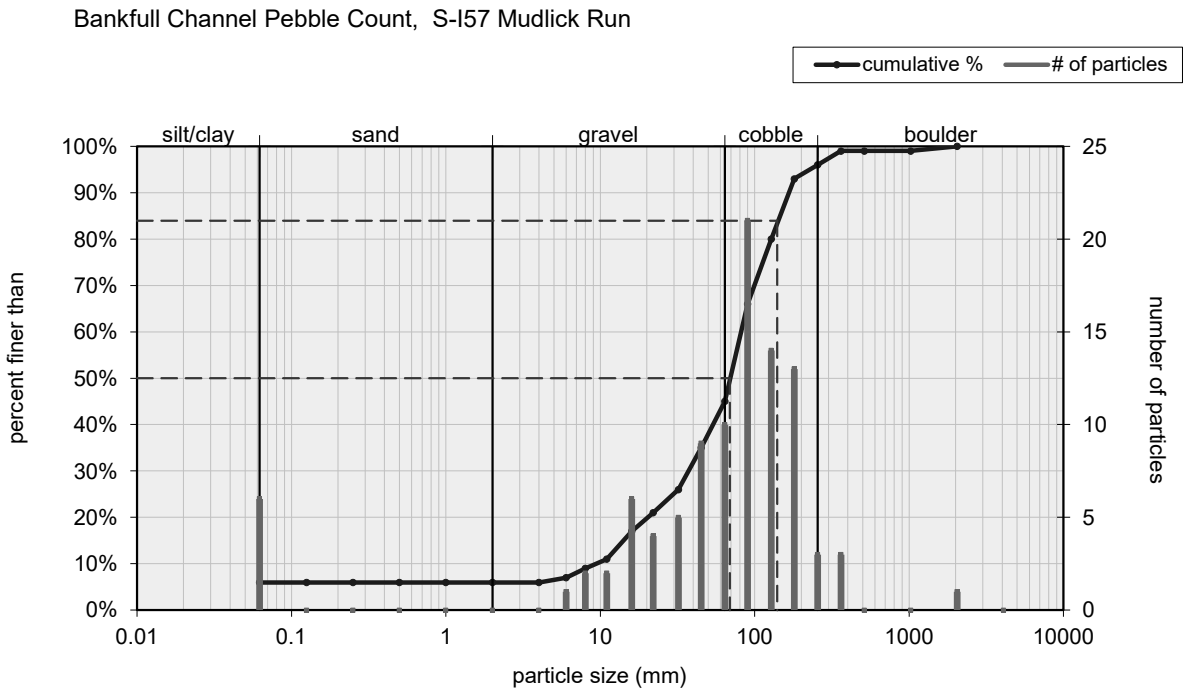
COBBLE

BOULDER

Bankfull Channel

Material	Size Range (mm)	Count
silt/clay	0 - 0.062	**6**
very fine sand	0.062 - 0.125	**0**
fine sand	0.125 - 0.25	**0**
medium sand	0.25 - 0.5	**0**
coarse sand	0.5 - 1	**0**
very coarse sand	1 - 2	**0**
very fine gravel	2 - 4	**0**
fine gravel	4 - 6	**1**
fine gravel	6 - 8	**2**
medium gravel	8 - 11	**2**
medium gravel	11 - 16	**6**
coarse gravel	16 - 22	**4**
coarse gravel	22 - 32	**5**
very coarse gravel	32 - 45	**9**
very coarse gravel	45 - 64	**10**
small cobble	64 - 90	**21**
medium cobble	90 - 128	**14**
large cobble	128 - 180	**13**
very large cobble	180 - 256	**3**
small boulder	256 - 362	**3**
small boulder	362 - 512	**0**
medium boulder	512 - 1024	**0**
large boulder	1024 - 2048	**1**
very large boulder	2048 - 4096	**0**
total particle count:		100
bedrock	----------	
clay hardpan	----------	
detritus/wood	----------	
artificial	----------	
total count:		100

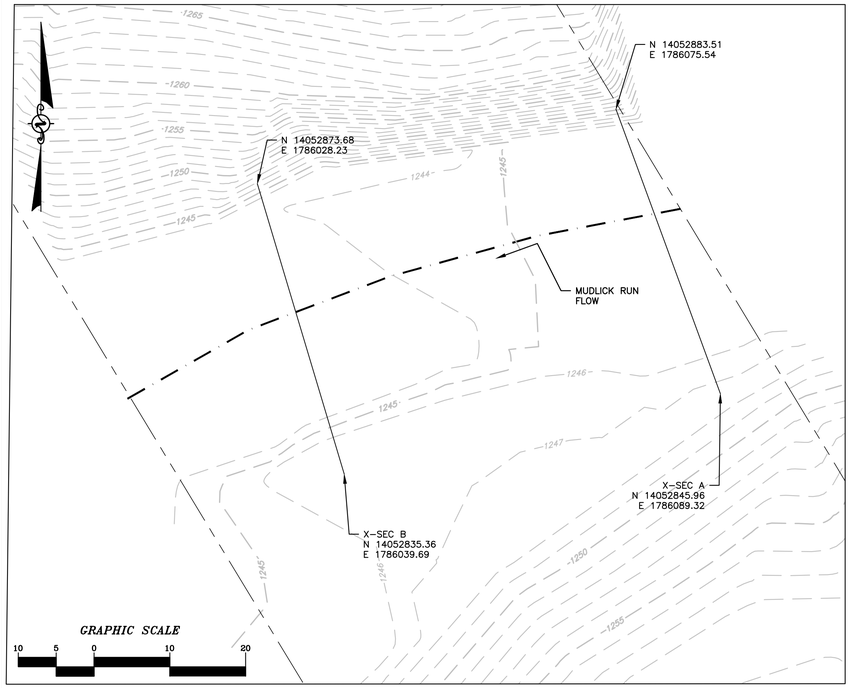
Note:



Size (mm)	
D16	15
D35	45
D50	69
D65	89
D84	140
D95	230

Size Distribution	
mean	45.8
dispersion	3.3
skewness	-0.18

Type	
silt/clay	6%
sand	0%
gravel	39%
cobble	51%
boulder	4%



S-I57

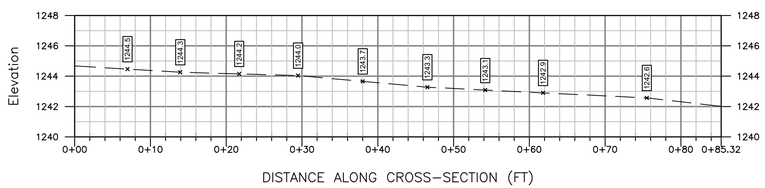
LEGEND

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

SURVEY NOTES:

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 9-29-2121.
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 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.
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.

S-I57 BASELINE THALWEG PROFILE

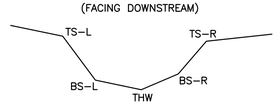


PROFILE LEGEND	
	EXISTING STREAM PROFILE INVERT ALONG THALWEG

PROFILE
SCALE: H: 1"=10'
V: 1"=5'

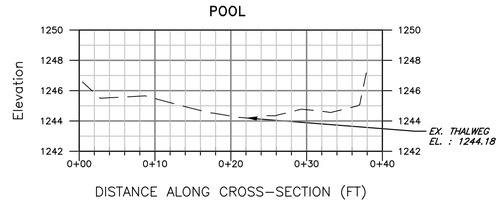
AS-BUILT TABLE: S-I57 CROSS SECTION B					
	PRE-CROSSING			AS-BUILT	
PT. LOC.	NORTHING	EASTING	ELEV.	VERT. DIFF.	HORZ. DIFF.
TS-L	14052841.16	1786037.89	1245.71		
BS-L	14052843.56	1786036.96	1242.96		
THW	14052855.02	1786033.18	1242.90		
BS-R	14052872.46	1786029.35	1243.35		
TS-R	14052873.41	1786028.91	1244.74		

TYPICAL 5-POINT CROSS-SECTION
(FACING DOWNSTREAM)

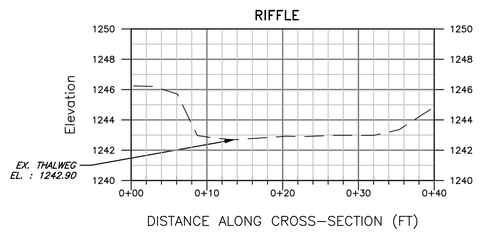


TS: TOP OF SLOPE
BS: BOTTOM OF SLOPE
THW: THALWEG (INVERT)

S-I57 BASELINE CROSS-SECTION A



S-I57 BASELINE CROSS-SECTION B



CROSS SECTION LEGEND	
— —	EXISTING GRADE

CROSS SECTION
SCALE: H: 1"=10'
V: 1"=5'

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

PRE-CROSSING PHOTOS

PHOTO TAKEN LOOKING DOWNSTREAM
FROM UPSTREAM IMPACT LIMITS

PHOTO TAKEN LOOKING UPSTREAM FROM
DOWNSTREAM IMPACT LIMITS

POST-CROSSING PHOTOS

PENDING CROSSING

PHOTO TAKEN LOOKING DOWNSTREAM
UPSTREAM FROM IMPACT LIMITS

PENDING CROSSING

PHOTO TAKEN LOOKING UPSTREAM FROM
UPSTREAM IMPACT LIMITS

PRE-CROSSING

DATE ISSUED 10/4/2021

-S-I57
CAD File No.
MBS
Drawn
CHH
Checked
BB/JLY
Approved
NOTED
Scale:
OCT. 2021
Date:
21-0244-005
Project No.

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POTESTA

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

Title
PROFILE AND CROSS-SECTIONS
BASELINE SURVEY
CROSSING S-I57 - MUDLICK RUN
(MP 79.7)
BAXTON COUNTY, WV

1
Drawing No.

File: S:\CAD-Proj-HPV\2021\21-0244-MVP\21-0244-S-I57.dwg
Layout: PRE-CROSSING
Plotted: Oct 07, 2021 - 9:52am
By: MBSonkoff