Baseline Assessment – Stream Attributes

Reach S-E40 (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, slope >4%)
RBP Physical Characteristics Form	✓
Water Quality Data	✓
RBP Habitat Form	✓
RBP Benthic Form	✓
Benthic Identification Sheet	✓ * Full pick <100
Wolman Pebble Count	✓
Reference Reach Software Pebble Count Data	✓
Longitudinal Profile and Cross Sections	✓

Photo Type: DS, DS View
Location, Orientation, Photographer Initials: Downstream Edge of ROW, Downstream View, ABK/AG

Photo Type: DS, US View
Location, Orientation, Photographer Initials: Downstream Edge of ROW, Upstream View, ABK/AG

Photo Type: CP, DS View
Location, Orientation, Photographer Initials: Center Point of ROW, Downstream View, ABK/AG

Photo Type: CP, US View
Location, Orientation, Photographer Initials: Center Point of ROW, Upstream View, ABK/AG

37.450757° N, -80.667719° W

Photo Type: US, DS View
Location, Orientation, Photographer Initials: Upstream Edge of ROW, Downstream View, ABK/AG

37.450757° N, -80.667719° W

Photo Type: US, US View
Location, Orientation, Photographer Initials: Upstream Edge of ROW, Upstream View, ABK/AG

"Q:\Charleston\2021 Projects\21-0244- MVP- STREAM AND WETLAND CONDITIONS ASSESSMENT AND SURVEY PLAN\002 - Pre-Crossing Monitoring\Spread F\S-E40 - ROW"

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.**	**37.450757**	**Lon.**	**-80.667719**	**WEATHER:**	**60 % Cloud Cover 75 °F**	**DATE:**	**8/20/2021**
IMPACT STREAM/SITE ID AND SITE DESCRIPTION: (watershed size {acreage}, unaltered or impairments)	**S-E40 ROW Dry Creek**		**MITIGATION STREAM CLASS./SITE ID AND SITE DESCRIPTION:** (watershed size {acreage}, unaltered or impairments)							**Comments:**	
STREAM IMPACT LENGTH:	**82**	**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)			
Stream Classification:	**Perennial**		
Percent Stream Channel Slope	**0.88**		
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	0-1	**15**
2. Embeddedness	0-20		**15**
3. Velocity/ Depth Regime	0-20		**9**
4. Sediment Deposition	0-20		**16**
5. Channel Flow Status	0-20		**18**
6. Channel Alteration	0-20		**14**
7. Frequency of Riffles (or bends)	0-20		**14**
8. Bank Stability (LB & RB)	0-20		**14**
9. Vegetative Protection (LB & RB)	0-20		**10**
10. Riparian Vegetative Zone Width (LB & RB)	0-20		**8**
Total RBP Score	Suboptimal		**133**
Sub-Total			**0.665**
CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WVDEP Water Quality Indicators (General)			
Specific Conductivity			
300-399 - 70 points	0-90	0-1	**341.1**
pH			
6.0-8.0 = 80 points	0-80		**8.07**
DO			
>5.0 = 30 points	10-30		**9.71**
Sub-Total			**0.9**
BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WV Stream Condition Index (WVSCI)			
Grey Zone	0-100	0-1	**65.11**
Sub-Total			**0.6511**

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	0-1	
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		
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	0-1	
pH			
	5-90		
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**

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	0-1	
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		
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	0-1	
pH			
	5-90		
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**

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	0-1	
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		
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	0-1	
pH			
	5-90		
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**

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	0-1	
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		
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	0-1	
pH			
	5-90		
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**
0.739	**82**	**60.5734**

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-E40 Dry Creek	LOCATION Monroe/F	
STATION # _____ RIVERMILE _____	STREAM CLASS Perennial	
LAT _____ LONG _____	COUNTY Monroe	
STORET #	AGENCY Potesta	
INVESTIGATORS A.Kincaid/A. Grimmett		
FORM COMPLETED BY A. Kincaid	DATE 8/20/2021 TIME 1000 AM	REASON FOR SURVEY Preliminary Assessment

WEATHER CONDITIONS

Now: 60 % cloud cover

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

Past 24 hours: ____ %

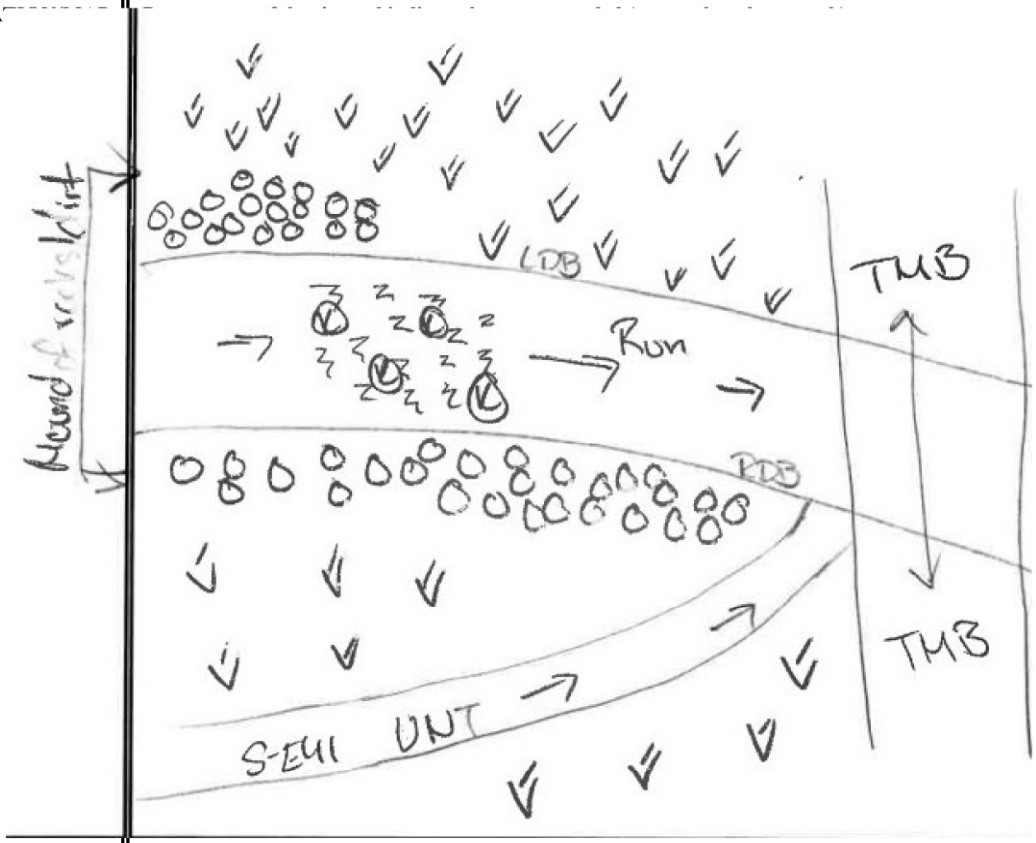
- ☑ storm (heavy rain)
- ☐ rain (steady rain)
- ☐ showers (intermittent)
- ☐ %cloud cover
- ☐ clear/sunny

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

Air Temperature 75 °F 0 C

Other _____

SITE LOCA



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
- ☑ Field/Pasture
- ☐ Agricultural
- ☐ Residential
- ☐ Commercial
- ☐ Industrial
- ☐ Other _____

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 Grasses

INSTREAM FEATURES

Estimated Reach Length 60 ft m

Estimated Stream Width 6 ft m

Sampling Reach Area 360 ft^2 m²

Area in km² (m²x1000) _____ km²

Estimated Stream Depth _____ m

Surface Velocity (at thalweg) See Field Note m/sec

Stream Dry ☐

Canopy Cover
- ☑ Partly open
- ☐ Partly shaded
- ☐ Shaded

High Water Mark _____ m

Proportion of Reach Represented by Stream Morphology Types
- Riffle 40 %
- Run 40 %
- Pool 20 %

Channelized ☐ Yes ☑ No

Dam Present ☐ Yes ☑ No

LARGE WOODY DEBRIS

LWD 0 m²

Density of LWD 0 m²/km² **(LWD/ reach area)**

AQUATIC VEGETATION

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

Dominant species present _____

Portion of the reach with aquatic vegetation <5 %

WATER QUALITY

Temperature 21.7 °C

Specific Conductance 341.1

Dissolved Oxygen 9.71

pH 8.07

Turbidity 3.88

WQ Instrument Used YSI/ Turbidity Meter

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 _____

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		0	Detritus	sticks, wood, coarse plant materials (CPOM)	<1%
Boulder	> 256 mm (10")	0			
Cobble	64-256 mm (2.5"-10")	25	Muck-Mud	black, very fine organic (FPOM)	0
Gravel	2-64 mm (0.1"-2.5")	45			
Sand	0.06-2mm (gritty)	15	Marl	grey, shell fragments	0
Silt	0.004-0.06 mm	15			
Clay	< 0.004 mm (slick)	0			

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

STREAM NAME S-E40 Dry Creek	LOCATION	
STATION # _____ RIVERMILE _____	STREAM CLASS Perennial	
LAT _____ LONG _____	COUNTY Monroe	
STORET #	AGENCY Potesta	
INVESTIGATORS A.Kincaid/A. Grimmett		
FORM COMPLETED BY A. Kincaid	DATE 8/20/2021 TIME 1000 AM 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 15	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 16	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 18	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 14	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 14	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 7	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 6	Left Bank 10 9	8 7 **6**	5 4 3	2 1 0
SCORE 4	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 4	Left Bank 10 9	8 7 6	5 **4** 3	2 1 0
SCORE 4	Right Bank 10 9	8 7 6	5 **4** 3	2 1 0

Total Score 133

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME S-E40 Dry Creek	LOCATION
STATION # _____ RIVERMILE _____	STREAM CLASS Perennial
LAT _____ LONG _____	COUNTY Monroe
STORET #	AGENCY Potesta
INVESTIGATORS A.Kincaid/A. Grimmett	LOT NUMBER
FORM COMPLETED BY A. Kincaid	DATE 8/20/2021 TIME 1000 AM
	REASON FOR SURVEY Preliminary Assessment

HABITAT TYPES	**Indicate the percentage of each habitat type present** ☑ Cobble 25 % ☐ Snags ____% ☐ Vegetated Banks ____% ☐ Sand ____% ☐ Submerged Macrophytes ____% ☐ Other ( ) ____%
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	

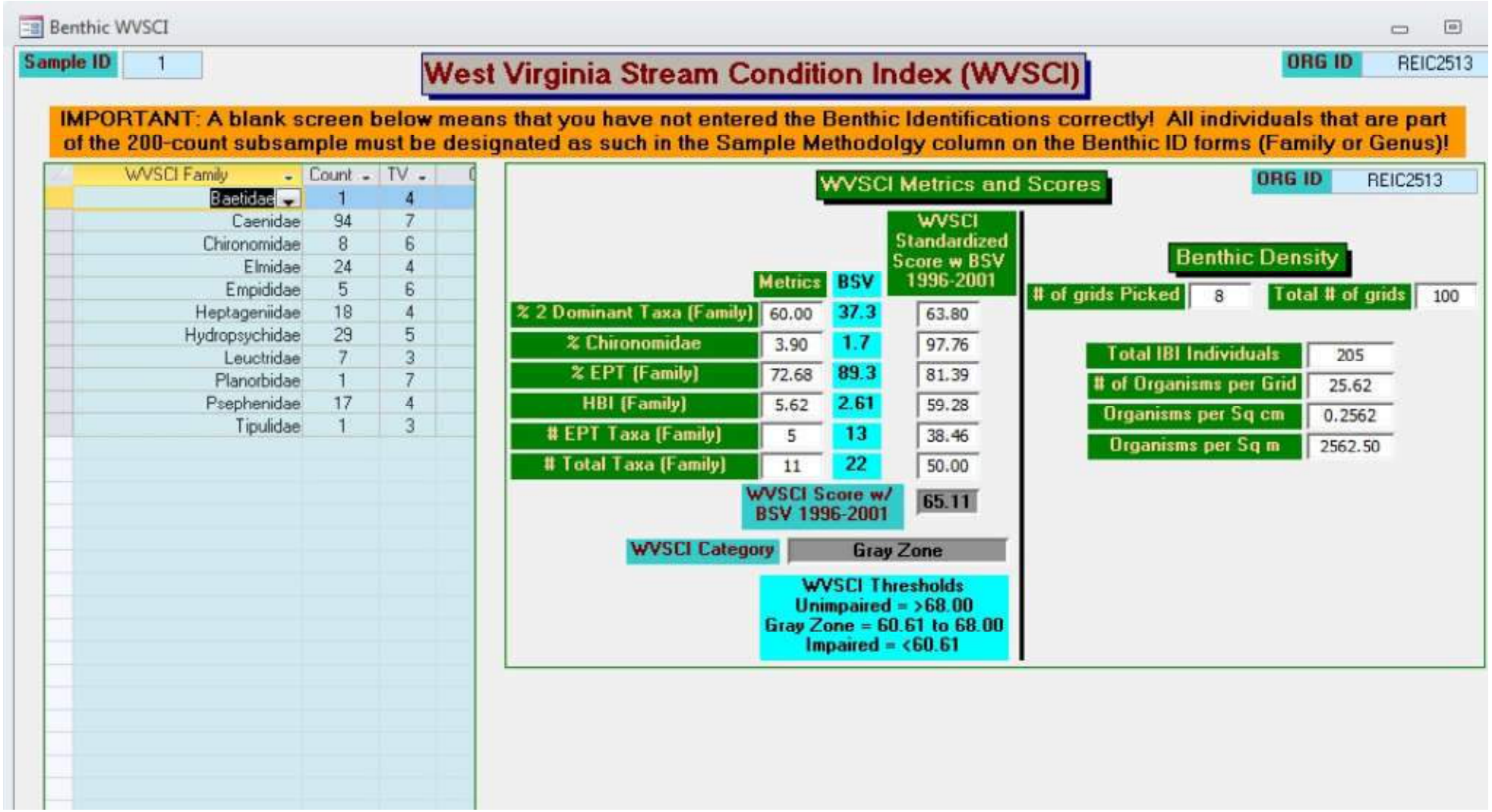
QUALITATIVE LISTING OF AQUATIC BIOTA
Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare, 2 = Common, 3= Abundant, 4 = Dominant

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	May flies, Water pennies					
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-E40 ROW, Spread F, Collected by POTESTA on 8/20/21



SITE ID: S-E40 Dry Creek (ROW)

DATE: 8/20/21

COLLECTOR(S): A. Vencill / A. Grimmett

Wolman Pebble Count (Reach Wide) mm

25	160	125	23	116	<.062	126	101	191	79
22	8	21	131	102	<.062	49	141	126	64
5	5	72	74	27	<.062	28	197	47	271
5	95	101	176	72	78	58	51	77	1
45	60	80	117	98	28	33	103	93	110
7	16	59	76	212	161	51	66	71	77
33	30	93	46	77	115	152	116	216	24
6	130	226	85	43	103	96	176	121	52
11	17	54	95	66	176	226	89	112	134
19	110	102	131	112	54	234	128	<.062	93

NOTES:

Riffle Pebble Count

NOTES:

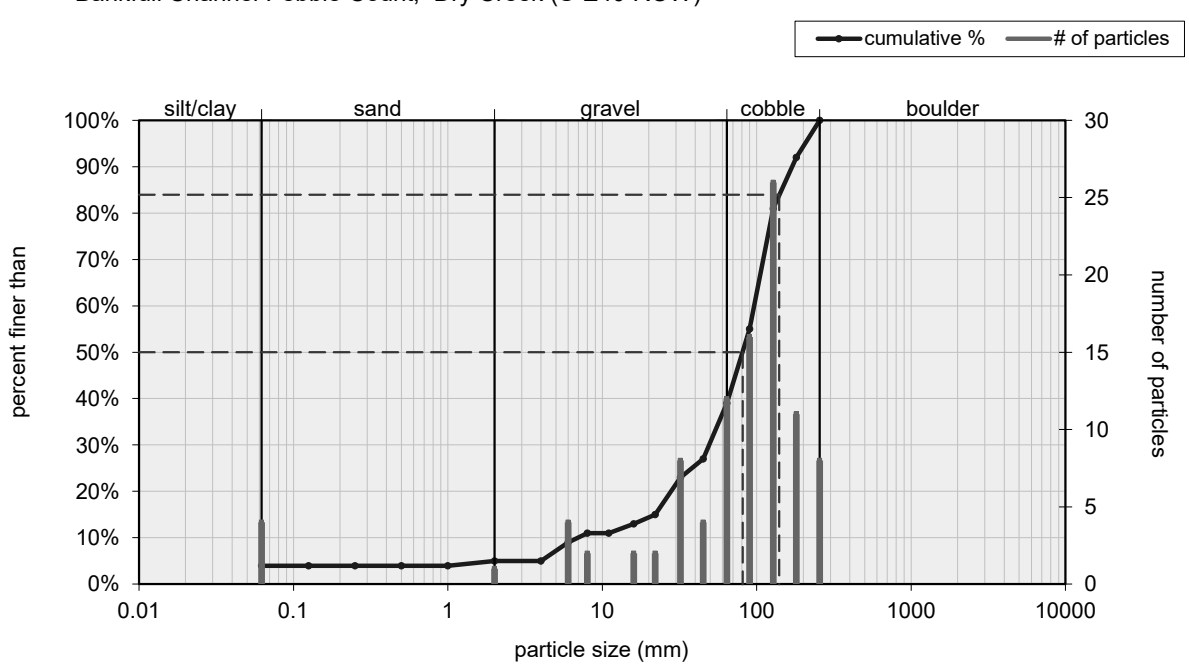
NOTES:

Inches	PARTICLE	Millimeters	
	Silt / Clay	< .062	S/C
	Very Fine	.062 - .125	SAND
	Fine	.125 - .25	
	Medium	.25 - .50	
	Coarse	.50 - 1.0	
.04 - .08	Very Coarse	1.0 - 2	
.08 - .16	Very Fine	2 - 4	GRAVEL
.16 - .22	Fine	4 - 5.7	
.22 - .31	Fine	5.7 - 8	
.31 - .44	Medium	8 - 11.3	
.44 - .63	Medium	11.3 - 16	
.63 - .89	Coarse	16 - 22.6	
.89 - 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	COBBLE
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	BOULDER
14.3 - 20	Small	362 - 512	
20 - 40	Medium	512 - 1024	
40 - 80	Large-Vry Large	1024 - 2048	
	Bedrock		BDRK

Bankfull Channel

Material	Size Range (mm)	Count
silt/clay	0 - 0.062	**4**
very fine sand	0.062 - 0.125	
fine sand	0.125 - 0.25	
medium sand	0.25 - 0.5	
coarse sand	0.5 - 1	
very coarse sand	1 - 2	**1**
very fine gravel	2 - 4	
fine gravel	4 - 6	**4**
fine gravel	6 - 8	**2**
medium gravel	8 - 11	
medium gravel	11 - 16	**2**
coarse gravel	16 - 22	**2**
coarse gravel	22 - 32	**8**
very coarse gravel	32 - 45	**4**
very coarse gravel	45 - 64	**12**
small cobble	64 - 90	**16**
medium cobble	90 - 128	**26**
large cobble	128 - 180	**11**
very large cobble	180 - 256	**8**
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

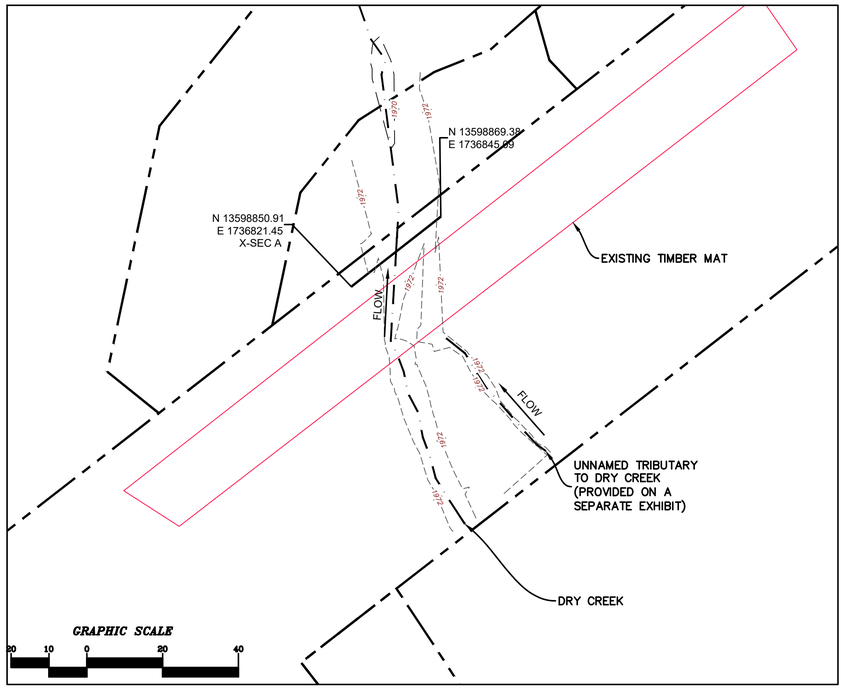
Note:



Size (mm)	
D16	23
D35	57
D50	81
D65	100
D84	140
D95	210

Size Distribution	
mean	56.7
dispersion	2.6
skewness	-0.17

Type	
silt/clay	4%
sand	1%
gravel	34%
cobble	61%
boulder	0%



S-E40

NORTH

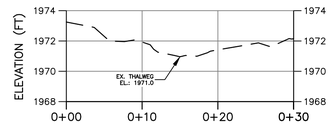
LEGEND

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

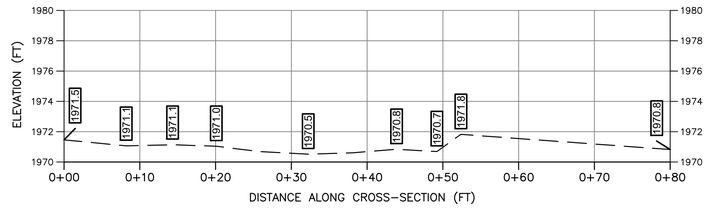
SURVEY NOTES:

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 AUGUST 20, 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.

S-E40 BASELINE CROSS-SECTION A



S-E40 BASELINE THALWEG PROFILE



PROFILE LEGEND

EXISTING STREAM PROFILE
INVERT ALONG THALWEG

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

CROSS SECTION LEGEND

EXISTING GRADE

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

AS-BUILT TABLE: S-E40 CROSS SECTION A

	PRE-CROSSING			AS-BUILT	
PT. LOC.	NORTHING	EASTING	ELEV	VERT. DIFF.	HORZ. DIFF.
TS-L	13598856.52	1736828.63	1972.08		
BS-L	13598858.35	1736830.98	1972.26		
THW	13598860.14	1736833.27	1970.96		
BS-R	13598862.38	1736836.13	1971.23		
TS-R	13598866.52	1736841.43	1971.87		

TYPICAL 5-POINT CROSS-SECTION
(FACING DOWNSTREAM)

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

NOTE: ALL SECTIONS 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
FROM UPSTREAM IMPACT LIMITS

PENDING CROSSING

PHOTO TAKEN LOOKING UPSTREAM FROM
DOWNSTREAM IMPACT LIMITS

PRELIMINARY

PRE-CROSSING

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

TETRA TECH, INC.
661 ANDERSEN DRIVE FOSTER PLAZA 7
PITTSBURGH, PA 15220
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TETRA TECH
www.tetratech.com

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

Title
PROFILE AND CROSS-SECTIONS
BASELINE SURVEY
CROSSING S-E40 – DRY CREEK
(MP 192.03)
MONROE COUNTY, WV

Drawing No. 1