Baseline Assessment – Stream Attributes

Reach S-I36 (Pipeline ROW)
Perennial
Spread D
Nicholas 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 Edge, US View
Location, Orientation, Photographer Initials: Downstream Edge of Right of Way, Upstream View, TF/CH/TA

Photo Type: DS Edge ROW, DS View
Location, Orientation, Photographer Initials: Downstream Edge of Right of Way, Downstream View, TF/CH/TA

Photo Type: C ROW, US View
Location, Orientation, Photographer Initials: Center Point of Right of Way, Upstream View, TF/CH/TA

Photo Type: C ROW, DS View
Location, Orientation, Photographer Initials: Center Right of Way, Downstream View, TF/CH/TA

Photo Type: US Edge of ROW, US View
Location, Orientation, Photographer Initials: Upstream Edge of Right of Way, Upstream View, TF/CH/TA

Photo Type: DS Edge of ROW, DS View
Location, Orientation, Photographer Initials: Downstream Edge of Right of Way, Downstream View, TF/CH/TA

Photo Type: C ROW, Facing N
Location, Orientation, Photographer Initials: Center of Right of Way, Facing North, TF/CH/TA

Photo Type: Center ROW, Facing South
Location, Orientation, Photographer Initials: Center of Right of Way, Facing South, TF/CH/TA

"Q:\Charleston\2021 Projects\21-0244- MVP- STREAM AND WETLAND CONDITIONS ASSESSMENT AND SURVEY PLAN\002 - Pre-Crossing Monitoring\Spread D\S-I36"

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.**	**38.178889**	**Lon.**	**-80.72979**	**WEATHER:**	**90% Cloud Cover 70 °F**	**DATE:**	9/17/2021
IMPACT STREAM/SITE ID AND SITE DESCRIPTION: (watershed size {acreage}, unaltered or impairments)	**S-I36 Hominy Creek**	**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)			
Stream Classification:	**Perennial**		
Percent Stream Channel Slope	**1.43**		
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	**18**
2. Embeddedness	0-20		**18**
3. Velocity/ Depth Regime	0-20		**18**
4. Sediment Deposition	0-20		**17**
5. Channel Flow Status	0-20		**19**
6. Channel Alteration	0-20		**19**
7. Frequency of Riffles (or bends)	0-20		**17**
8. Bank Stability (LB & RB)	0-20		**17**
9. Vegetative Protection (LB & RB)	0-20		**18**
10. Riparian Vegetative Zone Width (LB & RB)	0-20		**18**
Total RBP Score	Optimal		**179**
Sub-Total			**0.895**
CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WVDEP Water Quality Indicators (General)			
Specific Conductivity			
100-199 - 85 points	0-90	0-1	**187.9**
pH			
6.0-8.0 = 80 points	0-80		**7.74**
DO			
>5.0 = 30 points	10-30		**8.84**
Sub-Total			**0.975**
BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WV Stream Condition Index (WVSCI)			
Very Good	0-100	0-1	**77.3**
Sub-Total			**0.773**

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**
0.881	**77**	**67.837**

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 Hominy Creek	LOCATION S-I36	
STATION # _____ RIVERMILE _____	STREAM CLASS Perennial	
LAT 38.178889 LONG -80.72979	COUNTY Nicholas	
STORET #	AGENCY Potesta	
INVESTIGATORS TF/CH		
FORM COMPLETED BY TF	DATE 9/17/2021 TIME 10:00 AM	REASON FOR SURVEY Preliminary Assessment

WEATHER CONDITIONS

Now: 90 % cloud cover

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

Past 24 hours: ____ %

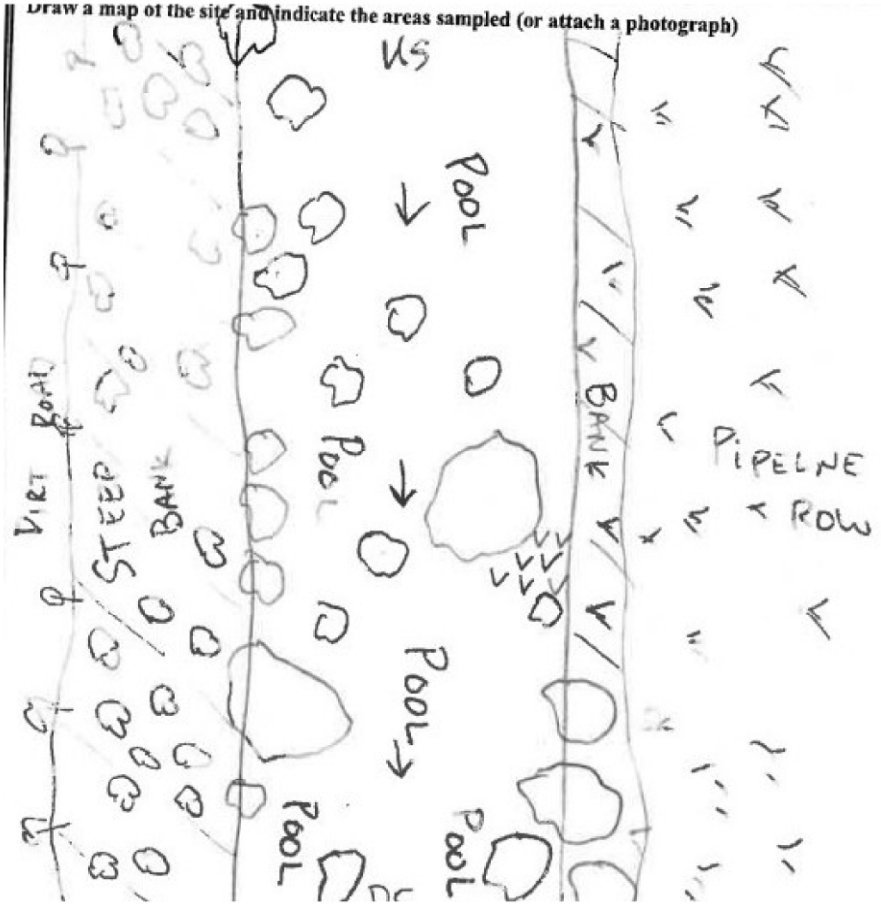
Has there been a heavy rain in the last 7 days? ☐ Yes ☑ No

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 _____
☐ 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 Rhododendron species

INSTREAM FEATURES

Estimated Reach Length 75.0 ft m
Estimated Stream Width 50.0 ft m
Sampling Reach Area 3,750 ft^2 m²
Area in km² (m²x1000) _____ km²
Estimated Stream Depth 2.2 ft m
Surface Velocity (at thalweg) _____ m/sec
Stream Dry ☐

Canopy Cover
☑ Partly open ☐ Partly shaded ☐ Shaded

High Water Mark 4.5 ft m

Proportion of Reach Represented by Stream Morphology Types
Riffle 45 25 % Run 30 %
Pool _____ %

Channelized ☐ Yes ☑ No
Dam Present ☐ Yes ☑ No

LARGE WOODY DEBRIS

LWD 25 ft^2 m²
Density of LWD _____ 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 NA

Portion of the reach with aquatic vegetation 0 %

WATER QUALITY

Temperature 17.3 °C
Specific Conductance 187.9 us/cm
Dissolved Oxygen 8.84 mg/L
pH 7.74 su
Turbidity NA
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 _____

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)	10
Boulder	> 256 mm (10")	30			
Cobble	64-256 mm (2.5"-10")	30	Muck-Mud	black, very fine organic (FPOM)	0
Gravel	2-64 mm (0.1"-2.5")	20			
Sand	0.06-2mm (gritty)	15	Marl	grey, shell fragments	0
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 Hominy Creek	LOCATION S-I36	
STATION # _____ RIVERMILE _____	STREAM CLASS Perennial	
LAT 38.178889 LONG -80.72979	COUNTY Nicholas	
STORET #	AGENCY Potesta	
INVESTIGATORS TF/CH		
FORM COMPLETED BY TF	DATE 9/17/2021 TIME 10:00 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 18	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 18	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 18	20 19 **18** 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE 17	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 19	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 19	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 17	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 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
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 9	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 9	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0
SCORE 9	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0

Total Score 179

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME Hominy Creek	LOCATION S-I36	
STATION # _____ RIVERMILE _____	STREAM CLASS Perennial	
LAT 38.178889 LONG -80.72979	COUNTY Nicholas	
STORET #	AGENCY Potesta	
INVESTIGATORS TF/CH		LOT NUMBER
FORM COMPLETED BY TF	DATE 9/17/2021 TIME 10:00 AM	REASON FOR SURVEY Preliminary Assessment

HABITAT TYPES	**Indicate the percentage of each habitat type present** ☑ Cobble 85 % ☑ Snags 10 % ☐ Vegetated Banks ____ % ☑ Sand 5 % ☐ 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	Benthic sample taken in 4 riffles

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

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

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

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

Insects	Count	Tolerance	TV
Ephemeroptera			80
Ameletidae		2	0
Baetidae	2	4	8
Beatiscidae	1	4	4
Caenidae	7	5	35
Ephemerellidae	51	3	153
Ephemeridae		5	0
Heptageniidae	17	3	51
Isonychiidae	1	3	3
Leptophlebiidae		4	0
Potamanthidae		5	0
Siphlonuridae	1	3	3
Tricorythidae		5	0
Plecoptera			6
Capniidae		2	0
Chloroperlidae		2	0
Leuctridae		2	0
Nemouridae		2	0
Peltoperlidae		1	0
Perlidae	3	1	3
Perlodidae	3	1	3
Pteronarcyidae		1	0
Taeniopterygidae		2	0
Trichoptera			31
Brachycentridae		2	0
Glossosomatidae		2	0
Helicopsychidae		3	0
Hydropsychidae	26	5	130
Hydroptilidae	1	3	3
Lepidostomatidae		3	0
Leptoceridae		3	0
Limnephilidae		4	0
Molannidae		3	0
Philopotamidae		4	0
Phryganeidae		4	0
Polycentropodidae		5	0
Psychomiidae		4	0
Rhyacophilidae	4	3	12
Uenoidae		2	0
Total Tolerance Value			1079

West Virginia Stream Condition Index (WVSCI)

Gerritson, J., J. Burton, and M.T. Barbour. 2000. A stream condition index for West Virginia wadeable streams. Tetra Tech, Inc. Owing Mills, MD.

Spreadsheet uses updated Best Standard Values [BSV] for each metric per WVSCI Addenda dated March 23, 2010

Insects	Count	Tolerance	TV
Odonata			0
Aeshnidae		3	0
Calopterygidae		6	0
Coenagrionidae		7	0
Cordulegastridae		3	0
Gomphidae		5	0
Lestidae		7	0
Libellulidae		7	0
Coleoptera			49
Chrysomelidae		7	0
Dryopidae		5	0
Dytiscidae		6	0
Elmidae	39	4	156
Gyrinidae		5	0
Haliplidae		7	0
Hydrophilidae		7	0
Psephenidae	10	3	30
Ptilodactylidae		5	0
Hemiptera			0
Belostomatidae		8	0
Corixidae		8	0
Gerridae		10	0
Hydrometridae		8	0
Nepidae		8	0
Notonectidae		8	0
Megaloptera			6
Corydalidae	6	3	18
Sialidae		6	0
Diptera			52
Athericidae		3	0
Blephariceridae		2	0
Ceratopogonidae	1	8	8
Chironomidae	51	9	459
Culicidae		10	0
Dixidae		6	0
Empididae		7	0
Psychodidae		8	0
Ptychopteridae		8	0
Simuliidae		7	0
Stratiomyidae		10	0
Syrphidae		10	0
Tabanidae		7	0
Tipulidae		5	0

Non-Insects	Count	Tolerance	TV
Crustacea			0
Asellidae		7	0
Cambaridae		5	0
Gammaridae		5	0
Palaemonidae		5	0
Annelida			0
Hirudinea		10	0
Nematoda		10	0
Nematomorpha		10	0
Oligochaeta		10	0
Turbellaria			0
Turbellaria		7	0
Bivalvia			0
Corbiculidae		6	0
Sphaeriidae		5	0
Unionidae		4	0
Gastropoda			0
Ancylidae		7	0
Hydrobiidae		4	0
Physidae		7	0
Planorbidae		5	0
Pleuroceridae		5	0
Viviparidae		5	0
Miscellaneous			0
Collembola		6	0
Lepidoptera		5	0
Neuroptera		5	0
Hydrachnidae		6	0
Totals	**Total number**		**224**
	Total families		**17**

SITE ID:	S-I36
	9/17/2021

Metric calculations

WVSCI Metric Scores		
Total Taxa	17	77.3
EPT Taxa	12	92.3
% EPT Abundance	52.2	58.5
% Chironomidae	22.8	78.6
Hilsenhoff Biotic Index (HBI)	4.82	70.1
% 2 Dominant Taxa	45.5	86.9
WV Stream Condition Index		**77.3**

Additional metrics	
Ephemeroptera Taxa	7
Plecoptera Taxa	2
Trichoptera Taxa	3
Long-lived Taxa	6
Odonata Taxa	0
Diptera Taxa	2
COET Taxa	12
% Sensitive	43.3
% Tolerant	23.2
% Clingers	54.9
% Net-spinners	11.6

SITE ID: S-I36 Hominy Creek

DATE: 9/17/21

COLLECTOR(S): TF / CH

Wolman Pebble Count (Reach Wide)

25,000	400	118	73	285	480	128	11	69	3500
350	20	12	25	168	1,100	151	141	560	470
163	105	139	510	218	195	102	820	33	19
43	330	410	29	33	430	140	470	130	168
58	80	265	110	81	490	125	218	330	640
99	239	151	68	89	129	410	162	295	125
138	420	208	110	78	86	55	110	345	61
89	258	78	10	CSA	92	79	66	114	110
67	288	120	440	31	1,250	285	265	218	365
340	110	129	310	32	37	CSA	MSA	MSA	113

NOTES:

millimeters

Riffle Pebble Count

NOTES:

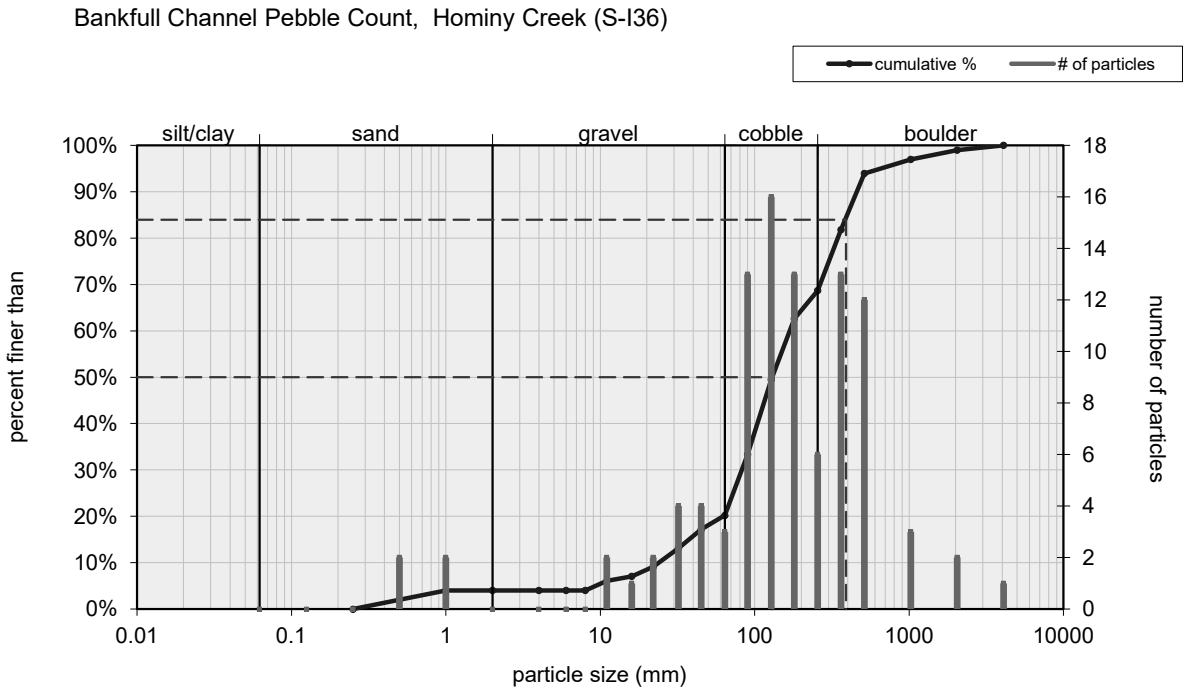
NOTES:

Inches		Millimeters	
	Silt/Clay	<.062	SILT/CLAY
	Very Fine	.062 - .125	SAND
	Fine	.125 - .25	
	Medium	.25 - .5	
	Coarse	.5 - 1	
.08 - .16	Very Coarse	1 - 2	
.16 - .32	Very Fine	2 - 4	GRAVEL
.32 - .63	Fine	4 - 8	
.63 - 1.3	Medium	8 - 16	
1.3 - 2.5	Medium	16 - 32	
2.5 - 5.1	Coarse	32 - 64	
5.1 - 10.1	Coarse	64 - 128	
10.1 - 13	Very Coarse	128 - 180	
13 - 20	Very Coarse	180 - 256	
20 - 40	Small	256 - 512	COBBLE
40 - 80	Large	512 - 1024	
80 - 160	Large	1024 - 2048	
160 - 320	Small	2048 - 4096	BOULDER
320 - 640	Medium	4096 - 8192	
640 - 1280	Large/Very Large	8192 - 16384	
	Bedrock		BEDROCK

Bankfull Channel

Material	Size Range (mm)	Count
silt/clay	0 - 0.062	**0**
very fine sand	0.062 - 0.125	**0**
fine sand	0.125 - 0.25	**0**
medium sand	0.25 - 0.5	**2**
coarse sand	0.5 - 1	**2**
very coarse sand	1 - 2	**0**
very fine gravel	2 - 4	**0**
fine gravel	4 - 6	**0**
fine gravel	6 - 8	**0**
medium gravel	8 - 11	**2**
medium gravel	11 - 16	**1**
coarse gravel	16 - 22	**2**
coarse gravel	22 - 32	**4**
very coarse gravel	32 - 45	**4**
very coarse gravel	45 - 64	**3**
small cobble	64 - 90	**13**
medium cobble	90 - 128	**16**
large cobble	128 - 180	**13**
very large cobble	180 - 256	**6**
small boulder	256 - 362	**13**
small boulder	362 - 512	**12**
medium boulder	512 - 1024	**3**
large boulder	1024 - 2048	**2**
very large boulder	2048 - 4096	**1**
total particle count:		99
bedrock ----------		**1**
clay hardpan ----------		
detritus/wood ----------		
artificial ----------		
total count:		100

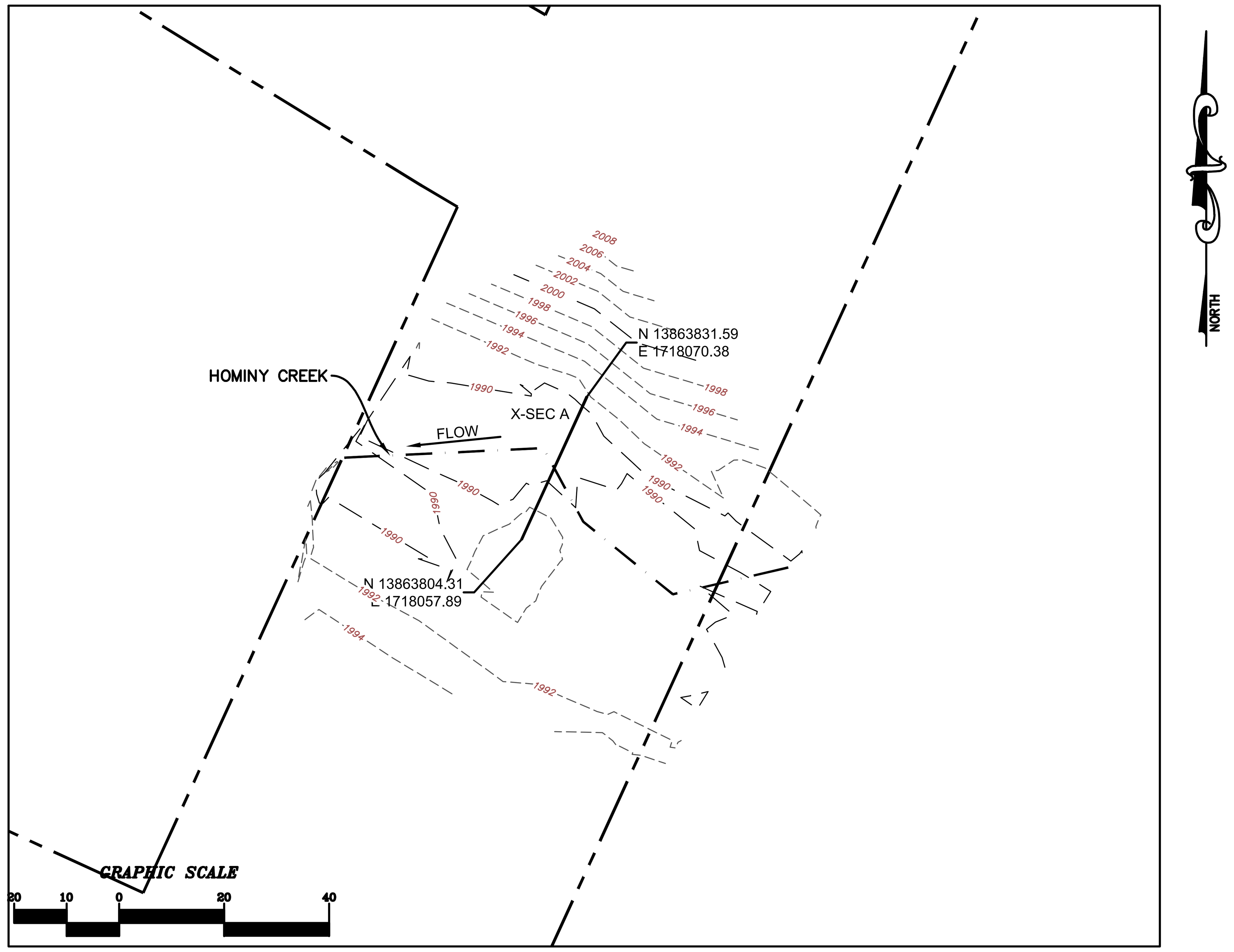
Note:



Size (mm)	
D16	41
D35	93
D50	130
D65	210
D84	390
D95	650

Size Distribution	
mean	126.5
dispersion	3.1
skewness	-0.01

Type			
silt/clay	0%	bedrock	1%
sand	4%		
gravel	16%		
cobble	48%		
boulder	31%		



S-136

LEGEND

STUDY AREA (EASEMENT)

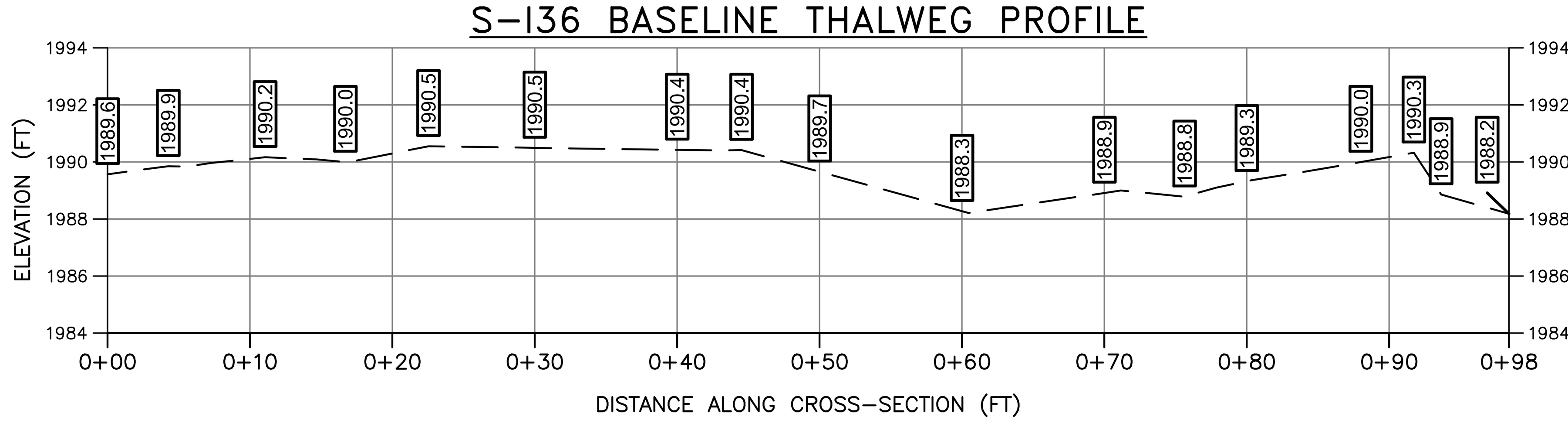
EXISTING SURVEY-LOCATED THALWEG

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 SEPTEMBER 17, 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-136 BASELINE THALWEG PROFILE



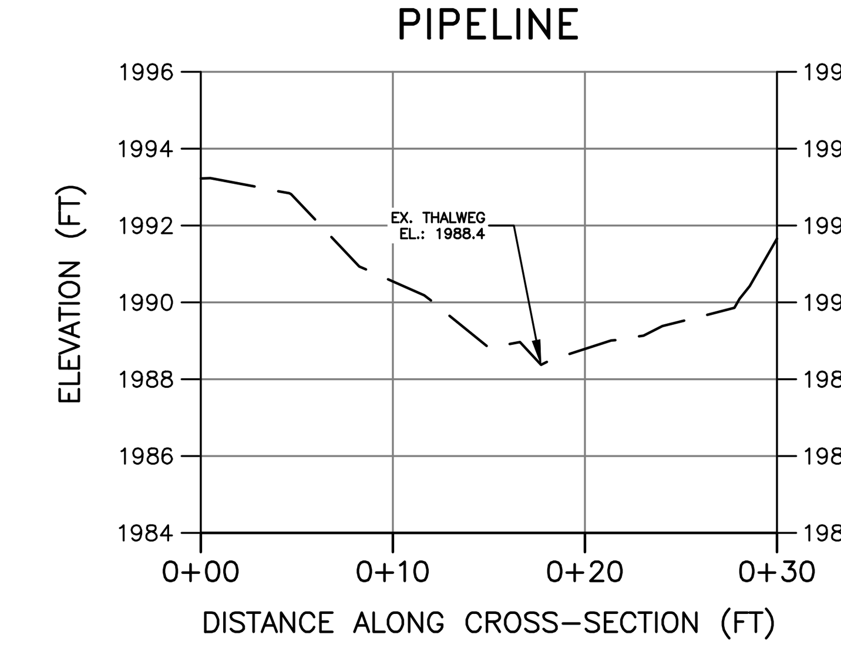
PROFILE LEGEND

EXISTING STREAM PROFILE INVERT ALONG THALWEG

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

S-136 BASELINE CROSS-SECTION A

PIPELINE



CROSS SECTION LEGEND

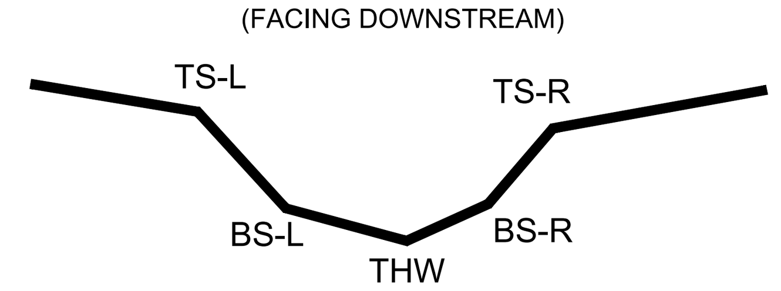
EXISTING GRADE

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

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

AS-BUILT TABLE: S-136 CROSS SECTION A					
	PRE-CROSSING			AS-BUILT	
PT. LOC.	NORTHING	EASTING	ELEV	VERT. DIFF.	HORZ. DIFF.
TS-L	13863779.6206	1718031.6263'	1994.911'		
BS-L	13863790.2306	1718039.1910'	1991.659'		
THW	13863821.7808	1718062.0620'	1988.211'		
BS-R	13863835.0399	1718068.4419'	1991.923'		
TS-R	13863836.2991	1718069.5339'	1992.804'		

TYPICAL 5-POINT CROSS-SECTION
(FACING DOWNSTREAM)



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

PRE-CROSSING PHOTOS

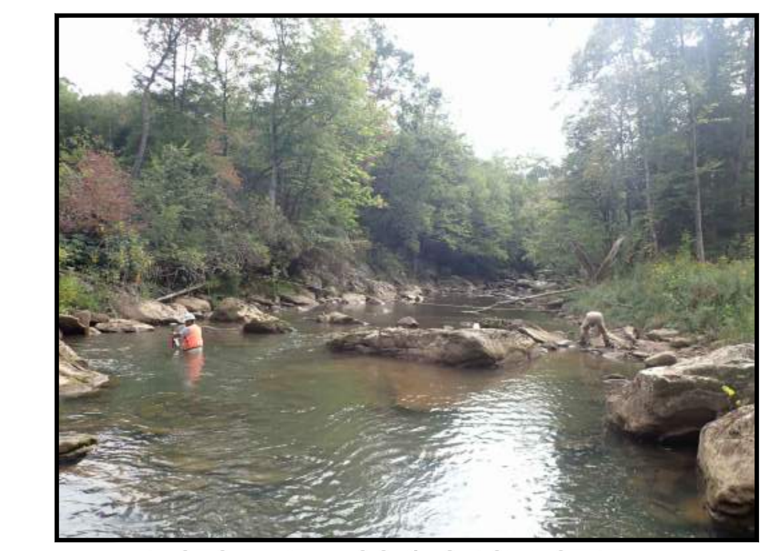


PHOTO TAKEN LOOKING DOWNSTREAM FROM UPSTREAM IMPACT LIMITS

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

PRE-CROSSING

PRELIMINARY

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
TEL: (412) 921-7090 FAX: (412) 921-4040
E-Mail Address: WWW.TETRATECH.COM

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-136 – HOMINY CREEK
(MP 126.86)
NICHOLAS COUNTY, WV

Drawing No. 1