

Baseline Assessment – Stream Attributes

Reach S-F40 (Timber Mat Crossing)

Perennial

Spread C

Webster 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	✓

Spread C Stream S-F40 (Timber Mat Crossing) Webster County



Photo Type: US, US View

Location, Orientation, Photographer Initials: Upstream Edge of Right of Way, Upstream View, ABK/EW/WP



Photo Type: US, DS View

Location, Orientation, Photographer Initials: Upstream Edge of Right of Way, Downstream View, ABK/EW/WP

Spread C Stream S-F40 (Timber Mat Crossing) Webster County

38.667943° N, -80.479023° W



Photo Type: CP, US View

Location, Orientation, Photographer Initials: Center Point of Right of Way, Upstream View, ABK/EW/WP

38.667943° N, -80.479023° W



Photo Type: CP, DS View

Location, Orientation, Photographer Initials: Center Point, Downstream View, ABK/EW/WP

Spread C Stream S-F40 (Timber Mat Crossing) Webster County

38.667943° N, -80.479023° W



Photo Type: DS, US View, US Edge of TMB

Location, Orientation, Photographer Initials: Downstream of Upstream Edge of Timber Mat Bridge, Upstream View, ABK/EW/WP

38.667943° N, -80.479023° W



Photo Type: DS, DS View, US Edge of TMB

Location, Orientation, Photographer Initials: Downstream of Upstream Edge of Timber Mat Bridge, Downstream View, ABK/EW/WP

Spread C Stream S-F40 (Timber Mat Crossing) Webster County

38.667943° N, -80.479023° W



Photo Type: X Section, US Riffle

Location, Orientation, Photographer Initials: Cross Section, Upstream Riffle, ABK/EW/WP

38.667943° N, -80.479023° W



Photo Type: X Section, DS Riffle

Location, Orientation, Photographer Initials: Cross Section, Downstream Riffle, ABK/EW/WP

Spread C Stream S-F40 (Timber Mat Crossing) Webster County



Photo Type: X Section, US Pool
Location, Orientation, Photographer Initials: Cross Section, Upstream Pool, ABK/EW/WP



Photo Type: X Section, DS Pool
Location, Orientation, Photographer Initials: Cross Section, Downstream Pool, ABK/EW/WP

"Q:\Charleston\2021 Projects\21-0244- MVP- STREAM AND WETLAND CONDITIONS ASSESSMENT AND SURVEY PLAN\002 – Pre-Crossing Monitoring\Spread C\S-F40"

SASCE FILE NO./ Project Name:
(v2.1, Sept 2015)

MOUNTAIN VALLEY PIPELINE

IMPACT COORDINATES:
(in Decimal Degrees)

Lat.

38.667943

Lon.

-80.479023

WEATHER:

Sunny

DATE:

9/16/2021

IMPACT STREAM/SITE ID AND SITE DESCRIPTION:
(watershed size (acreage), unaltered or impairments)

Oldlick Creek (S-F40)

MITIGATION STREAM CLASS./SITE ID AND SITE DESCRIPTION:
(watershed size (acreage), unaltered or impairments)

Comments:

STREAM IMPACT LENGTH:

22

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

2.3

HGM Score (attach data forms):

Average

Hydrology

Biogeochemical Cycling

Habitat

0

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

15

2. Embeddedness

0-20

17

3. Velocity/ Depth Regime

0-20

12

4. Sediment Deposition

0-20

15

5. Channel Flow Status

0-20

17

6. Channel Alteration

0-20

18

7. Frequency of Riffles (or bends)

0-20

15

8. Bank Stability (LB & RB)

0-20

18

9. Vegetative Protection (LB & RB)

0-20

17

10. Riparian Vegetative Zone Width (LB & RB)

0-20

12

Total RBP Score

Suboptimal

156

Sub-Total

0.78

CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)

WVDEP Water Quality Indicators (General)

Specific Conductivity

<=99 - 90 points

0-90

56.9

pH

6.0-8.0 = 80 points

0-80

7.17

DO

>5.0 = 30 points

10-30

9.02

Sub-Total

1

BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)

WV Stream Condition Index (WVSCI)

Very Good

0-100

0-1

87

Sub-Total

1

PART II - Index and Unit Score

Index

Linear Feet

Unit Score

0.927

22

20.38666667

Column No. 2- Mitigation Existing Condition - Baseline (Credit)

Stream Classification:

Percent Stream Channel Slope

HGM Score (attach data forms):

Average

Hydrology

Biogeochemical Cycling

Habitat

0

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. 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

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

Habitat

0

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

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

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

Habitat

0

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

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

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

Habitat

0

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

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

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME <u>Oldlick Creek</u>		LOCATION <u>S-F40</u>
STATION # _____ RIVERMILE _____		STREAM CLASS <u>Perennial</u>
LAT <u>38.667943</u> LONG <u>-80.479023</u>		COUNTY <u>Webster</u>
STORET # _____		AGENCY <u>Potesta/Edge</u>
INVESTIGATORS <u>ABK/EW/WP</u>		
FORM COMPLETED BY ABK		DATE <u>9/16/2021</u> TIME <u>1145 AM</u>
REASON FOR SURVEY <u>Preliminary Assessment</u>		

WEATHER CONDITIONS	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Now</p> <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> </div> <div> <p>storm (heavy rain) rain (steady rain) showers (intermittent) %cloud cover _____ clear/sunny</p> </div> </div> </div> <div style="width: 45%;"> <p>Past 24 hours</p> <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> </div> <div> <p>storm (heavy rain) rain (steady rain) showers (intermittent) %cloud cover _____ clear/sunny</p> </div> </div> </div> </div> <div style="margin-top: 10px;"> <p>Has there been a heavy rain in the last 7 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Air Temperature <u>75 F</u> °C Other _____</p> </div>
SITE LOCATION/MAP	<p>Draw a map of the site and indicate the areas sampled (or attach a photograph)</p>
STREAM CHARACTERIZATION	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Stream Subsystem <input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Tidal</p> <p>Stream Origin <input type="checkbox"/> Glacial <input type="checkbox"/> Spring-fed <input type="checkbox"/> Non-glacial montane <input checked="" type="checkbox"/> Mixture of origins <input type="checkbox"/> Swamp and bog <input type="checkbox"/> Other _____</p> </div> <div style="width: 45%;"> <p>Stream Type <input checked="" type="checkbox"/> Coldwater <input type="checkbox"/> Warmwater</p> <p>Catchment Area _____ km²</p> </div> </div>

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

WATERSHED FEATURES	Predominant Surrounding Landuse <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Commercial <input checked="" type="checkbox"/> Field/Pasture <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Agricultural <input checked="" type="checkbox"/> Other <u>Pipeline ROW</u> <input checked="" type="checkbox"/> Residential	Local Watershed NPS Pollution <input type="checkbox"/> No evidence <input type="checkbox"/> Some potential sources <input checked="" 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 type="checkbox"/> Herbaceous Dominant species present _____	
INSTREAM FEATURES	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Estimated Reach Length <u>65 ft</u> m Estimated Stream Width <u>20 ft</u> m Sampling Reach Area <u>1300 ft²</u> m² Area in km² (m²x1000) _____ km² Estimated Stream Depth <u>0.50 ft</u> m Surface Velocity (at thalweg) <u>0.35 ft/sec</u> m/sec Stream Dry <input type="checkbox"/> </div> <div style="width: 45%;"> Canopy Cover <input checked="" type="checkbox"/> Partly open <input type="checkbox"/> Partly shaded <input type="checkbox"/> Shaded High Water Mark <u>2.5 ft</u> m Proportion of Reach Represented by Stream Morphology Types Riffle <u>10</u> % Run <u>20</u> % Pool <u>20</u> % Channelized <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Dam Present <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No </div> </div>	
LARGE WOODY DEBRIS	LWD _____ m ² Density of LWD _____ m ² /km ² (LWD/ reach area) N/A	
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 checked="" type="checkbox"/> Attached Algae Dominant species present _____ Portion of the reach with aquatic vegetation <u>30</u> %	
WATER QUALITY	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Temperature <u>20.3</u> °C Specific Conductance <u>56.9</u> us/cm Dissolved Oxygen <u>9.02</u> mg/L pH <u>7.17</u> SU Turbidity <u>5.21</u> ntu WQ Instrument Used <u>YSI</u> </div> <div style="width: 45%;"> Water Odors <input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Fishy <input type="checkbox"/> Other _____ Water Surface Oils <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globs <input type="checkbox"/> Flecks <input checked="" type="checkbox"/> None <input type="checkbox"/> Other _____ Turbidity (if not measured) <input type="checkbox"/> Clear <input type="checkbox"/> Slightly turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other _____ </div> </div>	
SEDIMENT/ SUBSTRATE	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other _____ Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse </div> <div style="width: 45%;"> Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relict shells <input type="checkbox"/> Other _____ Looking at stones which are not deeply embedded, are the undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No </div> </div>	

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock		5	Detritus	sticks, wood, coarse plant materials (CPOM)	10
Boulder	> 256 mm (10")	15			
Cobble	64-256 mm (2.5"-10")	45	Muck-Mud	black, very fine organic (FPOM)	-
Gravel	2-64 mm (0.1"-2.5")	30			
Sand	0.06-2mm (gritty)	5	Marl	grey, shell fragments	-
Silt	0.004-0.06 mm	-			
Clay	< 0.004 mm (slick)	-			

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

STREAM NAME Oldlick Creek		LOCATION S-F40	
STATION # _____ RIVERMILE _____		STREAM CLASS Perennial	
LAT 38.667943 LONG -80.479023		COUNTY Webster	
STORET # _____		AGENCY Potesta/Edge	
INVESTIGATORS ABK/EW/WP			
FORM COMPLETED BY ABK		DATE 9/16/2021 TIME 1145 AM AM PM	REASON FOR SURVEY Preliminary Assessment

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover <input type="checkbox"/> N/A SCORE 15	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient). 20 19 18 17 16	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). 15 14 13 12 11	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed. 10 9 8 7 6	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking. 5 4 3 2 1 0
2. Embeddedness SCORE 17	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space. 20 19 18 17 16	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. 15 14 13 12 11	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. 10 9 8 7 6	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment. 5 4 3 2 1 0
3. Velocity/Depth Regime <input type="checkbox"/> N/A SCORE 12	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.) 20 19 18 17 16	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes). 15 14 13 12 11	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low). 10 9 8 7 6	Dominated by 1 velocity/depth regime (usually slow-deep). 5 4 3 2 1 0
4. Sediment Deposition SCORE 15	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition. 20 19 18 17 16	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools. 15 14 13 12 11	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. 10 9 8 7 6	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition. 5 4 3 2 1 0
5. Channel Flow Status <input type="checkbox"/> N/A SCORE 17	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed. 20 19 18 17 16	Water fills >75% of the available channel; or <25% of channel substrate is exposed. 15 14 13 12 11	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed. 10 9 8 7 6	Very little water in channel and mostly present as standing pools. 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 SCORE 18	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends) <input type="checkbox"/> N/A SCORE 15	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream. SCORE 9 SCORE 9	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Left Bank 10	8 7 6	5 4 3	2 1 0	
Right Bank 10	8 7 6	5 4 3	2 1 0	
9. Vegetative Protection (score each bank) SCORE 9 SCORE 8	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	8 7 6	5 4 3	2 1 0	
Right Bank 10	8 7 6	5 4 3	2 1 0	
10. Riparian Vegetative Zone Width (score each bank riparian zone) SCORE 6 SCORE 6	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	8 7 6	5 4 3	2 1 0	
Right Bank 10	8 7 6	5 4 3	2 1 0	

Total Score **156**

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME <u>Oldlick Creek</u>		LOCATION <u>S-F40</u>
STATION # <u> </u> RIVERMILE <u> </u>		STREAM CLASS <u>Perennial</u>
LAT <u>38.667943</u> LONG <u>-80.479023</u>		COUNTY <u>Webster</u>
STORET # <u> </u>		AGENCY <u>Potesta/Edge</u>
INVESTIGATORS <u>ABK/EW/WP</u>		LOT NUMBER <u> </u>
FORM COMPLETED BY ABK		DATE <u>9/15/2021</u> TIME <u>1145 AM</u>
REASON FOR SURVEY <u>Preliminary Assessment</u>		

HABITAT TYPES	Indicate the percentage of each habitat type present <input checked="" type="checkbox"/> Cobble <u>80</u> % <input type="checkbox"/> Snags <u> </u> % <input type="checkbox"/> Vegetated Banks <u> </u> % <input type="checkbox"/> Sand <u> </u> % <input type="checkbox"/> Submerged Macrophytes <u> </u> % <input checked="" type="checkbox"/> Other (<u>gravel</u>) <u>20</u> %
SAMPLE COLLECTION	Gear used <input type="checkbox"/> D-frame <input checked="" type="checkbox"/> kick-net <input type="checkbox"/> Other <u> </u> How were the samples collected? <input checked="" type="checkbox"/> wading <input type="checkbox"/> from bank <input type="checkbox"/> from boat Indicate the number of jabs/kicks taken in each habitat type. <input checked="" type="checkbox"/> Cobble <u>4</u> <input type="checkbox"/> Snags <u> </u> <input type="checkbox"/> Vegetated Banks <u> </u> <input type="checkbox"/> Sand <u> </u> <input type="checkbox"/> Submerged Macrophytes <u> </u> <input type="checkbox"/> Other (<u> </u>) <u> </u>
GENERAL COMMENTS	large area for kicks, over 50% of reach was riffle area

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	Insects	Count	Tolerance	TV	Non-Insects	Count	Tolerance	TV
Ephemeroptera			87	Odonata			2	Crustacea			0
Ameletidae		2	0	Aeshnidae		3	0	Asellidae		7	0
Baetidae	7	4	28	Calopterygidae		6	0	Cambaridae		5	0
Beatiscidae	4	4	16	Coenagrionidae		7	0	Gammaridae		5	0
Caenidae		5	0	Cordulegastridae		3	0	Palaemonidae		5	0
Ephemerellidae	1	3	3	Gomphidae	2	5	10	Annelida			0
Ephemeridae	1	5	5	Lestidae		7	0	Hirudinea		10	0
Heptageniidae	36	3	108	Libellulidae		7	0	Nematoda		10	0
Isonychiidae		3	0	Coleoptera			35	Nematomorpha			0
Leptophlebiidae	38	4	152	Chrysomelidae		7	0	Oligochaeta		10	0
Potamanthidae		5	0	Dryopidae		5	0	Turbellaria			0
Siphonuridae		3	0	Dytiscidae		6	0	Turbellaria		7	0
Tricorythidae		5	0	Elmidae	7	4	28	Bivalvia			0
Plecoptera			9	Gyrinidae		5	0	Corbiculidae		6	0
Capniidae		2	0	Haliplidae		7	0	Sphaeriidae		5	0
Chloroperlidae	6	2	12	Hydrophilidae		7	0	Unionidae		4	0
Leuctridae		2	0	Psephenidae	28	3	84	Gastropoda			0
Nemouridae		2	0	Ptilodactylidae		5	0	Ancylidae		7	0
Peltoperlidae		1	0	Hemiptera			0	Hydrobiidae		4	0
Perlidae	2	1	2	Belostomatidae		8	0	Physidae		7	0
Perlodidae		1	0	Corixidae		8	0	Planorbidae		5	0
Pteronarcyidae	1	1	1	Gerridae		10	0	Pleuroceridae		5	0
Taeniopterygidae		2	0	Hydrometridae		8	0	Viviparidae		5	0
Trichoptera			41	Nepidae		8	0	Miscellaneous			0
Brachycentridae		2	0	Notonectidae		8	0	Collembola		6	0
Glossosomatidae		2	0	Megaloptera			3	Lepidoptera		5	0
Helicopsychidae		3	0	Corydalidae	3	3	9	Neuroptera		5	0
Hydropsychidae	29	5	145	Sialidae		6	0	Hydrachnidae		6	0
Hydroptilidae		3	0	Diptera			36	Totals	Total number	213	
Lepidostomatidae		3	0	Athericidae		3	0		Total families	20	
Leptoceridae		3	0	Blephariceridae		2	0	Metric calculations			
Limnephilidae		4	0	Ceratopogonidae	5	8	40	WVSCI Metric Scores			
Molannidae		3	0	Chironomidae	23	9	207				
Philopotamidae	11	4	44	Culicidae		10	0				
Phryganeidae		4	0	Dixidae	1	6	6	Total Taxa		20	90.9
Polycentropodidae		5	0	Empididae		7	0	EPT Taxa		12	92.3
Psychomiidae		4	0	Psychodidae		8	0	% EPT Abundance		64.3	72.0
Rhyacophilidae	1	3	3	Ptychopteridae		8	0	% Chironomidae		10.8	90.7
Uenoidae		2	0	Simuliidae		7	0	Hilsenhoff Biotic Index (HBI)		4.40	75.7
Total Tolerance Value			938	Stratiomyidae		10	0	% 2 Dominant Taxa		34.7	100.0
West Virginia Stream Condition Index (WVSCI)				Syrphidae		10	0	WV Stream Condition Index			
Gerritson, J., J. Burton, and M.T. Barbour. 2000. A stream condition index for West Virginia wadeable streams. Tetra Tech, Inc. Owing Mills, MD.				Tabanidae		7	0				87.0
				Tipulidae	7	5	35				

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

SITE ID:	S-F40
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9/16/2021

SITE ID:

S-F40

Old Line Creek

Webster/C

DATE: 16 September 2021

COLLECTOR(S): E. Weaver

215	560	620	240	750	195	310	20	440	164
69	72	342	130	210	304	207	172	51	200
238	144	55	220	265	275	25	36	202	161
BR	780	298	BR	BR	400	355	275	302	89
LB	311	301	41	75	192	183	171	134	82
205	385	198	126	161	292	750	157	198	33
240	82	289	115	190	210	360	115	33	250
195	220	49	55	189	172	83	140	220	VLB
155	120	23	210	142	8	111	195	49	52
410	61	BR	162	51	BR	BR	172	180	61

NOTES:

[illegible]

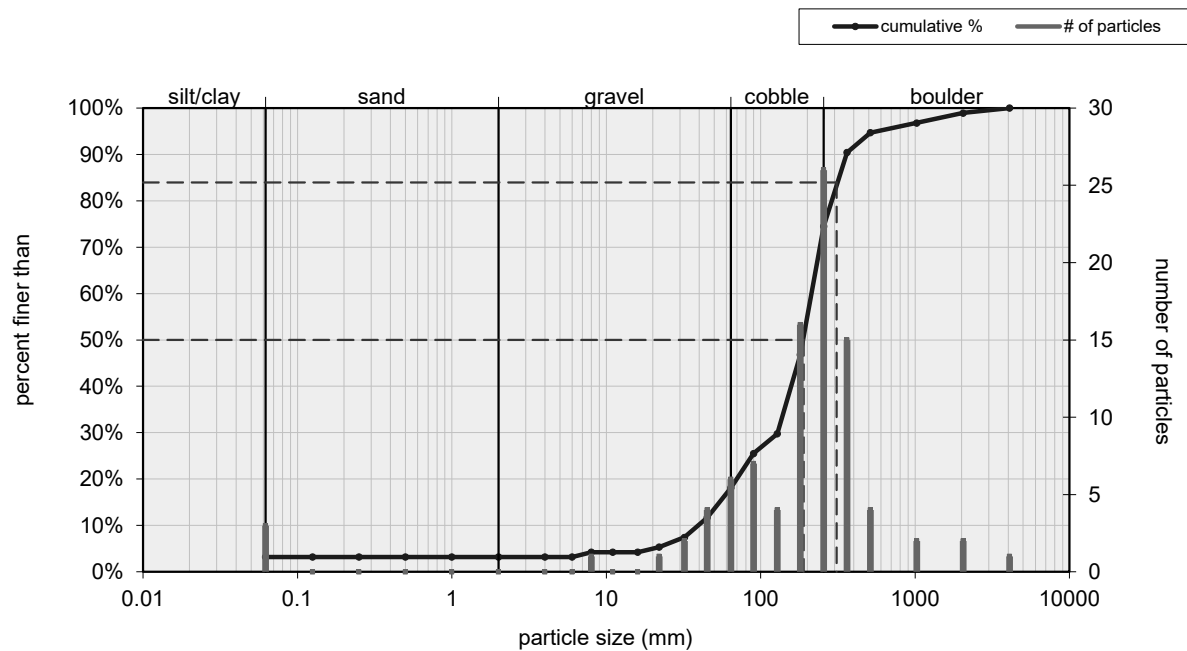
NOTES:

NOTES:

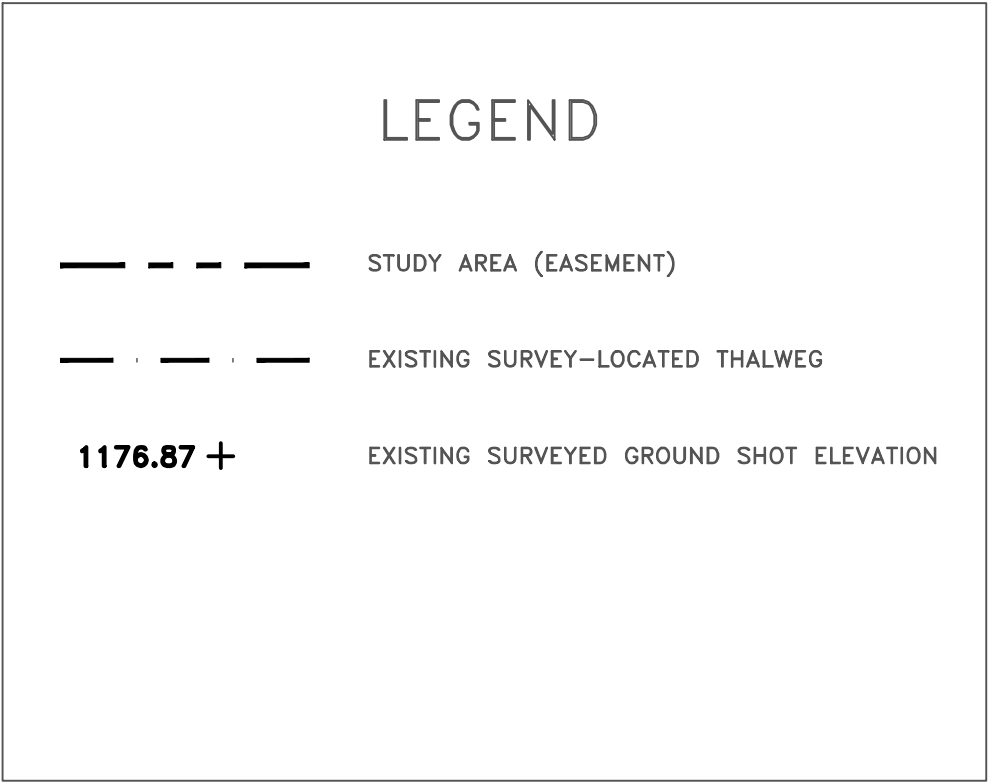
Inches	Fraction of Inch	Millimeters
	Silt/Clay	< 75
	Very Fine	75 - 125
	Fine	125 - 250
	Medium	250 - 500
	Coarse	500 - 1000
60 - 75	Very Coarse	1000 - 2000
75 - 100	Very Fine	2 - 4
100 - 150	Fine	2 - 5
250 - 350	Fine	5 - 8
350 - 425	Medium	8 - 13
425 - 630	Medium	13 - 16
630 - 950	Coarse	16 - 22.5
950 - 1300	Coarse	22.5 - 32
1300 - 1800	Very Coarse	32 - 45
1800 - 2500	Very Coarse	45 - 75
2500 - 3500	Small	44 - 90
3500 - 5000	Small	90 - 128
5000 - 7500	Large	128 - 180
7500 - 10000	Large	180 - 250
10000 - 14000	Small	250 - 360
14000 - 20000	Small	360 - 510
20000 - 28000	Medium	510 - 1020
28000 - 35000	Larger/Large	1020 - 2040
	Beach	

Bankfull Channel		
Material	Size Range (mm)	Count
silt/clay	0 - 0.062	3
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	0
fine gravel	6 - 8	1
medium gravel	8 - 11	0
medium gravel	11 - 16	0
coarse gravel	16 - 22	1
coarse gravel	22 - 32	2
very coarse gravel	32 - 45	4
very coarse gravel	45 - 64	6
small cobble	64 - 90	7
medium cobble	90 - 128	4
large cobble	128 - 180	16
very large cobble	180 - 256	26
small boulder	256 - 362	15
small boulder	362 - 512	4
medium boulder	512 - 1024	2
large boulder	1024 - 2048	2
very large boulder	2048 - 4096	1
total particle count:		94
bedrock -----		6
clay hardpan -----		
detritus/wood -----		
artificial -----		
total count:		100
Note:		

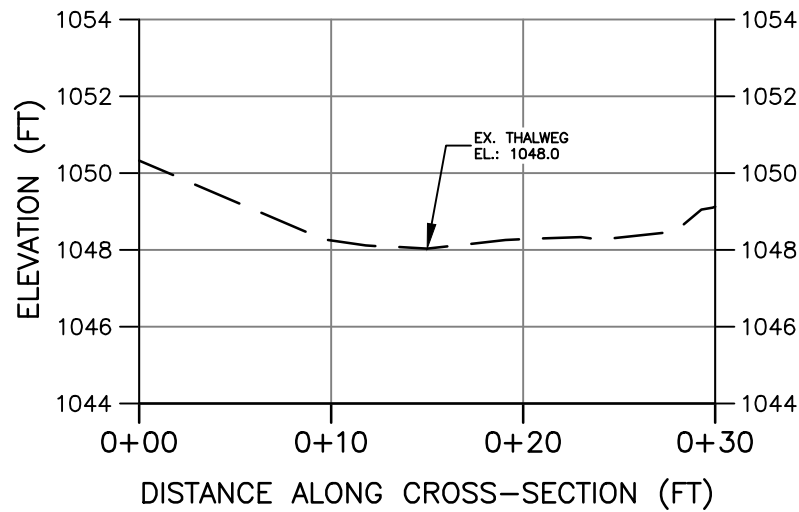
Bankfull Channel Pebble Count, Oldlick Creek (S-F40)



Size (mm)		Size Distribution		Type	
D16	57	mean	132.9	silt/clay	3%
D35	140	dispersion	2.5	sand	0%
D50	190	skewness	-0.18	gravel	14%
D65	230			cobble	53%
D84	310			boulder	24%
D95	570				
				bedrock	6%



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 16, 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.



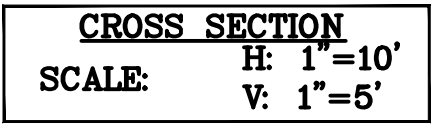
TYPICAL 5-POINT CROSS-SECTION
(FACING DOWNSTREAM)

TS-L TS-R

BS-L THW BS-R

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

AS-BUILT TABLE: S-F40 CROSS SECTION A					
PRE-CROSSING			AS-BUILT		
PT. LOC.	NORTHING	EASTING	ELEV	VERT. DIFF.	HORZ. DIFF.
TS-L	14042129.9957	1789094.8206 ¹	1049.905 ¹		
BS-L	14042130.6102	1789094.2155 ¹	1047.484 ¹		
THW	14042140.8170	1789090.2507 ¹	1047.762 ¹		
BS-R	14042151.9959	1789098.7208 ¹	1048.045 ¹		
TS-R	14042153.3076	1789099.4624 ¹	1049.586 ¹		



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



PHOTO TAKEN LOOKING DOWNSTREAM
FROM UPSTREAM IMPACT LIMITS



PHOTO TAKEN LOOKING UPSTREAM FROM
DOWNSTREAM IMPACT LIMITS

PENDING CROSSING

PENDING CROSSING

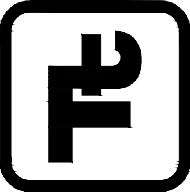
PHOTO TAKEN LOOKING DOWNSTREAM
FROM UPSTREAM IMPACT LIMITS

PHOTO TAKEN LOOKING UPSTREAM FROM
DOWNSTREAM IMPACT LIMITS

PRE-CROSSING

TETRA TECH, INC.
661 ANDERSEN DRIVE FOSTER PLAZA 7
PITTSBURGH, PA 15220
TEL: (412) 921-7090 FAX: (412) 921-4000
E-Mail Address: WWW.TETRA-TECH.COM

TETRA TECH



NTAIN VALLEY PIPELINE, LLC
O ENERGY DRIVE, 2ND FLOOR
CANONSBURG, PA 15317

Client	<p>PROFILE AND CROSS-SECTIONS BASELINE SURVEY CROSSING S-F40 – OLDLICK CREEK (MP 82.28) WEBSTER COUNTY, WV</p>
MC	222

Drawing No.

The 21 CDDA Philadelphi 7/15/27 - MP/Crossing
 1st Day/Time Out Oct. 2021 - 7:10pm
 Printed for greg@hobnob

Parents/Visit Nights 1928 Crossings/Crossings/MI - Completed/Completed/9-540/9-540 - MP 82.28 - 223.64/mile