

Baseline Assessment – Stream Attributes

Reach S-A100 (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	N/A – substrate too large
Wolman Pebble Count	✓
Reference Reach Software Pebble Count Data	✓
Longitudinal Profile and Cross Sections	✓

Spread C Stream A-100 (Timber Mat Crossing) Webster County

38.676643° N, -80.47794° W



Photo Type: US, US View

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

38.676643° N, -80.47794° W



Photo Type: US, DS View

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

Spread C Stream A-100 (Timber Mat Crossing) Webster County

38.676643° N, -80.47794° W



Photo Type: TMB, US View

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

38.676643° N, -80.47794° W



Photo Type: TMB, DS View

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

Spread C Stream A-100 (Timber Mat Crossing) Webster County

38.676643° N, -80.47794° W



Photo Type: ROW, N

Location, Orientation, Photographer Initials: Right of Way, Facing North, ABK/EW/WP

38.676643° N, -80.47794° W



Photo Type: ROW, S

Location, Orientation, Photographer Initials: Right of Way, Facing South, ABK/EW/WP

Spread C Stream A-100 (Timber Mat Crossing) Webster County



Photo Type: CP, US

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



Photo Type: CP, DS

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

Spread C Stream A-100 (Timber Mat Crossing) Webster County



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



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

Spread C Stream A-100 (Timber Mat Crossing) Webster County



Photo Type: DS ROW, US

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

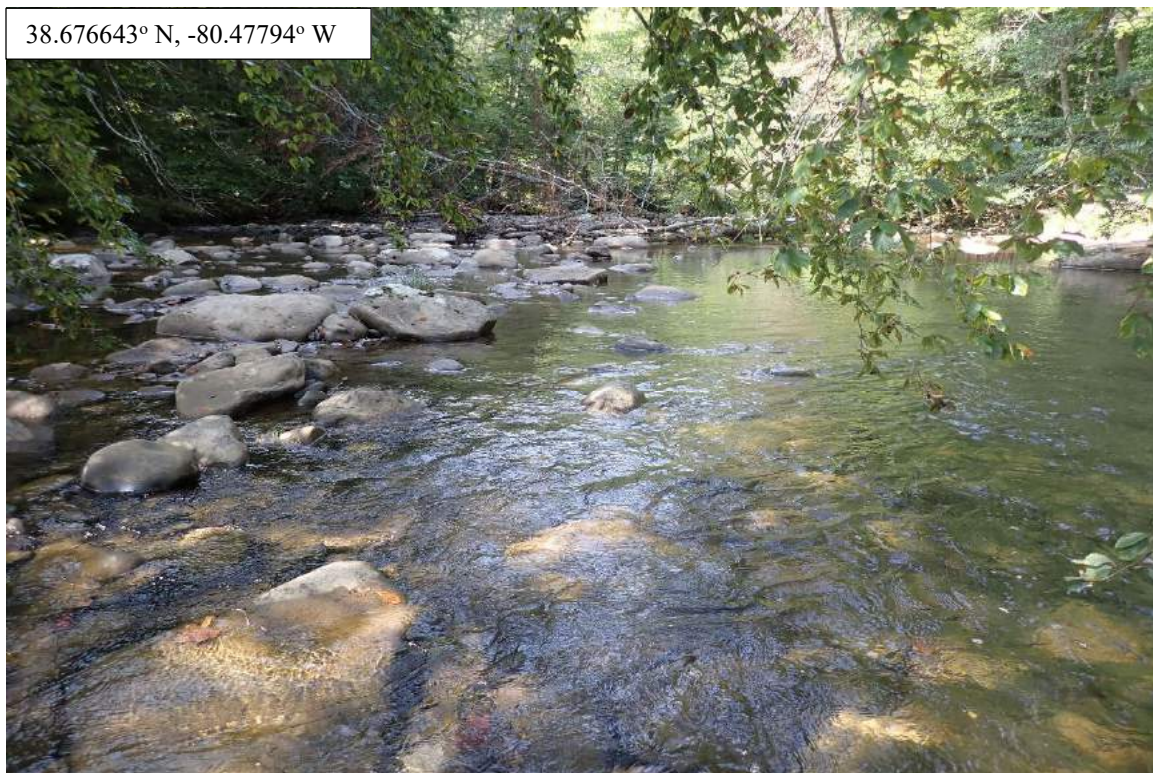


Photo Type: DS ROW, DS

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

Spread C Stream A-100 (Timber Mat Crossing) Webster County

38.676643° N, -80.47794° W



Photo Type: X Section, US Pool

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

38.676643° N, -80.47794° W



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-A100"

USCE FILE NO./ Project Name: (v2.1, Sept 2015)				MOUNTAIN VALLEY PIPELINE				IMPACT COORDINATES: (in Decimal Degrees)				Lat.	38.676643				Lon.	-80.47794				WEATHER:				10% cloud cover				DATE:				9/16/2021																									
IMPACT STREAM/SITE ID AND SITE DESCRIPTION: (watershed size (acreage), unaltered or impairments)										Left Fork Holly River (S-A100)										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)										Column No. 2- Mitigation Existing Condition - Baseline (Credit)										Column No. 3- Mitigation Projected at Five Years Post Completion (Credit)										Column No. 4- Mitigation Projected at Ten Years Post Completion (Credit)										Column No. 5- Mitigation Projected at Maturity (Credit)																			
Stream Classification:				Perennial						Stream Classification:										Stream Classification:				0						Stream Classification:				0						Stream Classification:				0															
Percent Stream Channel Slope				0.31						Percent Stream Channel Slope										Percent Stream Channel Slope				0						Percent Stream Channel Slope				0						Percent Stream Channel Slope				0															
HGM Score (attach data forms):										HGM Score (attach data forms):										HGM Score (attach data forms):										HGM Score (attach data forms):										HGM Score (attach data forms):										HGM Score (attach data forms):									
Average										Average										Average										Average										Average										Average									
Hydrology										Hydrology										Hydrology										Hydrology										Hydrology																			
Biogeochemical Cycling				0						Biogeochemical Cycling										Biogeochemical Cycling				0						Biogeochemical Cycling										Biogeochemical Cycling				0															
Habitat										Habitat										Habitat										Habitat										Habitat																			
PART I - Physical, Chemical and Biological Indicators										PART I - Physical, Chemical and Biological Indicators										PART I - Physical, Chemical and Biological Indicators										PART I - Physical, Chemical and Biological Indicators										PART I - Physical, Chemical and Biological Indicators										PART I - Physical, Chemical and Biological Indicators									
				Points Scale		Range		Site Score						Points Scale		Range		Site Score						Points Scale		Range		Site Score						Points Scale		Range		Site Score																					
PHYSICAL INDICATOR (Applies to all streams classifications)										PHYSICAL INDICATOR (Applies to all streams classifications)										PHYSICAL INDICATOR (Applies to all streams classifications)										PHYSICAL INDICATOR (Applies to all streams classifications)										PHYSICAL INDICATOR (Applies to all streams classifications)										PHYSICAL INDICATOR (Applies to all streams classifications)									
USEPA RBP (High Gradient Data Sheet)										USEPA RBP (Low Gradient Data Sheet)										USEPA RBP (High Gradient Data Sheet)										USEPA RBP (High Gradient Data Sheet)										USEPA RBP (High Gradient Data Sheet)										USEPA RBP (High Gradient Data Sheet)									
1. Epifaunal Substrate/Available Cover				0-20				18		1. Epifaunal Substrate/Available Cover				0-20						1. Epifaunal Substrate/Available Cover				0-20						1. Epifaunal Substrate/Available Cover				0-20						1. Epifaunal Substrate/Available Cover				0-20															
2. Embeddedness				0-20				18		2. Embeddedness				0-20						2. Embeddedness				0-20						2. Embeddedness				0-20						2. Embeddedness				0-20															
3. Velocity/ Depth Regime				0-20				11		3. Velocity/ Depth Regime				0-20						3. Velocity/ Depth Regime				0-20						3. Velocity/ Depth Regime				0-20						3. Velocity/ Depth Regime				0-20															
4. Sediment Deposition				0-20				17		4. Sediment Deposition				0-20						4. Sediment Deposition				0-20						4. Sediment Deposition				0-20						4. Sediment Deposition				0-20															
5. Channel Flow Status				0-20				17		5. Channel Flow Status				0-20						5. Channel Flow Status				0-20						5. Channel Flow Status				0-20						5. Channel Flow Status				0-20															
6. Channel Alteration				0-20				20		6. Channel Alteration				0-20						6. Channel Alteration				0-20						6. Channel Alteration				0-20						6. Channel Alteration				0-20															
7. Frequency of Riffles (or bends)				0-20				10		7. Frequency of Riffles (or bends)				0-20						7. Frequency of Riffles (or bends)				0-20						7. Frequency of Riffles (or bends)				0-20						7. Frequency of Riffles (or bends)				0-20															
8. Bank Stability (LB & RB)				0-20				17		8. Bank Stability (LB & RB)				0-20						8. Bank Stability (LB & RB)				0-20						8. Bank Stability (LB & RB)				0-20						8. Bank Stability (LB & RB)				0-20															
9. Vegetative Protection (LB & RB)				0-20				17		9. Vegetative Protection (LB & RB)				0-20						9. Vegetative Protection (LB & RB)				0-20						9. Vegetative Protection (LB & RB)				0-20						9. Vegetative Protection (LB & RB)				0-20															

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME <u>Left Fork Holly River</u>		LOCATION <u>S-A100</u>
STATION # _____ RIVERMILE _____		STREAM CLASS <u>Perennial</u>
LAT <u>38.678643</u> LONG <u>-80.47794</u>		COUNTY <u>Webster</u>
STORET # _____		AGENCY <u>Potesta/Edge</u>
INVESTIGATORS <u>EW/ABK/WP</u>		
FORM COMPLETED BY <u>E. Weaver/A.Kincaid</u>		DATE <u>8/16/2021</u> TIME <u>0945 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 checked="" type="checkbox"/> <input type="checkbox"/> </div> <div> storm (heavy rain) rain (steady rain) showers (intermittent) %cloud cover _____ clear/sunny </div> </div> <p>10 % <input checked="" type="checkbox"/></p> </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 checked="" type="checkbox"/> <input type="checkbox"/> </div> <div> storm (heavy rain) rain (steady rain) showers (intermittent) %cloud cover _____ clear/sunny </div> </div> <p>_____ %</p> </div> </div> <div style="margin-top: 10px;"> <p>Has there been a heavy rain in the last 7 days? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Air Temperature <u>70</u> F <u>0</u> C</p> <p>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 type="checkbox"/> Field/Pasture <input type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input type="checkbox"/> Other _____ <input type="checkbox"/> Residential	Local Watershed NPS Pollution <input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources Local Watershed Erosion <input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input checked="" type="checkbox"/> Herbaceous Dominant species present sycamore, ferns	
INSTREAM FEATURES	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Estimated Reach Length 75 ft m Estimated Stream Width 75 ft m Sampling Reach Area 5625 ft² m² Area in km² (m²x1000) _____ km² Estimated Stream Depth 1.2 ft m Surface Velocity 0.24 ft/sec 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 4.5 ft m Proportion of Reach Represented by Stream Morphology Types Riffle _____ % Run 90 % Pool 5 % 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 3 m ² Density of LWD _____ m ² /km ² (LWD/ reach area)	
AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present <input type="checkbox"/> Rooted emergent <input type="checkbox"/> Rooted submergent <input type="checkbox"/> Rooted floating <input type="checkbox"/> Free floating <input type="checkbox"/> Floating Algae <input type="checkbox"/> Attached Algae Dominant species present _____ Portion of the reach with aquatic vegetation _____ %	
WATER QUALITY	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Temperature 19.9 ° C Specific Conductance 52.8 us/cm Dissolved Oxygen 8.85 mg/L pH 7.19 SU Turbidity 2.29 ntu WQ Instrument Used YSI </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 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		10	Detritus	sticks, wood, coarse plant materials (CPOM)	10
Boulder	> 256 mm (10")	20			
Cobble	64-256 mm (2.5"-10")	60			
Gravel	2-64 mm (0.1"-2.5")	5	Muck-Mud	black, very fine organic (FPOM)	0
Sand	0.06-2mm (gritty)	5			
Silt	0.004-0.06 mm	0			
Clay	< 0.004 mm (slick)	0	Marl	grey, shell fragments	0

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

STREAM NAME <u>Left Fork Holly River</u>		LOCATION <u>S-A100</u>	
STATION # <u> </u> RIVERMILE <u> </u>		STREAM CLASS <u>Perennial</u>	
LAT <u>38.676643</u> LONG <u>-80.47794</u>		COUNTY <u>Webster</u>	
STORET # <u> </u>		AGENCY <u>Potesta/Edge</u>	
INVESTIGATORS <u>EW/ABK/WP</u>			
FORM COMPLETED BY <u>E. Weaver/A.Kincaid</u>		DATE <u>8/16/2021</u> TIME <u>0945 AM</u> AM PM	REASON FOR SURVEY <u>Preliminary Assessment</u>

	Habitat Parameter	Condition Category			
		Optimal	Suboptimal	Marginal	Poor
Parameters to be evaluated in sampling reach	1. Epifaunal Substrate/ Available Cover <input type="checkbox"/> N/A	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).	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 <input type="checkbox"/> N/A	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 <input type="checkbox"/> 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 11	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	4. Sediment Deposition <input type="checkbox"/> N/A	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 <input type="checkbox"/> 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 17	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.	
SCORE 20	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends) <input type="checkbox"/> N/A	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE 10	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE 8 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	
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 8 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 6 Left Bank 10 9	8 7 6	5 4 3	2 1 0	
SCORE 6 Right Bank 10 9	8 7 6	5 4 3	2 1 0	

Total Score **157**

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME <u>Left Fork Holly River</u>		LOCATION <u>S-A100</u>	
STATION # <u> </u> RIVERMILE <u> </u>		STREAM CLASS <u>Perennial</u>	
LAT <u>38.676643</u> LONG <u>-90.47794</u>		COUNTY <u>Webster</u>	
STORET # <u> </u>		AGENCY <u>Potesta/Edge</u>	
INVESTIGATORS <u>EW/ABK/WP</u>		LOT NUMBER <u> </u>	
FORM COMPLETED BY <u>E. Weaver/A.Kincaid</u>		DATE <u>8/15/2021</u> TIME <u>0945 AM</u>	REASON FOR SURVEY <u>Preliminary Assessment</u>

HABITAT TYPES	Indicate the percentage of each habitat type present <input type="checkbox"/> Cobble <u> </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> %
SAMPLE COLLECTION	Gear used <input type="checkbox"/> D-frame <input type="checkbox"/> kick-net <input type="checkbox"/> Other <u> </u> How were the samples collected? <input 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 type="checkbox"/> Cobble <u> </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	substrate too large for benthics

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						

SITE ID: S-A 100

Left Fork Holly River

Webster/C

DATE: _____

DATE: 16 September 2021

COLLECTOR(S):

COLLECTOR(S): A. K. Reed

Wolman Pebble Count (Reach Wide)

1040	CS	69	268	87	2000	113	BR	BR	127
BR	BR	BR	102	BR	BR	VLB	LB	BR	223
206	114	VLB	497	126	101	112	524	113	287
345	736	234	119	261	148	338	303	216	132
566	123	LB	525	215	403	151	486	160	505
207	382	CS	VLB	204	103	230	62	197	136
234	92	597	202	213	167	166	74	171	202
431	CS	87	126	28	177	BR	160	81	448
176	906	BR	VLB	481	268	CS	109	237	106
119	128	107	107	364	VLB	181	252	341	115

NOTES:

Riffle Pebble Count

[illegible]

NOTES:

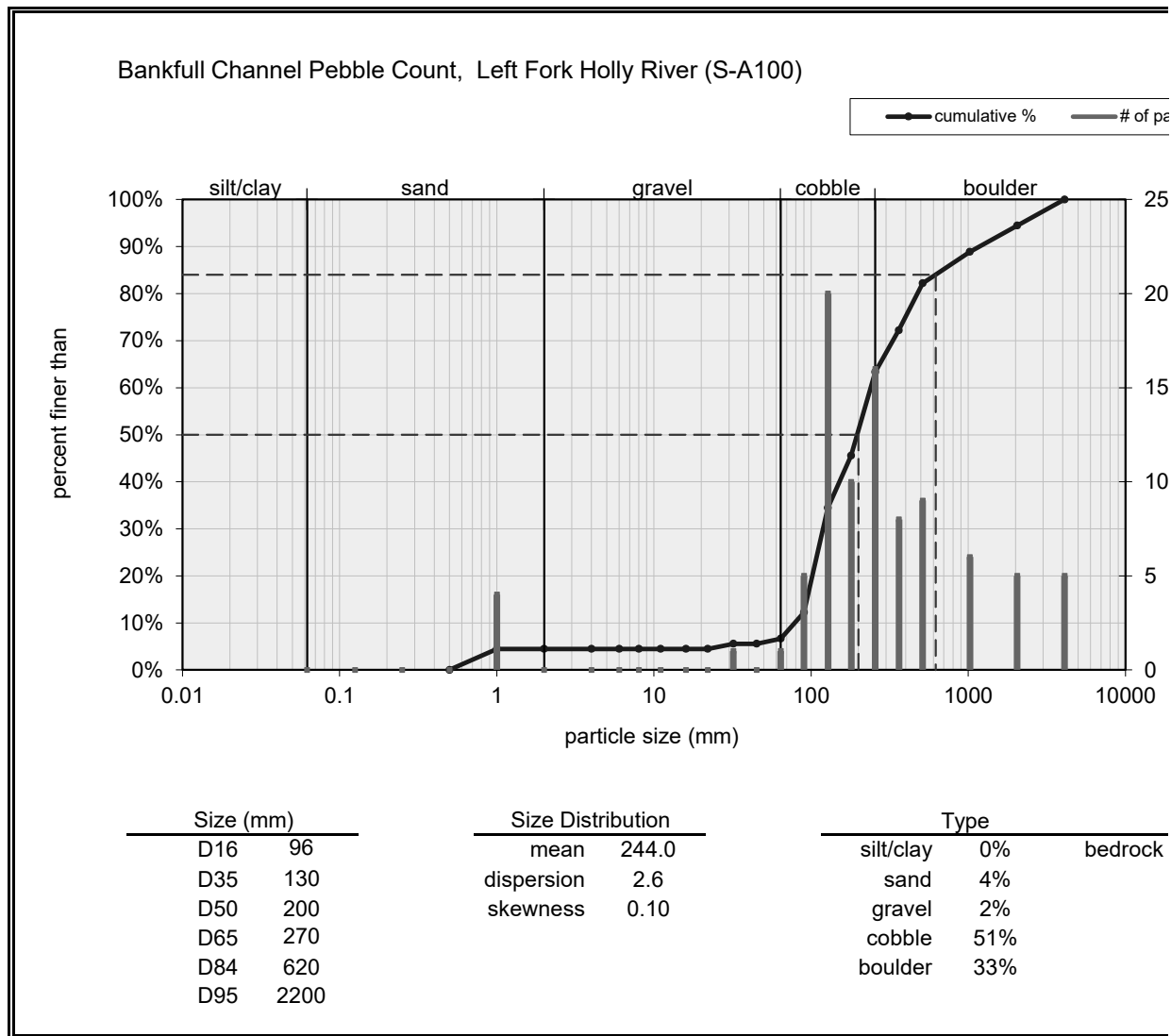
[illegible]

NOTES

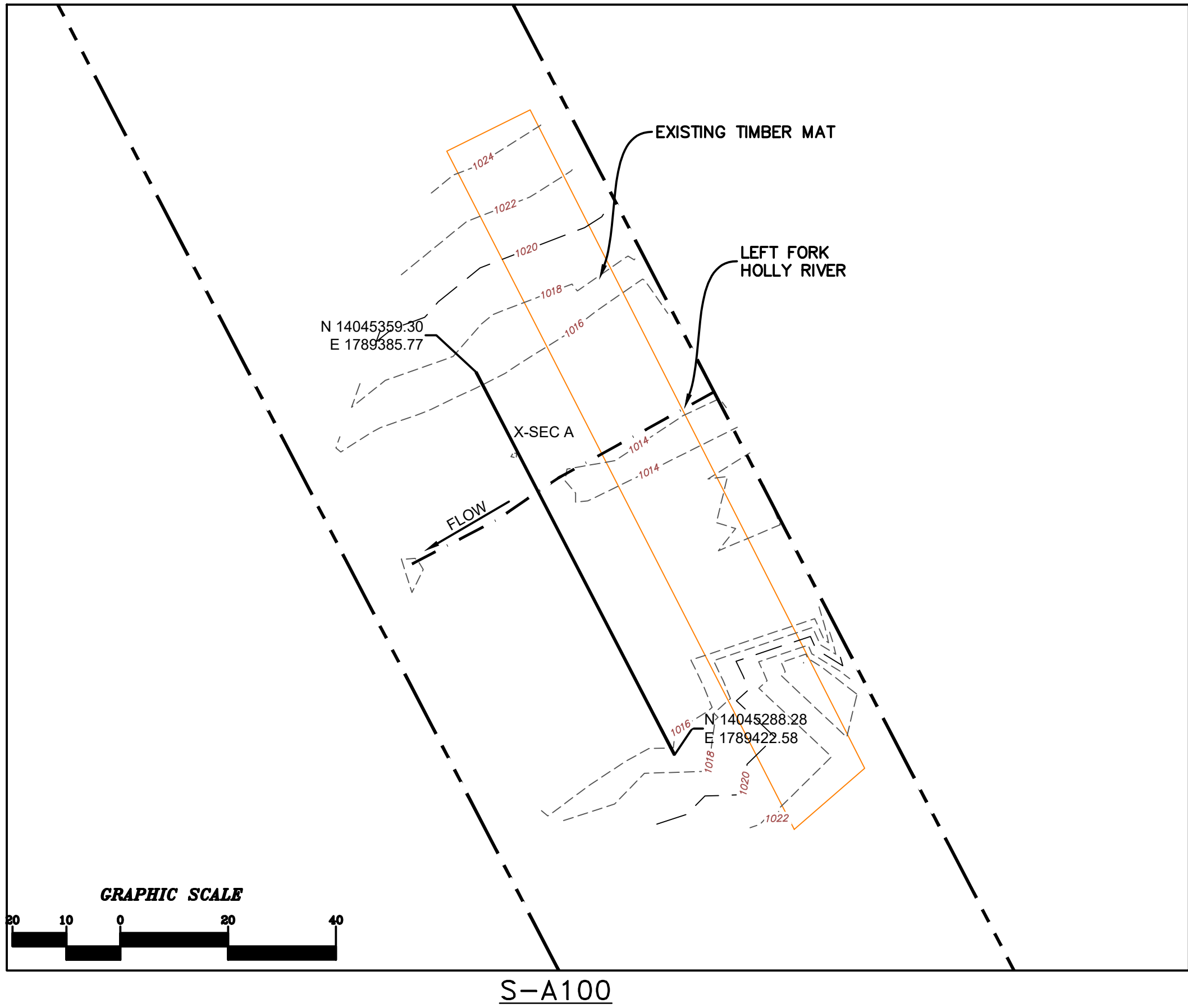
Smallest	FACTOR 2.5	Millimeters	
	Size Class	1-242	Size
	Very Fine	125 - 125	SAND
	Fine	125 - 25	
	Medium	25 - 50	
	Coarse	50 - 100	
102 - 108	Very Coarse	100 - 2	GRAVEL
108 - 16	Very Fine	2 - 4	
16 - 22	Fine	2.4 - 7	
22 - 31	Fine	4.7 - 8	
31 - 42	Medium	8 - 14.5	
44 - 62	Medium	11.3 - 16	
63 - 88	Coarse	16 - 20.4	
88 - 113	Coarse	20.4 - 30	
113 - 118	Very Coarse	30 - 45	GRAVEL
118 - 235	Very Coarse	45 - 14	
235 - 118	Small	14 - 80	
118 - 113	Small	80 - 128	
113 - 118	Large	128 - 180	
118 - 113	Large	180 - 204	
113 - 113	Small	204 - 362	
113 - 20	Small	362 - 572	
20 - 40	Medium	572 - 1004	GRAVEL
40 - 80	Large/Very Large	1004 - 2048	
	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	0
coarse sand	0.5 - 1	4
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	0
medium gravel	11 - 16	0
coarse gravel	16 - 22	0
coarse gravel	22 - 32	1
very coarse gravel	32 - 45	0
very coarse gravel	45 - 64	1
small cobble	64 - 90	5
medium cobble	90 - 128	20
large cobble	128 - 180	10
very large cobble	180 - 256	16
small boulder	256 - 362	8
small boulder	362 - 512	9
medium boulder	512 - 1024	6
large boulder	1024 - 2048	5
very large boulder	2048 - 4096	5
total particle count:		90
bedrock -----		10
clay hardpan -----		
detritus/wood -----		
artificial -----		
total count:		100
Note:		



This drawing was prepared by Tetra Tech, Inc. for the purpose of providing information only. It is not to be used for construction or any other purpose without the written consent of Tetra Tech, Inc. The user assumes all liability for any and all uses of this drawing. The user agrees to indemnify and hold Tetra Tech, Inc. harmless from and against all claims, damages, costs and expenses, including reasonable attorneys' fees, that may be asserted against or incurred by Tetra Tech, Inc. in connection with the use of this drawing. The user further agrees to defend, indemnify and hold Tetra Tech, Inc. harmless from and against all claims, damages, costs and expenses, including reasonable attorneys' fees, that may be asserted against or incurred by Tetra Tech, Inc. in connection with the use of this drawing. The user further agrees to defend, indemnify and hold Tetra Tech, Inc. harmless from and against all claims, damages, costs and expenses, including reasonable attorneys' fees, that may be asserted against or incurred by Tetra Tech, Inc. in connection with the use of this drawing.



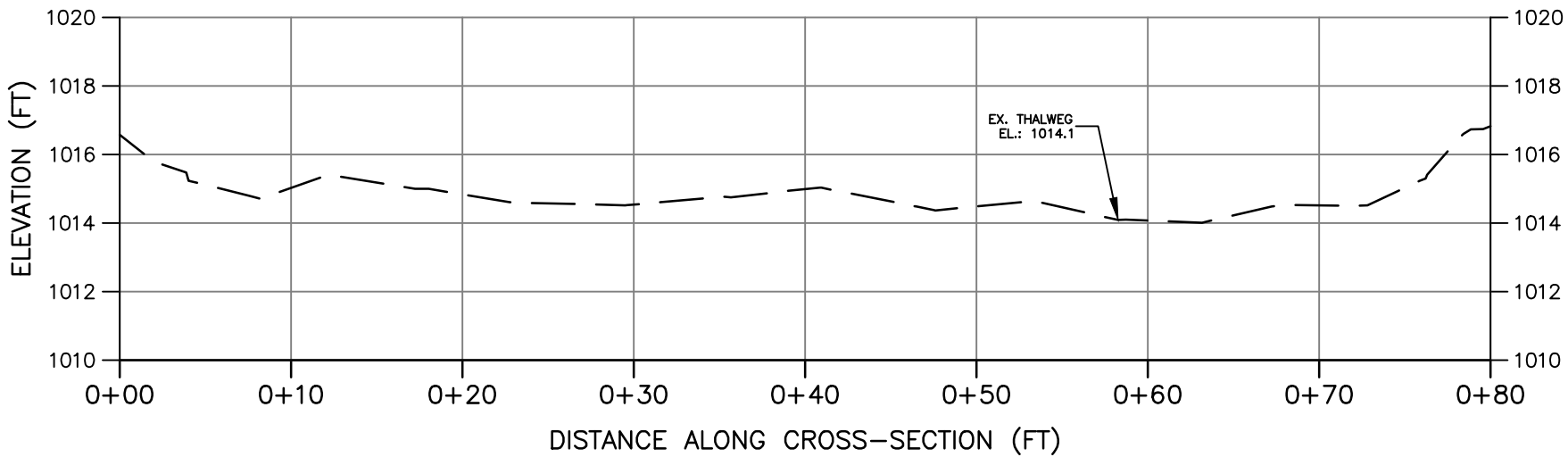
LEGEND

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

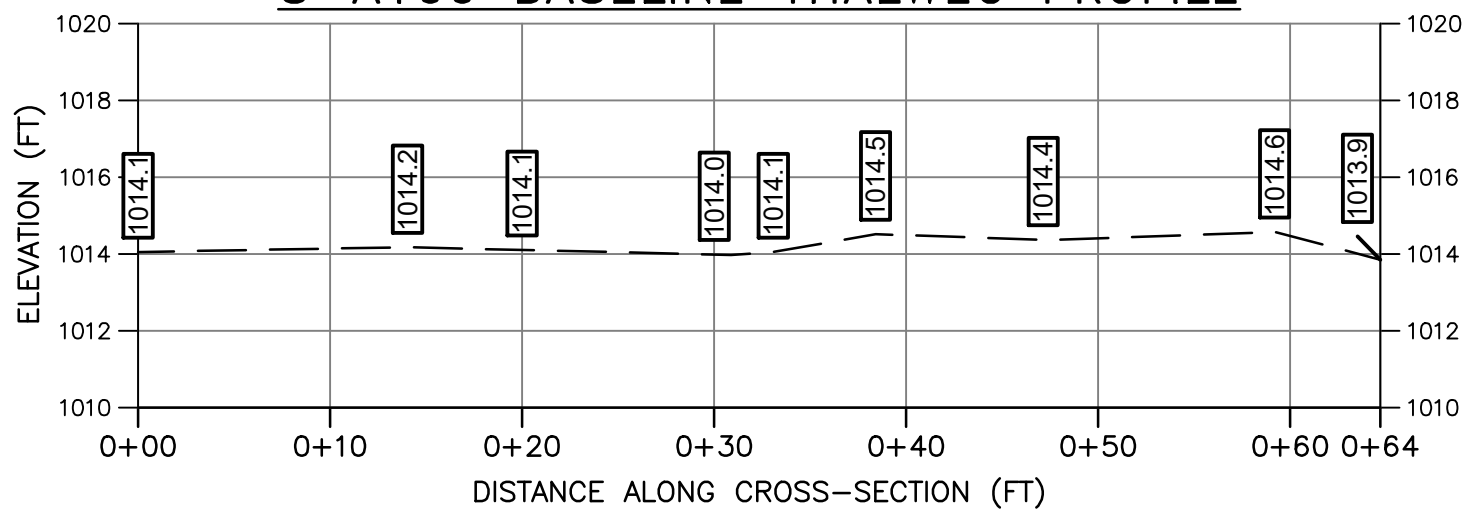
SURVEY NOTES:

- THIS MAP HAS BEEN ORIENTED TO NAD 1983 UTM ZONE 17N, AND VERTICALLY TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), USING REAL TIME DGPS. FIELD LOCATIONS WERE COMPLETED ON SEPTEMBER 16, 2021.
- EASEMENT LINES SHOWN ON PLAN VIEW WERE PROVIDED BY MOUNTAIN VALLEY PIPELINE.
- SURVEY POINTS FOR CROSS SECTIONS AND THALWEG PROFILES COLLECTED IN 2021 HAVE BEEN USED IN COMBINATION WITH SURVEY POINTS 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.
- ALL SECTION VIEWS SHOWN LEFT TO RIGHT FACING DOWNSTREAM.
- POST-CROSSING SURVEY INFORMATION SHOWN IN RED. DATA PENDING.
- POST-CROSSING SURVEY POINTS FOR CROSS SECTIONS AND THALWEG ARE PROJECTED ONTO PRE-CROSSING SECTION AND PROFILE VIEWS FOR COMPARISON.

S-A100 BASELINE CROSS-SECTION A



S-A100 BASELINE THALWEG PROFILE



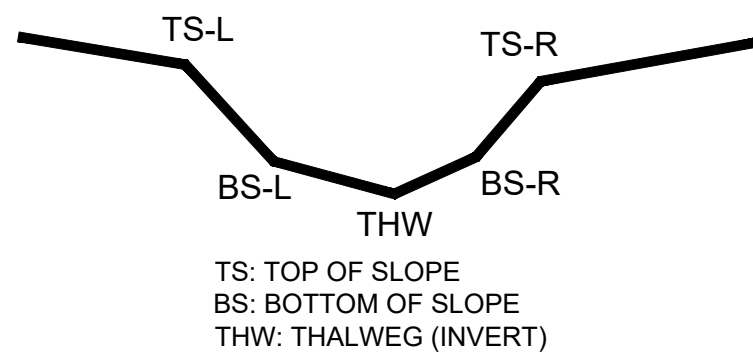
PROFILE LEGEND



PROFILE

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

TYPICAL 5-POINT CROSS-SECTION (FACING DOWNSTREAM)



CROSS SECTION LEGEND

--- EXISTING GRADE

CROSS SECTION

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

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

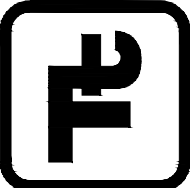
PRE-CROSSING

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

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

TETRA TECH, INC.
881 ANDERSEN DRIVE POSTER PLAZA 7
PITTSBURGH, PA 15220
TEL: (412) 921-7090 FAX: (412) 921-4040
E-Mail Address: WWW.TETRA TECH.COM

TETRA TECH



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

Client
MOUNTAIN VALLEY PIPELINE, LLC
2200 ENERGY DRIVE, 2ND FLOOR
CANONSBURG, PA 15317
Title
PROFILE AND CROSS-SECTIONS
BASELINE SURVEY
CROSSING S-A100 - LEFT FORK HOLLY
RIVER (MP 81.60)
WEBSTER COUNTY, WV

1
Drawing No.

PRELIMINARY