

Baseline Assessment – Stream Attributes

Reach S-L26(1) (Pipeline ROW) Perennial Spread E Greenbrier 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 – Low flow |
| Wolman Pebble Count | ✓ |
| Reference Reach Software Pebble Count Data | ✓ |
| Longitudinal Profile and Cross Sections | ✓ |

37.9819° N, -80.755213° W



Photo Type: US Reach, US View

Location, Orientation, Photographer Initials: Upstream Reach, Upstream View, AAK/SM

37.9819° N, -80.755213° W



Photo Type: US Reach, DS View

Location, Orientation, Photographer Initials: Upstream Reach, Downstream View, AAK/SM

37.9819° N, -80.755213° W



Photo Type: Mid-Reach, US View

Location, Orientation, Photographer Initials: Mid-Reach, Upstream View, AAK/SM

37.9819° N, -80.755213° W



Photo Type: Mid-Reach, DS View

Location, Orientation, Photographer Initials: Mid-Reach, Downstream View, AAK/SM



Photo Type: DS Reach, US View

Location, Orientation, Photographer Initials: Downstream Reach, Upstream View, AAK/SM



Photo Type: DS Reach, DS View

Location, Orientation, Photographer Initials: Downstream Reach, Downstream View, AAK/SM

"Q:\Charleston\2021 Projects\21-0244- MVP- STREAM AND WETLAND CONDITIONS ASSESSMENT AND SURVEY PLAN\002 - Pre-Crossing Monitoring\Spread E\SL-26(1)"

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|--------------------------|--|--|--|--|--|----------------------------|---------|--|---|------|------------|-------------|--|----------|--|------|-------------------------------------|-------------|--|----------------------------|--|--|----------|-------------|--|--------------------|---|--|--|--|--|
| USACE FILE NO./ Project Name: <small>(v2.1, Sept 2015)</small> | | | Mountain Valley Pipeline | | | IMPACT COORDINATES: (in Decimal Degrees) | | | Lat. | 37.9819 | | | Lon. | -80.755213 | | | WEATHER: | | | 40 % Cloud Cover, Clear/Sunny 70 °F | | | DATE: | | | 9/8/2021 | | | | | | | | |
| IMPACT STREAM/SITE ID AND SITE DESCRIPTION: <small>(watershed size (acreage), unaltered or impairments)</small> | | | | | | S-L26(1) UNT to Meadow River (1) | | | | | | MITIGATION STREAM CLASS./SITE ID AND SITE DESCRIPTION: <small>(watershed size (acreage), unaltered or impairments)</small> | | | | | | | | | | | | Comments: | | | | | | | | | | |
| STREAM IMPACT LENGTH: | | | 205 | | | 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 | | | 1 | | | Percent Stream Channel Slope | | | | | | Percent Stream Channel Slope | | | 0 | | | Percent Stream Channel Slope | | | 0 | | | Percent Stream Channel Slope | | | 0 | | | | | | | |
| HGM Score (attach data forms): | | | | | | HGM Score (attach data forms): | | | | | | HGM Score (attach data forms): | | | | | | HGM Score (attach data forms): | | | | | | HGM Score (attach data forms): | | | | | | | | | | |
| Average | | | | | | Average | | | | | | Average | | | | | | Average | | | | | | Average | | | | | | | | | | |
| Hydrology | | | | | | Hydrology | | | | | | Hydrology | | | | | | Hydrology | | | | | | Hydrology | | | | | | | | | | |
| Biogeochemical Cycling | | | 0 | | | Biogeochemical Cycling | | | 0 | | | Biogeochemical Cycling | | | 0 | | | Biogeochemical Cycling | | | 0 | | | Biogeochemical Cycling | | | 0 | | | | | | | |
| Habitat | | | | | | Habitat | | | | | | Habitat | | | | | | Habitat | | | | | | Habitat | | | | | | | | | | |
| PART I - Physical, Chemical and Biological Indicators | | | | | | PART I - Physical, Chemical and Biological Indicators | | | | | | PART I - Physical, Chemical and Biological Indicators | | | | | | PART I - Physical, Chemical and Biological Indicators | | | | | | PART I - Physical, Chemical and Biological Indicators | | | | | | | | | | |
| Points ScaleRangeSite Score | | | | | | Points ScaleRangeSite Score | | | | | | Points ScaleRangeSite Score | | | | | | Points ScaleRangeSite Score | | | | | | Points ScaleRangeSite Score | | | | | | | | | | |
| PHYSICAL INDICATOR (Applies to all streams classifications) | | | | | | PHYSICAL INDICATOR (Applies to all streams classifications) | | | | | | PHYSICAL INDICATOR (Applies to all streams classifications) | | | | | | PHYSICAL INDICATOR (Applies to all streams classifications) | | | | | | PHYSICAL INDICATOR (Applies to all streams classifications) | | | | | | | | | | |
| USEPA RBP (High Gradient Data Sheet) | | | | | | USEPA RBP (Low Gradient Data Sheet) | | | | | | USEPA RBP (High Gradient Data Sheet) | | | | | | USEPA RBP (High Gradient Data Sheet) | | | | | | USEPA RBP (High Gradient Data Sheet) | | | | | | | | | | |
| 1. Epifaunal Substrate/Available Cover | | | 0-20 | | | 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 | | | 2. Embeddedness | | | 0-20 | | | 2. Embeddedness | | | 0-20 | | | 2. Embeddedness | | | 0-20 | | | 2. Embeddedness | | | 0-20 | | | | | | | |
| 3. Velocity/ Depth Regime | | | 0-20 | | | 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 | | | 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 | | | 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 | | | 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 | | | 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 | | | 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 | | | 9. Vegetative Protection (LB & RB) | | | 0-20 | | | 9. Vegetative Protection (LB & RB) | | | 0-20 | | | 9. Vegetative Protection (LB & RB) | | | 0-20 | | | 9. Vegetative Protection (LB & RB) | | | 0-20 | | | | | | | |
| 10. Riparian Vegetative Zone Width (LB & RB) | | | 0-20 | | | 10. Riparian Vegetative Zone Width (LB & RB) | | | 0-20 | | | 10. Riparian Vegetative Zone Width (LB & RB) | | | 0-20 | | | 10. Riparian Vegetative Zone Width (LB & RB) | | | 0-20 | | | 10. Riparian Vegetative Zone Width (LB & RB) | | | 0-20 | | | | | | | |
| Total RBP Score | | | Poor | | | Total RBP Score | | | Poor | | | Total RBP Score | | | Poor | | | Total RBP Score | | | Poor | | | Total RBP Score | | | Poor | | | | | | | |
| Sub-Total | | | 0.29 | | | Sub-Total | | | 0 | | | Sub-Total | | | 0 | | | Sub-Total | | | 0 | | | Sub-Total | | | 0 | | | | | | | |
| CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams) | | | | | | CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams) | | | | | | CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams) | | | | | | CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams) | | | | | | CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams) | | | | | | | | | | |
| WVDEP Water Quality Indicators (General) | | | | | | WVDEP Water Quality Indicators (General) | | | | | | WVDEP Water Quality Indicators (General) | | | | | | WVDEP Water Quality Indicators (General) | | | | | | WVDEP Water Quality Indicators (General) | | | | | | | | | | |
| Specific Conductivity | | | | | | Specific Conductivity | | | | | | Specific Conductivity | | | | | | Specific Conductivity | | | | | | Specific Conductivity | | | | | | | | | | |
| <=99 - 90 points | | | 0-90 | | | <=99 - 90 points | | | 0-90 | | | <=99 - 90 points | | | 0-90 | | | <=99 - 90 points | | | 0-90 | | | <=99 - 90 points | | | 0-90 | | | | | | | |
| pH | | | | | | pH | | | | | | pH | | | | | | pH | | | | | | pH | | | | | | | | | | |
| 6.0-8.0 = 80 points | | | 0-80 | | | 6.0-8.0 = 80 points | | | 5-90 | | | 6.0-8.0 = 80 points | | | 5-90 | | | 6.0-8.0 = 80 points | | | 5-90 | | | 6.0-8.0 = 80 points | | | 5-90 | | | | | | | |
| DO | | | | | | DO | | | | | | DO | | | | | | DO | | | | | | DO | | | | | | | | | | |
| >5.0 = 30 points | | | 10-30 | | | >5.0 = 30 points | | | 10-30 | | | >5.0 = 30 points | | | 10-30 | | | >5.0 = 30 points | | | 10-30 | | | >5.0 = 30 points | | | 10-30 | | | | | | | |
| Sub-Total | | | 1 | | | Sub-Total | | | 0 | | | Sub-Total | | | 0 | | | Sub-Total | | | 0 | | | Sub-Total | | | 0 | | | | | | | |
| BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams) | | | | | | BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams) | | | | | | BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams) | | | | | | BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams) | | | | | | BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams) | | | | | | | | | | |
| WV Stream Condition Index (WVSCI) | | | | | | WV Stream Condition Index (WVSCI) | | | | | | WV Stream Condition Index (WVSCI) | | | | | | WV Stream Condition Index (WVSCI) | | | | | | WV Stream Condition Index (WVSCI) | | | | | | | | | | |
| 0 | | | 0-100 | | | 0 | | | 0-1 | | | 0 | | | 0-100 | | | 0 | | | 0-1 | | | 0 | | | 0-100 | | | 0 | | | | |
| Sub-Total | | | 0 | | | Sub-Total | | | 0 | | | Sub-Total | | | 0 | | | Sub-Total | | | 0 | | | Sub-Total | | | 0 | | | | | | | |
| PART II - Index and Unit Score | | | | | | PART II - Index and Unit Score | | | | | | PART II - Index and Unit Score | | | | | | PART II - Index and Unit Score | | | | | | PART II - Index and Unit Score | | | | | | | | | | |
| Index | | | Linear Feet | | | Index | | | Linear Feet | | | Index | | | Linear Feet | | | Index | | | Linear Feet | | | Index | | | Linear Feet | | | | | | | |
| 0.645 | | | 205 | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | | | | | |
| Unit Score | | | 132.225 | | | Unit Score | | | 0 | | | Unit Score | | | 0 | | | Unit Score | | | 0 | | | Unit Score | | | 0 | | | | | | | |

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

| | | | |
|---|--|--|--|
| STREAM NAMES-L26(1) | | LOCATION UNT to Meadow River Spread E | |
| STATION # _____ RIVERMILE _____ | | STREAM CLASS Perennial <input checked="" type="checkbox"/> | |
| LAT 37.9819 _____ LONG -80.755213 _____ | | COUNTY Greenbrier <input checked="" type="checkbox"/> | |
| STORET # _____ | | AGENCY Potesta/Edge | |
| INVESTIGATORS AK/SM | | | |
| FORM COMPLETED BY AK | | DATE 9-8-2021 TIME 1115 | REASON FOR SURVEY Preliminary Assessment |

| | |
|---------------------------|---|
| WEATHER CONDITIONS | <div style="display: flex; justify-content: space-between;"> <div> <p>Now</p> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 10px; height: 10px;"></div> </div> <div> <p>40 % <input checked="" type="checkbox"/></p> <p>storm (heavy rain)</p> <p>rain (steady rain)</p> <p>showers (intermittent)</p> <p>%cloud cover</p> <p>clear/sunny</p> </div> </div> </div> <div> <p>Past 24 hours</p> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 10px; height: 10px;"></div> </div> <div> <p>_____ %</p> </div> </div> |
|---------------------------|---|

Has there been a heavy rain in the last 7 days?

☒ Yes ☐ No

Air Temperature 70 F °C

Other _____

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

| | | |
|--|--|--|
| WATERSHED FEATURES | Predominant Surrounding Landuse <input checked="" type="checkbox"/> Forest <input checked="" 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 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 checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous Dominant species present <u>rhododendron, hemlock, birch</u> | |
| INSTREAM FEATURES | <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Estimated Reach Length <u>75 ft</u> m Estimated Stream Width <u>1.2 ft</u> m Sampling Reach Area <u>90 ft²</u> m² Area in km² (m²x1000) _____ km² Estimated Stream Depth <u>0.1 ft</u> m Surface Velocity <small>0.10 ft/sec</small> _____ m/sec Stream Dry <input type="checkbox"/> </div> <div style="width: 45%;"> Canopy Cover <input type="checkbox"/> Partly open <input type="checkbox"/> Partly shaded <input checked="" type="checkbox"/> Shaded High Water Mark <u>0.4 ft</u> m Proportion of Reach Represented by Stream Morphology Types Riffle¹⁰ _____ % Run⁵⁰ _____ % Pool⁰ _____ % 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 <u>1</u> 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 checked="" 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 <u>attached algae</u> Portion of the reach with aquatic vegetation <u>10</u> % | |
| WATER QUALITY | <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Temperature <u>16.3</u> °C Specific Conductance <small>0.092 us/cm</small> _____ Dissolved Oxygen <u>7.31</u> mg/L pH <u>6.45</u> su Turbidity <u>16.7</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 Flecks <input type="checkbox"/> None <input checked="" type="checkbox"/> Other <small>iron stains</small> _____ Turbidity (if not measured) <input type="checkbox"/> Clear <input checked="" 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 type="checkbox"/> Absent <input checked="" 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 checked="" 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 | | 0 | Detritus | sticks, wood, coarse plant materials (CPOM) | 20 |
| Boulder | > 256 mm (10") | 0 | | | |
| Cobble | 64-256 mm (2.5"-10") | 0 | Muck-Mud | black, very fine organic (FPOM) | 0 |
| Gravel | 2-64 mm (0.1"-2.5") | 10 | | | |
| Sand | 0.06-2mm (gritty) | 35 | Marl | grey, shell fragments | 0 |
| Silt | 0.004-0.06 mm | 35 | | | |
| Clay | < 0.004 mm (slick) | 20 | | | |

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

| | | | |
|---|--|---|---|
| STREAM NAMES-L26(1) | | LOCATION | |
| STATION # _____ RIVERMILE _____ | | STREAM CLASS Perennial <input type="checkbox"/> | |
| LAT 37.9819 _____ LONG -80.755213 _____ | | COUNTY Greenbrier <input type="checkbox"/> | |
| STORET # _____ | | AGENCY Potesta/Edge | |
| INVESTIGATORS | | | |
| FORM COMPLETED BY AK | | DATE 9-8-2021 TIME 1115 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 2 <input type="checkbox"/> | 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 1 <input type="checkbox"/> | 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 7 <input type="checkbox"/> | 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 5 <input type="checkbox"/> | 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 7 <input type="checkbox"/> | 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 <u>15</u> | 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 <u>5</u> | 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 <u>2</u> SCORE <u>2</u> | 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 9 | 8 7 6 | 5 4 3 | 2 1 0 |
| | Right Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 |
| 9. Vegetative Protection (score each bank) SCORE <u>2</u> SCORE <u>2</u> | 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 9 | 8 7 6 | 5 4 3 | 2 1 0 |
| | Right Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 |
| 10. Riparian Vegetative Zone Width (score each bank riparian zone) SCORE <u>6</u> SCORE <u>2</u> | 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 9 | 8 7 6 | 5 4 3 | 2 1 0 |
| | Right Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 |

Total Score 58

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

| | | | |
|---|--|---|---|
| STREAM NAMES-L26(1) | | LOCATION | |
| STATION # _____ RIVERMILE _____ | | STREAM CLASS Perennial ▼ | |
| LAT <small>37.9819</small> _____ LONG <small>-80.755213</small> _____ | | COUNTY Greenbrier ▼ | |
| STORET # _____ | | AGENCY Potesta/Edge | |
| INVESTIGATORS | | LOT NUMBER | |
| FORM COMPLETED BY AK | | DATE <small>9-8-2021</small> TIME <small>1115</small> | REASON FOR SURVEY Preliminary Assessment |

| | |
|--------------------------|--|
| HABITAT TYPES | Indicate the percentage of each habitat type present <input type="checkbox"/> Cobble _____% <input type="checkbox"/> Snags _____% <input type="checkbox"/> Vegetated Banks _____% <input type="checkbox"/> Sand _____% <input type="checkbox"/> Submerged Macrophytes _____% <input type="checkbox"/> Other (_____) _____% |
| SAMPLE COLLECTION | Gear used <input type="checkbox"/> D-frame <input type="checkbox"/> kick-net <input type="checkbox"/> Other _____ 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 _____ <input type="checkbox"/> Snags _____ <input type="checkbox"/> Vegetated Banks _____ <input type="checkbox"/> Sand _____ <input type="checkbox"/> Submerged Macrophytes _____ <input type="checkbox"/> Other (_____) _____ |
| GENERAL COMMENTS | No benthics collected due to unsuitable substrate * very limited flow |

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-L26(1) UNT to Meadow River Spread E
DATE: 8 September 2021
COLLECTOR(S): SM

Wolman Pebble Count (Reach Wide)[illegible]

NOTES:

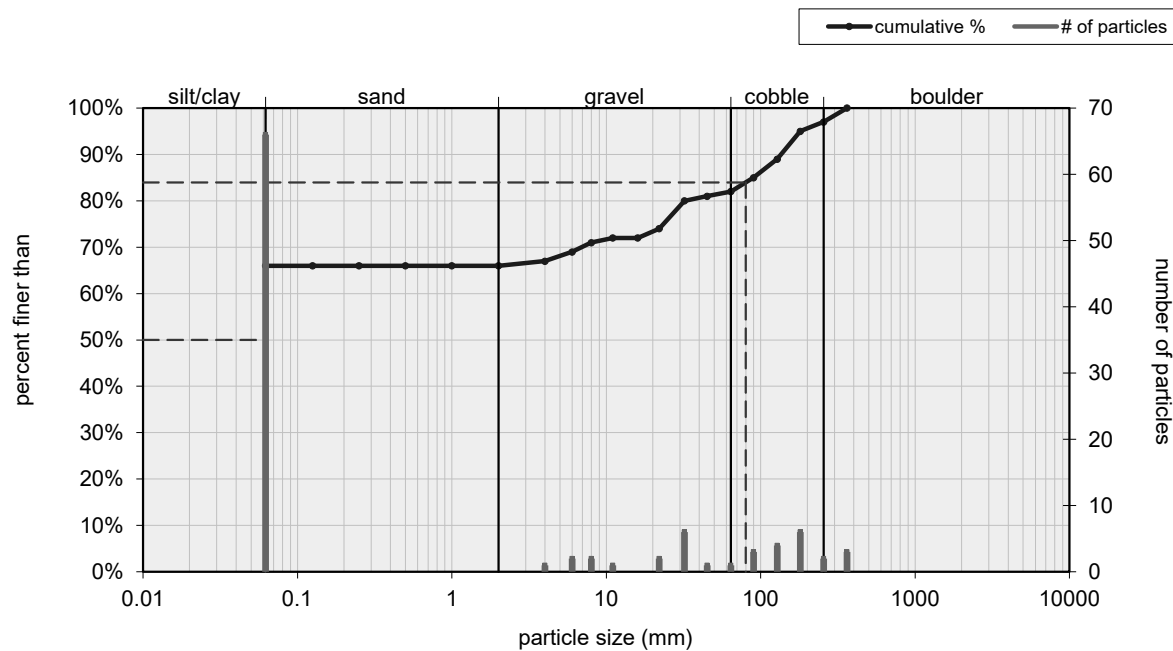
Riffle Pebble Count[illegible]

NOTES:

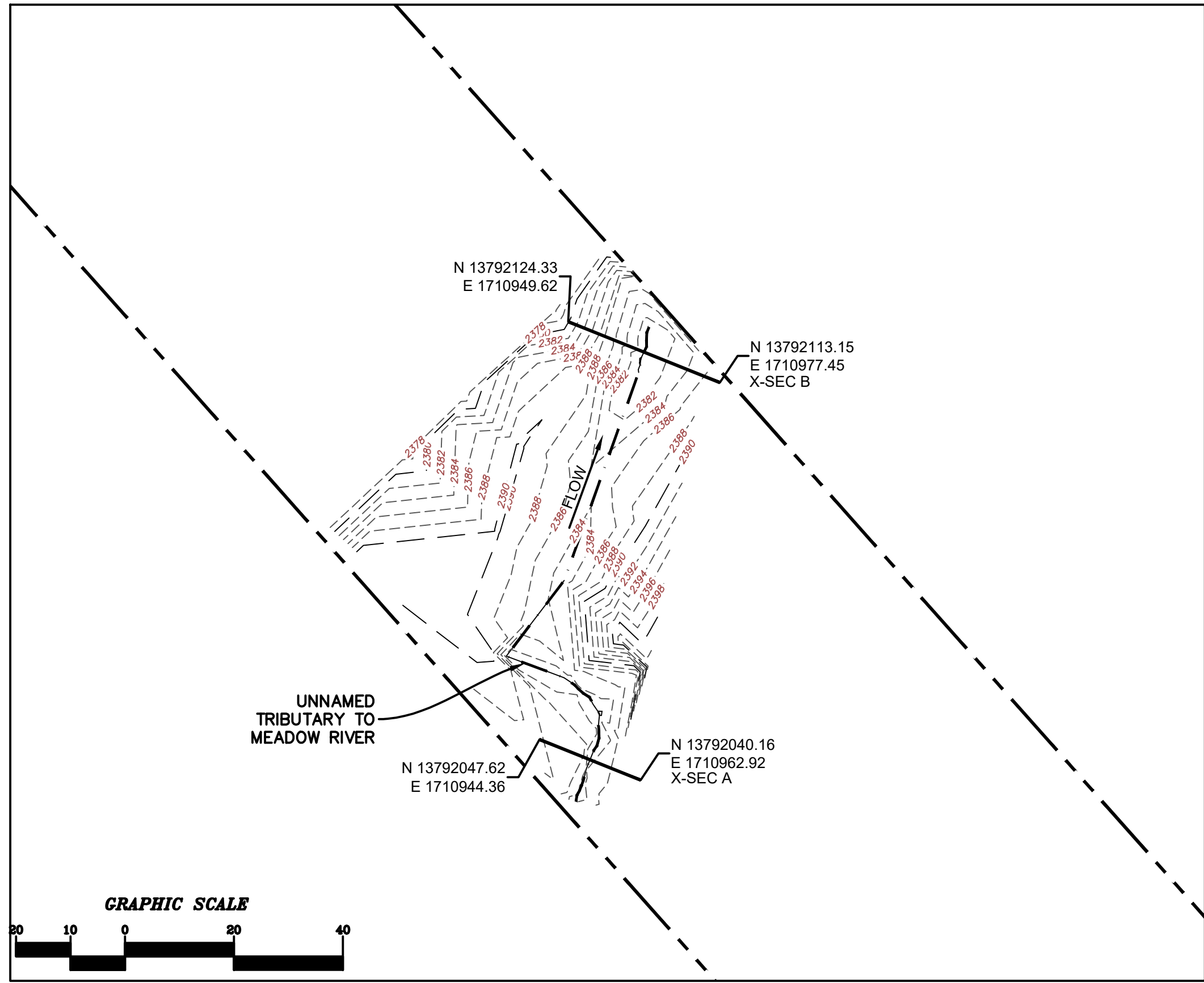
| Inches | Material | Millimeter | |
|-----------------|------------------|------------|--------|
| 1/4 - 1/2 | Stiff Clay | 6.35 | SAND |
| | Very Fine | 20 - 25 | |
| | Fine | 25 - 50 | |
| | Medium | 50 - 85 | |
| 1/2 - 3/4 | Coarse | 85 - 150 | GRAVEL |
| 3/4 - 1 1/4 | Very Coarse | 150 - 200 | |
| 1 1/4 - 2 | Very Fine | 2 - 4 | |
| 2 - 2 1/2 | Fine | 4 - 5.7 | |
| 2 1/2 - 3 1/4 | Fine | 5.7 - 8 | GRAVEL |
| 3 1/4 - 4 1/4 | Medium | 8 - 11.3 | |
| 4 1/4 - 5 1/4 | Medium | 11.3 - 16 | |
| 5 1/4 - 6 1/4 | Coarse | 16 - 22.5 | |
| 6 1/4 - 7 1/4 | Coarse | 22.5 - 32 | GRAVEL |
| 7 1/4 - 8 1/4 | Very Coarse | 32 - 45 | |
| 8 1/4 - 9 1/4 | Very Coarse | 45 - 64 | |
| 9 1/4 - 10 1/4 | Small | 64 - 86 | |
| 10 1/4 - 12 1/4 | Small | 86 - 125 | GRAVEL |
| 12 1/4 - 14 1/4 | Large | 125 - 180 | |
| 14 1/4 - 16 1/4 | Large | 180 - 250 | |
| 16 1/4 - 18 1/4 | Small | 250 - 350 | |
| 18 1/4 - 20 1/4 | Small | 350 - 500 | GRAVEL |
| 20 1/4 - 24 1/4 | Large | 500 - 625 | |
| 24 1/4 - 30 1/4 | Large-Very Large | 625 - 762 | GRAVEL |
| 30 1/4 - 36 1/4 | Bedrock | | |

| Bankfull Channel | | |
|-----------------------|-----------------|-------|
| Material | Size Range (mm) | Count |
| silt/clay | 0 - 0.062 | 66 |
| very fine sand | 0.062 - 0.125 | |
| fine sand | 0.125 - 0.25 | |
| medium sand | 0.25 - 0.5 | |
| coarse sand | 0.5 - 1 | |
| very coarse sand | 1 - 2 | |
| very fine gravel | 2 - 4 | 1 |
| fine gravel | 4 - 6 | 2 |
| fine gravel | 6 - 8 | 2 |
| medium gravel | 8 - 11 | 1 |
| medium gravel | 11 - 16 | |
| coarse gravel | 16 - 22 | 2 |
| coarse gravel | 22 - 32 | 6 |
| very coarse gravel | 32 - 45 | 1 |
| very coarse gravel | 45 - 64 | 1 |
| small cobble | 64 - 90 | 3 |
| medium cobble | 90 - 128 | 4 |
| large cobble | 128 - 180 | 6 |
| very large cobble | 180 - 256 | 2 |
| small boulder | 256 - 362 | 3 |
| small boulder | 362 - 512 | |
| medium boulder | 512 - 1024 | |
| large boulder | 1024 - 2048 | |
| very large boulder | 2048 - 4096 | |
| total particle count: | | 100 |
| bedrock ----- | | |
| clay hardpan ----- | | |
| detritus/wood ----- | | |
| artificial ----- | | |
| total count: | | 100 |
| Note: _____ | | |

Bankfull Channel Pebble Count, UNT to Meadow River (1) (S-L26(1))



| Size (mm) | Size Distribution | Type |
|-----------|-------------------|---------------|
| D16 0.062 | mean 2.2 | silt/clay 66% |
| D35 0.062 | dispersion 645.7 | sand 0% |
| D50 0.062 | skewness 0.88 | gravel 16% |
| D65 0.062 | | cobble 15% |
| D84 80 | | boulder 3% |
| D95 180 | | |



LEGEND

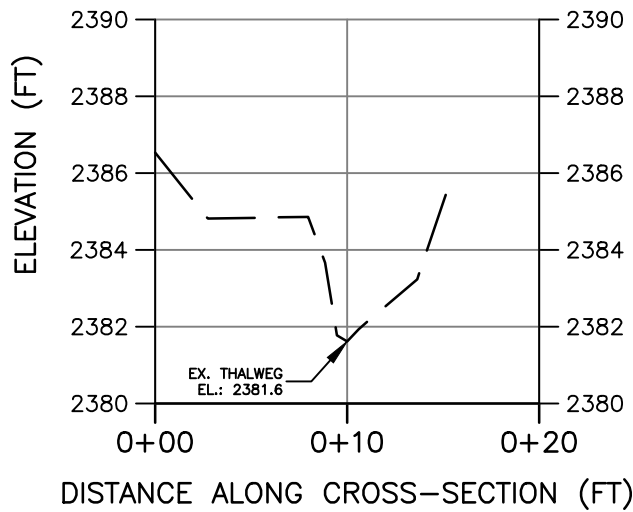
--- STUDY AREA (EASEMENT)

--- EXISTING SURVEY-LOCATED THALWEG

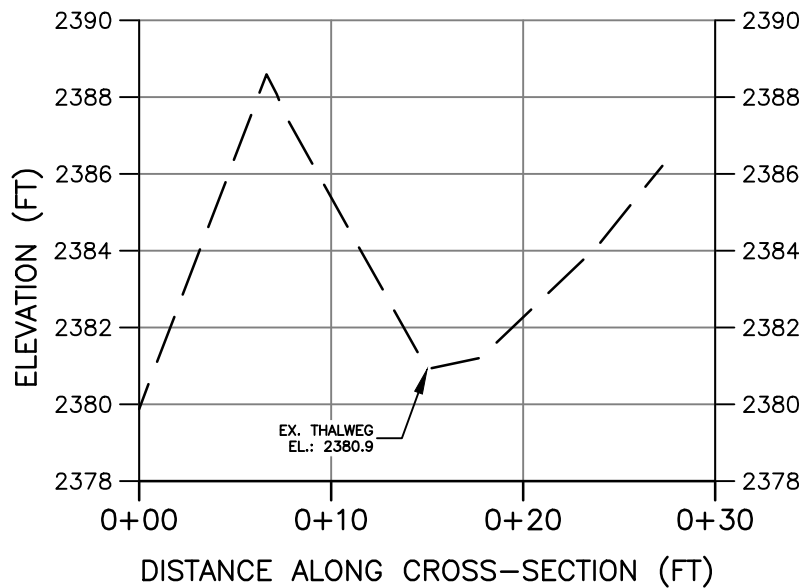
1176.87 + EXISTING SURVEYED GROUND SHOT ELEVATION

- 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 OCTOBER 11, 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.

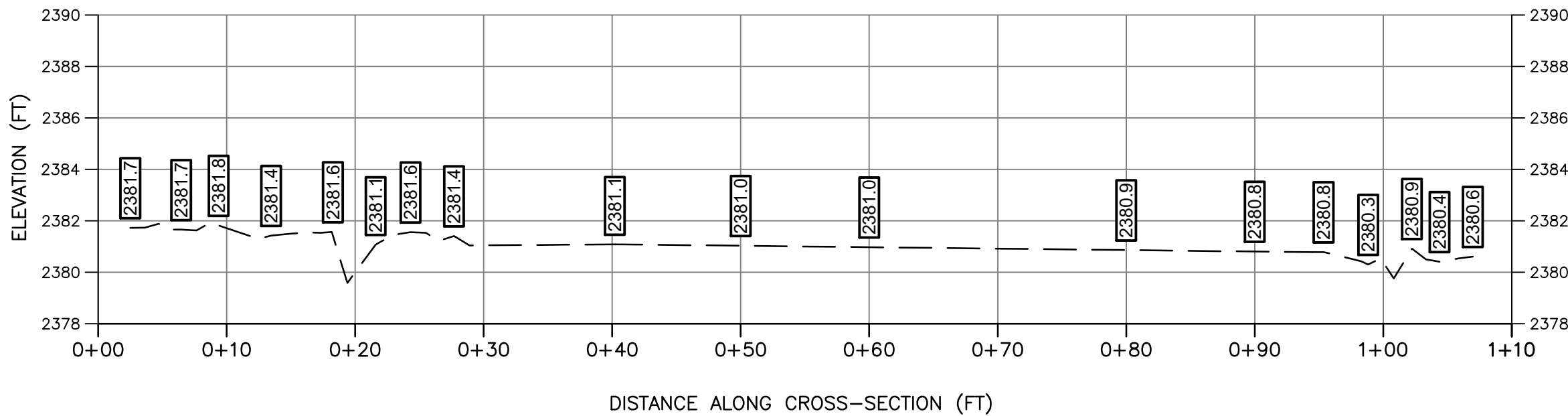
**S-L26 (1) BASELINE CROSS-SECTION A
UPSTREAM**



**S-L26 (1) BASELINE CROSS-SECTION B
DOWNSTREAM**



S-L26 (1) BASELINE THALWEG PROFILE



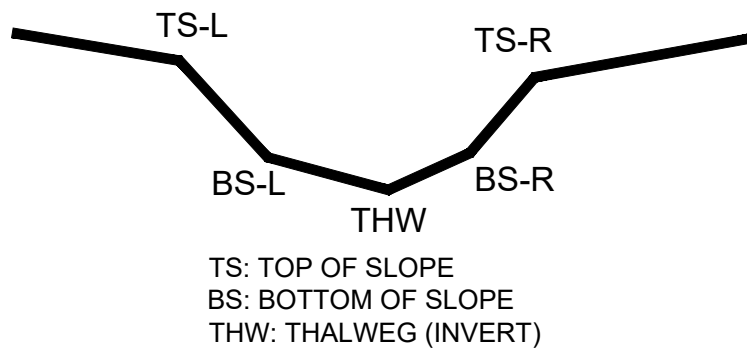
PROFILE LEGEND

--- EXISTING STREAM PROFILE
--- INVERT ALONG THALWEG

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

| AS-BUILT TABLE: S-L26 (1) CROSS SECTION A | | | | |
|---|---------------|--------------|-----------|----------|
| PT. LOC. | PRE-CROSSING | | | AS-BUILT |
| | NORTHING | EASTING | ELEV. | |
| TS-L | 13792054.5700 | 1710945.8160 | 2384.084' | |
| BS-L | 13792056.7300 | 1710947.9920 | 2381.492' | |
| THW | 13792058.9530 | 1710948.8760 | 2381.043' | |
| BS-R | 13792059.1900 | 1710950.0270 | 2381.604' | |
| TS-R | 13792060.1800 | 1710950.6260 | 2383.587' | |

**TYPICAL 5-POINT CROSS-SECTION
(FACING DOWNSTREAM)**



CROSS SECTION LEGEND

--- EXISTING GRADE

CROSS SECTION

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

PRE-CROSSING PHOTOS



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:
1121C07157
Project No.

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

TETRA TECH
www.tetratech.com

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-L26 (1) - UNNAMED
TRIBUTARY TO MEADOW RIVER (MP 144.08)
GREENBRIER COUNTY, WV

1
Drawing No.