



**TINKER'S CREEK WATERSHED PARTNERS, INC.**  
**Hudson Tenbroeck Restoration Project**  
**REQUEST FOR PROPOSALS**  
**February 1, 2018**



**SECTION A: SUPPLIES OR SERVICES AND PRICES/COSTS**

Tinker's Creek Watershed Partners, Inc. (TCWP) is seeking a contractor to complete design and construction of the Hudson Tenbroeck Restoration Project (the Project), a stream and habitat restoration of a channelized portion of Tinker's Creek located in Hudson, Ohio. While much of the stream is channelized, the mature forested areas surrounding the stream preclude significant channel relocation and the project will focus largely on improving habitat within the existing channel. The Project is funded by the Lake Erie Tributary Initiative (LETI), selected by the Ohio EPA and the Great Lakes National Program Office (GLNPO). This contract will include providing assistance to TCWP and Summit Metro Parks.

The total maximum fee for design and build performance under this contract is \$180,000. The maximum amount of \$180,000 for design and build performance shall not be exceeded under any circumstances unless written authorization is obtained from TCWP. The contractor shall furnish all necessary drawings, plans, cost estimates, labor, equipment, and construction oversight services to complete the Project scope of services.

## **SECTION B: DESCRIPTION**

Tinker's Creek Watershed Partners, Inc. is a non-profit 501(c)(3) watershed organization established in 2006. TCWP is guided by a Board of Directors, an Executive Director, and three endorsed Nonpoint Source Implementation Strategy Plans (NPS-IS Plans). The Project is described in TCWP's Headwaters NPS-IS Plan, which can be found on our website at [www.tinkerscreek.org](http://www.tinkerscreek.org).

A 3,100 linear foot stretch of Tinker's Creek was channelized at 3210 Hudson Aurora Road, Hudson, Ohio (41.262119, -81.394334), impacting the habitat and functions of this stream. Improving in-stream habitat, managing invasive species, will improve floodplain functionality and water quality.

TCWP will select a contractor to design and build the Project on the channelized portion of Tinker's Creek in the Summit Metro Parks conservation area located on Hudson Aurora Road in Hudson, Ohio. Contractors must first consider soft engineering and restoration practices, such as grading and vegetation, before incorporating structural measures into the designs.

## **SECTION C: CONTRACTOR SCOPE OF SERVICES AND SCHEDULE**

Through this Request for Proposals, TCWP will select a contractor to develop a restoration plan and construct the Project. A summary of the contractor scope of services and proposed schedule are as follows.

## **CONTRACTOR SCOPE OF SERVICES**

1. With TCWP and Summit Metro Parks staff, visit the Project site to gain comprehensive knowledge of current conditions and provide preliminary cost estimates.
2. Prepare restoration design plans, drawings, and cost estimates for the Project
  - Designs must consider soft engineering practices.
  - Designs must consider use of onsite materials such as trees, aggregates, and soil for use in streambank stabilization projects as feasible.
  - No materials will be spoiled onsite. Spoil materials generated from this restoration project must be removed at contractor's expense.
  - Designs must minimize construction staging costs and tree removal costs as feasible.
  - Designs must restore at least 0.25 acre of riparian area.
  - Design must avoid removing the existing spoil pile per Summit Metro Parks' request
  - Design must use native soils, native species, and avoid invasive species
  - Scope must include management of invasive species within the riparian area and associated wetland and upland habitats.
3. Provide all information and secure all necessary local, state and federal permits for the Project.
4. Streambank stabilization and riparian and floodplain restoration activities should avoid wetlands to the greatest extent possible. If any wetlands are impacted as a result of the Project, any mitigation, if required by the agencies, will be completed on site and included as a part of the Project construction.
5. Erosion and sediment discharge must be controlled throughout the construction process in accordance with the Ohio EPA construction general permit and the community in which construction is done. Coordinate with Summit Metro Parks regarding control of erosion and sediment.
6. Coordinate with TCWP and the local community regarding compliance with potential riparian and wetland setback ordinances.
7. Any areas disturbed for construction access and staging must be restored to former condition or incorporated into restoration design at the close of the Project.
8. The Project should restore stream and riparian habitat and look as natural as possible along the restored stream.
9. All materials, reports, surveys, delineations, plans, etc. will be available to TCWP and Summit Metro Parks to use for educational materials and signage, grant documentation and reporting, and permitting.
10. All materials and each part or detail of work shall be subject to inspection by TCWP.
11. Communicate with TCWP regarding the construction schedule and any significant changes to the schedule with a two week lead time.
12. Coordinate with TCWP and Summit Metro Parks as necessary.
13. Construction and planting of the Project must be completed by July 31, 2019, but the contractor is encouraged to provide a more expeditious timeline if they feel the Project can be effectively completed sooner.
14. The contractor agrees to release, indemnify and hold TCWP, Summit Metro Parks, and their officers and employees harmless from and against any and all liabilities, damages, business interruptions, delays, losses, claims, judgments of any kind, including all costs, reasonable attorneys' fees, and expenses incidental thereto, which may be suffered by, or charged to TCWP

by reason of any loss of or damage to any property, or injury to or death of any person arising out of or by reason of any negligence of the contractor, its subcontractor, their servants, employees or agents of any covenant or condition of this Agreement, or by any act or failure to act of those persons.

## **SCHEDULE**

*February 21, 2018:* Proposals must be received by TCWP by 5:00 pm.

*March 15, 2018:* TCWP anticipates award of contract.

*April 1, 2018 – July 31, 2019:* Complete site visits, prepare design materials, obtain permits, and construct the Project.

## **SECTION D: APPLICABLE STATE AND FEDERAL REQUIREMENTS**

In the performance of the duties and obligations under the Lake Erie Tributary Initiative Grant Agreement, the contractor and its subcontractors shall comply with all applicable:

1. Ohio Governor Executive Orders;
2. Federal, state and local laws, regulations (rules), assurances, orders, and Ohio Department of Commerce Prevailing Wage Guidelines, regarding prevailing wages, deductions, worker compensation, taxes, social security and unemployment, compensation, and any contributions thereto; and
3. Federal state, and local laws and regulations (rules, ordinances), assurances, and orders, whether or not specifically referenced herein.

## **SECTION E: REQUIRED CONTRACT CONDITIONS**

### **ACKNOWLEDGEMENT**

The contractor will credit LETI and TCWP in all written materials.

### **NON-COMPLIANCE**

In the event of the contractor's non-compliance with the non-discrimination clauses of this contract, this contract may be canceled, terminated, or suspended in whole or in part.

### **INDEPENDENT CAPACITY OF CONTRACTOR**

The parties hereto agree that the contractor, and any agents and employees of the contractor, in the performance of this agreement, shall act in an independent capacity and not as officers, employees, or agents of TCWP or LETI. Nothing in this Agreement shall be construed so as to create a partnership, joint venture, or other relationship between the parties.

### **LIABILITY AND INDEMNIFICATION**

The contractor agrees to indemnify and to hold TCWP, Summit Metro Parks, and other project partners harmless and immune from any and all claims for injury or damages arising from this Agreement which are attributable to contractor's own actions or omissions or those of its trustees, officers, agents, employees, subcontractors, suppliers, third parties by contractor, or joint venturers while acting under this Agreement. In no event shall either party be liable to the other party for indirect, consequential, incidental, special, or punitive damages, or lost profits.

The contractor agrees to indemnify, defend, and hold harmless LETI and its Member States' agents, officers, and employees from all costs, losses, damages, claims, and suits including court costs, attorney's fees and other expenses arising from any negligent act or omission of the contractor, TCWP, Summit Metro Parks, and other project partners.

#### **CONTRACTOR'S LIABILITY**

Contractor waves all rights against LETI and TCWP for recovery of damages to the extent these damages are covered by the insurance policies the contractor is required to maintain. The contractor is required to pay for and provide the following minimum coverage:

1. Throughout the contract period, the contractor shall carry Workers' Compensation Insurance, as required by the Ohio Workers' Compensation Act, upon all its employees engaged in this work and shall be responsible to see that any sub-contractors carry such insurance on their employees. The contractor shall also provide public liability and property damage insurance for the entire period, thus insuring the interests of all parties against any and all claims that may arise out of contractor operations under the terms of this contract. It is agreed that in the event any carrier of such insurance exercises cancellation, notice will be made immediately to TCWP of such cancellation.

2. Commercial General Liability with the following minimum coverage:

- \$2,000,000 General Aggregate Limit other than Products/Completed Operations
- \$2,000,000 Products/Completed Operations Aggregate Limit
- \$1,000,000 Personal & Advertising Injury Limit
- \$1,000,000 Each Occurrence Limit

The contractor must provide a certificate of insurance coverage to TCWP.

3. If a motor vehicle is used to provide services or products, the contractor must have vehicle liability insurance on any auto owned, hired, and non-owned vehicle used for bodily injury and property damage as required by law.

4. Employers liability insurance with the following minimum limits:

- \$100,000 each accident
- \$100,000 each employee by disease
- \$500,000 aggregate disease

## **TRANSFER OF RECORDS**

Data shall be collected and formatted in a manner consistent with common good engineering practices. All records (original tracings, maps, field sketches, minutes of public meetings, meeting summaries, etc.) generated by the project shall be the property of TCWP and shall be turned over to TCWP upon completion or as directed.

## **NON-DISCRIMINATION**

The contractor agrees to comply with all federal, state and local statutes, regulations, Executive Orders, and policies on nondiscrimination including but not limited to, Title VI and Title VII of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title IX of the Education Amendments of 1972, the Age Discrimination Act of 1975, the Americans with Disabilities Act, and the Fair Housing Act.

Specifically, no person in the United States shall, on the ground of race, color, national origin, handicap, age, religion, sex, or sexual orientation, be excluded from participation in, be denied the benefits of, or be subject to discrimination under this Project. The contractor will take affirmative action to ensure that applicants are employed and that employees are treated during their employment, without regard to their race, religion, color, sexual orientation, sex, or national

origin. Such action shall include, but not limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training.

## **SECTION F: INSTRUCTION TO OFFERERS PROPOSAL FORMAT**

In responding to this RFP, please submit one (1) digital copy of a proposal addressing the following items:

1. Description of contractor's Understanding of the Project.
2. Description of Services to be Performed.
3. Demonstration of Experience.
4. Assumptions and Expectations.
5. Cost Proposal. Please provide fees for all pre-construction tasks and estimated construction budget. This project is cost reimbursable up to a maximum of \$180,000.
6. Proposed project schedule identifying milestones, deliverables, and key coordination meetings.
7. Personal Experience and Resumes of Personnel.
8. Three (3) References.

## **SELECTION AND AWARD PROCESS**

The selection process will involve screening of submitted proposals and interviews may be requested. TCWP will select a contractor on the basis of contractor qualifications, experience, understanding of the scope of services, and level of services to be provided.

If interested, please submit one (1) digital copy of a proposal to the email address below.

Submissions must be received at TCWP's offices no later than 5:00 pm on February 21, 2018.

Proposals received after this date will not be accepted. TCWP expects to award the contract by March 15, 2018. Work will commence after successful execution of a contract for services between the contractor and TCWP. All work under this contract, including invoices, must be complete and delivered to TCWP by July 31, 2019.

### **Responses to this RFP must be sent to:**

Kate Chapel, [kchapel@tinkerscreekwatershed.org](mailto:kchapel@tinkerscreekwatershed.org)

<b>Nine Element Criteria</b>	<b>Information needed</b>	<b>Explanation</b>
<i>n/a</i>	<b>Title</b>	Hudson Tenbroeck (TC-2) Restoration Project – Project #1
<i>criteria d</i>	<b>Project Lead Organization &amp; Partners</b>	Tinker's Creek Watershed Partners (TCWP) City of Hudson Davey Resource Group
<i>criteria c</i>	<b>HUC-12 and Critical Area</b>	04110002 05 02 Critical Area 1
<i>criteria c</i>	<b>Location of Project</b>	3210 Hudson Aurora Road, Hudson, OH 44236 41.262119, -81.394334
<i>n/a</i>	<b>Which strategy is being addressed by this project?</b>	Altered Stream and Habitat Restoration Strategies
<i>criteria f</i>	<b>Time Frame</b>	Short-Term (Priority) (1-3 yr.)
<i>criteria g</i>	<b>Short Description</b>	This 3,100 linear feet stretch of Tinker's Creek was channelized, impacting the potential habitat and functions of this stream. Reconnecting the floodplain, improving in-stream habitat, and replanting the area with woody vegetation will improve floodplain functionality and water quality.
<i>criteria g</i>	<b>Project Narrative</b>	<p>A total of fourteen wetlands and four streams, one being Tinker's Creek, were found within the study area. The wetlands are moderate to high quality and include areas of emergent, scrub/shrub, and forested plant communities. All of the wetlands fall into the Ohio Rapid Assessment Method (ORAM) Category 2 or 3 ranges and are abutting or adjacent to streams and/or in the floodplain of Tinker's Creek.</p> <p>To evaluate the potential habitat in Tinker's Creek, the Qualitative Habitat Evaluation Index (QHEI) was performed on three reaches along this stream. The upstream reach, Reach 1, is moderately embedded with mostly muck. The stream has been channelized, but there is only fair development. This stream reach has many negative habitat characteristics diagnostic of the MWH habitat use. Based on the potential habitat, the middle reach (Reach 2) of this stream is very likely to attain WWH. The maximum pool depths are greater than 0.4 meter; the dominant substrate types are gravel and sand and are moderately embedded; there is fast flow; there is moderate cover with four types present; and the channelization is not maintained. The substrate of the downstream reach, Reach 3) is dominated by muck, heavily embedded, lacking fast flow, and lacking sinuosity with fair development. With the multitude of negative habitat characteristics, it is likely that this reach would not attain WWH.</p> <p>The Index of Biotic Integrity (IBI) was also performed on this reach in 2009. The majority of the fish species identified are tolerant species. As this stream is in the Erie Ontario Lake Plains Ecoregion, this stream falls into the poor range. The use designation of this segment of Tinker's Creek is WWH, per the Ohio Administrative Code, Chapter 3745-1-26 Water Quality Standards. According to the 2009 IBI, a portion of this stream is not attaining WWH; and according to both the 2009 and current QHEI, portions of this stream are not likely to attain WWH. This site also serves as excellent habitat with good connectivity to other natural areas for two species of bats: the federally endangered Indiana bat (<i>Myotis</i></p>



		<p><i>Sodalis</i>) and the federally threatened northern long-eared bat (<i>Myotis septentrionalis</i>).</p> <p>This restoration project will use dredged materials to create a floodplain bench and restore a hydrological connection to the adjacent wetlands and floodplain. The area is approximately 575 feet long by 17 feet wide and will be excavated to a depth of approximately 4 to 5 feet. Four modified Newbury rock riffle grade control structures will be installed to improve in-stream habitat and maintain channel elevation. Following construction, areas near and within the riparian area will be seeded with native plants. Erosion control matting will be placed along the edge of the streambanks and anchored with live stakes, including shrubby willows and dogwoods. The excavated floodplain will be planted with larger native trees and native smaller trees and shrubs.</p>
<i>criteria d</i>	<b>Estimated Total cost</b>	<p><u>Sub-Contractual</u>: The following are the cost estimates combining materials, construction, and permitting as estimated by Davey Resource Group: USACE/OEPA permitting costs an estimated \$5,000; SWPPP preparation and coordination \$2,600; engineering and modeling \$20,000; surveying, pre-construction, and as-built \$6,700; construction staking \$2,300; construction and oversight \$135,200; and plant and seed installation \$19,700. <b>In total the project is expected to cost \$185,250.</b></p>
<i>criteria d</i>	<b>Possible Funding Source</b>	Section 319(h) grants, GLRI and USFWS.
<i>criteria a</i>	<b>Identified Causes and Sources</b>	<p>Causes: direct habitat alterations, flow alterations</p> <p>Sources: land development, suburbanization</p>
<i>criteria b &amp; h</i>	<b>Part 1: How much improvement is needed to remove the NPS impairment for the whole Critical Area?</b>	<p>The goals are to achieve an IBI score of at least 34 at Tinker's Creek @ Hudson-Aurora Rd. (RM 25.05) at a site that currently has an IBI score of 26; achieve an IBI score of at least 34 at Tinker's Creek near Hudson @ St. Rt. 82 (RM 24.50) at a site that currently has an IBI score of 26; achieve a QHEI score of at least 60 at Tinker's Creek @ Hudson-Aurora Rd. (RM 25.05) at a site that currently has a QHEI score of 54.5; to maintain a QHEI score of 63 at Tinker's Creek near Hudson @ St. Rt. 82 (RM 24.50) at a site that has a score of 63.</p> <p>Reasonable objectives are:</p> <p><b>Objective 1:</b> Preserve and protect land along riparian areas and important natural features such as wetlands and fens from development through acquisition, revegetation, conservation easements, and LID or conservation development. Increase forest and understory cover protection along riparian areas through the adoption of riparian setbacks and enforcement by communities.</p> <ul style="list-style-type: none"> <li>Plant 50 acres of riparian area along Tinker's Creek and its tributaries.</li> </ul> <p><b>Objective 2:</b> Increase wetland protection through adoption of wetland setbacks and enforcement in watershed communities, especially in vulnerable headwater communities.</p> <ul style="list-style-type: none"> <li>Restore 50 acres of wetlands/floodplain wetlands in Tinker's Creek.</li> </ul> <p><b>Objective 3:</b> Restore in-stream habitat utilizing natural channel design to help create habitat and flood plain connectivity to support aquatic life.</p> <ul style="list-style-type: none"> <li>Restore and reconnect a minimum of 3,000 linear feet of stream.</li> </ul>
	<b>Part 2: How much of the needed improvement for the whole Critical Area is estimated to be</b>	<ul style="list-style-type: none"> <li>50 acres of the 50 acres of riparian area planted along Tinker's Creek and its tributaries of objective 1 will be met (100%)</li> </ul>

	<b>accomplished by this project?</b>	<ul style="list-style-type: none"> <li>• 25 acres of the 50 acres of wetlands/floodplain wetlands restored in Tinker's Creek of objective 2 will be met (50%)</li> <li>• 1000 linear feet of the 3000 linear feet of in-stream habitat restored and reconnected in Tinker's Creek of objective 3 will be met (33.3%)</li> </ul> <p>Goals: There is recognition that there is lag time associated with nonpoint source-related projects and measured stream response. With respect to the goals in critical area 1, QHEI will be the main driver as that will dictate the habitability of fish and macroinvertebrates. Current data shows that the QHEI at RM 25.05 is 54.5, which is 5.5 points below the attainment index score of 60. It is expected that the restoration project will substantially improve the QHEI such that it will be at a 60 or better within a year of restoration, and maintain or improve the QHEI score at RM 24.50, currently scoring 63, with incremental increases in the IBI scores for the next several years thereafter. Both RM 24.50 and 25.05 sites currently have an IBI score of 26, with goals to achieve at least an IBI score of 34.</p>
	<b>Part 3: Load Reduced</b>	Estimated 150.6 pounds/year Nitrogen, 80.4 pounds/year Phosphorus, and 24.4 tons/year sediment will be removed as a result of this project.
<i>criteria i</i>	<b>How will the effectiveness of this project in addressing the NPS impairment be measured?</b>	If the project is funded the monitoring will be completed by the sub-contractor for the period as depicted by the required 401 and 404 permits. Thereafter we anticipate staff from the OEPA-DSW Ecological Assessment Unit will perform both pre- and post-project monitoring.
<i>criteria e</i>	<b>Information and Education</b>	At a minimum the project will be highlighted in the TCWP annual report and featured on the TCWP website and social media accounts. In addition, information will be provided and education/outreach will comply with all grant and funding source requirements (e.g. 1 fact sheet, 1 press release and 2 web articles).



# Map View Locations



Map  
View 1

Hudson Aurora Road

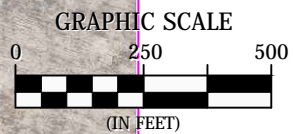
E Firelands Drive

Tinker's Creek

Map  
View 2

Map  
View 3

Map  
View 4



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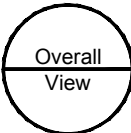


Prepared for

Tinker's Creek  
Watershed  
Partners

Conceptual Stream  
Restoration Plan Development  
Tinker's Creek, Aurora Road  
Summit County, Ohio

Data used to produce this  
map were collected  
on May 19, 2015





= Spoil pile excavation to create a floodplain bench and reestablish a hydrological connection with the adjacent wetlands (approximately 575 feet x 17 feet wide, excavated to a depth 4-5 feet or 1,810 cubic yards to be removed from site)

= Three modified Newbury rock riffle grade control structures will be installed to improve in-stream habitat and maintain channel elevation. These structures will improve habitat in the lower scoring QHEI downstream reach of the site while maintaining the channel development in the higher scoring QHEI upstream reaches of the stream. One of the structures will be part of the temporary stream crossing. (estimate 75 tons each)

= Three partial weirs will be installed to encourage the development of a natural stream meander morphology on the opposing bank. (estimate 45 tons each)

= The  $\frac{1}{4}$  acre excavated floodplain will be planted with native trees and shrubs, (12) larger trees, 30 feet on center and (105) smaller trees and shrubs 10 feet on center to reestablish a riparian plant community quickly. The large trees will help close the canopy and provide shade to the stream channel.

= Cross section location

#### NOTE:

All disturbed areas will be seeded with a riparian seed mix, erosion control matting along the edge of the stream and will be anchored with diverse assemblage of 275 livestakes, including shrubby willows and dogwoods.

--- = Approximate study area

— = Perennial stream

- - - = Intermittent stream

→ = Direction of flow

① = Photograph location and direction of view

▨ = Areas of wetlands assessed within study area

△ = Potential maternity roost tree for the federally endangered Indiana bat (*Myotis sodalis*)

1 = Potential habitat tree for the federally endangered Indiana bat (*Myotis sodalis*)

#### Preliminary Ecological Site Assessment

**NOTE:** Access to remove spoil and install in-stream structures will be via a temporary stream crossing from the west bank and made from the Summit County property. Excavated spoil will be removed using tracked equipment and removed from the floodplain area.

Qualitative Habitat Evaluation Index (QHEI)  
QHEI Score: 52

GRAPHIC SCALE  
0 50 100  
(IN FEET)

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Tinker's Creek  
Watershed  
Partners

Conceptual Stream  
Restoration Plan Development  
Tinker's Creek, Aurora Road  
Summit County, Ohio

Data used to produce this  
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Map  
View 1  
of 4





**NOTE:** Access to install these three in-stream structures will be from the west bank and made from the Summit County property

Qualitative Habitat Evaluation Index (QHEI)  
QHEI Score: 63

Qualitative Habitat Evaluation Index (QHEI)  
QHEI Score: 52

- Preliminary Ecological Site Assessment**
- = Approximate study area
  - = Perennial stream
  - - - = Intermittent stream
  - = Direction of flow
  - ① = Photograph location and direction of view
  - ▨ = Areas of wetlands assessed within study area
  - △1 = Potential maternity roost tree for the federally endangered Indiana bat (*Myotis sodalis*)
  - 1 = Potential habitat tree for the federally endangered Indiana bat (*Myotis sodalis*)

- Preliminary Restoration Concept**
- ▨ = Spoil pile excavation to create a floodplain bench and reestablish a hydrological connection with the adjacent wetlands (approximately 575 feet x 17 feet wide, excavated to a depth 4-5 feet or 1,810 cubic yards to be removed from site)
  - 🌳 = Three modified Newbury rock riffle grade control structures will be installed to improve in-stream habitat and maintain channel elevation. These structures will improve habitat in the lower scoring QHEI downstream reach of the site while maintaining the channel development in the higher scoring QHEI upstream reaches of the stream. One of the structures will be part of the temporary stream crossing. (estimate 75 tons each)
  - 🌳 = Three partial weirs will be installed to encourage the development of a natural stream meander morphology on the opposing bank. (estimate 45 tons each)
  - 🌳 = The ¼ acre excavated floodplain will be planted with native trees and shrubs, (12) larger trees, 30 feet on center and (105) smaller trees and shrubs 10 feet on center to reestablish a riparian plant community quickly. The large trees will help close the canopy and provide shade to the stream channel.
  - XS-B = Cross section location

**NOTE:**

All disturbed areas will be seeded with a riparian seed mix, erosion control matting along the edge of the stream and will be anchored with diverse assemblage of 275 livestakes, including shrubby willows and dogwoods.



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Tinker's Creek  
Watershed  
Partners

**Conceptual Stream  
Restoration Plan Development**  
Tinker's Creek, Aurora Road  
Summit County, Ohio

Data used to produce this  
map were collected  
on May 19, 2015

Map  
View 2  
of 4





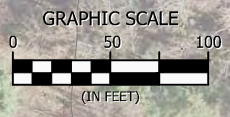
- = Approximate study area
- = Perennial stream
- = Intermittent stream
- = Direction of flow
- = Photograph location and direction of view
- = Areas of wetlands assessed within study area
- = Potential maternity roost tree for the federally endangered Indiana bat (*Myotis sodalis*)
- = Potential habitat tree for the federally endangered Indiana bat (*Myotis sodalis*)

**Preliminary  
Ecological Site  
Assessment**

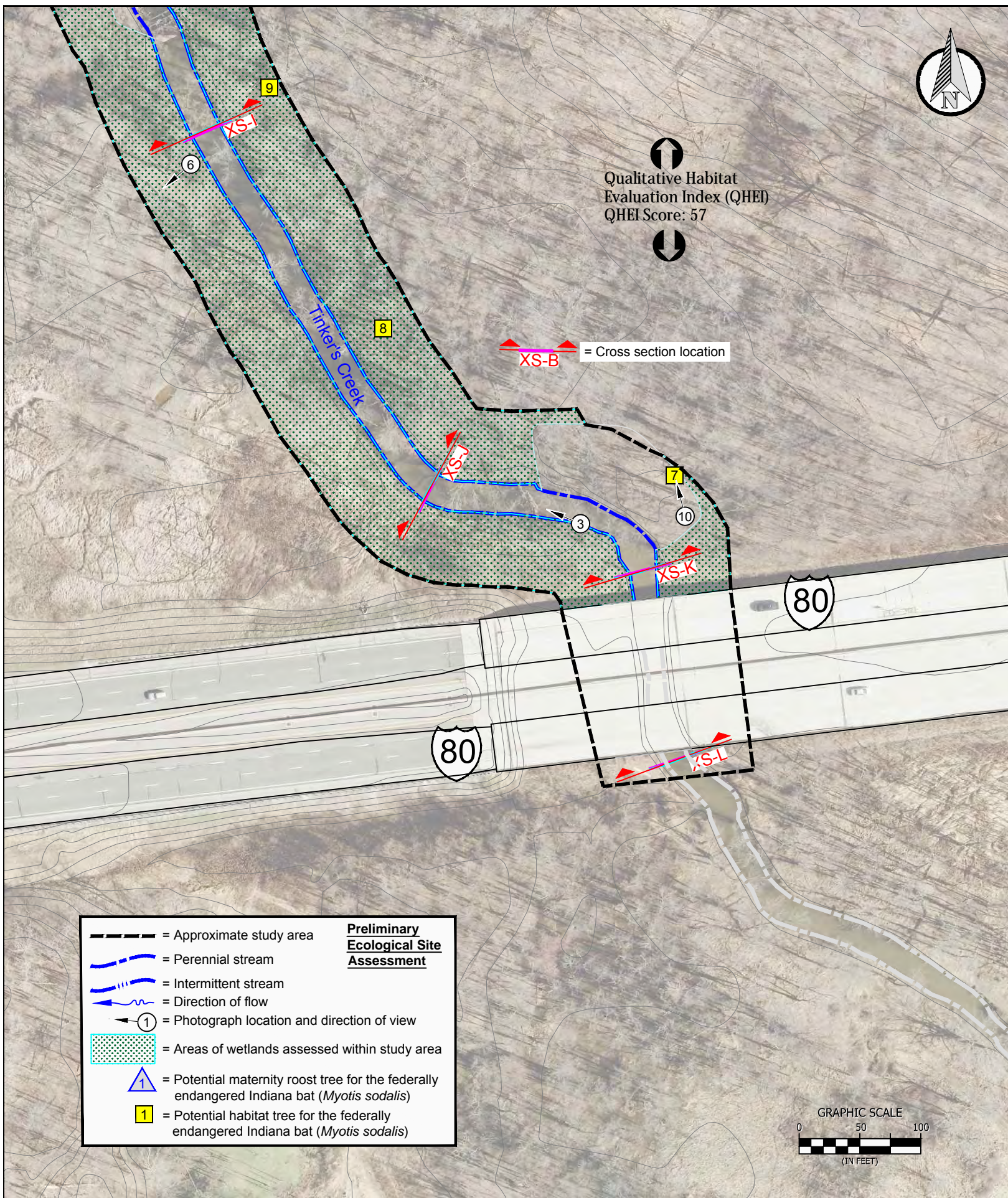
Qualitative Habitat  
Evaluation Index (QHEI)  
QHEI Score: 57

Qualitative Habitat  
Evaluation Index (QHEI)  
QHEI Score: 63

XS-B = Cross section location

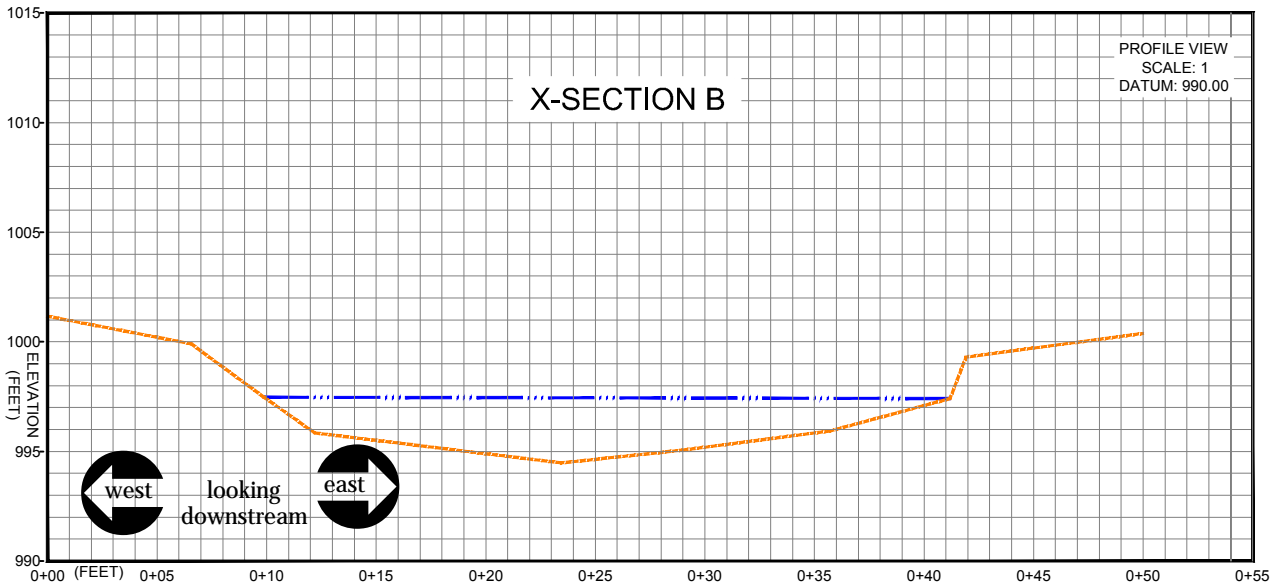
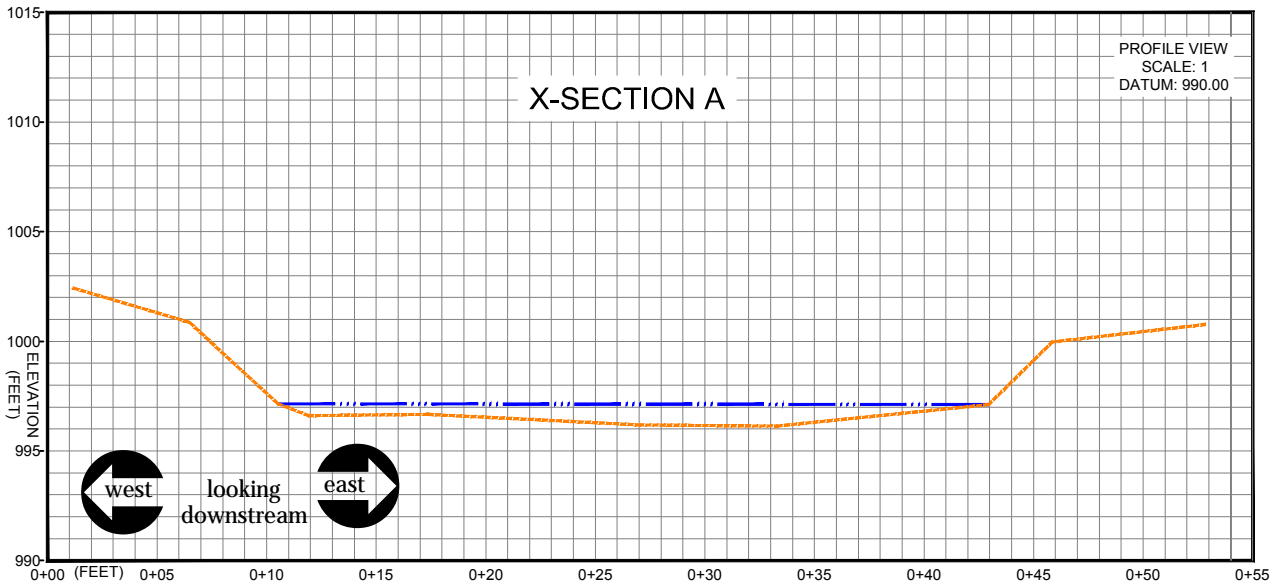
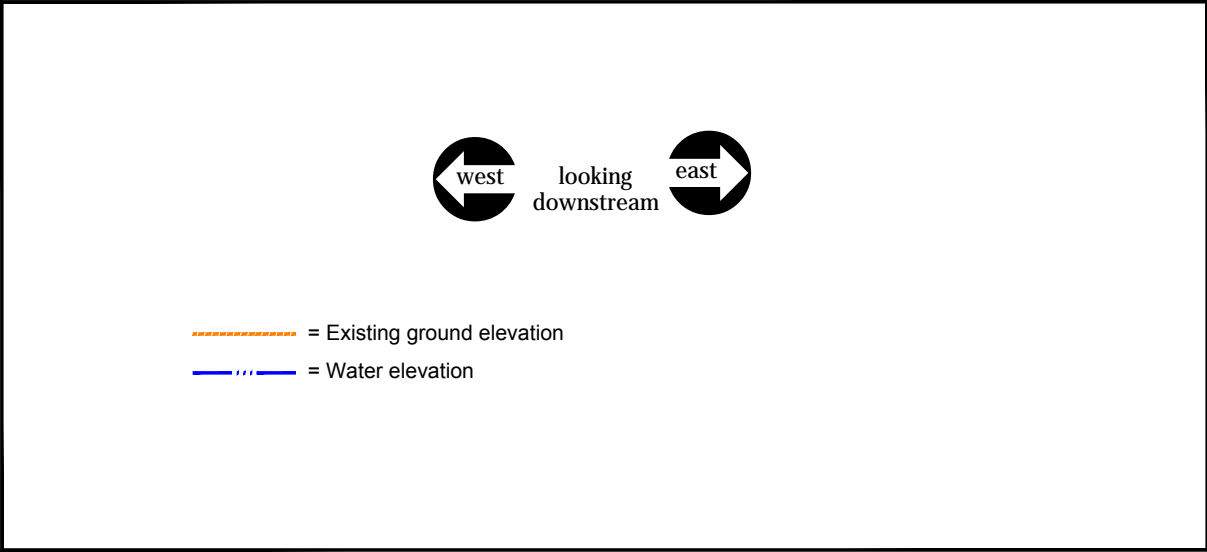








# Cross-Sections



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Tinker's Creek  
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Conceptual Stream  
Restoration Plan Development  
Tinker's Creek, Aurora Road  
Summit County, Ohio

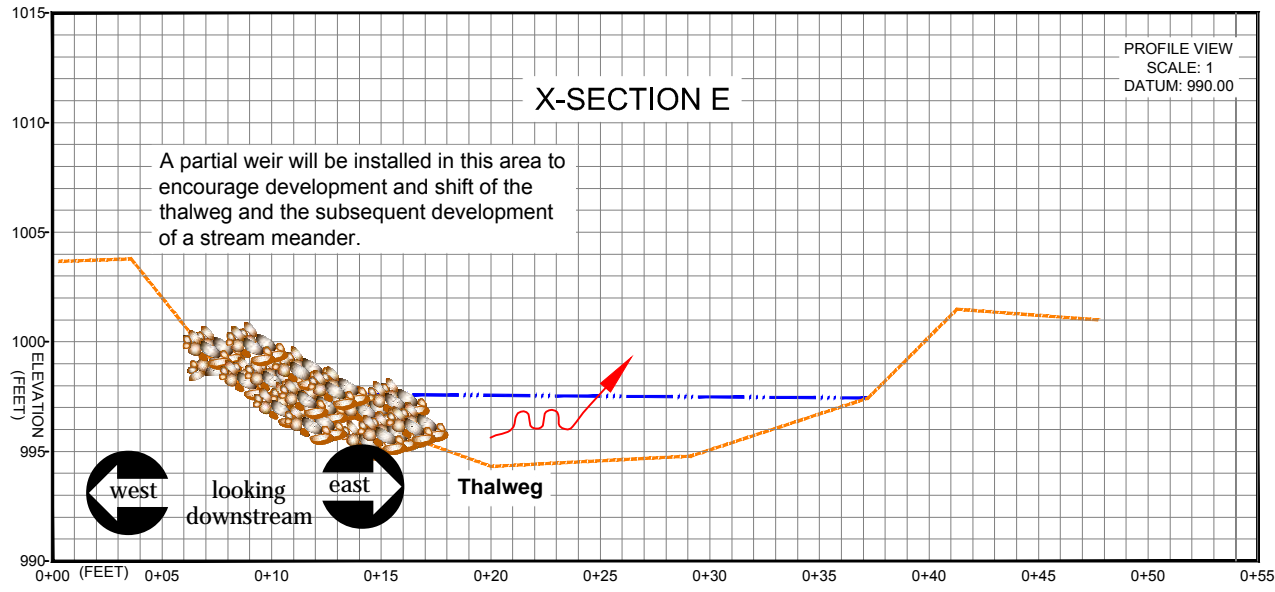
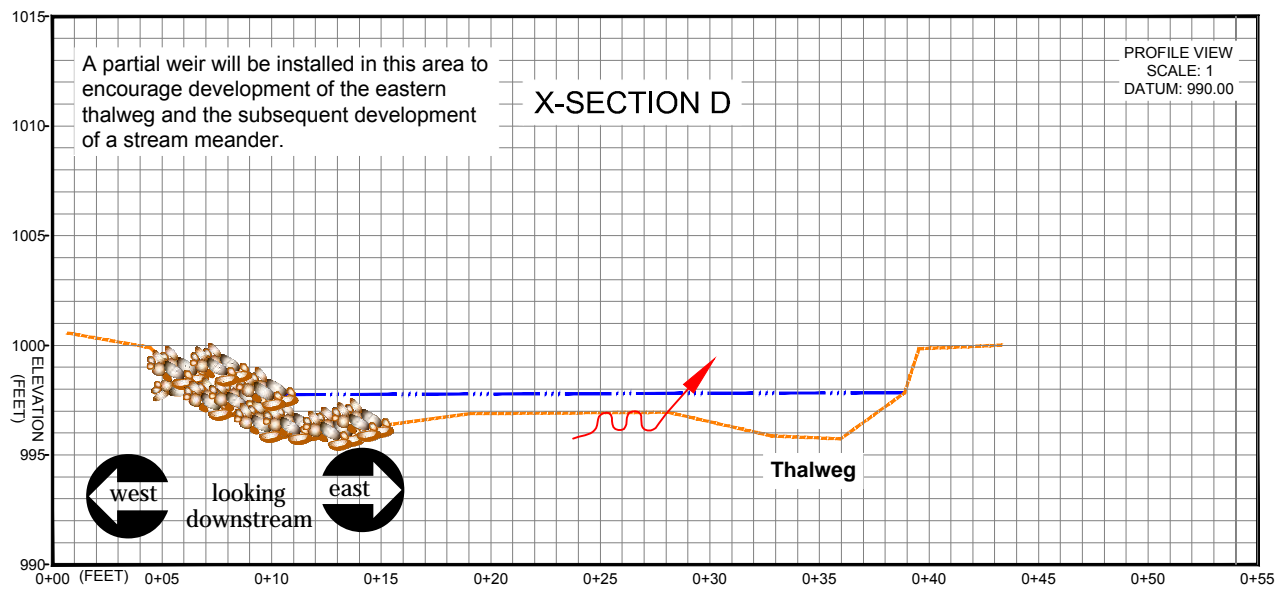
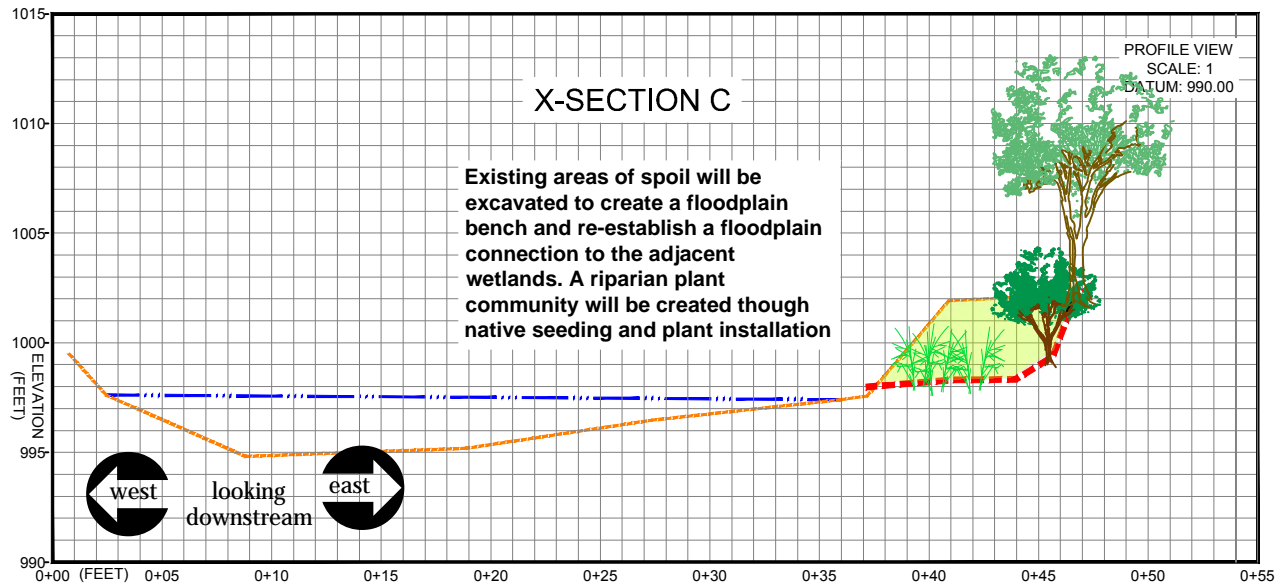
Data used to produce this  
sheet were collected  
on July 17, 2015

X-S  
Sheet

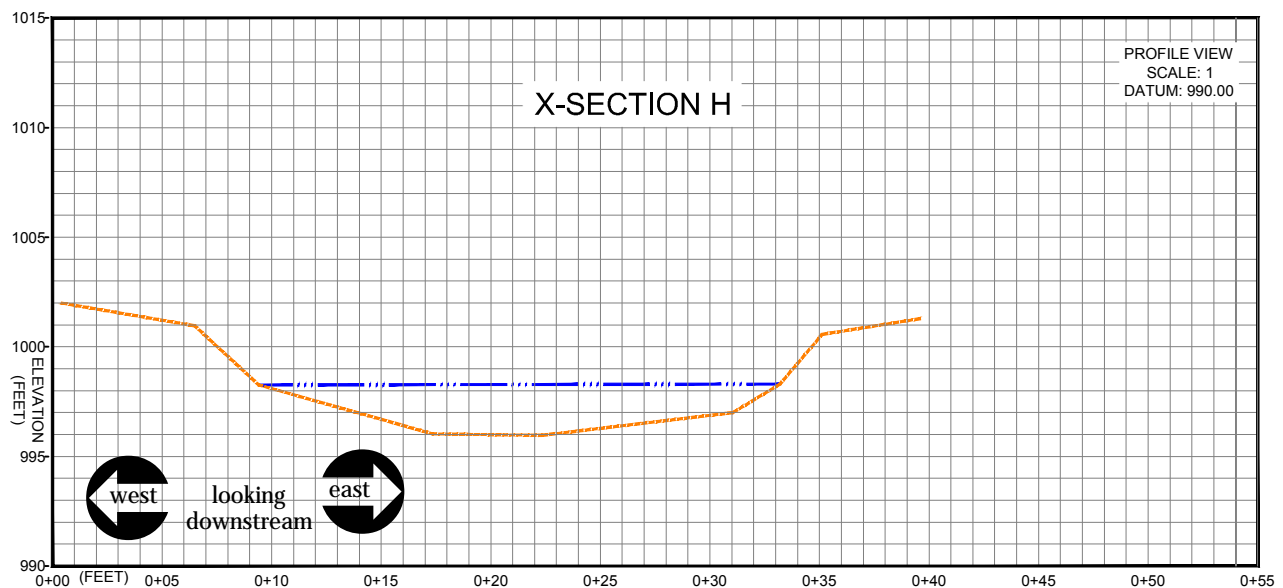
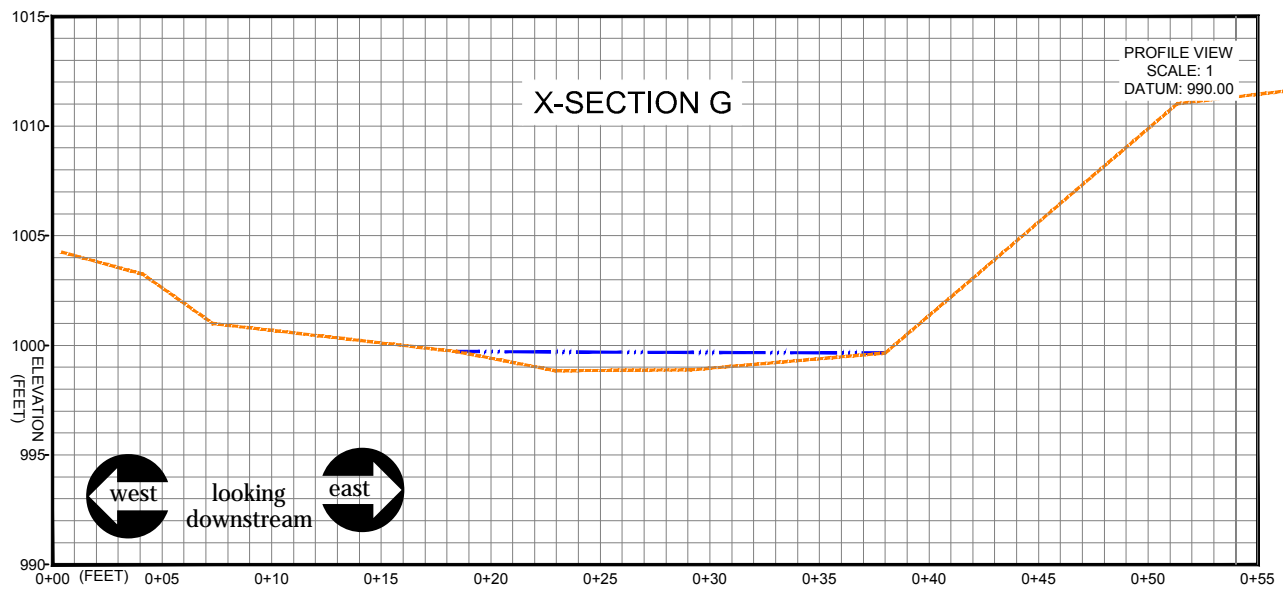
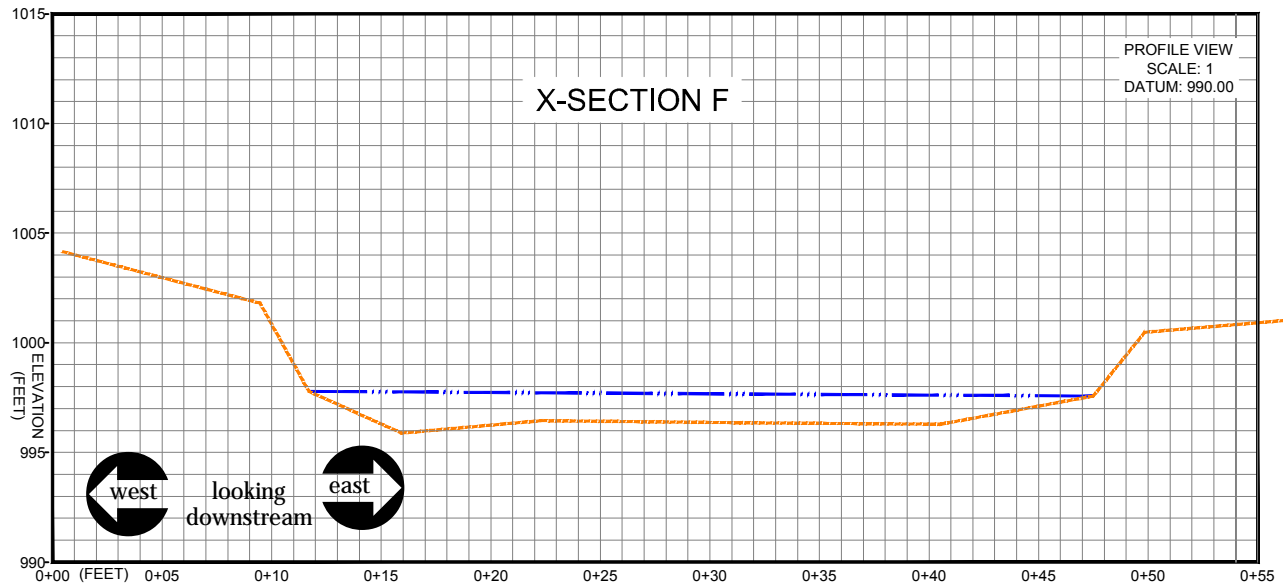
1 of 5



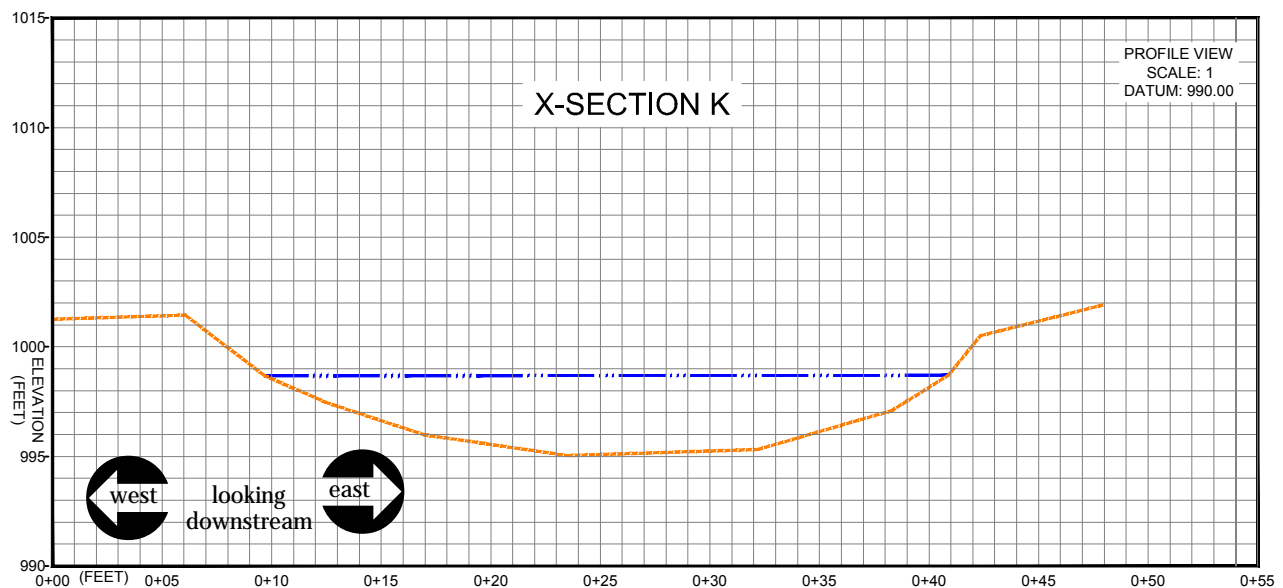
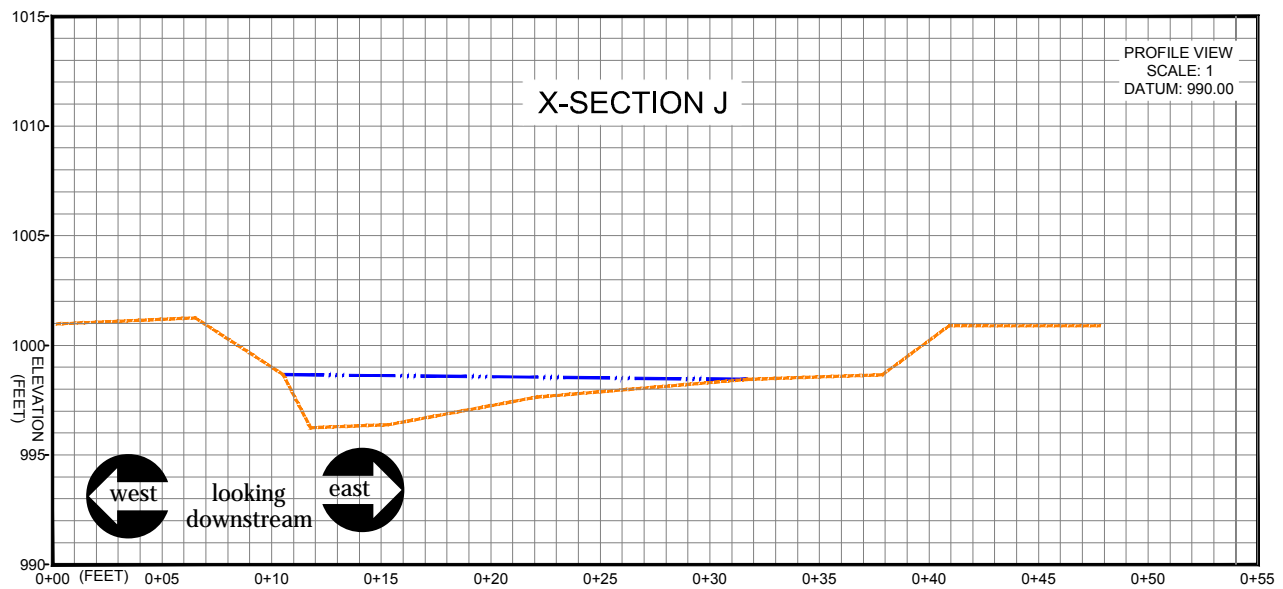
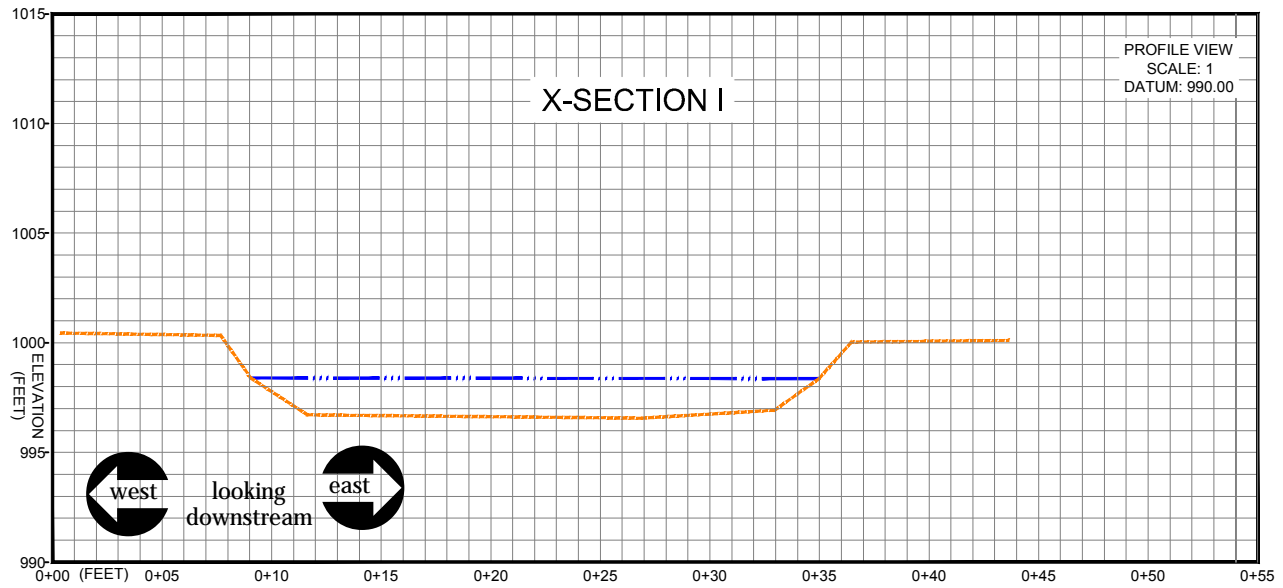
# Cross-Sections



# Cross-Sections



# Cross-Sections



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Tinker's Creek  
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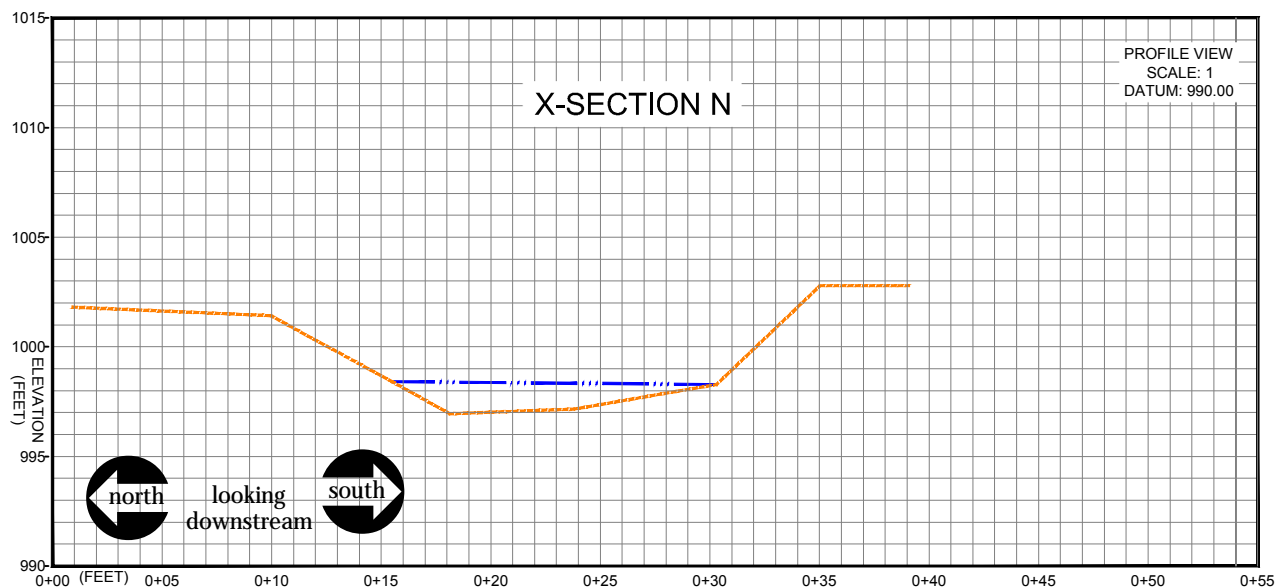
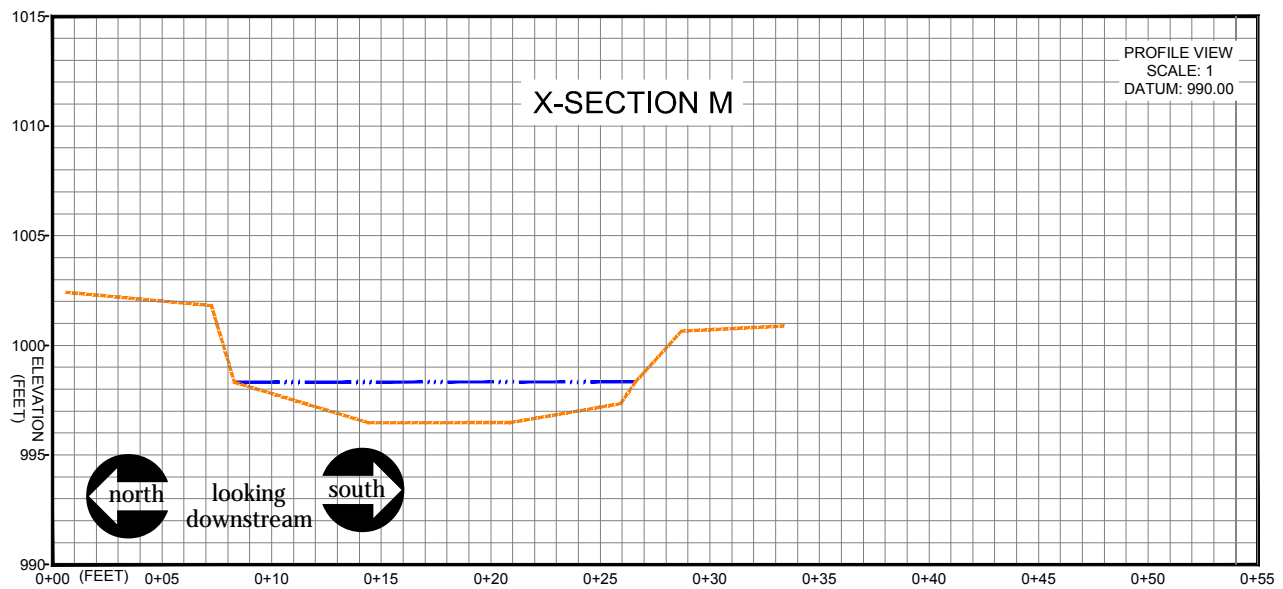
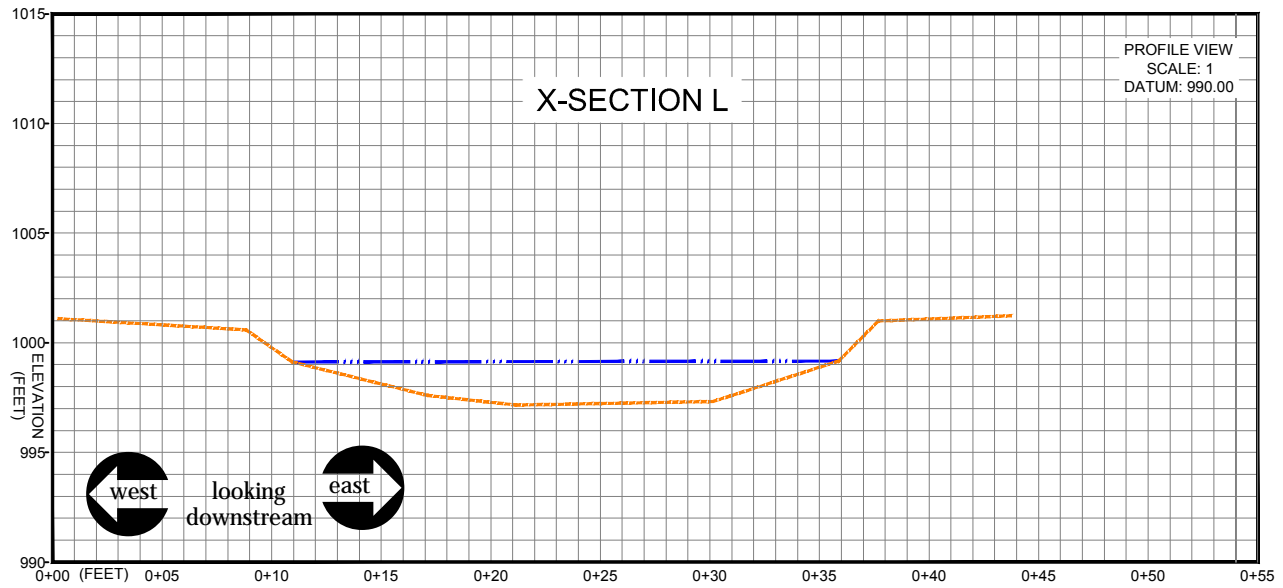
**Conceptual Stream  
Restoration Plan Development**  
Tinker's Creek, Aurora Road  
Summit County, Ohio

Data used to produce this  
sheet were collected  
on July 17, 2015

X-S  
Sheet

4 of 5

# Cross-Sections



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Restoration Plan Development  
Tinker's Creek, Aurora Road  
Summit County, Ohio

Data used to produce this  
sheet were collected  
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X-S  
Sheet

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# Typical Rock Grade Control Structure and Riffle Features

Table 1. (From Ohio Department of Transportation, Construction & Material Specifications, 1997)

Velocity of Stream During High Flows	Size Range	
2 - 6 feet/second	4" - 12"; average 6"	(ODOT Type D)
6 - 8 feet/second	6" - 18"; average 12"	(ODOT Type C)
8 - 10 feet/second	12" - 24"; average 18"	(ODOT Type B)
10 - 12 feet/second	18" - 30"; average 24"	(ODOT Type A)

## Typical cross-section (looking up channel)

Ponding height dictated by center height of rock grade control structure; low center to encourage water to flow over and not around structure.

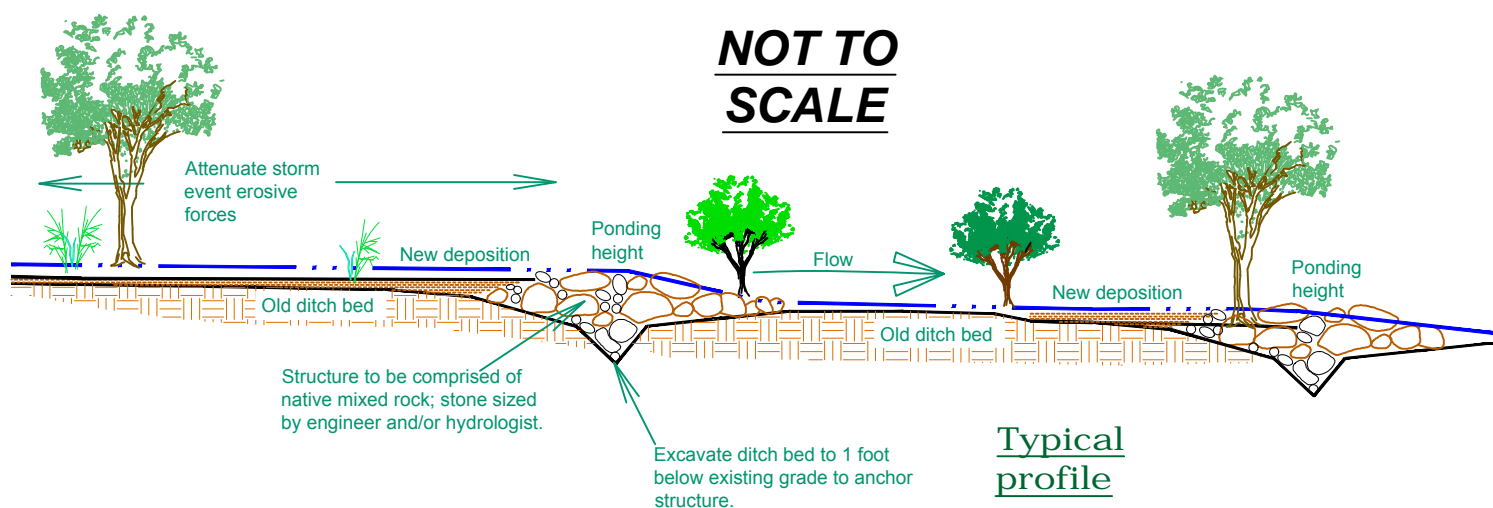
Key stone of structure embedded into bank to prevent overflow around.

## Typical plan view

Backfill upstream of structures with mixed (coarse and fine grain) material as specified.

Partial weirs installed to encourage meander development

**NOT TO SCALE**



## Typical Restored Stream Channel

### Typical isometric

Stream bank with BioNet® Extended-Term Biodegradable Erosion Control Blanket 125BN or equivalent.

Small shrubs and trees spaced 10- feet apart and planted in groupings

Large trees spaced 30- feet apart

Seed and mulch disturbed areas of restored riparian zone

Pool

Riffle

Pool

### Typical cross-section

Live stakes placed 2-3 feet apart along erosion control fabric edge angled, pointed upstream to help anchor fabric.

Restored excavated riparian area

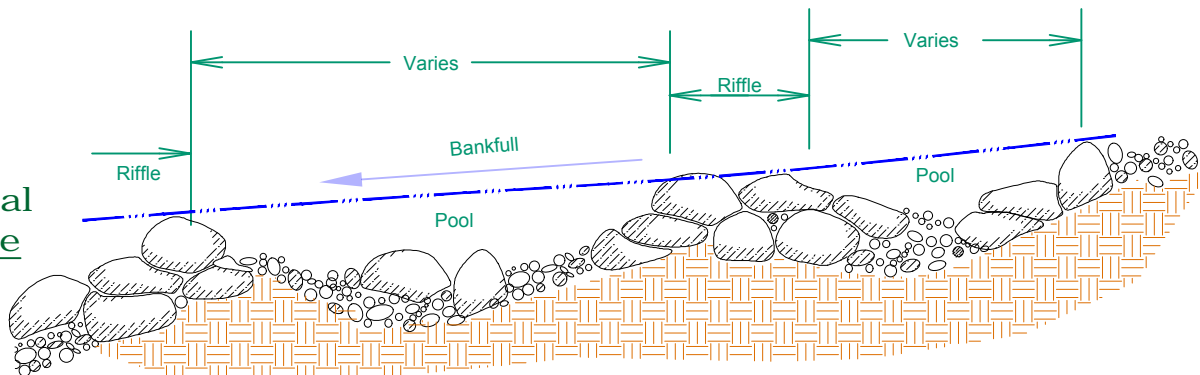
Thalweg

Bed material sized by engineer and/or hydrologist

Retention Basin Slope seed mix with BioNet® Extended-Term Biodegradable Erosion Control Blanket 125BN or equivalent.

**NOT TO SCALE**

### Typical profile



Bed material amended in riffles; mixture of sediment size classes appropriate for design shear stress.

Typical Restored Stream Channel

Typical 2  
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