Applied Geoecology, LLC

September 2, 2025

James S. Matschulat
Gary Rogers
East Haddam Fishing and Game Club
138 Bashan Road
East Haddam, CT 06423

Hello James & Gary,

Please find the habitat enhancement stream design for 4, 5 & 6. The proposed work focuses on increasing the occurrence and quality of deep flowing pools to better hold adult trout. This is accomplished through excavation of the stream bed for pools and using the excavated material to create gravel bars that narrow the channel and direct water keep water moving in low flow conditions. The result is an asymmetric channel that replaces overly wide and shallow channel forms that currently exist. The work will increase the amount and quality of fishable water within the subject reaches.

The 4, 5 & 6 beats of the Club can be divided into several sub-reaches based upon gradient, channel conditions and geomorphology.

00+50 – 11+00 - Below the beaver pond at the head of 4 is a section of excessively widened, shallow stream channels with poor thalweg definition. These are punctuated by old boulder step dams, areas of shallow pools and small riffle zones. Locally, deeper boulder choked pools exist. Restoration work will focus on reforming boulder steps into weirs, digging new pools, defining the thalweg and narrowing the channel through the creation of gravel bars. Large boulders will be rearranged to promote local scour and for enhanced fish cover habitat.

11+00 - 20+00 – This is a higher gradient section that includes the falls. This sub reach within 4 & 5 is characterized by step pools featuring boulder weirs, natural plunge pools and wooden V-dams. The reach above the falls will be restructured with boulder steps, dug pools and gravel bars. The old mill pool, above the falls is currently dammed by a loose boulder weir that is more sieve than water retainer. There are several ways to correct this. Firstly, an impervious membrane can be hidden within the boulder weir to help seal the interstices. Alternatively, a new concrete dam can be constructed to replace the original. The left bank is bedrock. However, it appears the right bank seems to be a large boulder, possibly making it an unacceptable anchor. Regardless, the old mill pond dam fix is not part of this proposal. The 2 plunge pools below the falls will be cleaned out if several small trees can be removed for better access. New boulder grade control weirs need to be constructed in the reach downstream of the second falls pool and upstream of the 2,000-foot mark. The pools will be excavated, with a new deep thalweg in the new narrower channel which incorporate gravel bars.

20+00 – 22+50 – This sub-reach is very wide and very shallow. Pools will be dug out and the channel narrowed using the excavated material to create new gravel bars.

22+50 – 29+00 - Slow, deep low gradient channel. The fix for this sub reach is improved access. A boardwalk is laid out. If a boardwalk is something the club is interested in, it will be constructed by others.

Rlewis@appliedgeoecology.com
(908) 285-6554
P. O. Box 183
Far Hills, NJ 07931



29+00 – 39+89 – The upper step pools, seem to be functioning. The weirs will be reconstructed, possibly with new imported boulders. The Thalweg will be excavated to increase pool depth and create a narrower cross-sectional area throughout this reach. The Towards the bottom of this reach, numerous boulders will be reorganized to improve fish habitat. (Davie's pool has not been included in the current plan as it appears to require dredging, it makes sense to discuss options separately.)

This work will improve fish habitat and the fishing experience for your members. If you like we can set up a call to go through the design and discuss the project. In the meantime, should you have any questions or need to discuss anything, please do not hesitate to call. Thank you!

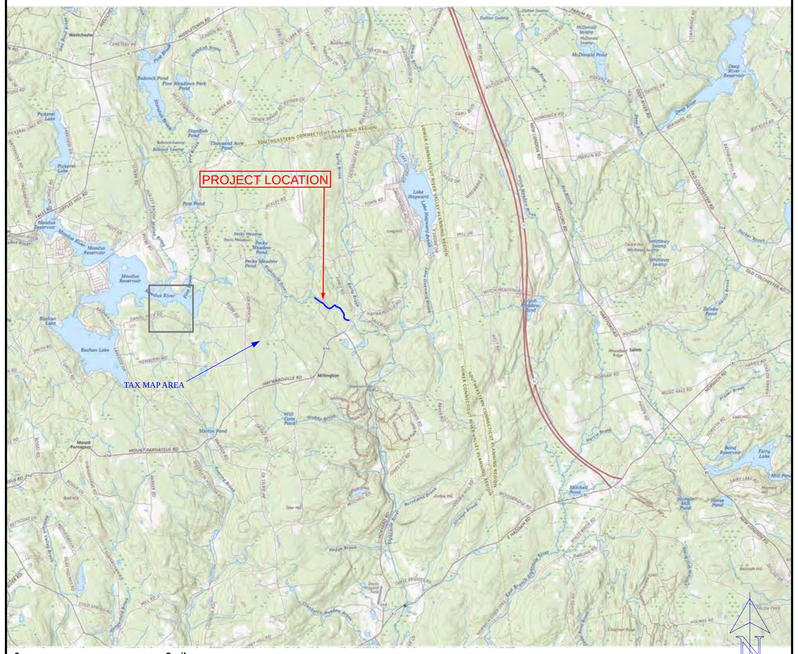
Sincerely,

Robert Lewis

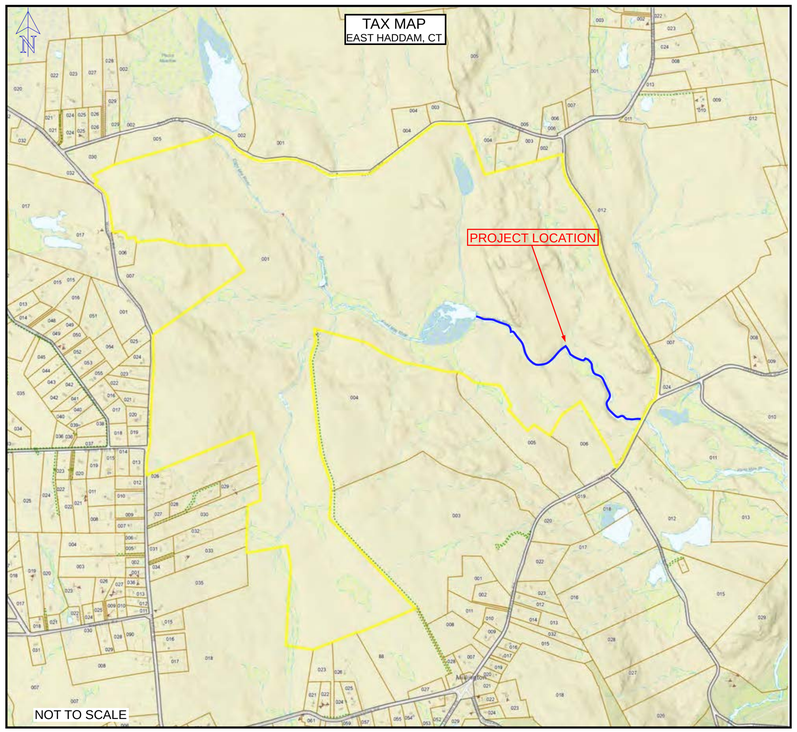
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P. O. Box 183
Far Hills, NJ 07931

LOCATION MAP
USGS NATION AL MAP



TAX MAP
EAST HADDAM, CT



EIGHT MILE RIVER
RESTORATION & HABITAT ENHANCEMENT

MILLINGTON, EAST HADDAM
MIDDLESEX, CONNECTICUT

SEPTEMBER 1, 2025

Prepared For:

EAST HADDAM FISHING & GAME CLUB

138 BASHAN ROAD
EAST HADDAM, CT

Prepared By:

Applied Geoecology, LLC
P. O. Box 183
Far Hills, NJ 07931

DRAWING INDEX

STREAM HABITAT ENHANCEMENT PLANS PREPARED BY APPLIED GEOECOLOGY, LLC	
Sheet No.	Sheet Title
1 of 7	COVER SHEET WITH PROJECT LOCATION & TAX MAP
2 of 7	EXISTING and PROPOSED TOPOGRAPHY with LOT LINES
3 of 7	STREAM ENHANCEMENT SITE PLAN 00+00 - 12+50
4 of 7	STREAM ENHANCEMENT SITE PLAN 12+50 - 24+40
5 of 7	DESIGN CROSS-SECTIONS
6 of 7	DESIGN CROSS-SECTIONS & LONGITUDINAL STREAM BED PROFILE
7 of 7	TYPICAL STREAM HABITAT ENHANCEMENT DESIGN FIGURES w/ NOTES

APPLIED GEOECOLOGY LLC
P. O. Box 183
Far Hills, New Jersey

908-770-0111

REVISIONS

No.	DATE	DESCRIPTION

SHEET TITLE

COVER SHEET
with
PROJECT LOCATION
&
TAX MAP

PROJECT:

EIGHTMILE River Restoration & Habitat Enhancement

EAST HADDAM FISHING AND GAME CLUB
138 BASHAN ROAD
EAST HADDAM, CT

SOURCES:

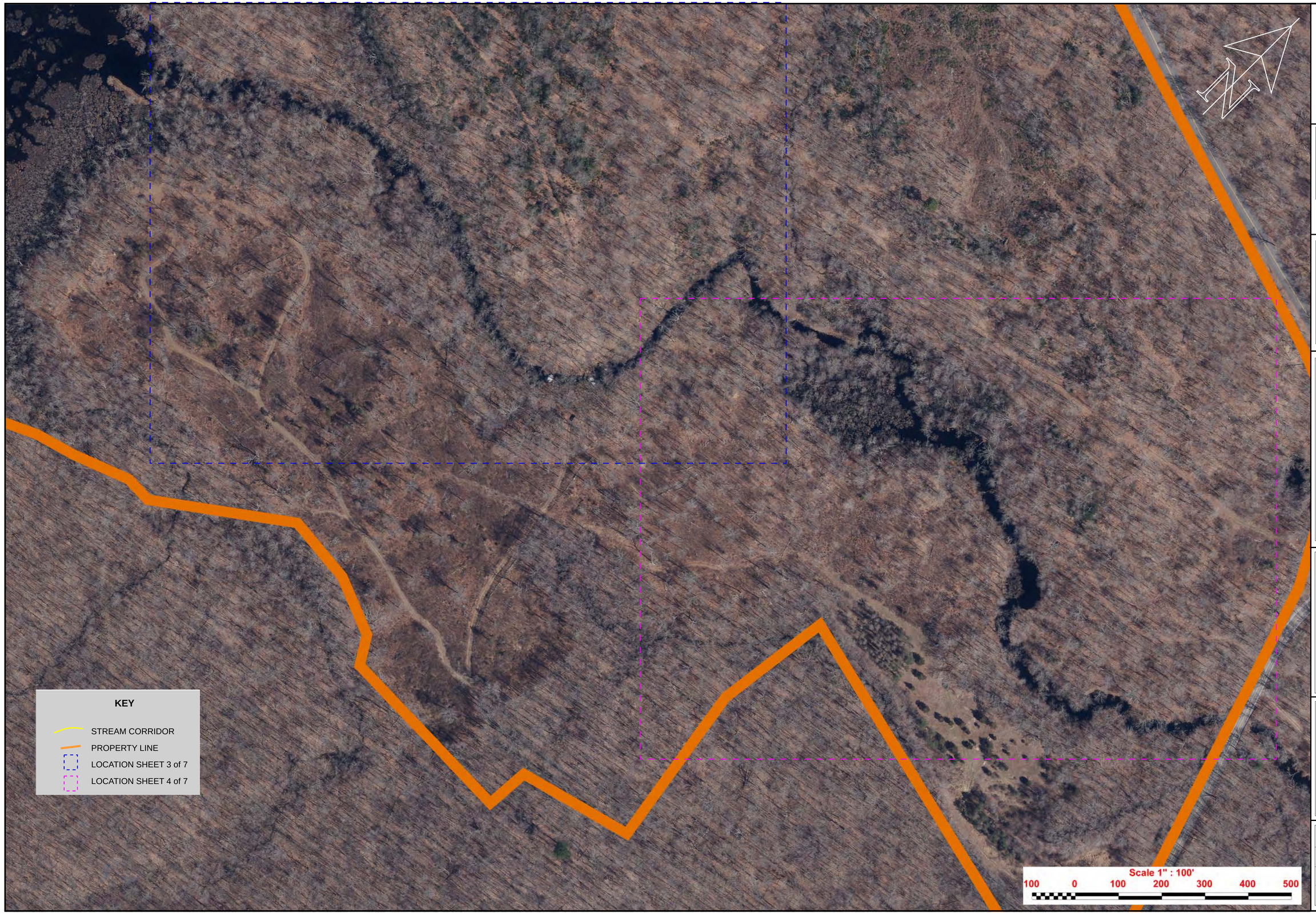
1. Road map - The USGS National Map apps.nationalmap.gov/viewer
2. EAST HADDAM TAx Map portion of Sheet 70

DATE **September 1, 2025**

SCALE **Various**

DRAWN R. Lewis

SHEET NO. 1 of 7



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P. O. Box 183
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REVISIONS

No.	DATE	DESCRIPTION

SHEET TITLE

EXISTING and PROPOSED TOPOGRAPHY with LOT LINES

PROJECT:

EIGHTMILE River Restoration & Habitat Enhancement

EAST HADDAM FISHING AND GAME CLUB
138 BASHAN ROAD
EAST HADDAM, CT

SOURCES:

1. Satellite Image from UCON - 2023 orthoimagery
2. Topography processed from UCONN - 2023 CT LIDAR tile(s).
3. Property line information from East Haddam CT

DATE: **September 1, 2025**	
SCALE: **1" = 100'**	CONTOUR INTERVAL: **5 ft**
DRAWN: R. Lewis	SHEET NO.: 2 of 7
DATUM: NAVD 88	

DISTURBANCE DETAILS				
Activity	Location	Type		Area (acres)
Boulder Weir Habitat	State Open Waters	Filled	Permanent	0.223
Gravel Bar Creation	State Open Waters	Filled	Permanent	0.421
Pool Creation	State Open Waters	Excavated	Temporary	0.202
Thalweg Enh. & Run Creation	State Open Waters	Excavated	Temporary	1.338
Brush Management	Dec.Tree/Shrub Wetland		Temporary	1.130
Equip. Ingress-Egress	Riparian Zone			0.203

KEY

- ORDINARY HIGH WATER
- SURVEYED THALWEG
- CROSS SECTION LOCATION
- 20+00 RUNNING FOOTAGE
- INGRESS/EGRESS
- PROPERTY LINE
- DESIGNED THALWEG
- POOL EXCAVATION
- GRAVEL BAR FILL
- BOULDER PLACEMENT
- RIFFLE ENHANCEMENT

N

100 0 100 200

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REVISIONS

No.	DATE	DESCRIPTION

SHEET TITLE

HABITAT ENHANCEMENT SITE PLAN
00+00 - 21+00

PROJECT:

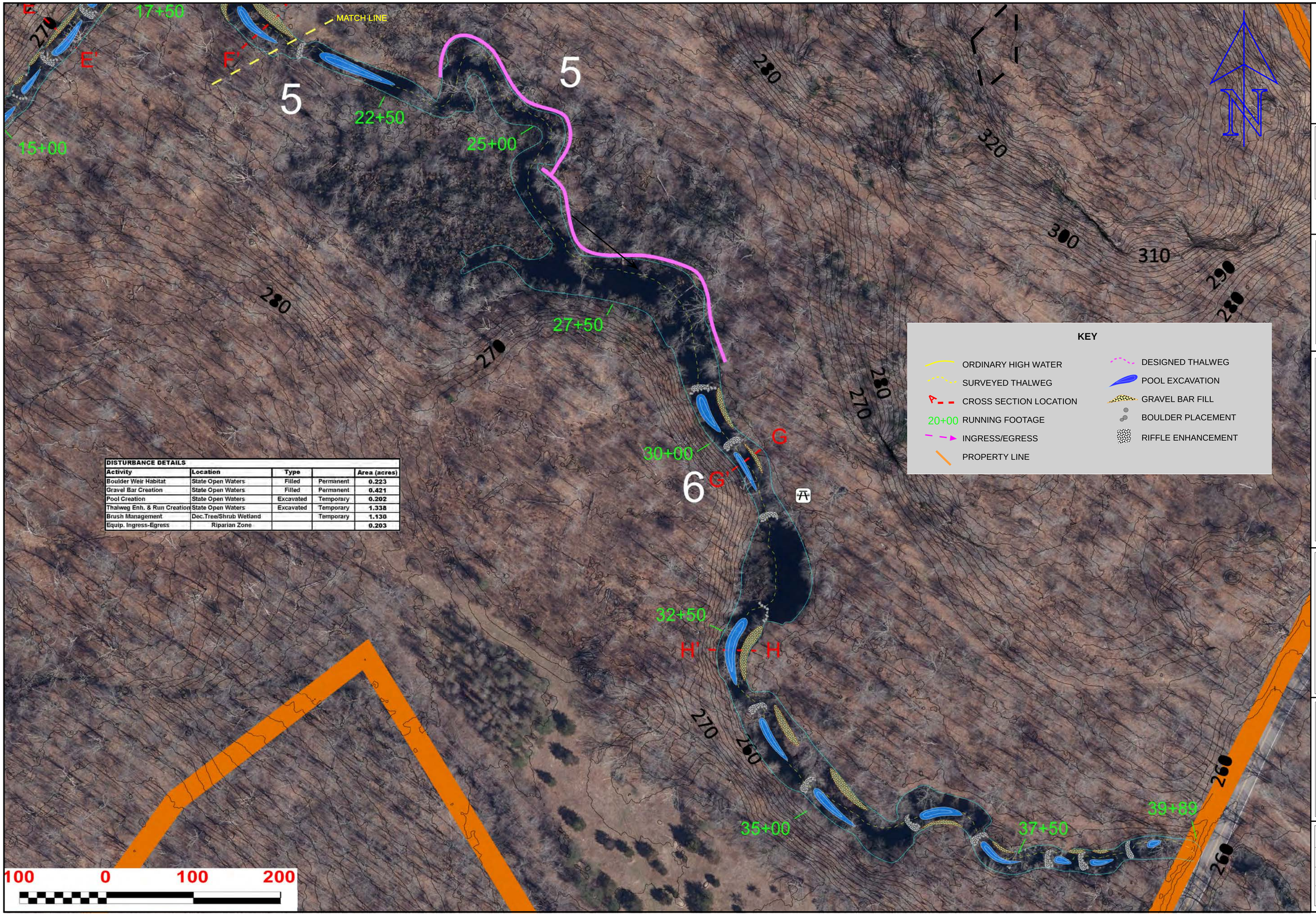
EIGHTMILE River Restoration & Habitat Enhancement

EAST HADDAM FISHING AND GAME CLUB
138 BASHAN ROAD
EAST HADDAM, CT

SOURCES:

1. Satellite Image from UCON - 2023 orthoimagery
2. Topography processed from UCONN - 2023 CT LIDAR tile(s).
3. Property line information from East Haddam CT
4- Stream site survey by Applied Geoecology, LLC on 15 March 2025

DATE: September 1, 2025	
SCALE: 1" = 50'	CONTOUR INTERVAL: 5 ft
DRAWN: R. Lewis	SHEET NO.: 3 of 7
DATUM: NAVD 88	



DISTURBANCE DETAILS

Activity	Location	Type		Area (acres)
Boulder Weir Habitat	State Open Waters	Filled	Permanent	0.223
Gravel Bar Creation	State Open Waters	Filled	Permanent	0.421
Pool Creation	State Open Waters	Excavated	Temporary	0.202
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KEY

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- PROPERTY LINE
- DESIGNED THALWEG
- POOL EXCAVATION
- GRAVEL BAR FILL
- BOULDER PLACEMENT
- RIFFLE ENHANCEMENT

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908-770-0111

REVISIONS

No.	DATE	DESCRIPTION

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HABITAT ENHANCEMENT SITE PLAN 21+00 - 39+89

PROJECT:

EIGHTMILE River Restoration & Habitat Enhancement

EAST HADDAM FISHING AND GAME CLUB
138 BASHAN ROAD
EAST HADDAM, CT

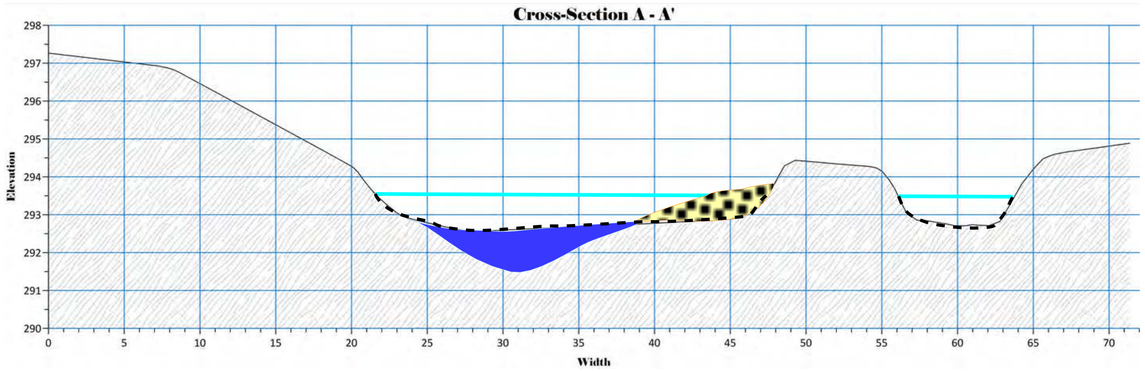
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4- Stream site survey by Applied Geoecology, LLC on 15 March 2025

DATE	**September 1, 2025**
SCALE	**1" = 50'**
CONTOUR INTERVAL	**5 ft**
DRAWN	R. Lewis
SHEET NO.	4 of 7
DATUM	NAVD 88

EIGHTMILE RIVER DESIGNED CHANNEL CROSS-SECTIONS

A



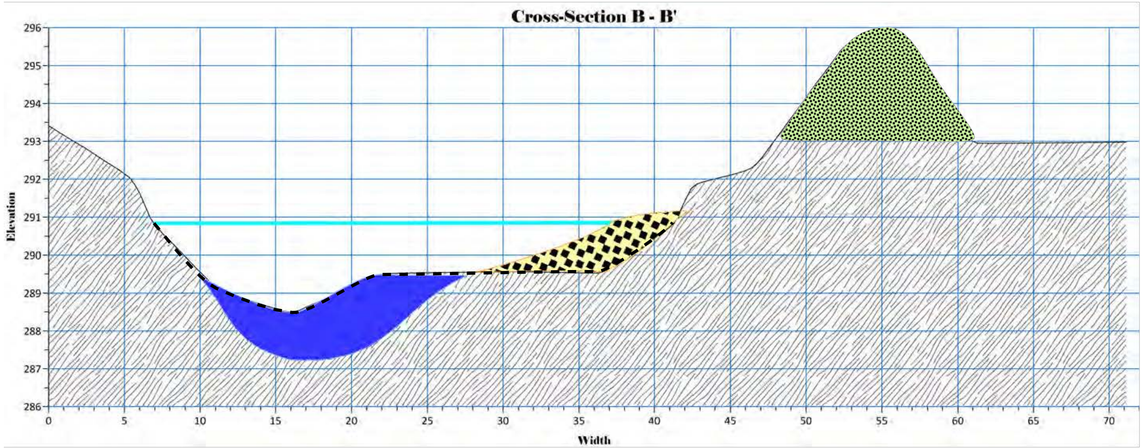
A'

SCALE	
Vertical:	1 inch = 2 feet
Horizontal:	1 inch = 5 feet
Vertical Exaggeration:	2.5 X

KEY

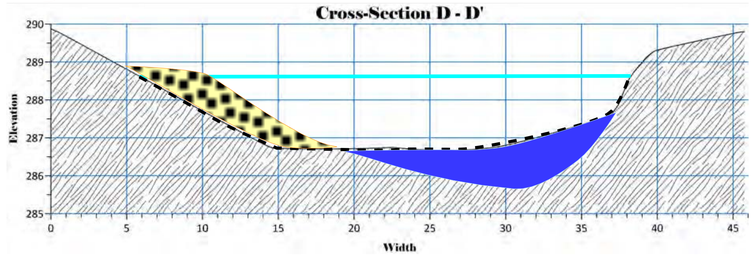
- SURVEYED WATER SURFACE
- SURVEYED GROUND SURFACE
- DESIGNED CHANNEL WATER
- DESIGNED GRAVEL BAR PLACEMENT
- EXCAVATED SPOILS (EXISTING)

B



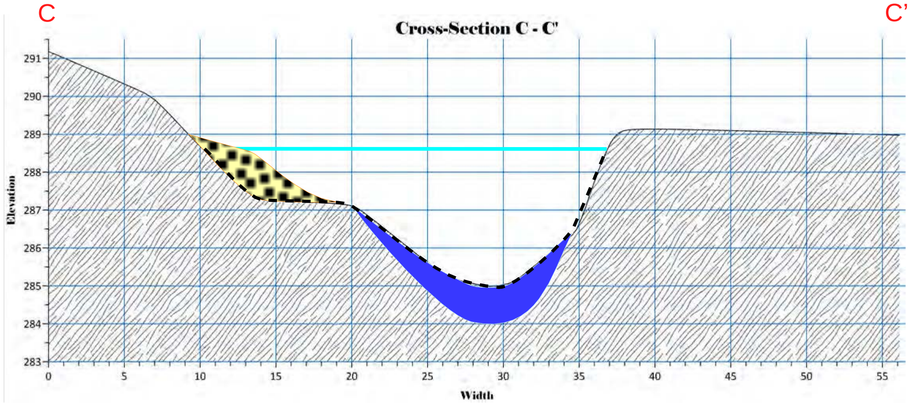
B'

D



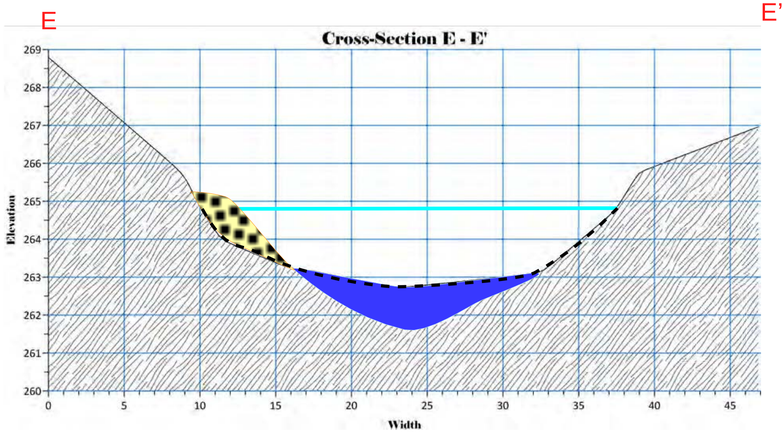
D'

C



C'

E



E'

STREAM FLOW DIRECTION IS INTO PAGE

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REVISIONS

No.	DATE	DESCRIPTION

SHEET TITLE

DESIGN CROSS-SECTIONS & LONGITUDINAL STREAMBED PROFILE

PROJECT:

EIGHTMILE River Restoration & Habitat Enhancement

EAST HADDAM FISHING AND GAME CLUB
138 BASHAN ROAD
EAST HADDAM, CT

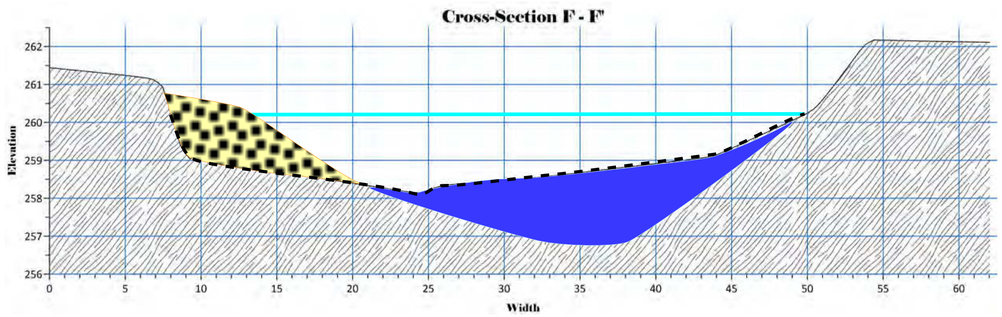
SOURCES:

1. Stream cross-sections surveyed by Applied Geoecology, LLC March 15, 2025

DATE	**September 1, 2025**
SCALE	**VARIOUS**
DATUM	NAVD 88
DRAWN	R. Lewis
SHEET NO.	5 of 7

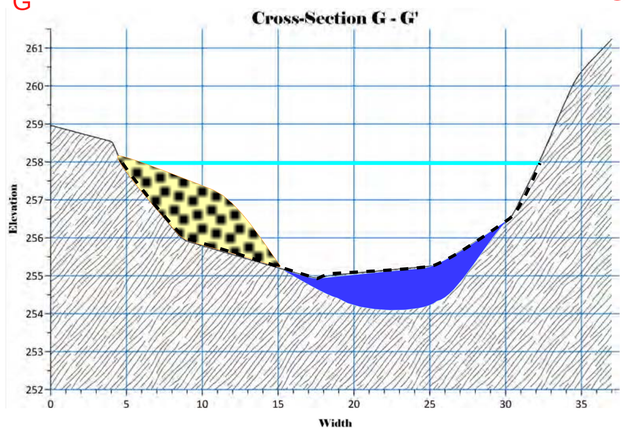
EIGHTMILE RIVER DESIGNED CHANNEL CROSS-SECTIONS

F



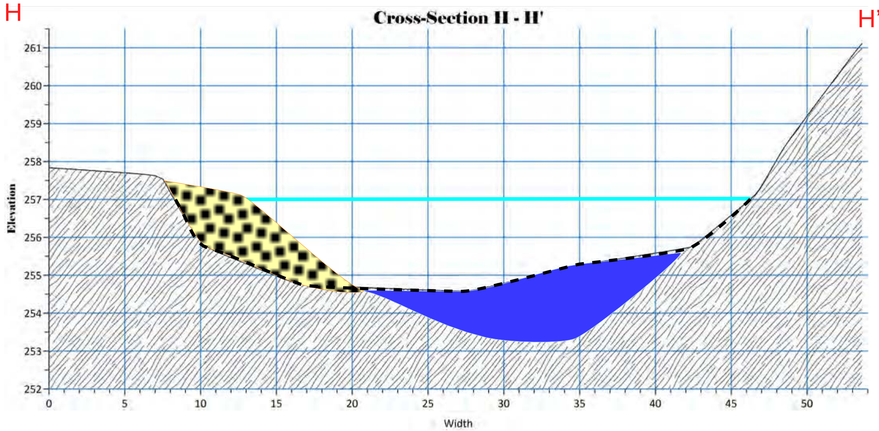
F’

G



G’

H



H’

SCALE

Vertical:	1 inch = 2 feet
Horizontal:	1 inch = 5 feet
Vertical Exaggeration:	2.5 X

KEY

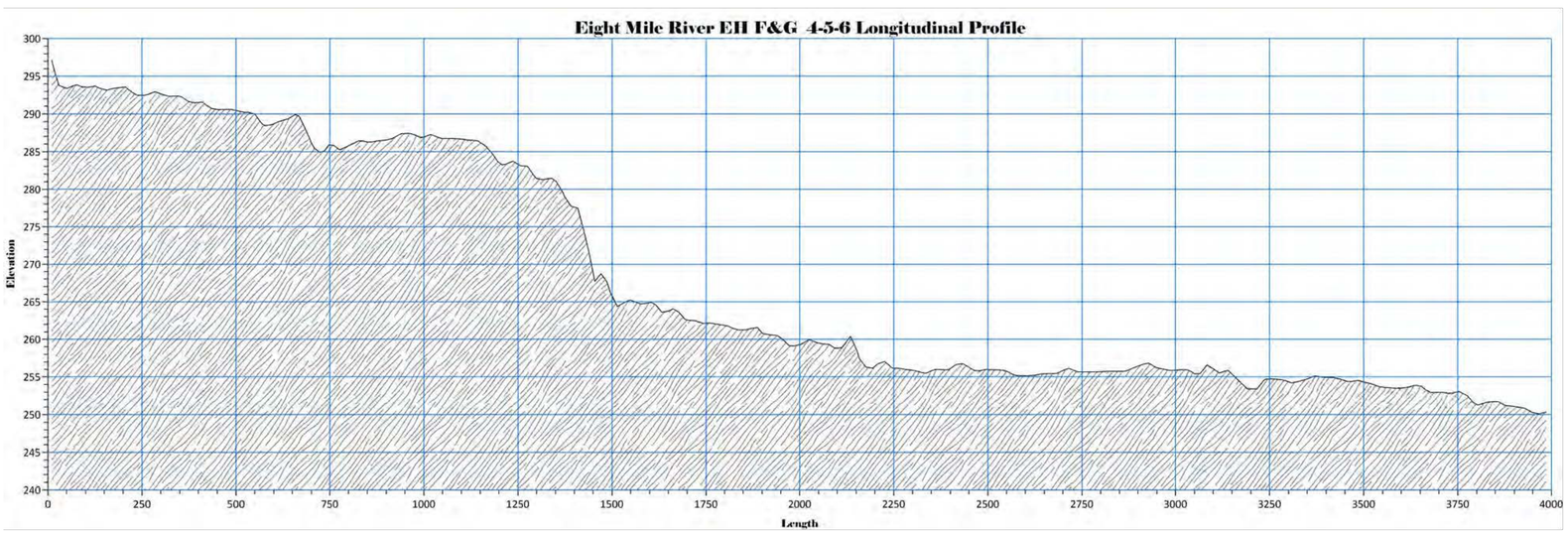
- SURVEYED WATER SURFACE
- SURVEYED GROUND SURFACE
- DESIGNED CHANNEL WATER
- DESIGNED GRAVEL BAR PLACEMENT

STREAM FLOW DIRECTION IS INTO PAGE

Subject Reach:

Gradient = 62.2 feet per mile

Slope = 1.18%



SCALE

Vertical:	1 inch = 10 feet
Horizontal:	1 inch = 200 feet
Vertical Exaggeration:	20 X

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Far Hills, New Jersey 07931
908-770-0111

REVISIONS

No.	DATE	DESCRIPTION

SHEET TITLE

DESIGN CROSS-SECTIONS & LONGITUDINAL STREAMBED PROFILE

PROJECT:

EIGHTMILE River Restoration & Habitat Enhancement

EAST HADDAM FISHING AND GAME CLUB
138 BASHAN ROAD
EAST HADDAM, CT

SOURCES:

1. Stream cross-sections surveyed by Applied Geoecology, LLC March 15, 2025

DATE **September 1, 2025**

SCALE **VARIOUS**

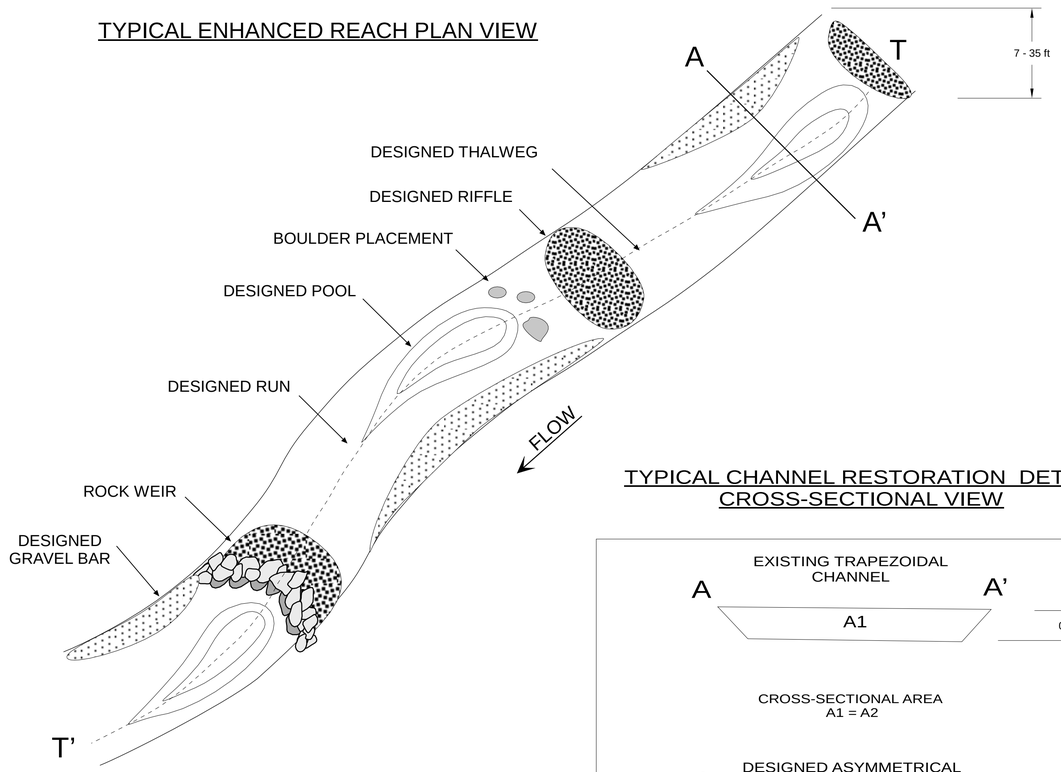
DATUM NAVD 88

DRAWN R. Lewis

SHEET NO. 5 of 7

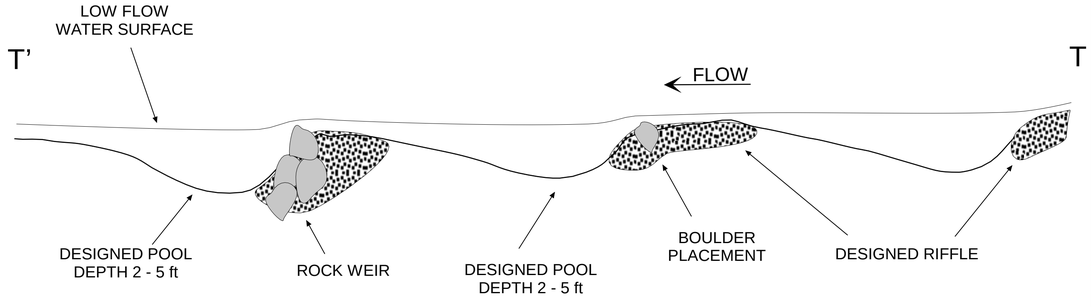
TYPICAL STREAM CHANNEL ENHANCEMENTS / RIFFLE, POOL, RUN CREATION

TYPICAL ENHANCED REACH PLAN VIEW



TYPICAL CHANNEL RESTORATION DETAIL CROSS-SECTIONAL VIEW

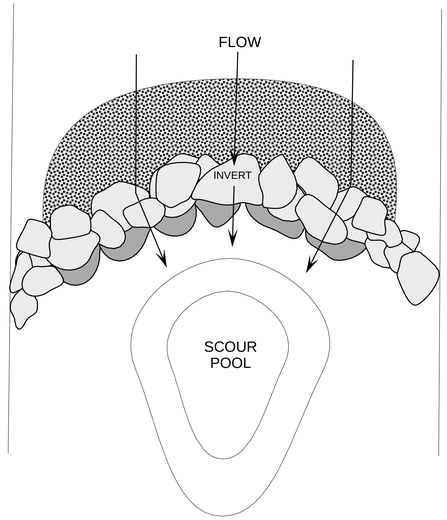
TYPICAL ENHANCED REACH PROFILE VIEW ALONG THALWEG



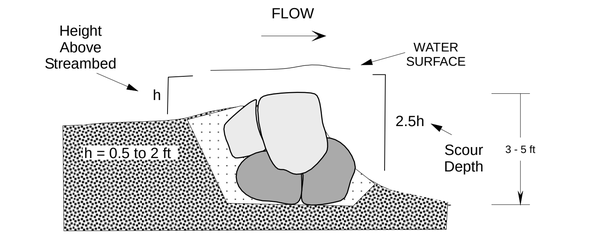
NOT TO SCALE

(c) APPLIED GEOECOLOGY, LLC

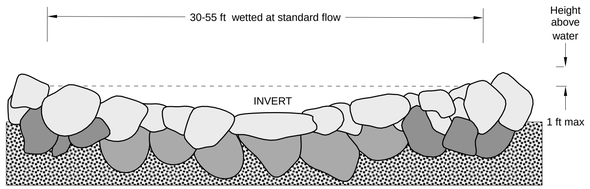
TYPICAL LOW-PROFILE ROCK WEIR



TYPICAL ROCK WEIR PLAN VIEW



TYPICAL ROCK WEIR CROSS-SECTION



TYPICAL ROCK WEIR PROFILE

CONSTRUCTION NOTES

1. NATIVE STREAM BED MATERIAL EXCAVATED AND FILLED LATERALLY IN CHANNEL TO CREATE NEW BEDFORMS TO DIVERSIFY HABITAT.
2. IMPORTED (LOCALLY OBTAINED) 1 - 4 TON CLASS NATURAL BOULDERS USED TO CREATE WEIR STRUCTURE.
3. INVERT ROCK TO BE SET AT THALWEG STREAM BED HEIGHT FOR CENTRALIZED LOW FLOW & AQUATIC ORGANISM PASSAGE.
4. BOULDERS AT BANK EDGE TO BE NO HIGHER THAN 12" ABOVE WATER AT STANDARD FLOW.
5. FOOTER BOULDERS TO BE BURIED BELOW SCOUR DEPTH IN STREAM BED.

NOT TO SCALE

(c) APPLIED GEOECOLOGY, LLC

CONSTRUCTION AND COMPLIANCE NOTES

1. EXCAVATED STREAMBED MATERIAL TO BE PLACED ONLY LATERALLY IN THE CHANNEL TO ENSURE CHANNEL CROSS-SECTIONAL AREA IS NOT ALTERED.
2.. FILL TO BE LIMITED TO EXCAVATED STREAM BED MATERIAL AND IMPORTED, LOCALLY DERIVED BOULDERS.
3. CATERPILLAR 315 OR SIMILAR SIZE EXCAVATOR WITH HYDRAULIC THUMB WILL BE USED IN ENHANCEMENT IMPLEMENTATION.
4. ALL BOULDER PLACEMENTS TO BE SET TO DIRECT CURRENTS AWAY FROM STREAM BANKS.
5. EXCAVATOR TO OPERATE IN STREAM CHANNEL TO MINIMIZE OR ELIMINATE BANK AND RIPARIAN ZONE DAMAGE.
6. STREAM WORK TO PROGRESS FROM UPSTREAM TO DOWNSTREAM, ALL WORK STARTED IN GIVEN DAY TO BE COMPLETED SAME DAY.
7. BEST MANAGEMENT PRACTICES WILL BE PRACTICED AT ALL TIMES.
8. DISTURBED RIPARIAN AREAS TO BE SEEDED IMMEDIATELY WITH *Avina sativa* OR NATIVE SEED MIX.
9. STRAW MULCH APPLIED TO STABILIZE ANY DISTURBED AREAS ABOVE THE HIGH WATER MARK.
10. EXPOSED CONSTRUCTED POINT BARS TO BE SEEDED WITH *Avina sativa*.
11. SEDIMENT / TURBIDITY BARRIER TO BE INSTALLED PRIOR TO COMMENCEMENT OF WORK AND MAINTAINED THROUGHOUT THE PROJECT.
12. OIL SORBENT TOWELS AND BOOM TO BE ON SITE FOR RAPID DEPLOYMENT DURING CONSTRUCTION.
13. PLANS CALL FOR THE IMPORTATION OF 30 LOCALLY SOURCED NATURAL 2-4 TON BOULDERS

(c) APPLIED GEOECOLOGY LLC

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P. O. Box 183
Far Hills, New Jersey 07931
908-770-0111

REVISIONS

No.	DATE	DESCRIPTION

SHEET TITLE

TYPICAL STREAM HABITAT ENHANCEMENT DESIGN FIGURES

PROJECT:

EIGHTMILE River Restoration & Habitat Enhancement

EAST HADDAM FISHING AND GAME CLUB
138 BASHAN ROAD
EAST HADDAM, CT

DATE
September 1, 2025

SCALE
N/A

DRAWN
R. Lewis

SHEET NO.
6 of 7

Mine Brook Habitat Enhancement Site Photos

Before & After Enhancement

September 5, 2024

Photos Taken 12 February, 2023
And September 2-5, 2024



01+10 View Downstream



00+90 View Downstream After Enhancement



03+00 View Downstream



02+80 After Enhancement



07+80 View of Pool Looking Downstream



07+80 View of Pool Looking Downstream After Enhancement



08+90 View Downstream confluence of Mine Brook Tributary on Right Bank



08+90 View Downstream confluence of Mine Brook Tributary on Right Bank Post Enhancement



15+50 View of Eroded Right Bank at Outfall of Large Pipe from Rt 202/Far Hills



15+50 View of Eroded Right Bank at Outfall of Large Pipe from Rt 202/Far Hills After Enhancement



16+25 Outfall of 10” Clay Pipe from Rt 202/Far Hills along Right Bank



16+25 Outfall of 10” Pipe from Rt 202/Far Hills along Right Bank After Bank Stabilization



17+40 View upstream at long Cutbank



17+40 View upstream at long Stabilized Bank



17+70 View Downstream



17+70 View Downstream – Post Enhancement



21+50 View Downstream



21+50 View Downstream After Enhancement



24+20 View of Natural Shear at bottom of Riffle to be Reinforced with buried Boulders.



24+20 View Downstream – After Enhancement



26+50 View of Mine Brook to Confluence with North Branch of the Raritan River



26+50 View of Mine Brook to Confluence with North Branch of the Raritan River