

TECHNICAL MEMORANDUM



To: Kristopher Houle, Massachusetts Division of Ecological Restoration,
James Turek, National Oceanic and Atmospheric Administration

From: Keith Kantak; Mike McAllister, PE; Nick Nelson; Sarah Widing, PE

Date: August 31, 2018

Re: Cotley River Restoration Project, Post-Construction Monitoring, Taunton, MA

Introduction

In 2010, the Massachusetts Division of Environmental Restoration (DER) and other project partners (including the City of Taunton, local Tribes, Save the Bay, the NOAA Restoration Center, the U.S. Fish and Wildlife Service, and the Taunton Development Corporation (TDC)) initiated a project to remove Barstowe's Pond Dam on the Cotley River in Taunton, MA. Barstowe's Pond Dam was approximately 2,000 ft from the Cotley River's confluence with the undammed Taunton River, making Barstowe's Pond Dam the first obstruction to water, sediment, and fish passage. The goal of the dam removal project was to restore river processes, improve fish passage, and improve riverine habitat. The Barstowe's Pond Dam was successfully removed in March 2018.

This memorandum is part of post-construction monitoring packet that includes information on the plan-view, profile, and cross-sections of the Cotley River in the vicinity of the former dam and the associated impoundment before and after the dam was removed. This information provides a baseline for monitoring the geomorphic evolution of the Cotley River as it adjusts to a new equilibrium following the removal of the dam.

Data Collection Methods

In July and August of 2018, Inter-Fluve collected topographic survey data at 18 cross-sections of the Cotley River extending from the former dam upstream to approximately 100-feet past the railroad crossing (Figure 1). We collected the data with a Real-Time Kinematic (RTK) GPS and Total Station (TS) equipment.

For each cross-section, we collected data to characterize the channel and floodplain; including top of bank and the channel thalweg. Five of the cross-sections are located along the 500-foot reach adjacent to the former dam, eight cross-sections are located along the 2,200-foot reach within the former impoundment, three cross-sections are located in the vicinity of the railroad crossing, and two cross-sections are located in the vicinity of the access road crossing. Both the railroad crossing and the access road are located upstream of the former dam. **Attachment 1** provides the plan, profile, and section views of the Cotley River at these surveyed locations.

Monument Placement

We placed capped rebar monuments at the endpoints of each cross-section and flagged the monuments with brightly-colored field tape. We established local control points around the site and at the endpoints of each cross-section. **Attachment 2** provides an index and photos of each of the cross-section monuments. Note that we did not establish permanent monuments on cross-section end-points that are located off the project proponent's property.

Results and Analysis

During this field excursion to collect topographic data along the Cotley River, we made observations about the current condition of the river form and substrate. Our observations indicate that the system has not yet reached—but is moving towards—equilibrium and will likely undergo significant changes over the coming months.

- We observed that the channel has assumed a sinuous, single thread though nearly the entire reach, with one exception—we observed a short, braided section above Cross-section 9 (Figure 2, Attachment 1).
- We observed a head-cut (a locally steepened, eroding section of channel) propagating upstream through the former impoundment. At the time of this field effort, the knickpoint of the head-cut was located approximately 100 feet upstream of Cross-section 9.
- We observed that the channel form upstream of the head-cut is poorly defined. The bed and the banks currently consist of poorly-consolidated, fine-grained sediment. The fine-grained sediment is very mobile; therefore, in areas where this substrate predominates, we expect that the channel will experience rapid evolution in the coming months.
- We observed that the channel substrate downstream of the head-cut includes more gravel and cobble; it appears that a greater proportion of the fine-grained sediments have been transported downstream.

Subsequent monitoring excursions may be used to track the upstream migration of the head-cut and to track the transition of the channel bed substrate from fine-grained material to coarser grained material.

Attachments:

1. Cotley River Restoration Project, Post-Construction Monitoring. Taunton, Massachusetts. August 31, 2018.
2. Index and Photos of the Cross-section Monuments

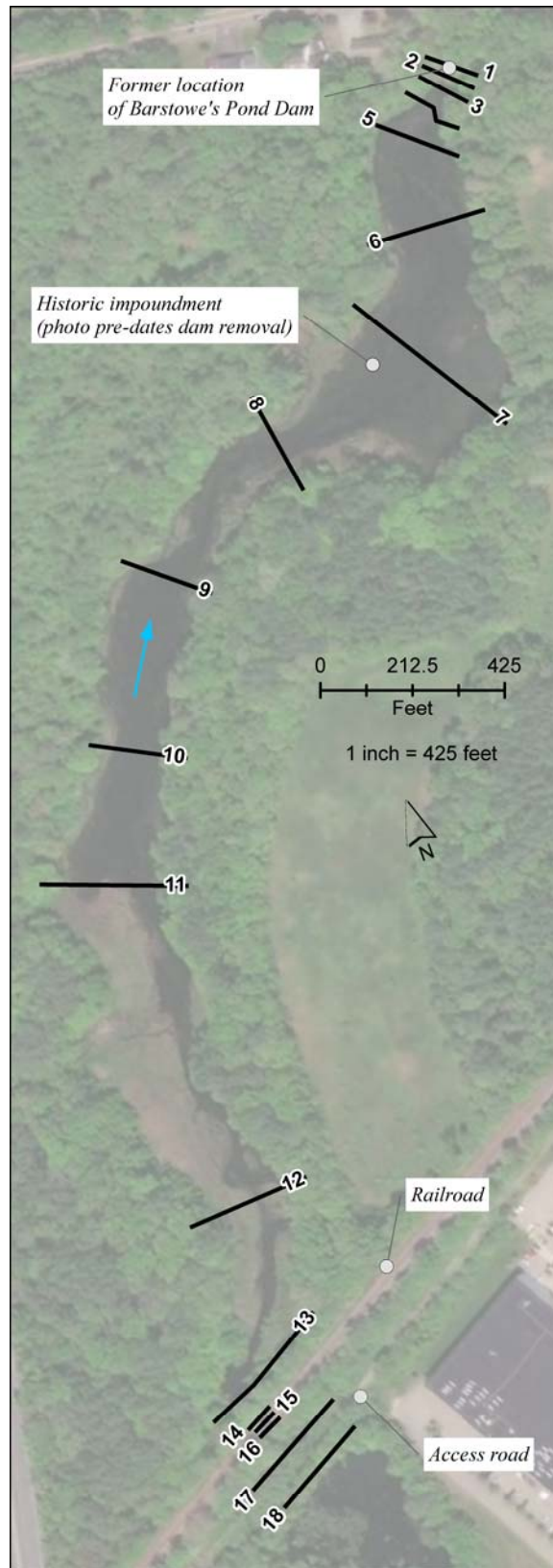
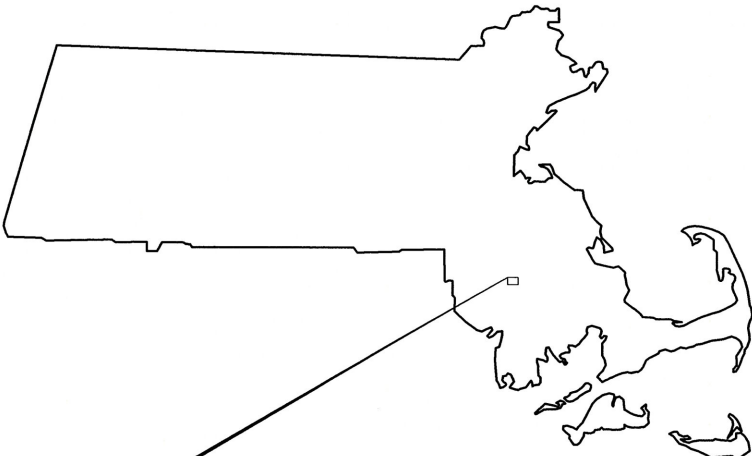


Figure 1. Cross-section locations.

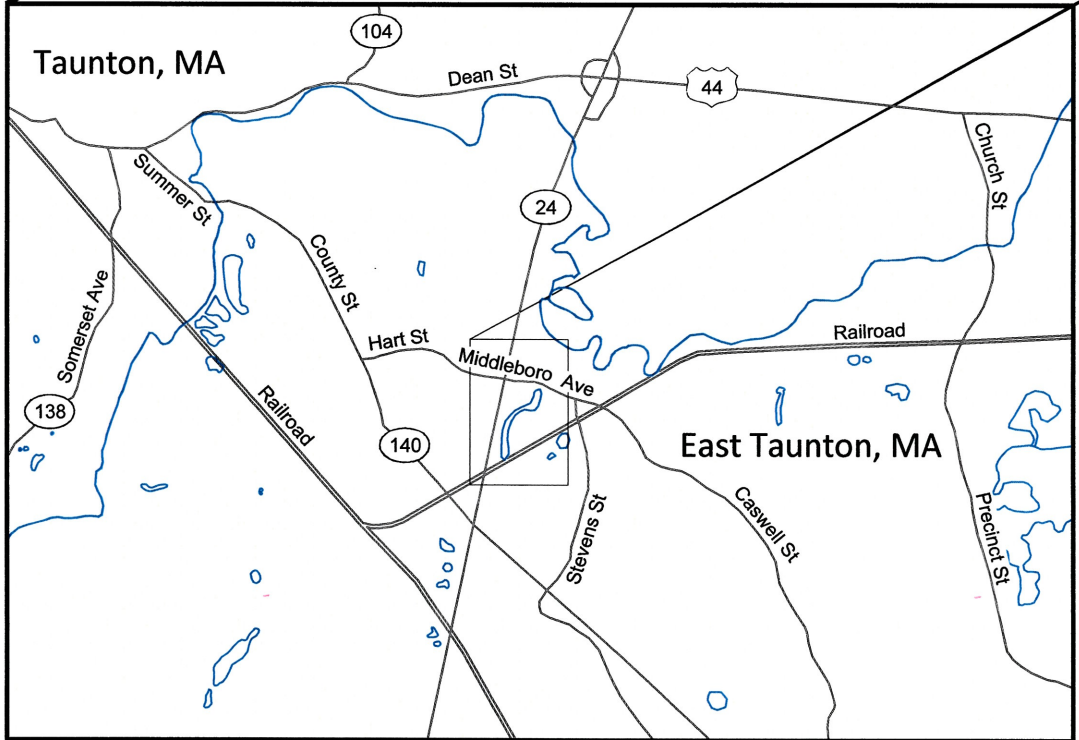


Figure 2 The channel at cross-section 9, looking upstream.

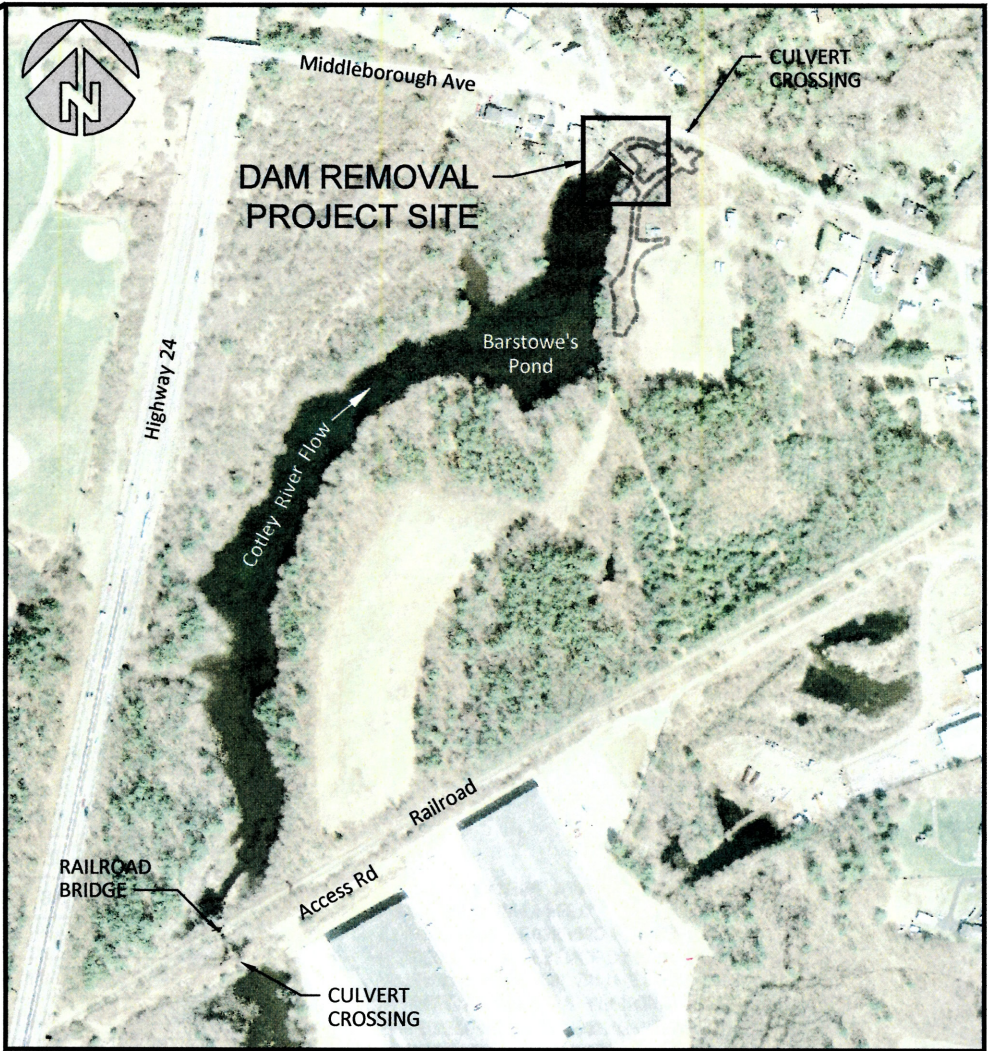
COTLEY RIVER RESTORATION PROJECT POST-CONSTRUCTION MONITORING PLANS TAUNTON, MA



STATE OF MASSACHUSETTS
NOT TO SCALE



VICINITY MAP
NOT TO SCALE



SITE PLAN
SCALE 1" = 500'

SHEET LIST

- 1 Title, Sheet List and Location Maps
- 2 Site Plan and Profile
- 3 Cross Sections
- 4 Cross Sections
- 5 Cross Sections

LOCATION

SITE LOCATION:
LATITUDE: 41°88'17.68" NORTH
LONGITUDE: 71°04'78.21" WEST
TAUNTON, MASSACHUSETTS



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NO.	BY	DATE	REVISION DESCRIPTION

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DRAWN	DESIGNED	CHECKED
SAW	8/31/18	18-05-08
APPROVED	DATE	PROJECT

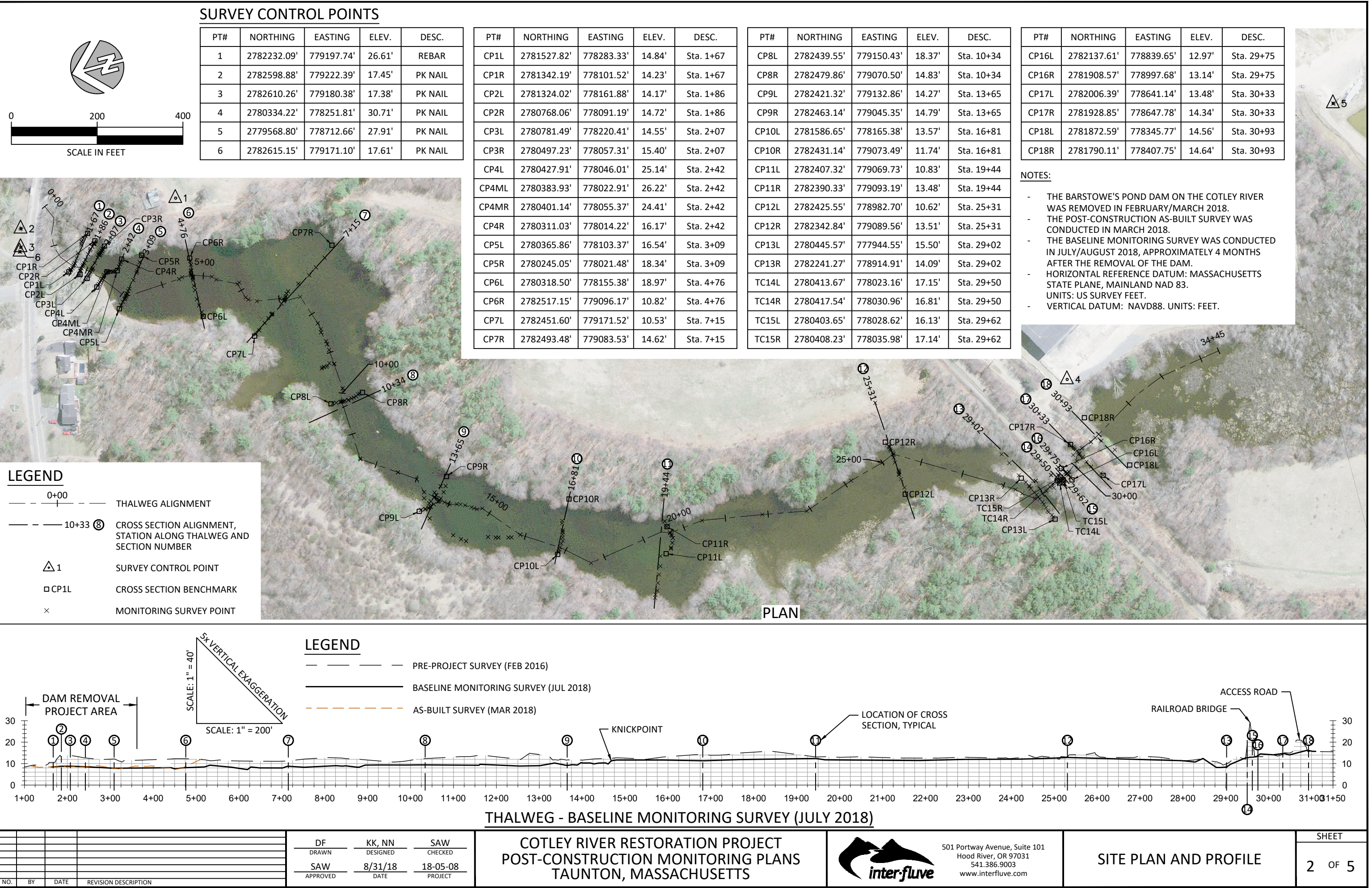
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TAUNTON, MASSACHUSETTS



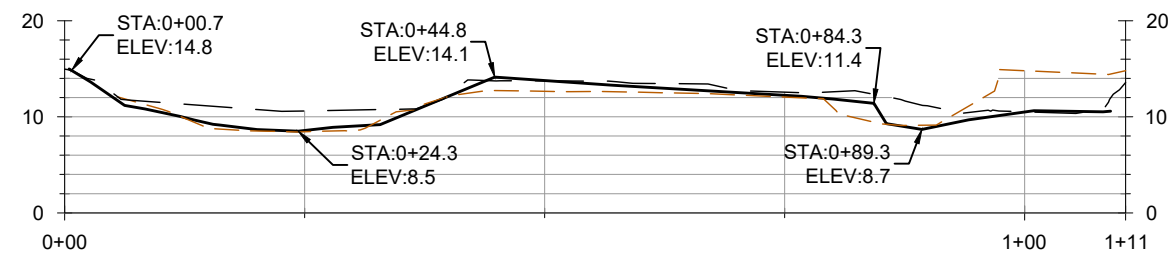
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TITLE, SHEET LIST AND
LOCATION MAPS

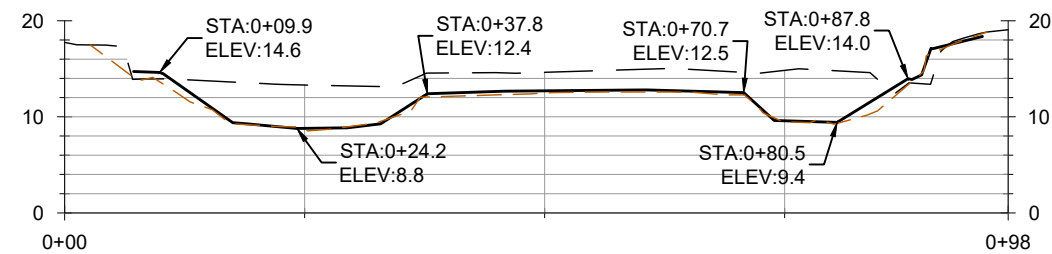
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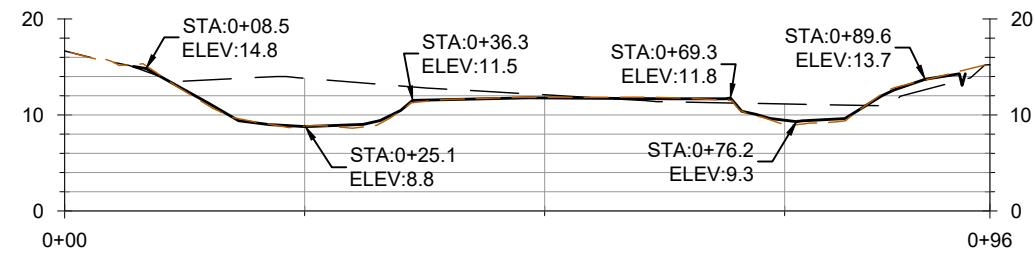
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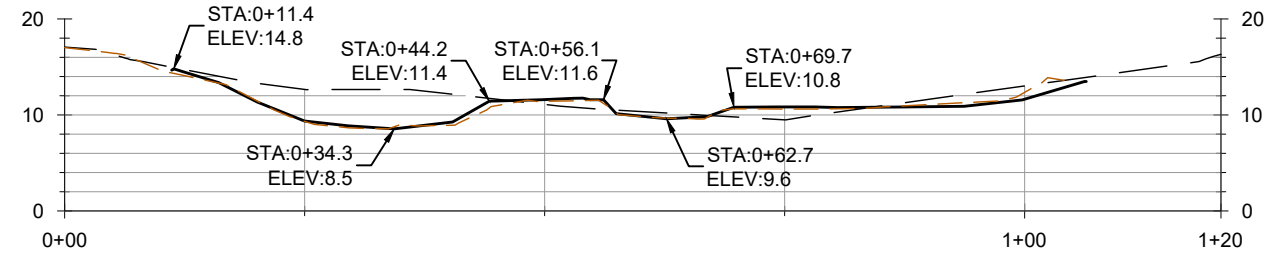
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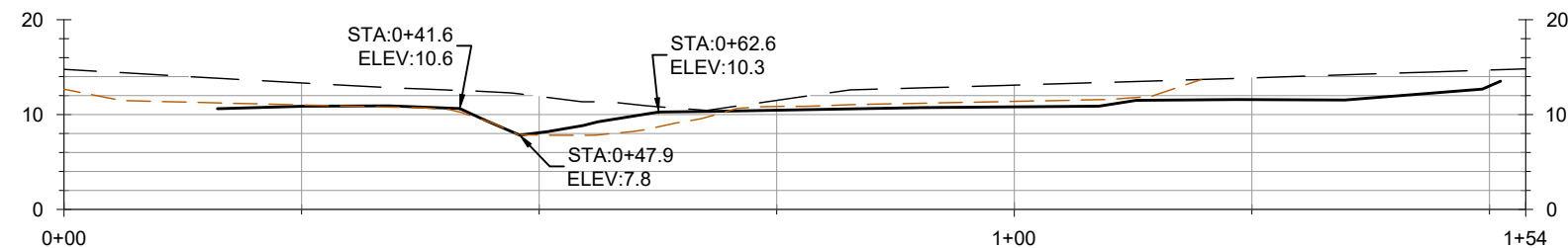
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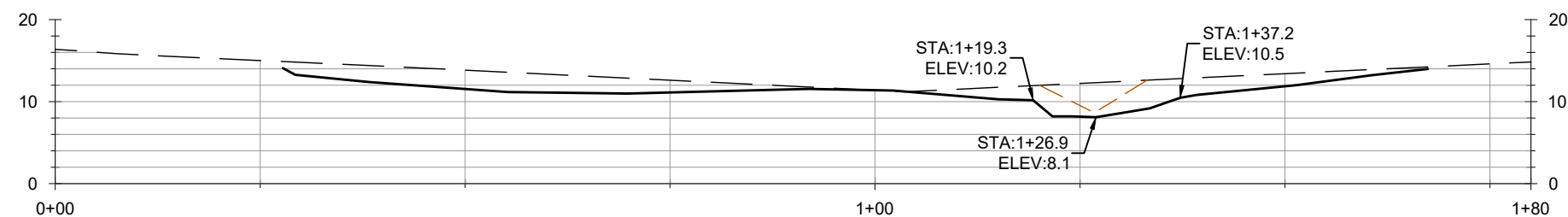
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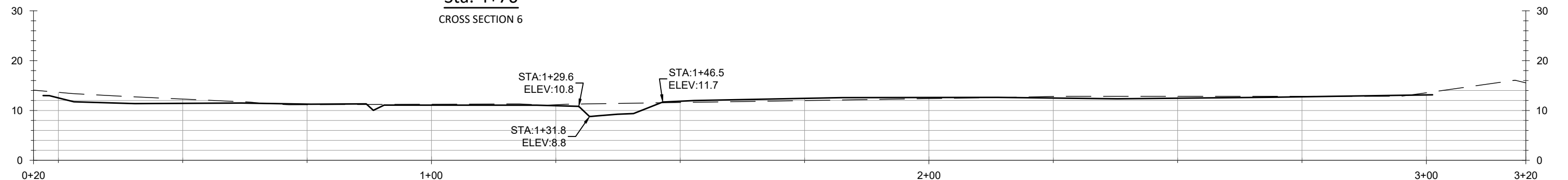
Sta. 2+42
CROSS SECTION 4



Sta. 3+09
CROSS SECTION 5



Sta. 4+76
CROSS SECTION 6



Sta. 7+15
CROSS SECTION 7

LEGEND

- PRE-PROJECT SURVEY (FEB 2016)
- BASLINE MONITORING SURVEY (JUL 2018)
- AS-BUILT SURVEY (MAR 2018)

1x VERTICAL EXAGGERATION
SCALE: 1" = 20'

NO.	BY	DATE	REVISION DESCRIPTION

DF	KK, NN	SAW
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APPROVED	DATE	PROJECT

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TAUNTON, MASSACHUSETTS

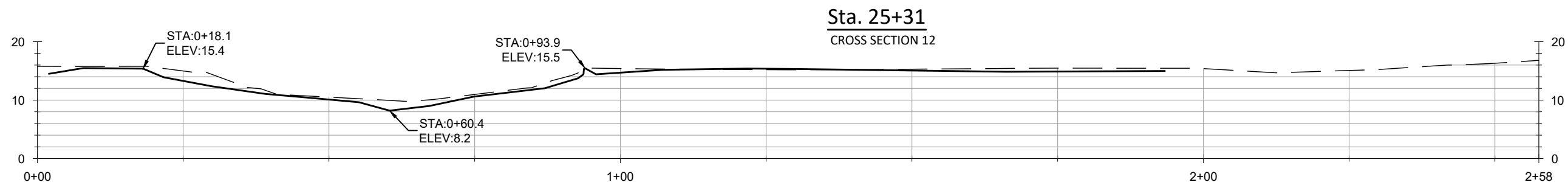
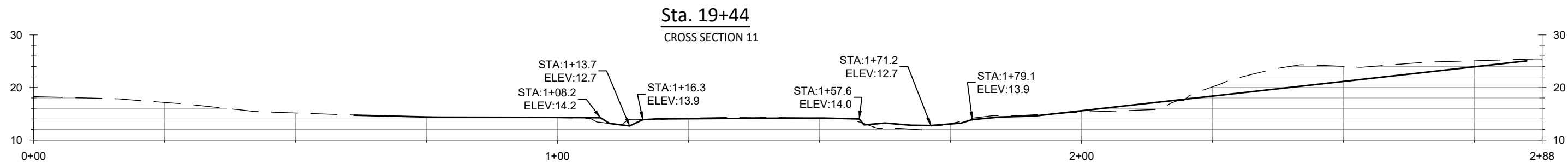
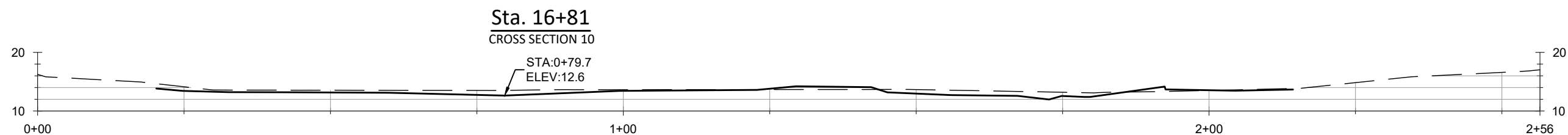
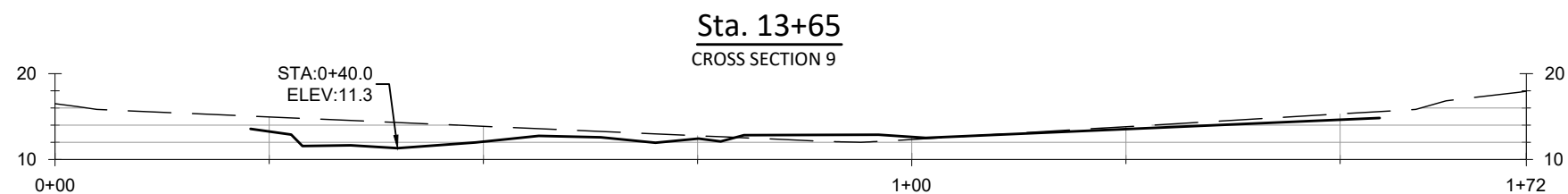
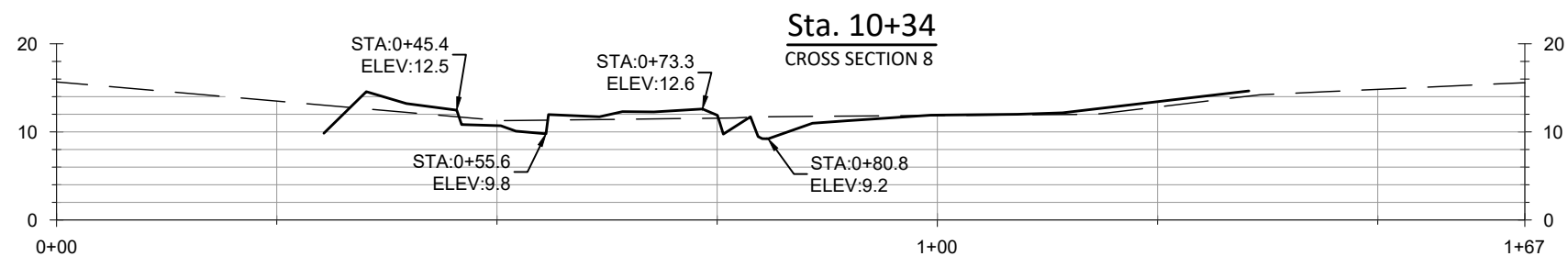
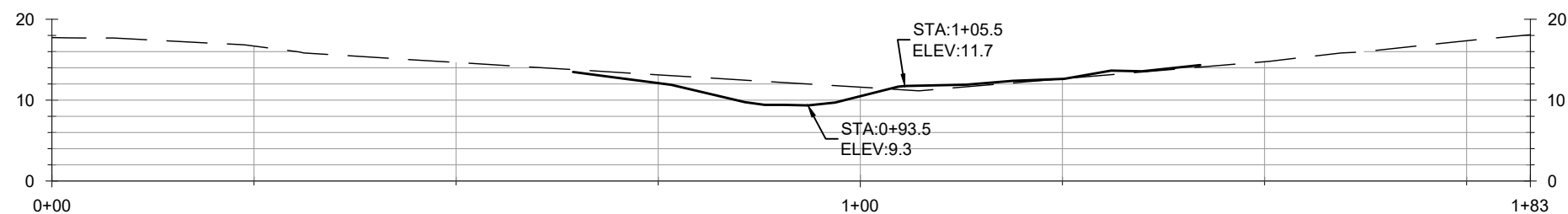
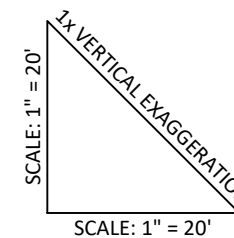


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LEGEND

- PRE-PROJECT SURVEY (FEB 2016)
- BASELINE MONITORING SURVEY (JUL 2018)



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POST-CONSTRUCTION MONITORING PLANS
TAUNTON, MASSACHUSETTS



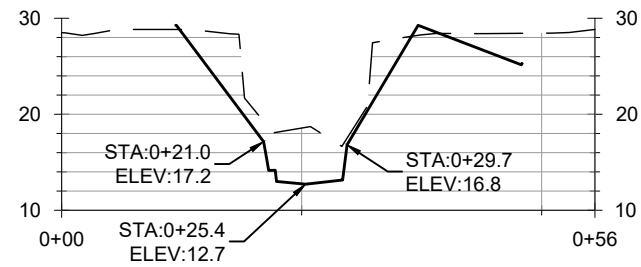
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CROSS SECTIONS

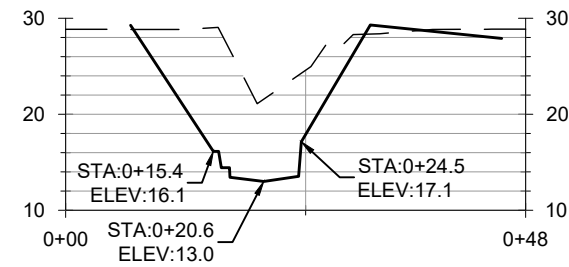
SHEET

4 OF 5

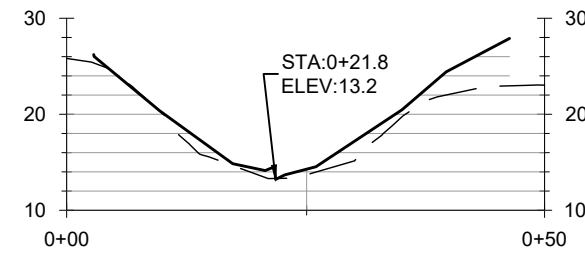
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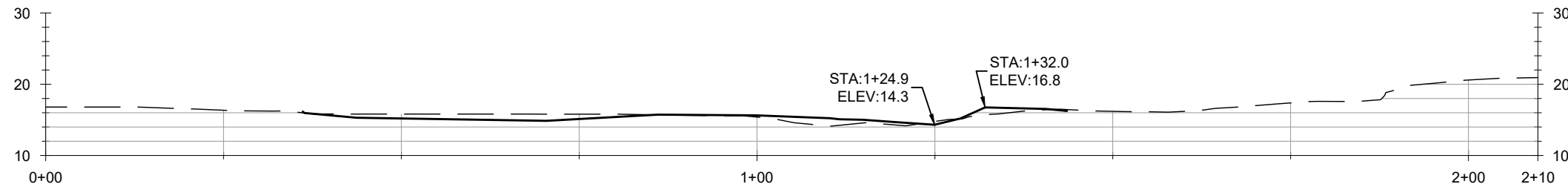
Sta. 29+50
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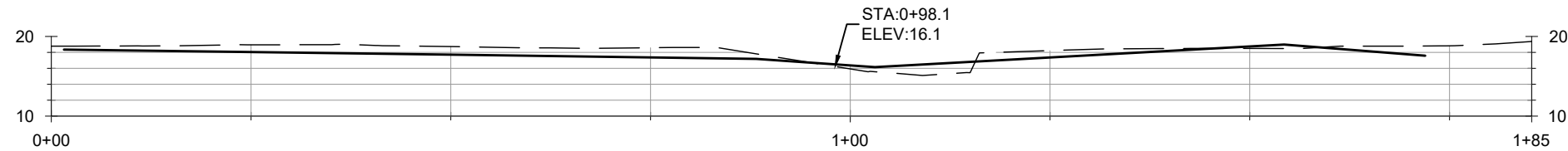
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Sta. 29+75
CROSS SECTION 16



Sta. 30+33
CROSS SECTION 17



Sta. 30+93
CROSS SECTION 18

LEGEND

— — — — — PRE-PROJECT SURVEY (FEB 2016)

————— BASELINE MONITORING SURVEY (JUL 2018)

1x VERTICAL EXAGGERATION

SCALE: 1" = 20'

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CROSS SECTIONS

SHEET

5 OF 5



Attachment 2:
Barstowe's Pond Dam Removal Cotley River Restoration,
Post-Construction Monitoring, Taunton, MA

Index and Photos of the Cross-section Monuments

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Cross-section	Point ID	Northing (feet)	Easting (feet)	Elevation (NAVD88)	Station
1	CP1L	2781527.82	778283.33	14.8	Sta. 1+67
1	CP1R	2781342.19	778101.52	14.2	Sta. 1+67
2	CP2L	2781324.02	778161.88	14.2	Sta. 1+86
2	CP2R	2780768.06	778091.19	14.7	Sta. 1+86
3	CP3L	2780781.49	778220.41	14.6	Sta. 2+07
3	CP3R	2780497.23	778057.31	15.4	Sta. 2+07
4	CP4L	2780427.91	778046.01	25.1	Sta. 2+42
4	CP4ML	2780383.93	778022.91	26.2	Sta. 2+42
4	CP4MR	2780401.14	778055.37	24.4	Sta. 2+42
4	CP4R	2780311.03	778014.22	16.2	Sta. 2+42
5	CP5L	2780365.86	778103.37	16.5	Sta. 3+09
5	CP5R	2780245.05	778021.48	18.3	Sta. 3+09
6	CP6L	2780318.50	778155.38	19.0	Sta. 4+76
6	CP6R	2782517.15	779096.17	10.8	Sta. 4+76
7	CP7L	2782451.60	779171.52	10.5	Sta. 7+15
7	CP7R	2782493.48	779083.53	14.6	Sta. 7+15
8	CP8L	2782439.55	779150.43	18.4	Sta. 10+34
8	CP8R	2782479.86	779070.50	14.8	Sta. 10+34
9	CP9L	2782421.32	779132.86	14.3	Sta. 13+65
9	CP9R	2782463.14	779045.35	14.8	Sta. 13+65
10	CP10L	2781586.65	778165.38	13.6	Sta. 16+81
10	CP10R	2782431.14	779073.49	11.7	Sta. 16+81
11	CP11L	2782407.32	779069.73	10.8	Sta. 19+44
11	CP11R	2782390.33	779093.19	13.5	Sta. 19+44
12	CP12L	2782425.55	778982.70	10.6	Sta. 25+31
12	CP12R	2782342.84	779089.56	13.5	Sta. 25+31
13	CP13L	2780445.57	777944.55	15.5	Sta. 29+02
13	CP13R	2782241.27	778914.91	14.1	Sta. 29+02
14	TC14L	2780413.67	778023.16	17.2	Sta. 29+50
14	TC14R	2780417.54	778030.96	16.8	Sta. 29+50
15	TC15L	2780403.65	778028.62	16.1	Sta. 29+62
15	TC15R	2780408.23	778035.98	17.1	Sta. 29+62
16	CP16L	2782137.61	778839.65	13.0	Sta. 29+75
16	CP16R	2781908.57	778997.68	13.1	Sta. 29+75
17	CP17L	2782006.39	778641.14	13.5	Sta. 30+33
17	CP17R	2781928.85	778647.78	14.3	Sta. 30+33
18	CP18L	2781872.59	778345.77	14.6	Sta. 30+93
18	CP18R	2781790.11	778407.75	14.6	Sta. 30+93

R = Right bank, L= Left bank, M= Middle

The convention with Left and Right assumes that the viewer is looking in the downstream direction.

Notes: Monuments were not placed in areas located outside the bounds of the project proponent's property.

Coordinates are referenced to the NAD 83 Massachusetts Mainland State Plane (2001) horizontal datum.

Elevations are referenced to the NAVD88 vertical datum.

Cross-section 1

CP 1R



CP 1L



Cross-section 2

CP2R



CP 2L



Cross-section 3

CP3R



CP3L



Cross-section 4

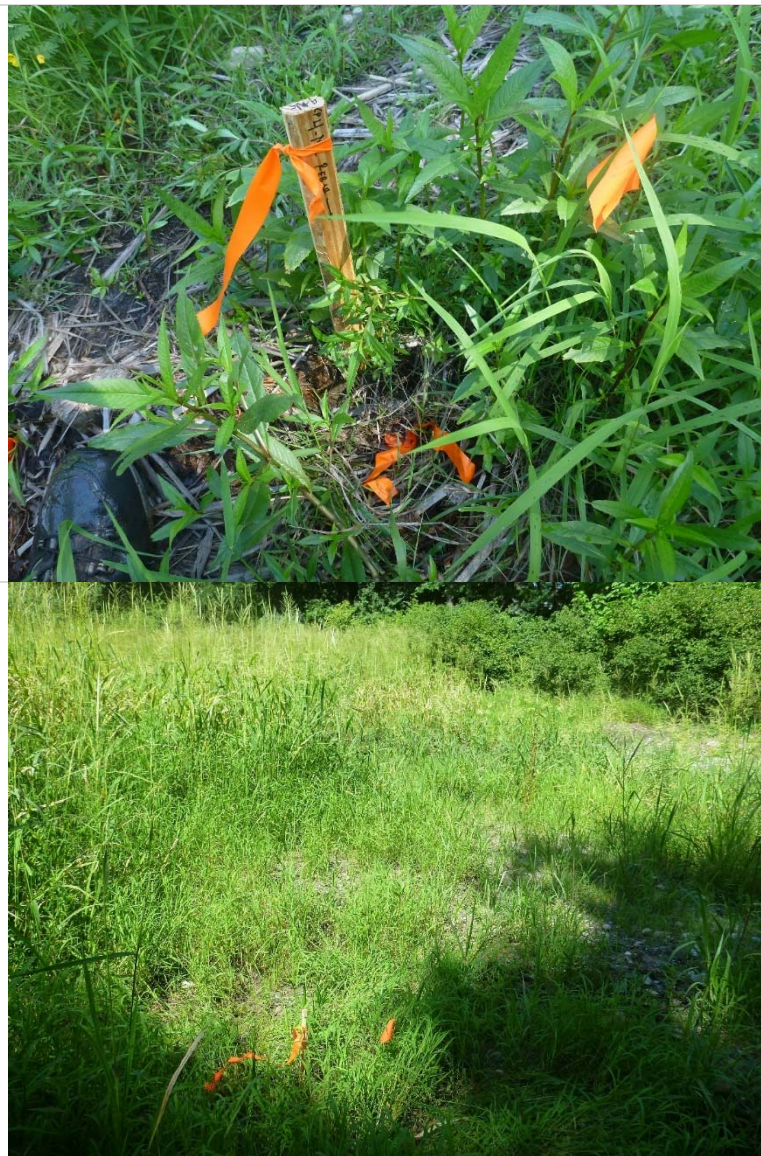
CP4R	CP4MR
 A close-up photograph of a wooden stake with an orange ribbon tied around it. The stake is marked with handwritten text: 'CP4R' at the top, 'Zebra' in the middle, and an arrow pointing downwards. The stake is positioned in a thicket of dry branches and green leaves.	 A photograph showing a wooden stake with an orange ribbon, similar to the one in the CP4R image, standing in a field of tall green grass. The stake is marked with 'CP4MR', 'Zebra', and an arrow. The background shows a dense line of green bushes under bright sunlight.

Cross-section 4

CP4L



CP4ML



Cross-section 5

CP5R



CP5L



Cross-section 6

CP6R	CP6L
Photo not available.	Photo not available.

Cross-section 7

CP7R



CP7L



Cross-section 8

CP8R



CP8L



Cross-section 9

CP9R



CP9L



Cross-section 10

CP10R



CP10L



Cross-section 11

CP11R



CP11L



Cross-section 12

CP12R



CP12L



Cross-section 13


CP13R



CP13L



Cross-section 14

<p>TC14R</p> 	<p>TC14L</p> <p>Photo not available.</p> <p>Note: The endpoints from cross-section 14 are on the concrete walls of the bridge. Monuments have not been set. Control points have not been set. Coordinates for the endpoints have been provided.</p>
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Cross-section 15

TC15R	TC15L
<p>Photo not available.</p> <p>Note: The endpoints from cross-section 14 are on the concrete walls of the bridge. Monuments have not been set. Control points have not been set. Coordinates for the endpoints have been provided.</p>	<p>Photo not available.</p> <p>Note: The endpoints from cross-section 14 are on the concrete walls of the bridge. Monuments have not been set. Control points have not been set. Coordinates for the endpoints have been provided.</p>

Cross-section 16

CP16R



CP16L



Cross-section 17

CP17R



CP17L



Cross-section 18

CP18L



CP18R

