Presentation to

WSCAC
Quinapoxet Dam Removal

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June 11, 2024

Todays presentation

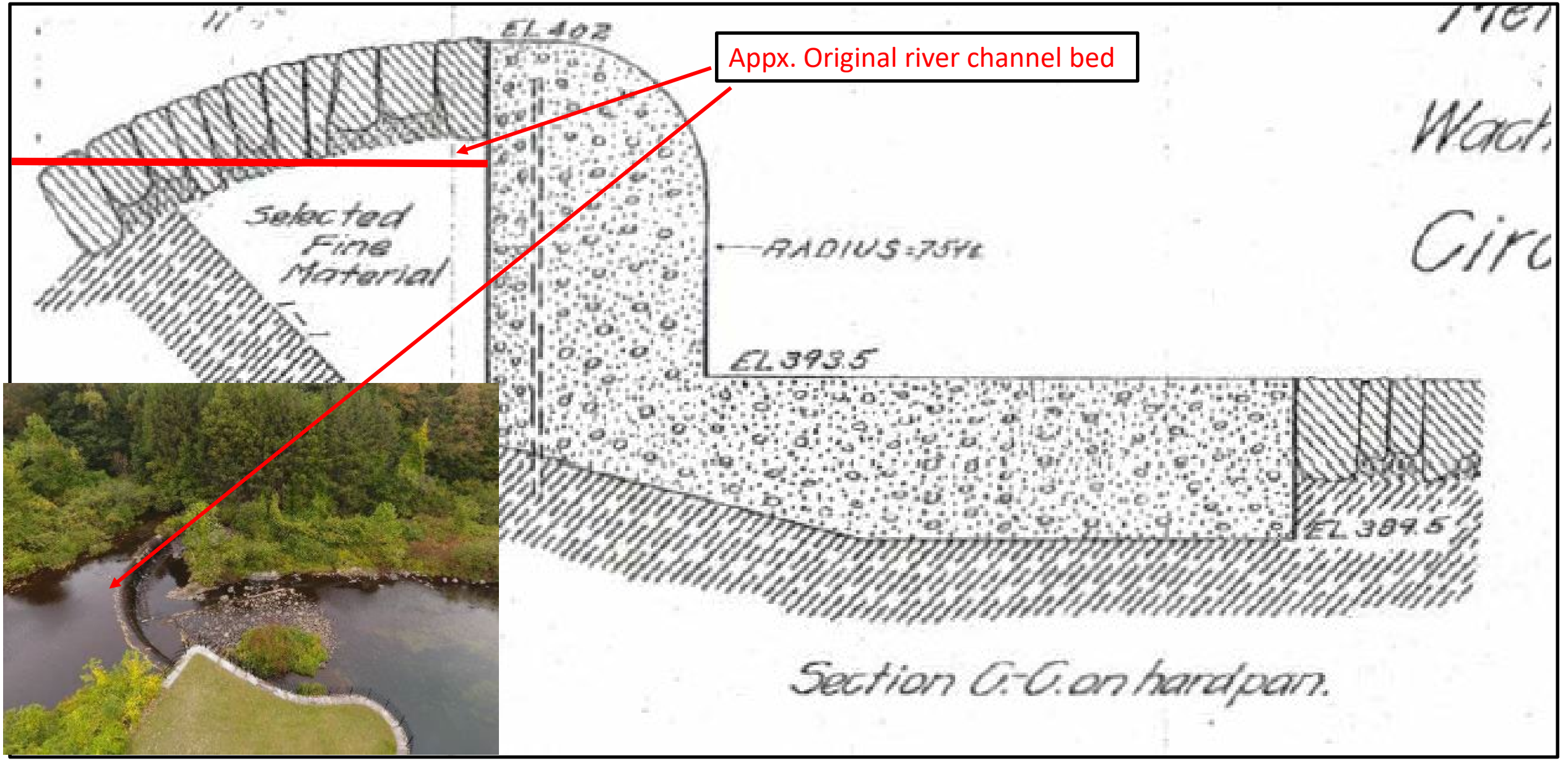
- Project location and history of the Quinapoxet River Dam
- Rationale for removal of Quinapoxet Dam
- Dam Removal Design Components
  - Permitting
  - Water control
  - WQ and sediment control
  - River restoration components
- MCRT Access Request
- Schedule
- Examples of other successful dam removals

Project Location – Wachusett Reservoir, West Boylston, MA

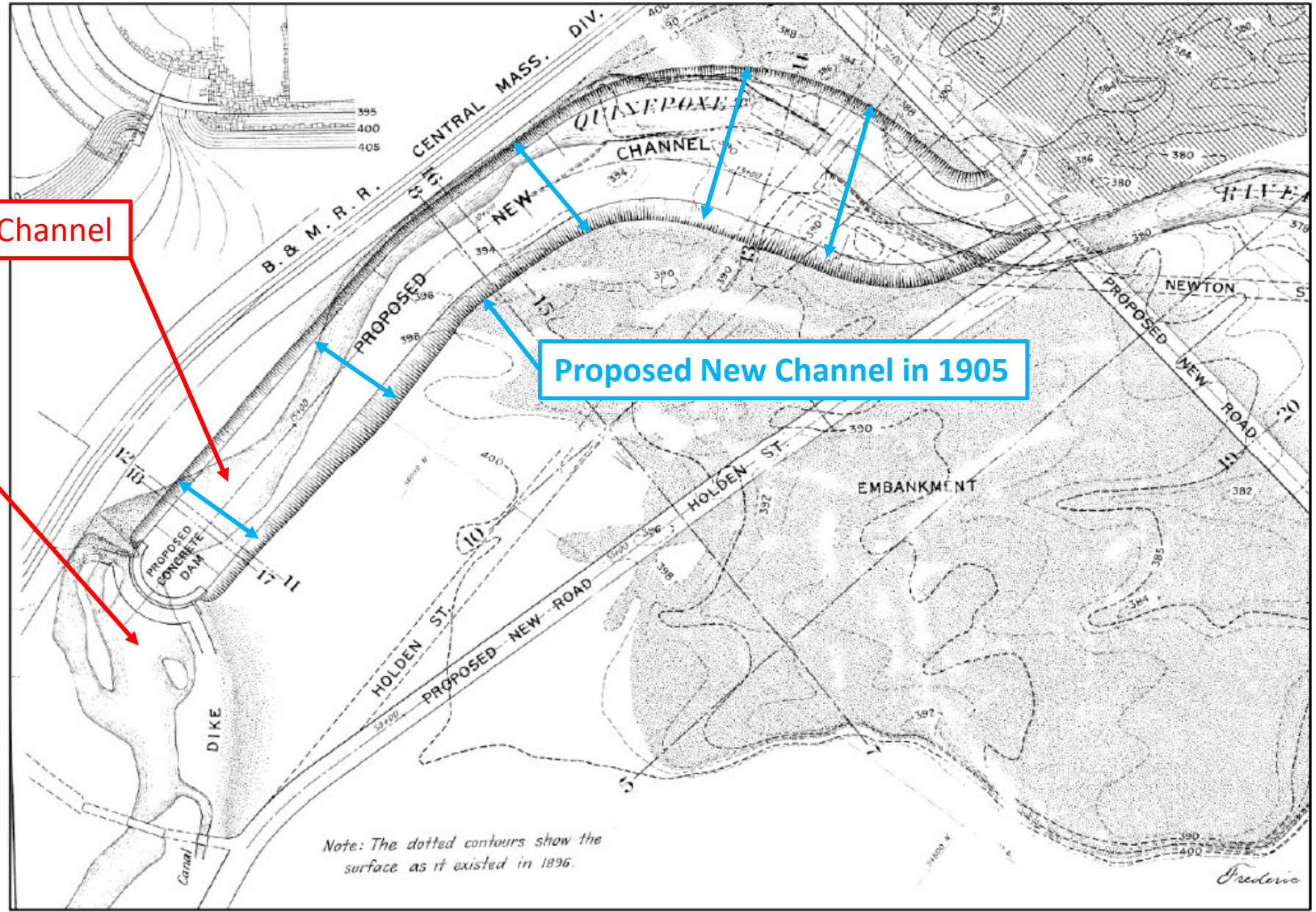
History of Quinapoxet Dam

- Quinapoxet Dam spillway was created ca. 1905 by excavating back the downstream river channel up to rock outcrop of present dam spillway location.
- Quini. Dam is very unique. It has practically no impoundment. The top of spillway is at approximately the grade of the original river bed. Virtually no impounded sediment.
- Downstream riverbed from Quini. Dam to the 3-arch bridge was lowered and overwidened to reduce velocities and allow accretion of sediment in that modified reach of river channel prior to entering Wachusett Reservoir

Unique Design of circular dam



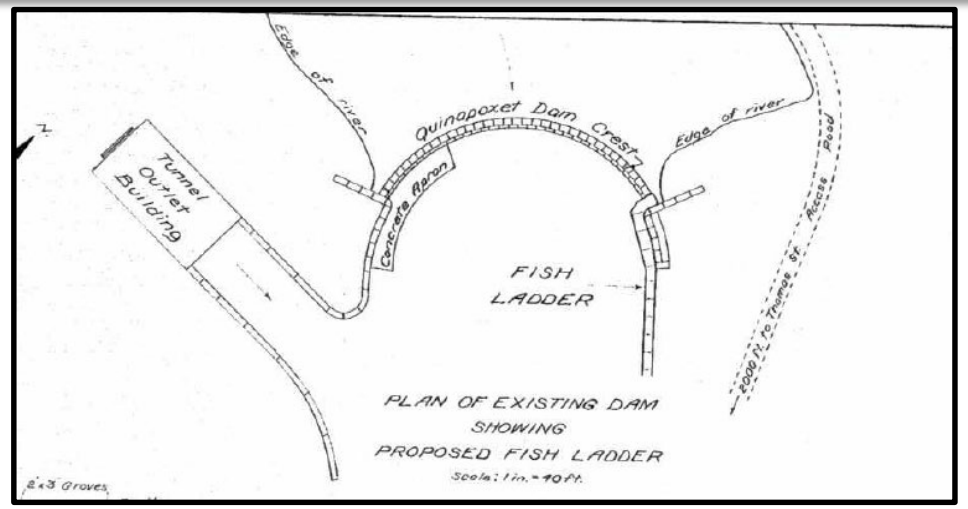
Historic River Channel ca. 1902

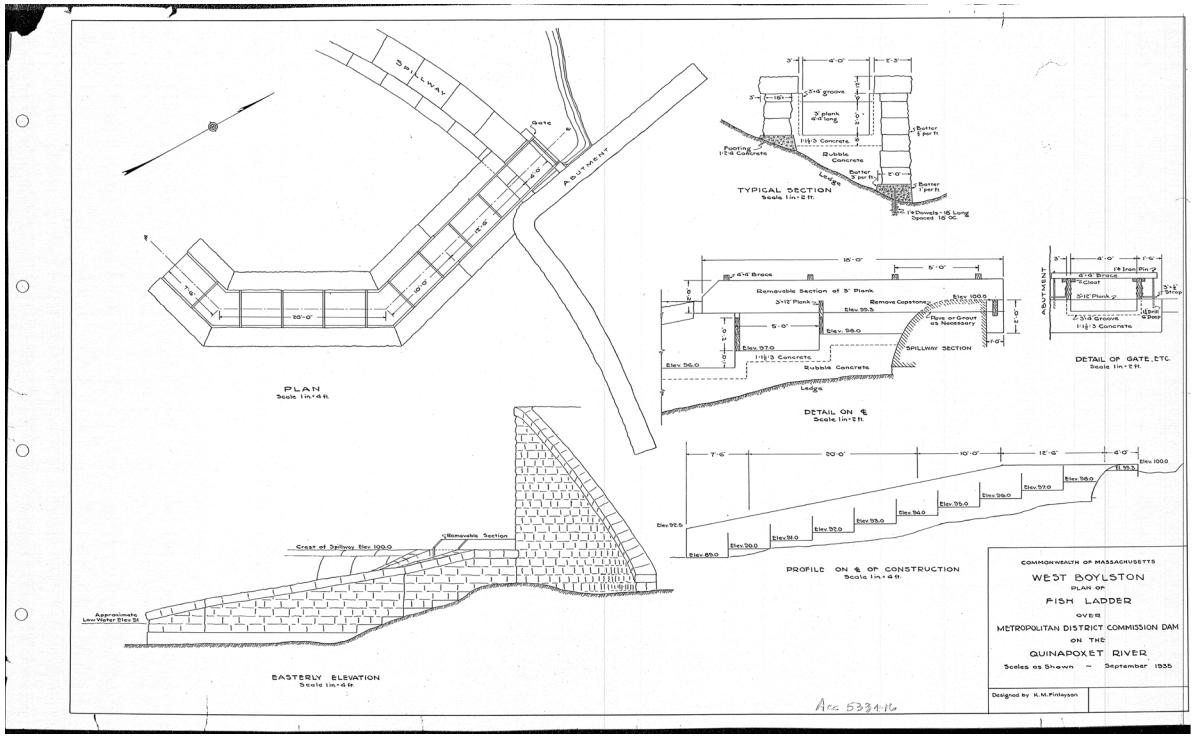


Quinapoxet River Channel 1902 – 1904 (and today)

Quinapoxet Circular Dam 1905

Fish Passage issues ca. 1930s





Quabbin Aqueduct

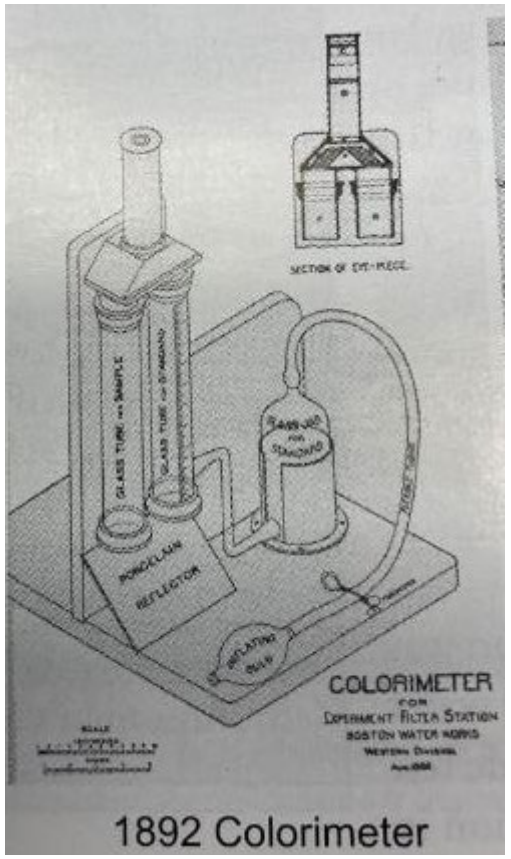
Reservoir Design in the Victorian Era

Rationale of Dam Removal: modern reservoir operations

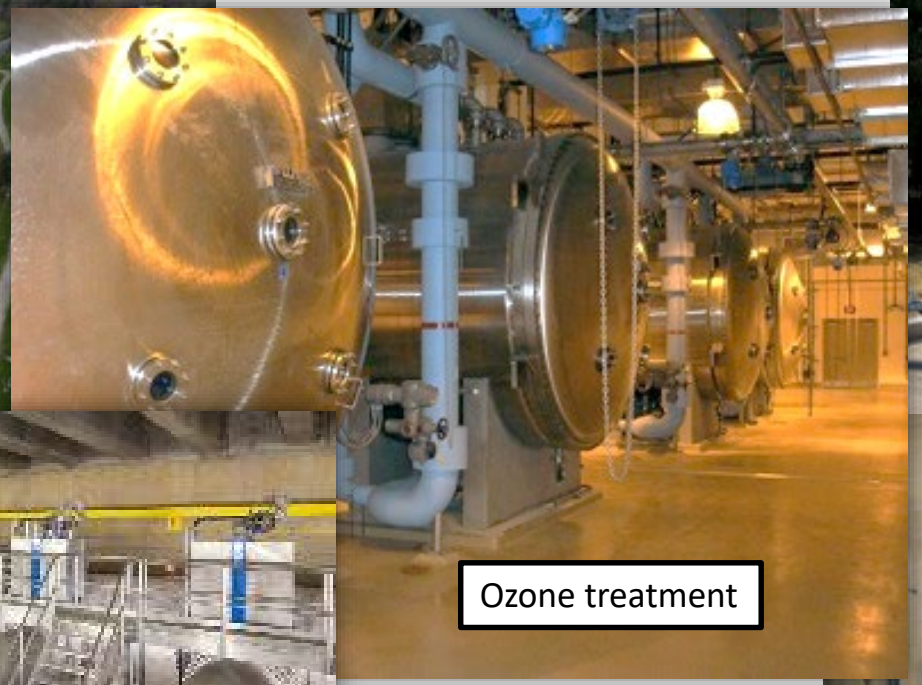
Early 2000s, an operating band was set at 390’ – 391. 5’, subsequently modified to 389’ to 391.5’.

Rationale for dam removal: Improvements in water quality monitoring

George C. Whipple, Sanitary Engineer at MIT, Director of Chestnut Hill Laboratory, Boston 1889-1897 – Father of water microscopy



Modern Water Monitoring and Treatment



Ozone treatment

UV treatment

Rational for Dam Removal: Condition of the spillway

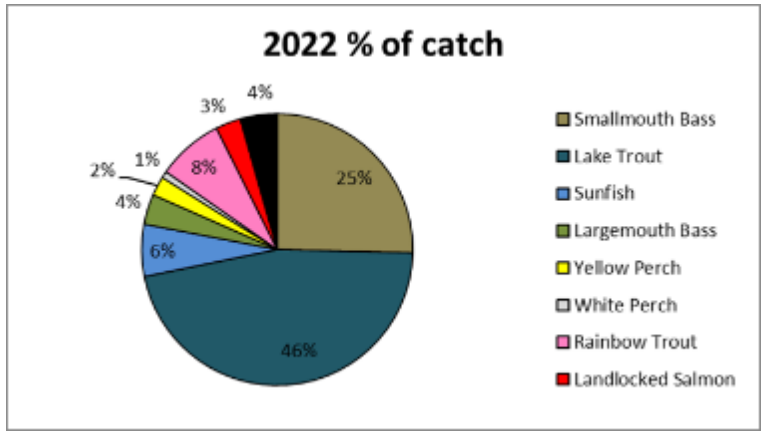
3.7 Opinion of Probable Construction Costs

The conceptual cost estimate for the recommended studies and analyses above is approximately $60,000 to $120,000, while the estimated cost for repair / remedial items (including engineering) is approximately $250,000 to $500,000. It is assumed that annual maintenance-related items

Rationale for dam removal: environmental factors

- Removal of the dam spillway was determined by MWRA, DCR-DWSP and MA Dept. of Ecological Restoration (MA DER) to be warranted to restore fish passage (landlocked salmon and native brook trout) in the Quinapoxet River,
- Returning the river to a natural riverine hydrology aids in climate resiliance.

DER: "*Quinapoxet River at this location has high potential for restoration*."



Courtesy of Max Nyquist, Aquatic Biologist, DCR-DWSP

LL Salmon at Wachusett Reservoir

Project Team

Water Resources Authority Massachusetts

dcr Massachusetts

Massachusetts Department of Fish and Game Division of Ecological Restoration
Invested in Nature and Community

SLR

Lucianos Excavation Inc.

Executive Office of Energy & Environmental Affairs

… and Supporters

Commonwealth of Massachusetts Division of Fisheries & Wildlife MassWildlife

U.S. Fish & Wildlife Service Department of the Interior

Trout Unlimited Massachusetts

Eastern Brook Trout Joint Venture
A Fish Habitat Partnership

Dam Removal Design

- Paramount in achi ls is the protection of Wachusett Rese akdale Shaft 1 facility and operat
- Key tasks in the dam removal work are

PWS Name: MWRA
PWS ID #6000000
Filtration Waiver Inspections
Wachusett Reservoir

II. INSPECTION RESULTS FOR WACHUSETT RESERVOIR

A. SOURCE WATER QUALITY CONDITIONS

1) Coliform Bacteria – The system has demonstrated that the requirements of 310 CMR 22.20A(2)(a)(1) for fecal coliform bacteria have been met in at least 90 percent of the representative source water samples. The samples were taken immediately prior to the point of disinfection application and were representative of the prior six-month period during which water was served to the public.

2) Turbidity – The system has met the requirements of 310 CMR 22.20A(2)(a)(2) and (3) for turbidity levels in representative source water samples that were taken immediately prior to the point of disinfection application.

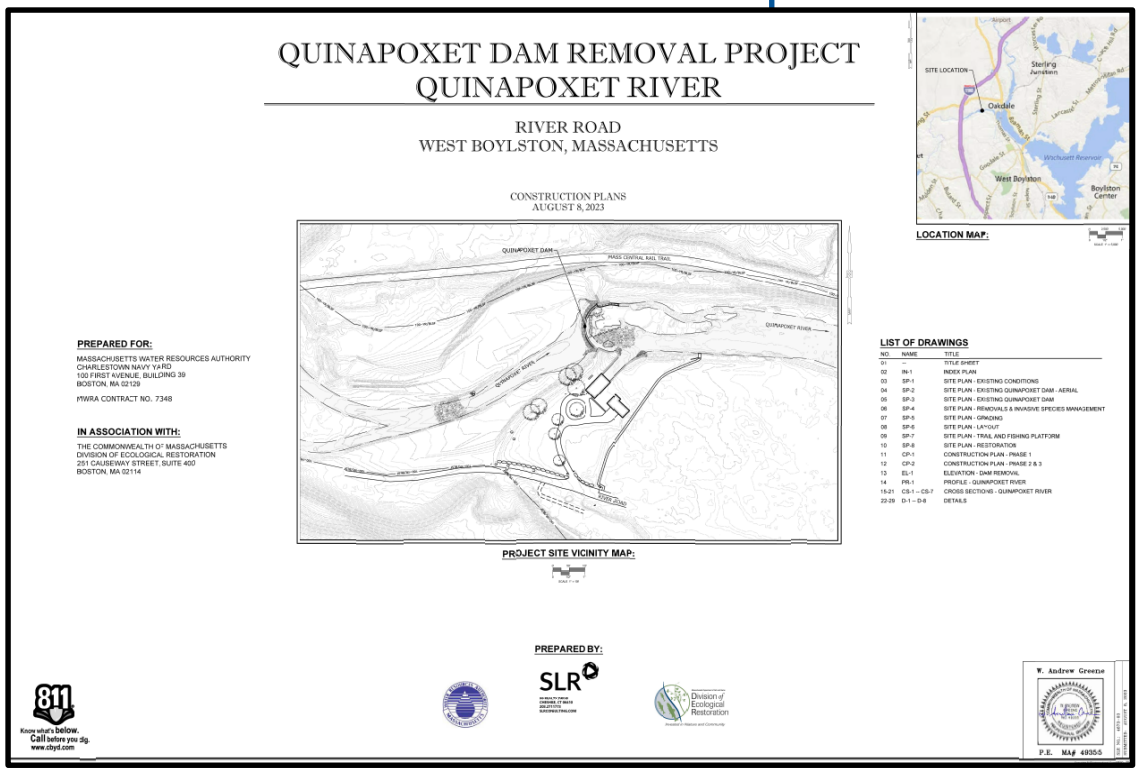
DESIGN CONTRACT

Regulatory Review and Permitting

- Local, State, and Federal jurisdiction over various aspects of the project.
- Key review and permitting completed:
  - MEPA -- **Rec'd Waiver**
  - West Boylston ConCom -- **Rec'd OOC**
  - Waterways/C. 91 -- **Received**
  - US ACOE 404 dredge and fill/NPDES General Construction Permit -- **Received**
  - MA DEP 401 WQ Cert.-- **Received**
  - MA Endangered Species Review -- **No ES issues**
  - Dam Safety Ch. 253 -- **Not required. Dam removal determined Non-jurisdictional**
  - MA Historic Commission -- **Received**
  - Additional careful coordination with agencies, interest groups and community.

Design Components

- Structural and water quality protections determined and included as part of design:
  - Design
  - Permitting
  - Water Control Plan
  - Sediment Mgmt. Plan
  - Turbidity Monitoring Plan
  - Infrastructure Protection
    - (DMPs on Shaft 1 Facility)
  - Architectural Rendering
  - Construction Videography
  - Riverine restoration and post construction monitoring



Construction Phasing

Phase I. Cofferdam upstream river, removal of southern portion of dam to accommodate install bypass piping

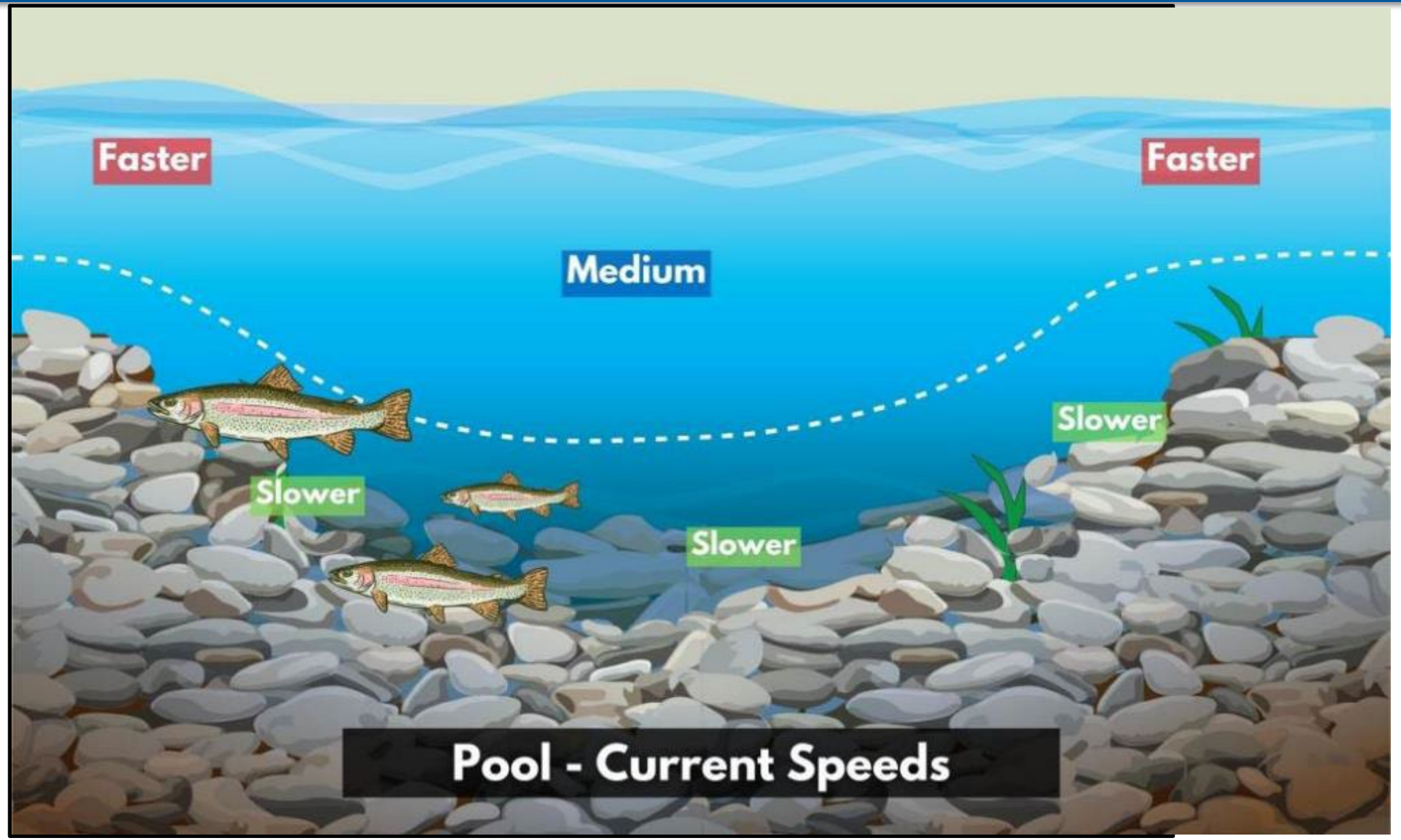
Phase II. Water gravity bypass and limited groundwater pumping to dry out the work area. Culvert crossings over flow path for river and dam access. Demo of masonry weir, fish ladder, appurtenances and removal of existing islands.

Phase III. Installation of tailrace channel, riverine reconstruction, ADA fishing platform, floodplain bioengineering restorations

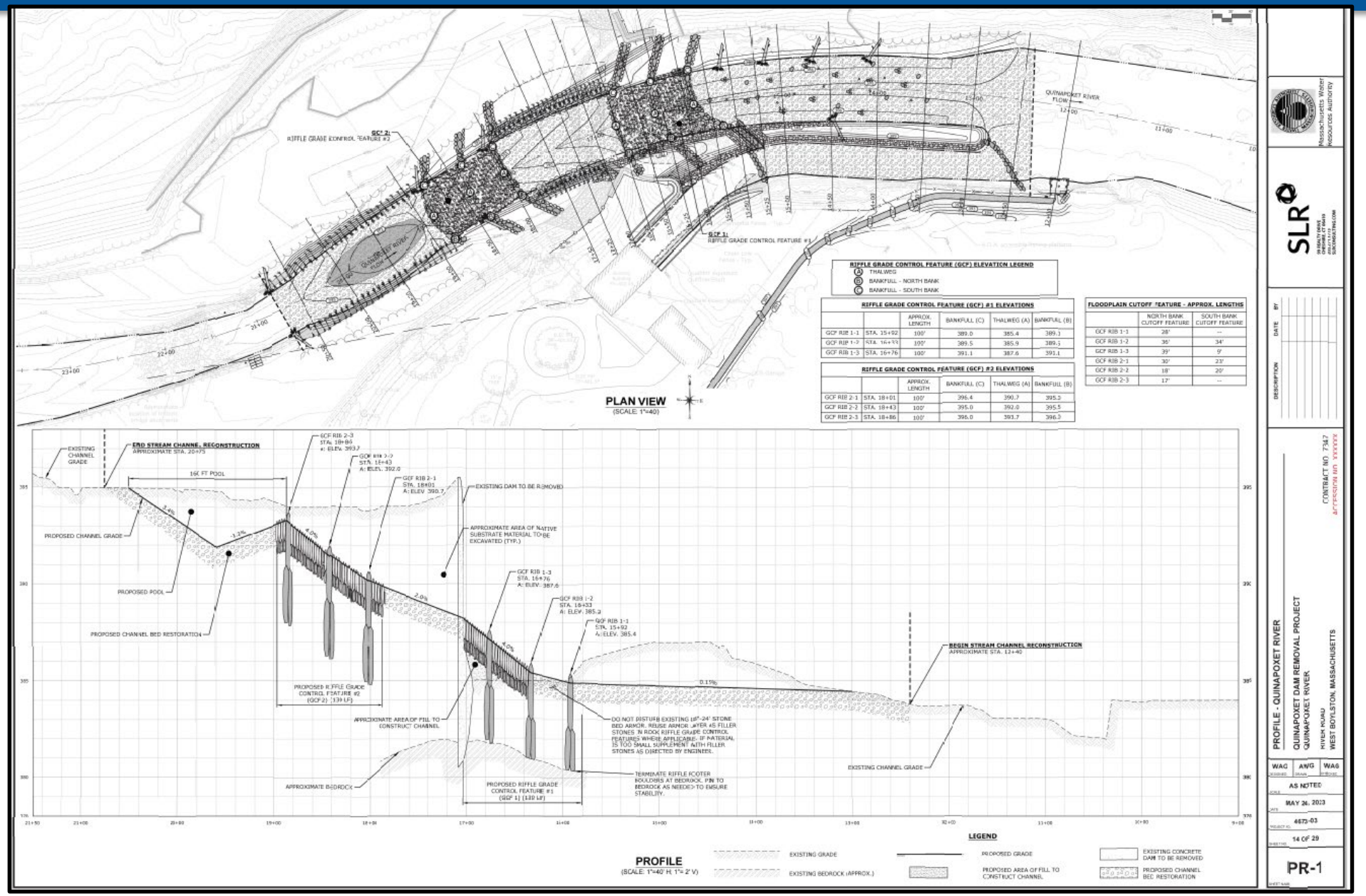
Dam Removal Water Control Examples designed by SLR

Housatonic River

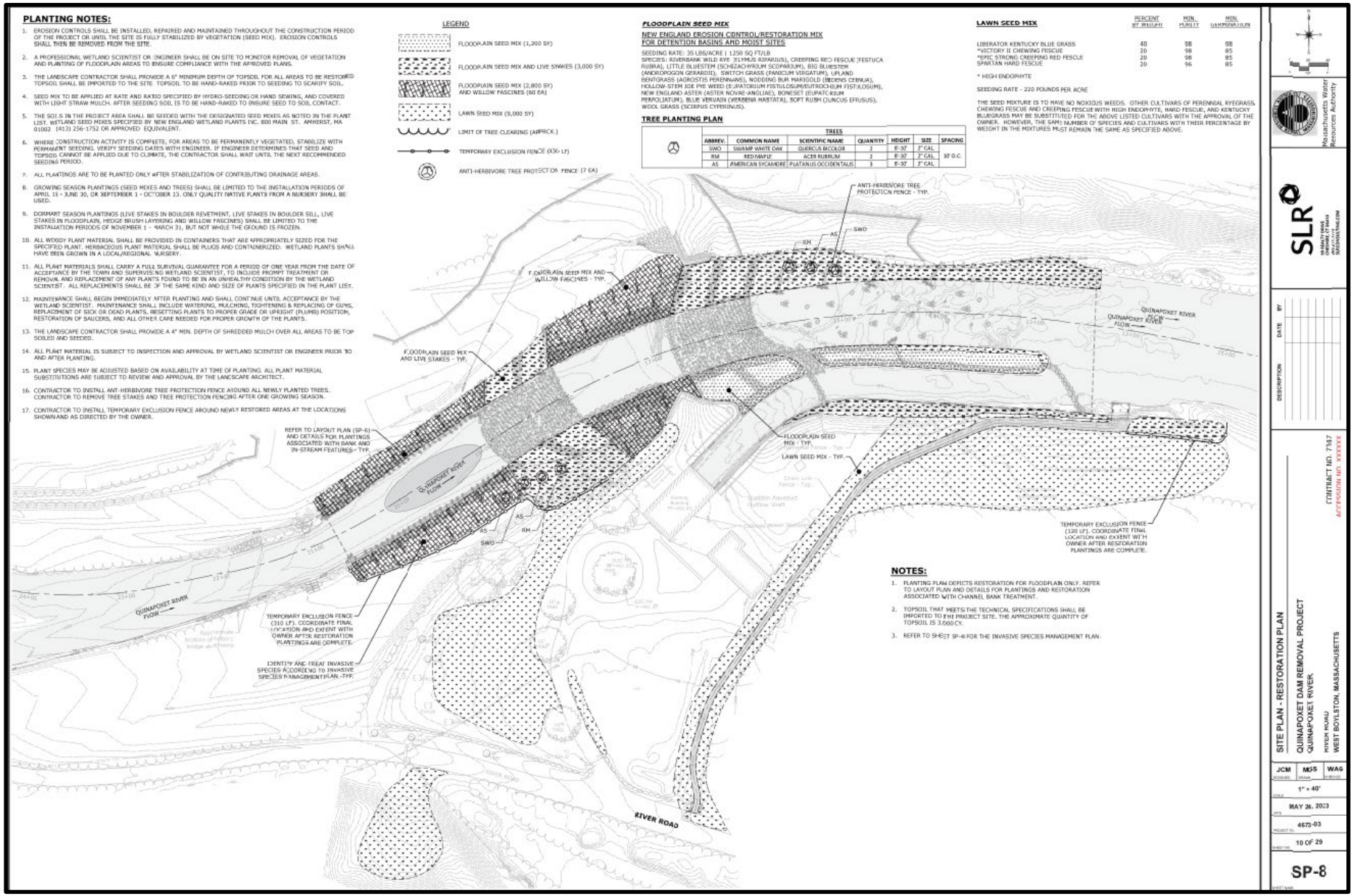
Project overview

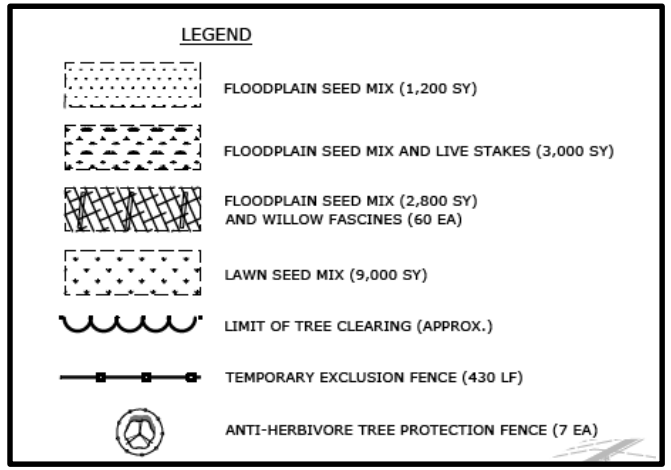


Design components

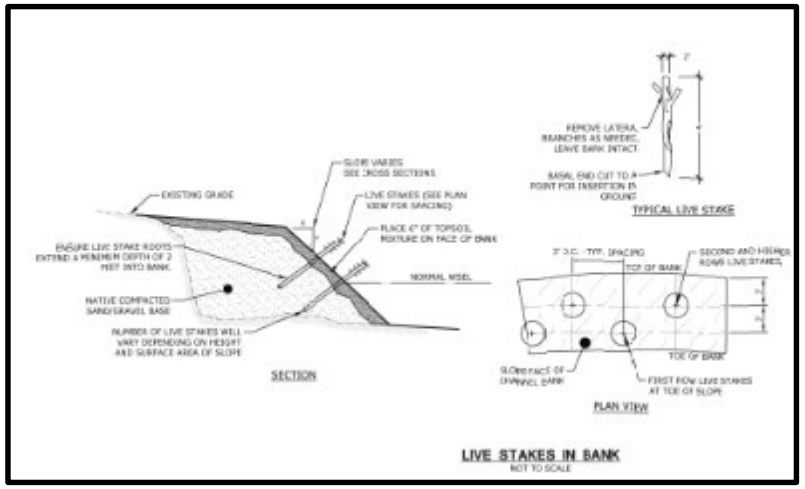


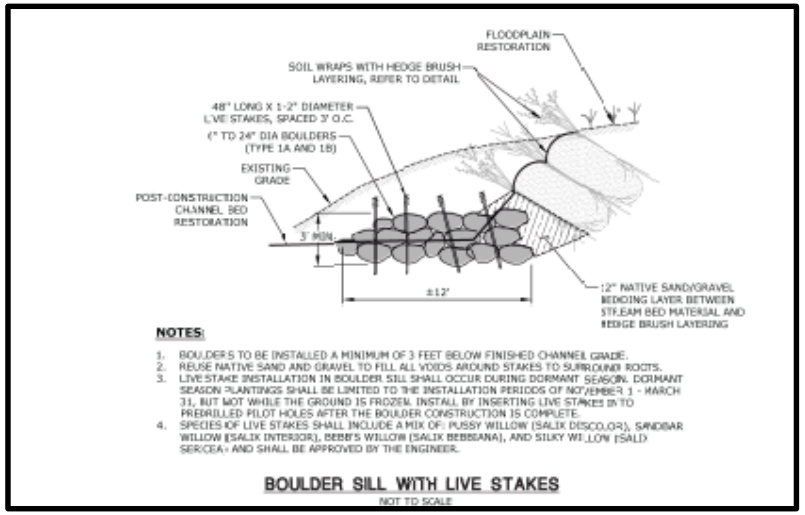
Restoration Plan

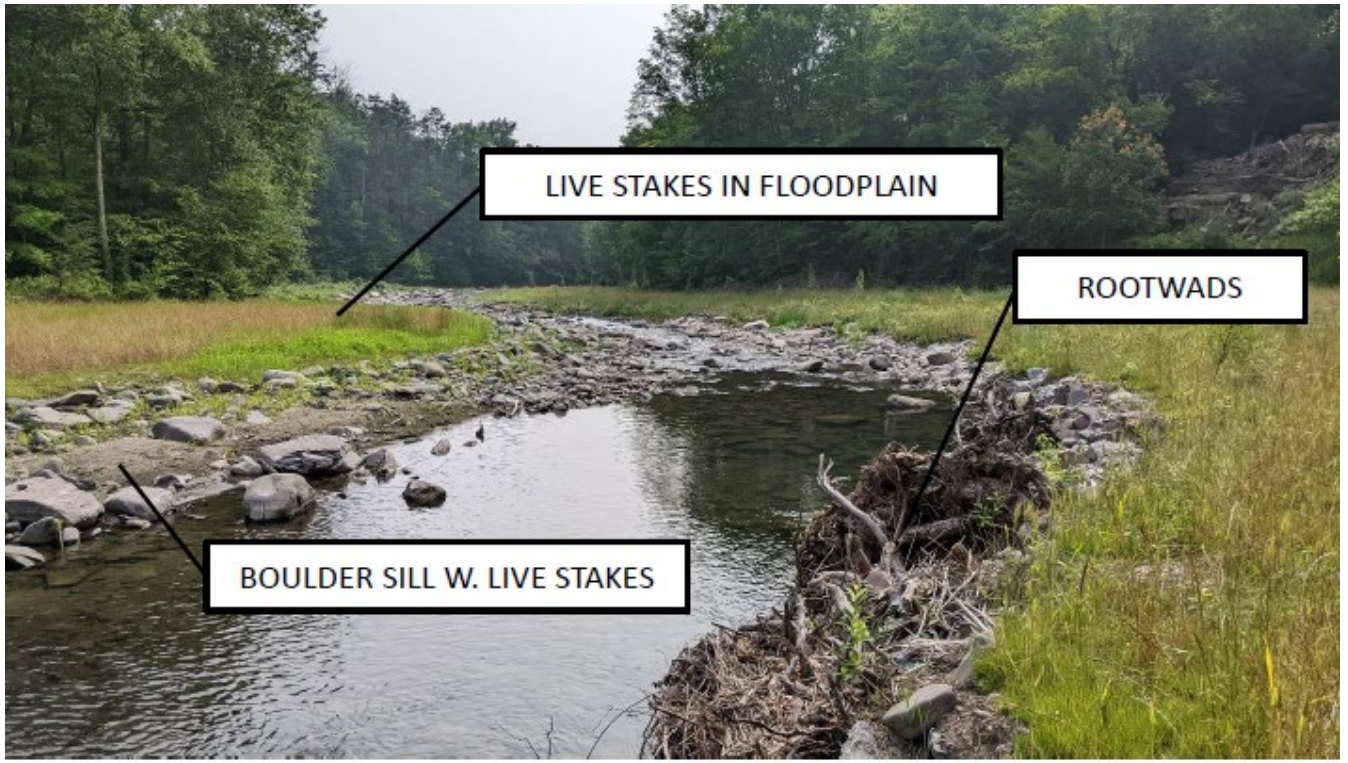




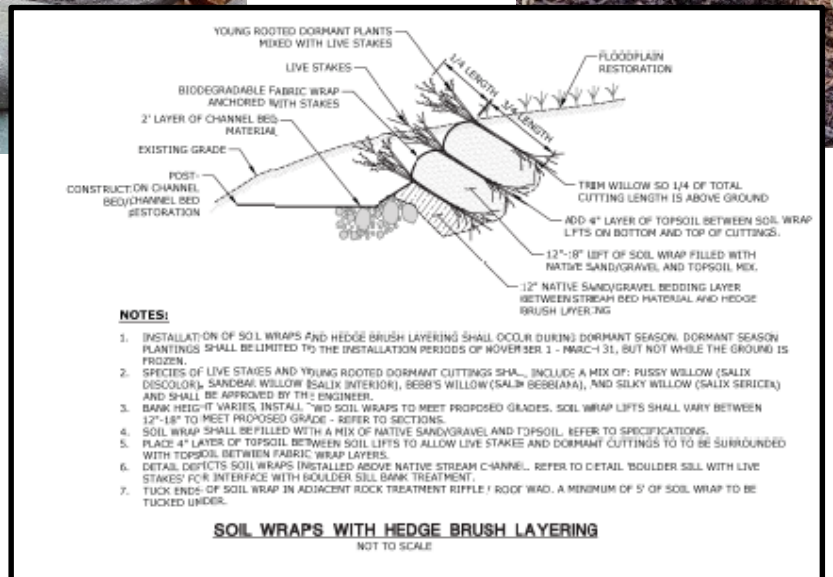
Bioengineering



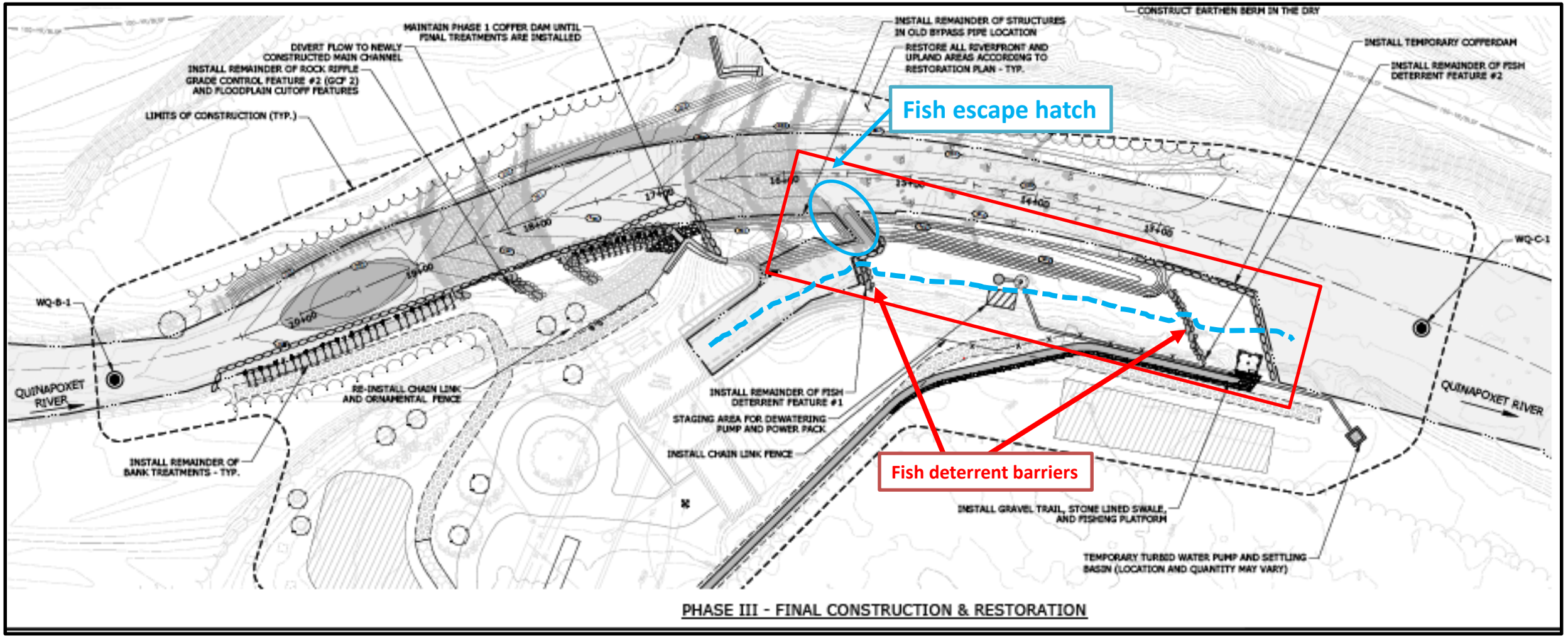




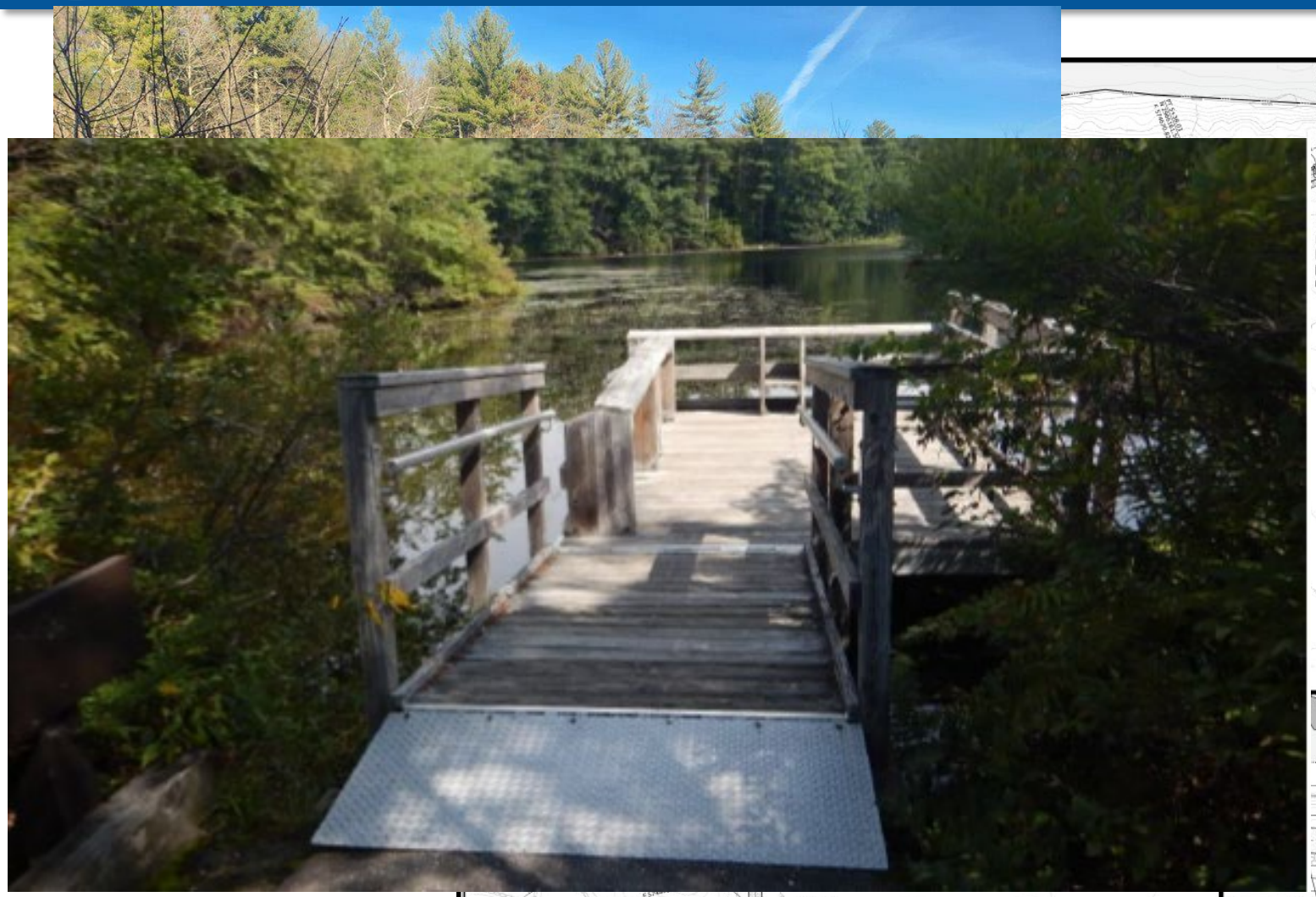
Bioengineering



Structures to counter attraction flow from the tailrace

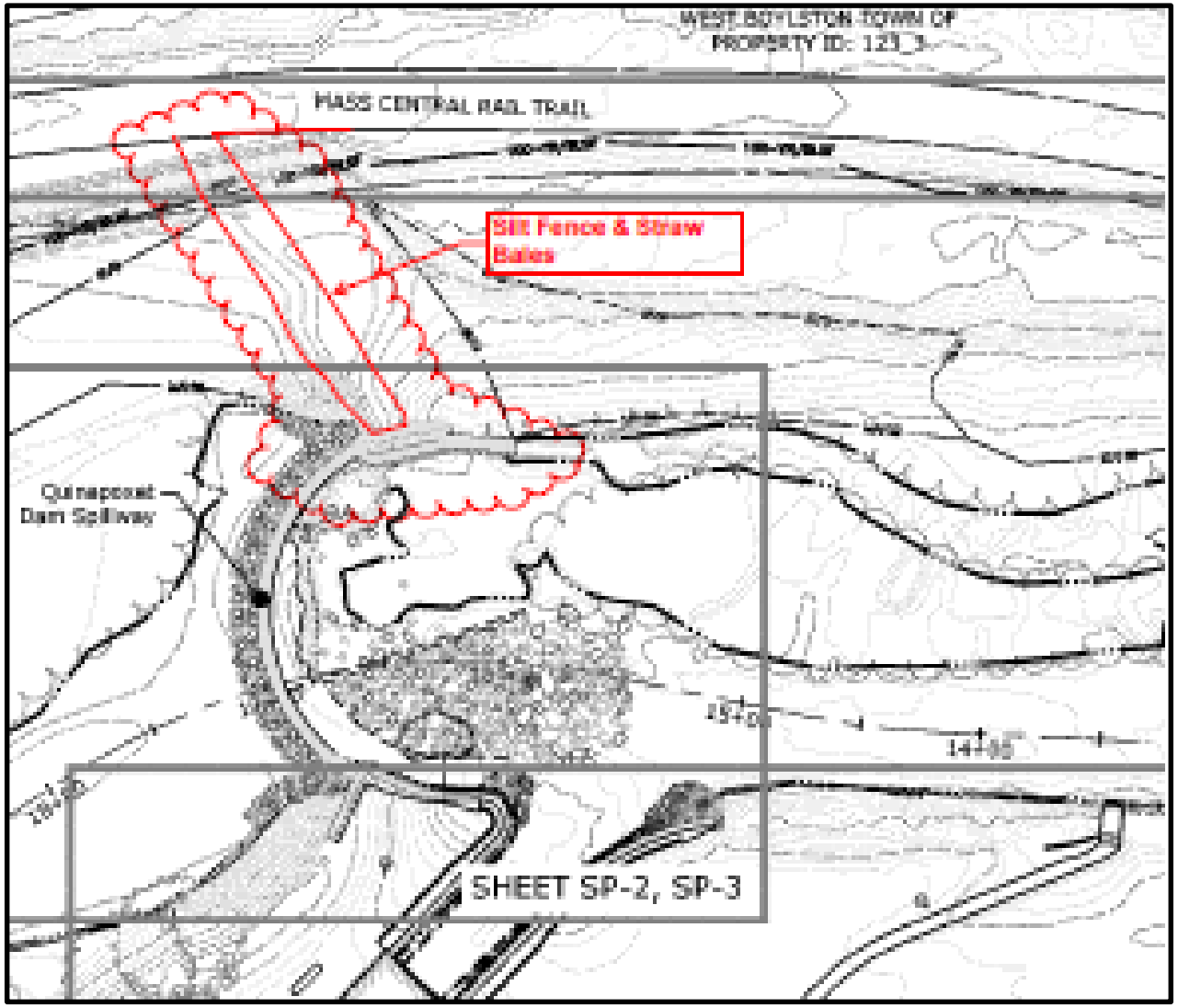


ADA Accessible fishing platform

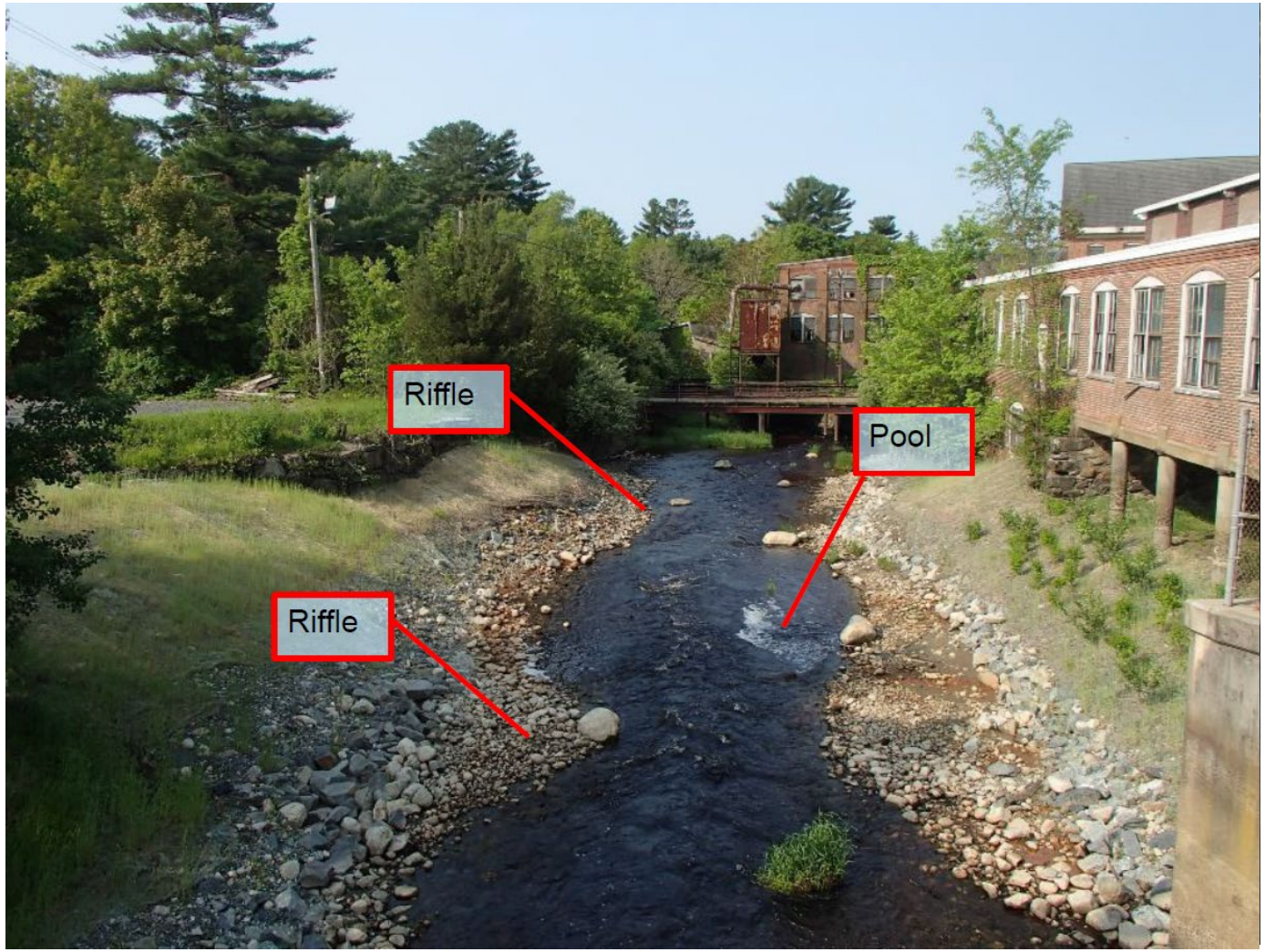


MCRT Access Request

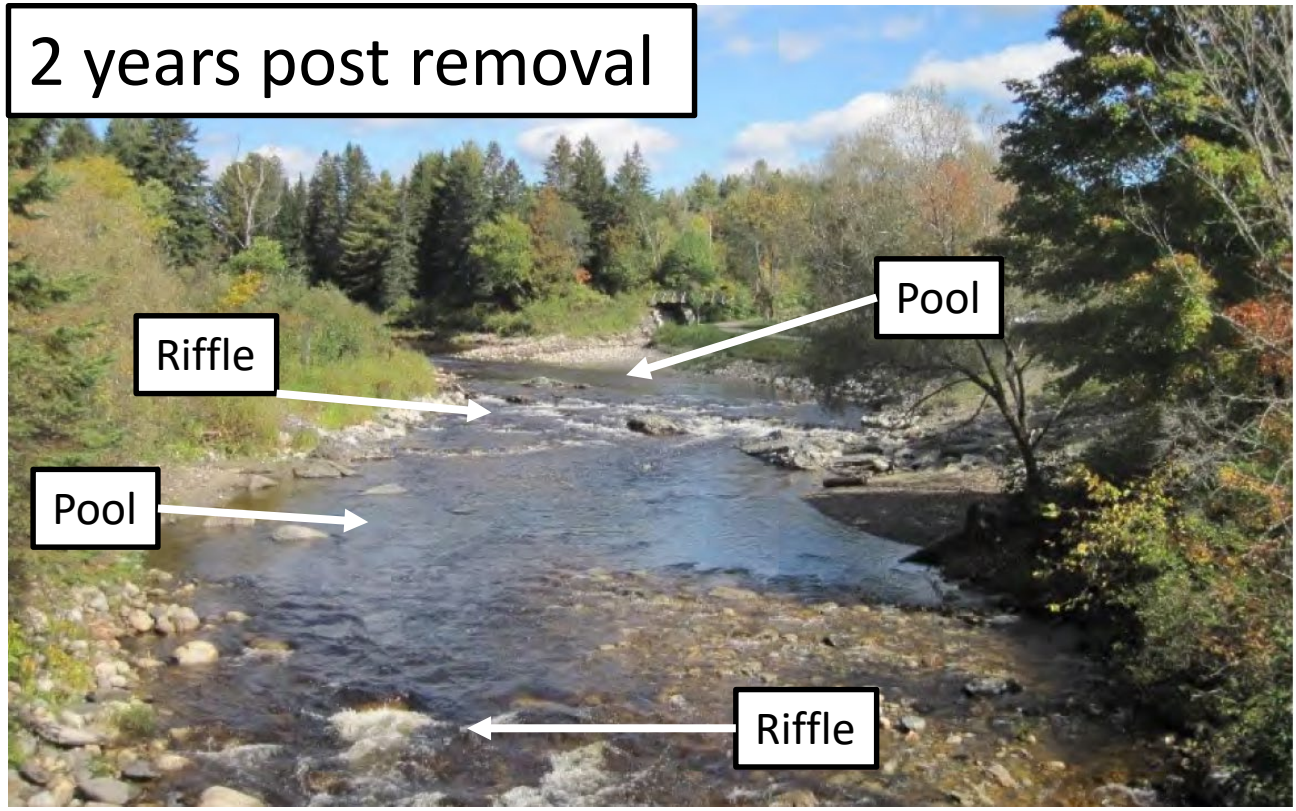
- When: Periodic access November 2024 – April 2025 .
- Environmental controls (silt fence and straw bales).
- Machine access temp gravel path for some dam demolition materials removal and river channel and bank reconstruction
- Selective tree/vegetation removal for access. Other trees protected.
- Site signage and cones/safety tape to alert public to access area for equipment
- Public notice of access days. Public access not impeded.
- Access area restored upon completion. Path to view area and informational Kiosk (DCR)



Example: Restored River @ Cotton Gin Dam, Bridgewater, MA



East Burke Dam, VT.



Schedule

Early mobe items in spring 2024:

- Access roads
- Trailer
- Staging of materials (incl. bypass piping)
- Groundbreaking event June 17, 2024
- Fall 2024 more intense site work to support in-channel construction ops starting early November.