Great Dam Removal Project

Resource Agency Coordination Meeting

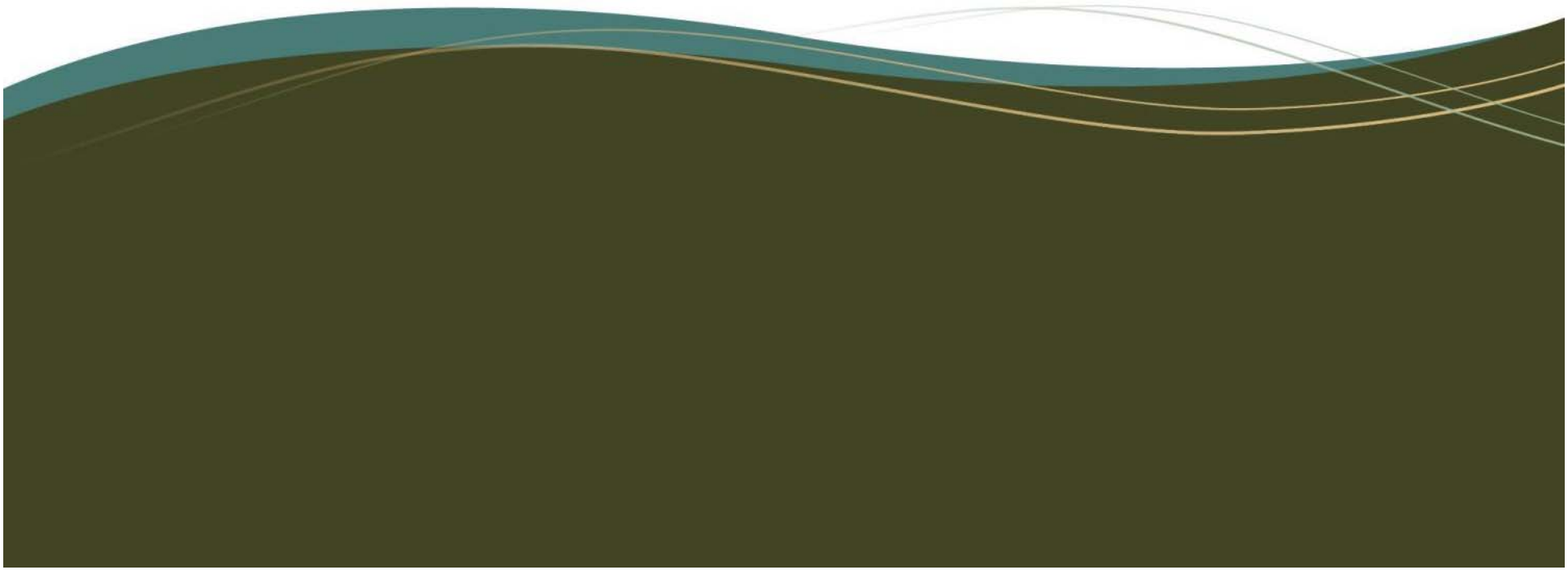
December 16, 2014
Exeter Public Library

Agenda

- Project Background
- Study Area Orientation
- Project Scope and Issues
- Sediment Management

Great Dam Removal

PROJECT BACKGROUND



Dam Safety

- Dam is classified as a “Class A Dam” (Low hazard)
- Class A Dams shall pass a 50-year flood or shall be stable enough so that it is safe under the specified flood conditions
- Great Dam ***does not pass the 50-year flow*** with 1 ft freeboard and ***does not meet stability criteria***

Project History – Previous Activities

1981	• Town Takes Ownership of the Dam
2000-2009	• NHDES Dam Bureau Issues Letter of Deficiency and Amendment
2007	• Phase 1 (Dam Modification) Final Report for the Town of Exeter (Wright-Pierce)
2008	• Riverbank Scour/Design Impacts to Water Quality (Wright-Pierce)
2009	• Geomorphic Assessment (Bear Creek Environmental/Fitzgerald)
2010	• Water Supply Alternatives Study – Final Report (Weston & Sampson)
2013	• Great Dam Removal Feasibility and Impact Study (VHB)
2014	• Town Warrant Article No. 8 Passes

Exeter River Study Committee

Member	Representing
Lionel Ingram, Chair	Exeter Resident
Pete Richardson, Vice Chair	Exeter Resident
Frank Patterson	Exeter Resident
Rob Bourdon	Exeter Resident
Richard Huber	Exeter Resident
Dr. Mimi Larsen Becker	Exeter Resident
Roger Wakeman	Phillips Exeter Academy
Kristen Murphy	Exeter Natural Resource Planner
Paul Vlasich	Exeter Public Works
Ginny Raub	Exeter Conservation Commission
Don Clement	Board of Selectmen
Additional Members of the Working Group	
Deborah Loiselle, Co-Chair	NHDES Dam Bureau
Phyllis Duffy	Town of Exeter Engineering Dept.
Eric Hutchins	NOAA Restoration Center
Sally Soule	NHDES Watershed Assistance

Feasibility Study: General Alternatives

- **Lower spillway** by various amounts
  - Carried forward
- **Adjustable spillway** using alternative systems
  - Carried forward.
- **Extension of the existing spillway** into Founder's Park.
  - (Discarded: Too much impact to Founder's Park – 300 ft)
- Creation of an **additional spillway** in Founder's Park.
  - (Discarded: Too much impact to Founder's Park & Penstock)
- Construction of a **labyrinth spillway**.
  - (Discarded: Not enough gain in hydraulic capacity)

Feasibility Study: Alternatives Considered

- **Alternative A** – **No Action/Existing Condition**
- **Alternative B – Dam Removal**
- **Alternative C** – Dam Modification Concept 2 (W-P 2007)
- **Alternative D** – Revised Dam Modification Concept 2 (0 ft Freeboard)
- **Alternative E** – Revised Dam Modification Concept 2 (1 ft Freeboard)
- **Alternative F** – **Partial Removal**
- **Alternative G – Stabilize in Place**
- **Alternative H** – **Dam Modification** - Inflatable Flashboard/Gate System

Feasibility Study Findings

Flooding and Hydraulics

- Substantially lower water levels upstream of the dam under normal flow conditions.
- There would be no changes in river depths, widths or velocities downstream of the dam.
- Reduce the depth of flooding substantially. The area subject to flooding would decrease, but not by a substantial amount.

Infrastructure

- Bridges, walls and foundations upstream of the Great Bridge and downstream of the dam should not be affected by any of the Alternatives.
- Regardless of the alternative chosen, additional investigation is needed to ensure that structures in the immediate vicinity of the dam are properly founded and not damaged.
- Surface water intakes would be adversely affected but could be mitigated.
- Public and private wells are not likely to be impacted to a great degree with any alternative.

Feasibility Study Findings

Cultural Resources

- The Great Dam is a contributing element of Exeter's historic character. Its modification or removal would represent an adverse impact to a historic structure and the surrounding historic district.
- The area around the Great Dam is considered sensitive for archaeological resources which could be impacted by any of the alternatives, although this impact could be mitigated.

Natural Resources

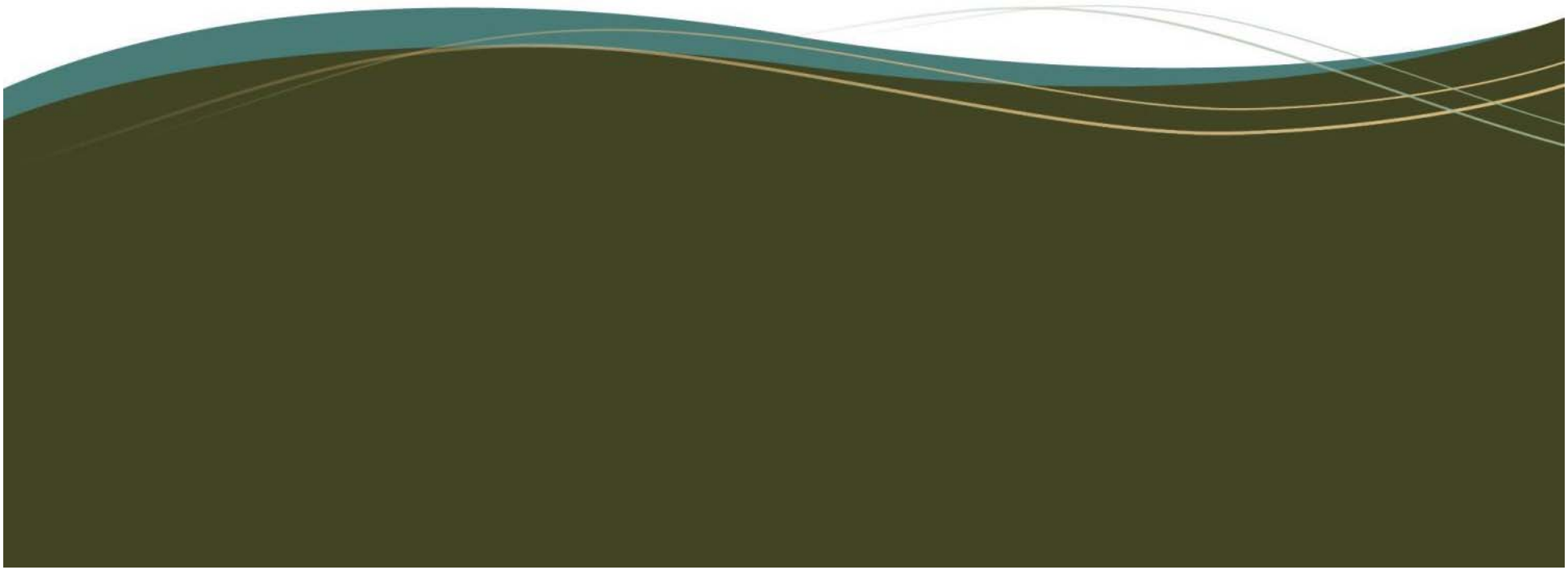
- Substantial net benefit on water quality.
- Significant benefit to important fish populations.
- Not expected to result in significant adverse impacts to wildlife populations.
- Could affect wetlands and floodplain forests which rely to some degree on flooding, including a rare swamp white oak forest community upstream.

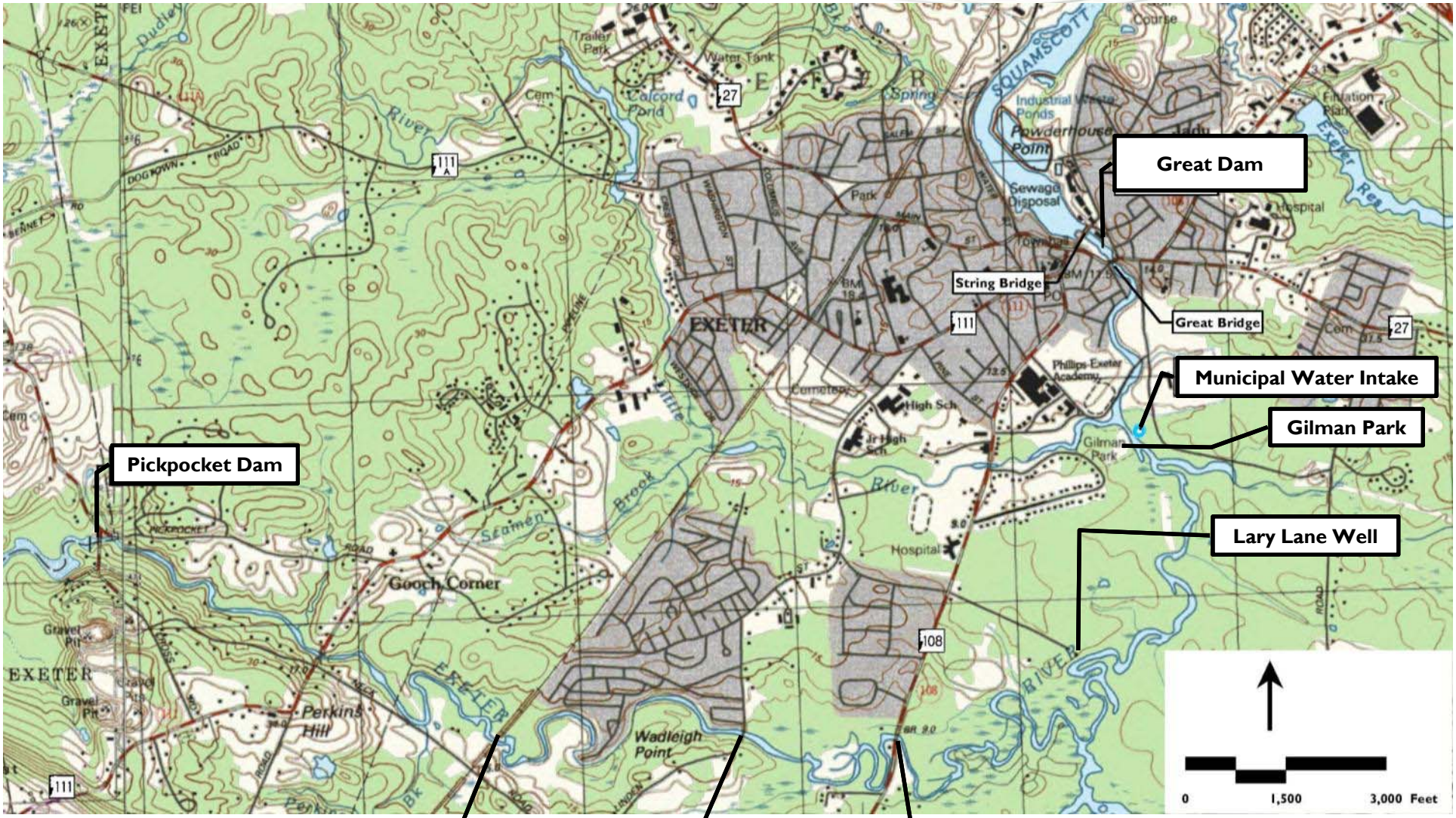
Design and Permitting: Project Schedule

Task	Timeline
Final Design Surveys	September – October 2014
Engineering Design	October 2014 – July 2015
Environmental Permitting	**February – August 2015**
Section 106 Consultation	October 2014 – June 2015
Bid Phase	July – September 2015
Construction Phase	**September 2015 – Spring 2016**

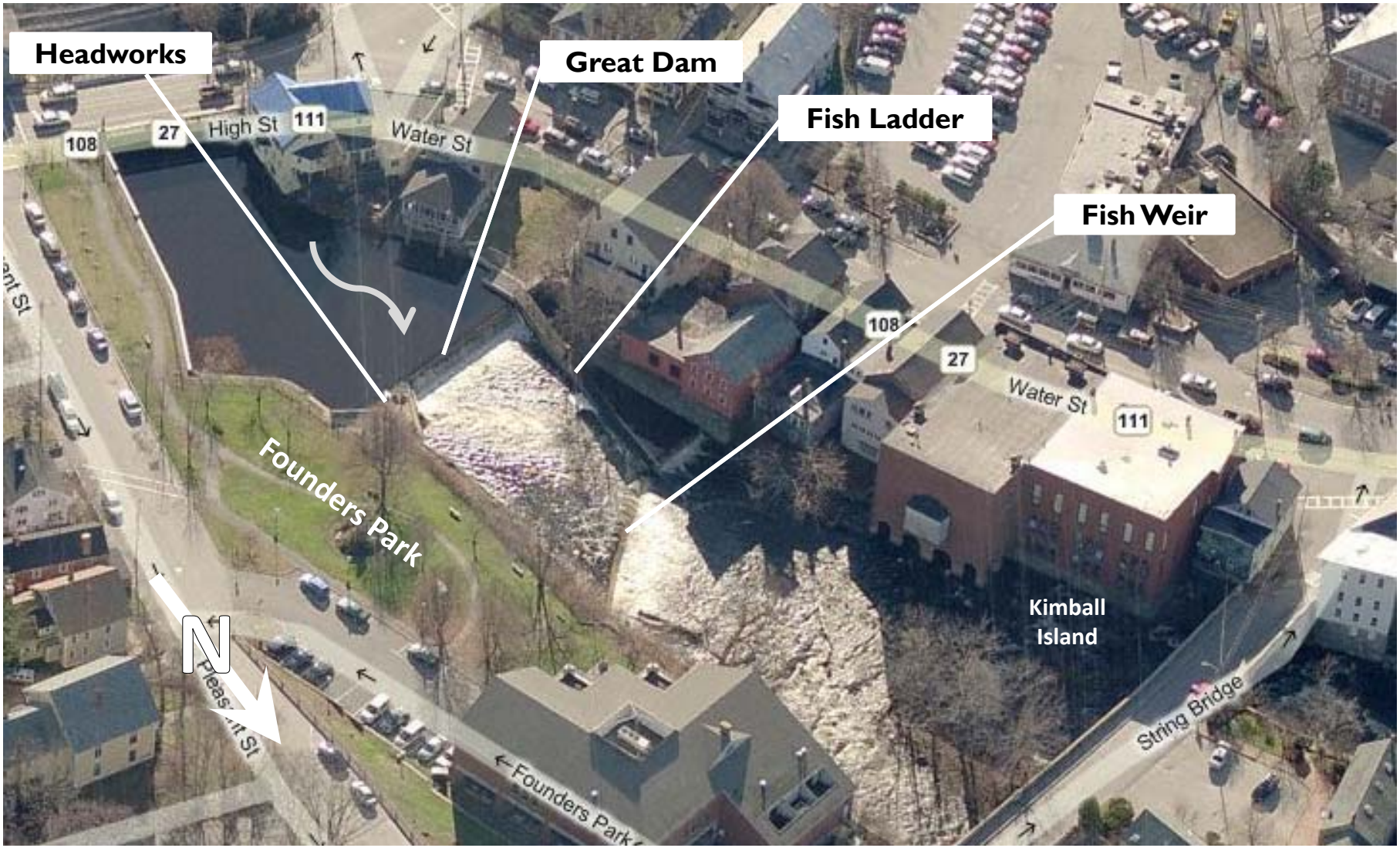
Great Dam Removal

STUDY AREA ORIENTATION

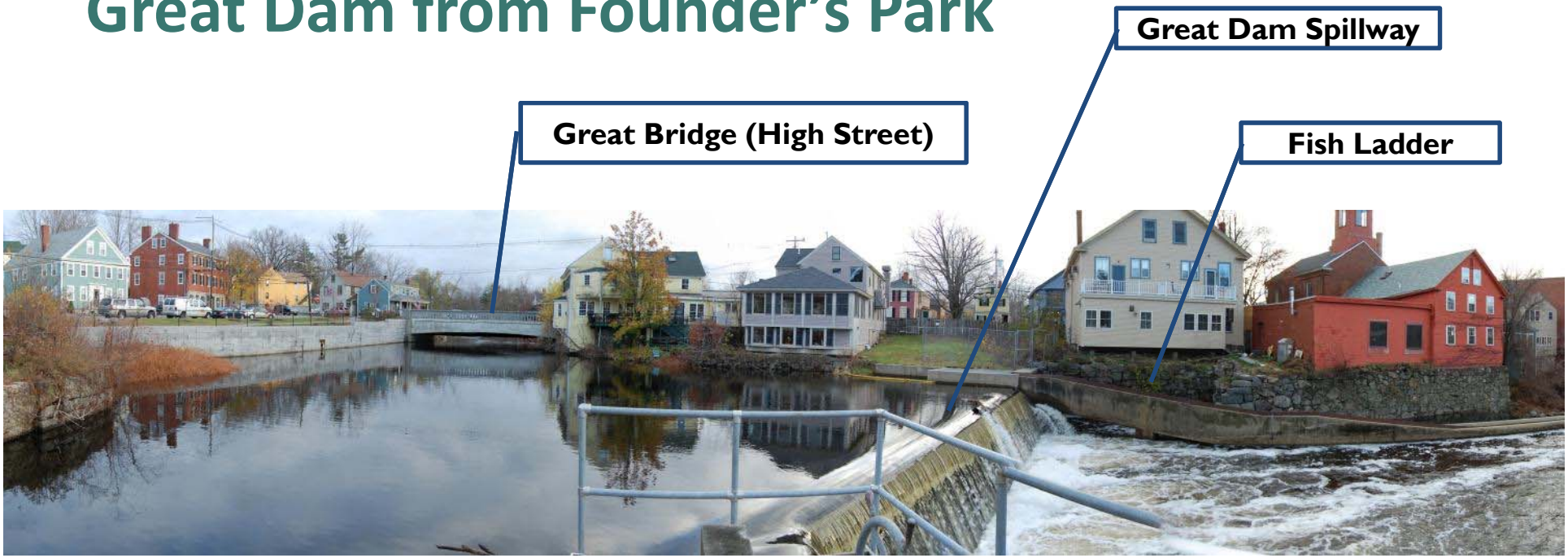



Great Dam
String Bridge
Great Bridge
Municipal Water Intake
Gilman Park
Lary Lane Well
Pickpocket Dam
Railroad Bridge
Linden Street Bridge
NH 108/Court Street Bridge
EXETER
Gooch Corner
Perkins Hill
Wadleigh Point
Seamen Brook
Little River
Exeter River
Squamscott River
Powderhouse Point
Phillips Exeter Academy
Hospital
Sewage Disposal
Gilman Park
Cemetery
High Sch
Jr High Sch
Trailer Park
Water Tank
Calcord Pond
Industrial Waste Ponds
Filtration Plant
Golf Course
Gravel Pit
0
1,500
3,000 Feet

Great Dam Site, Looking Southwest

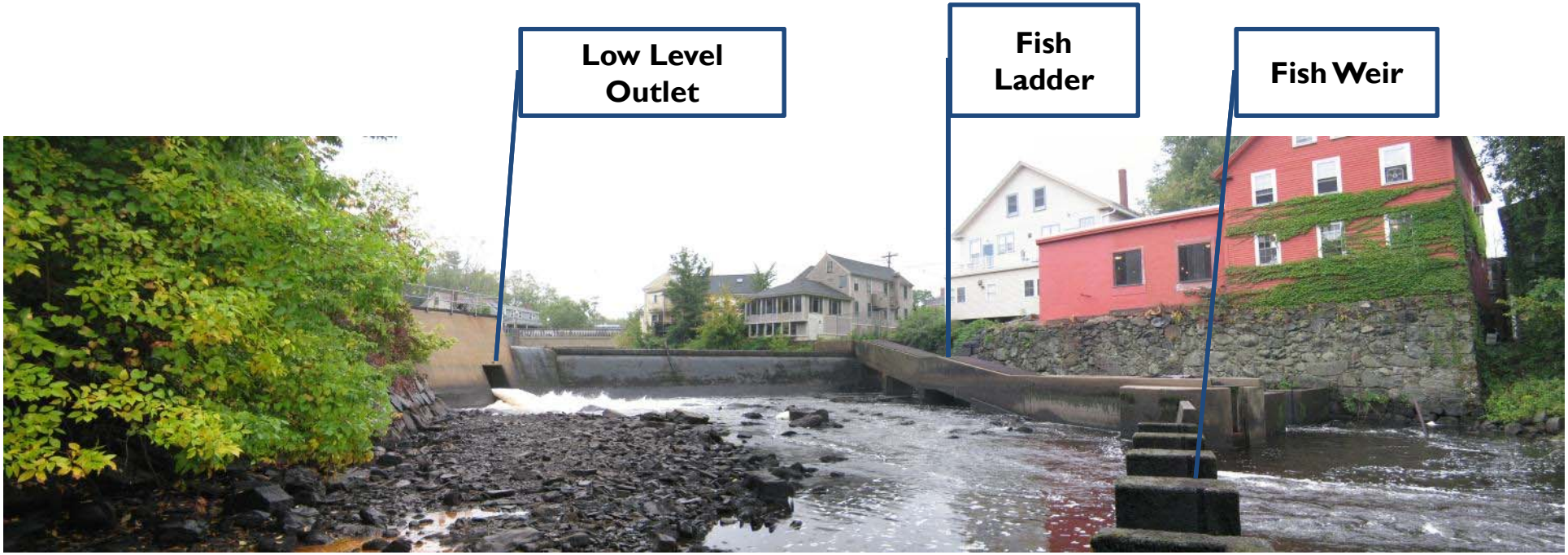


Great Dam from Founder's Park



Looking West

Great Dam from Downstream



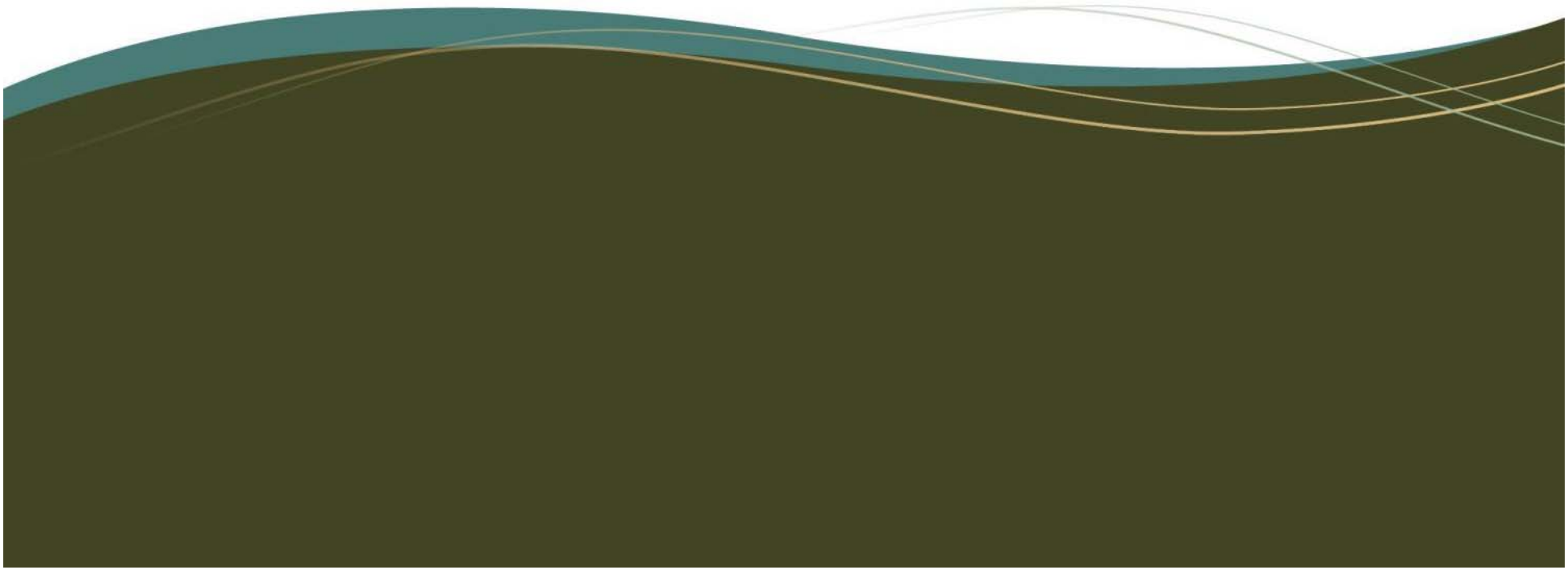
Looking upstream (south)

Great Dam Headworks (Looking East)

Great Dam Headworks (Looking west)

Great Dam Removal

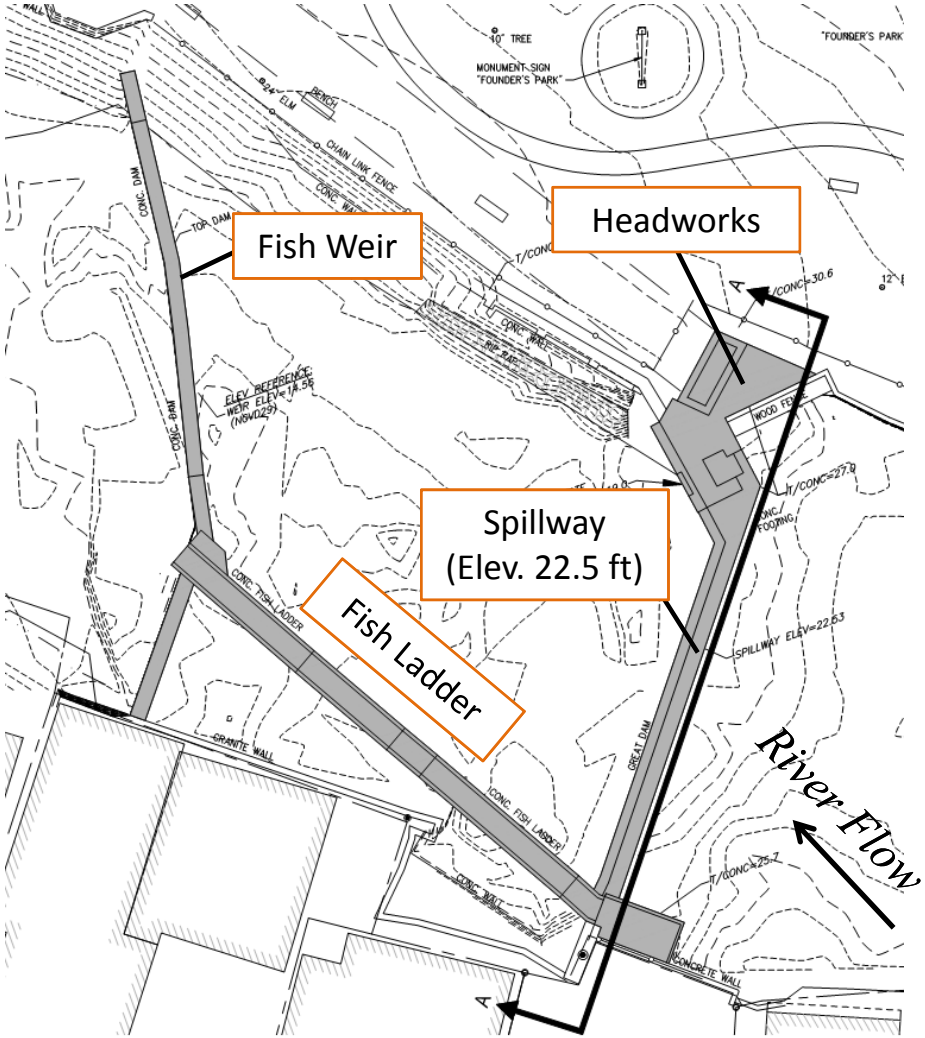
PROJECT SCOPE

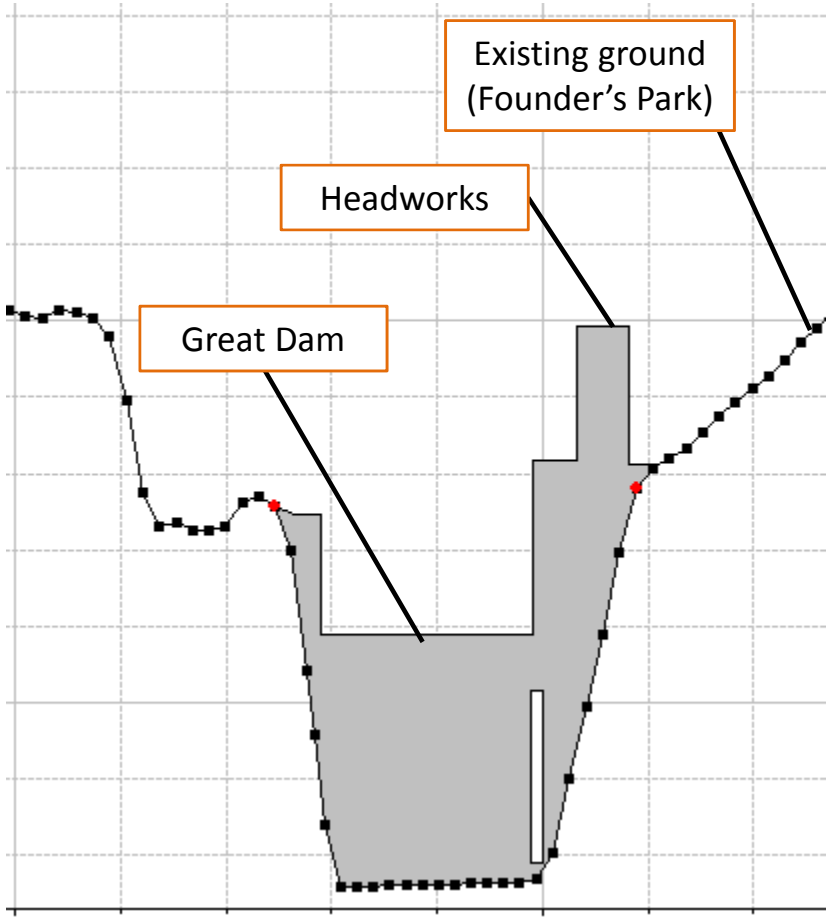


Project Scope: Major Tasks

- **Detailed Topographic and Bathymetric Survey**
- **Geotechnical Investigation**
- **Exeter Mills Penstock**
- **Engineering Design**
  - **Dam Removal**
  - **Water Intakes**

Existing Conditions

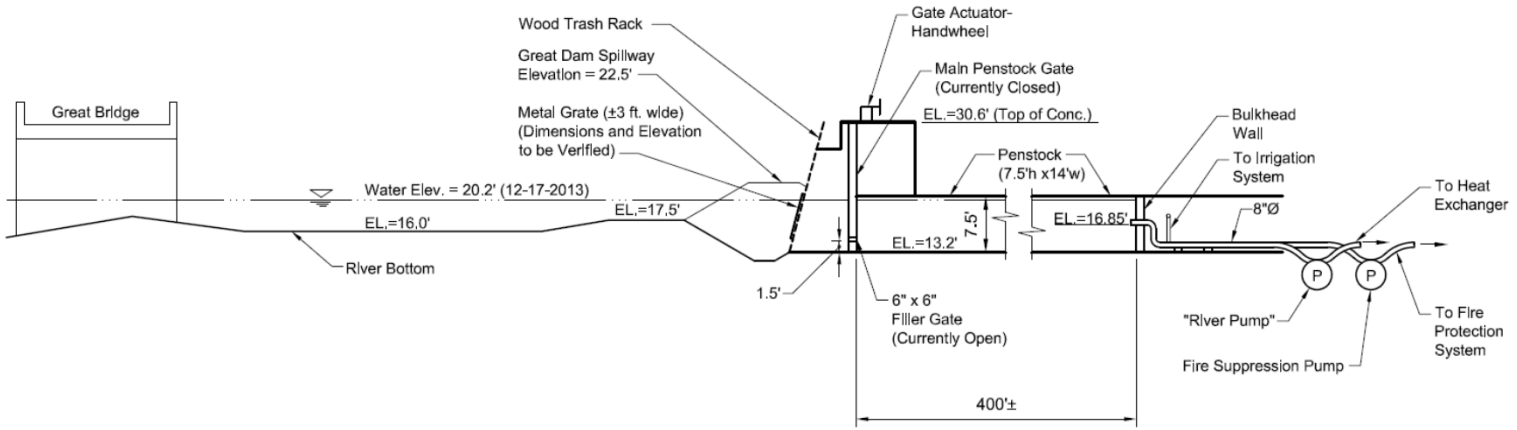




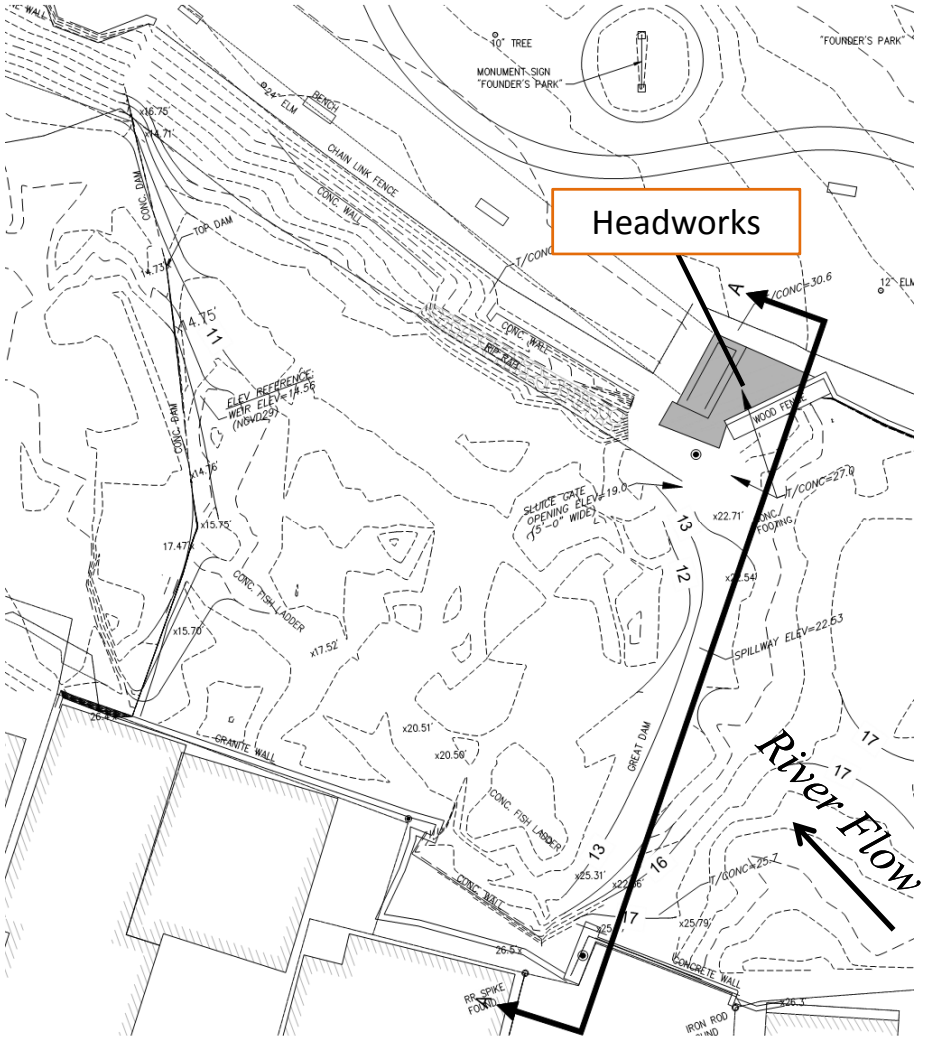
Geotechnical Investigation

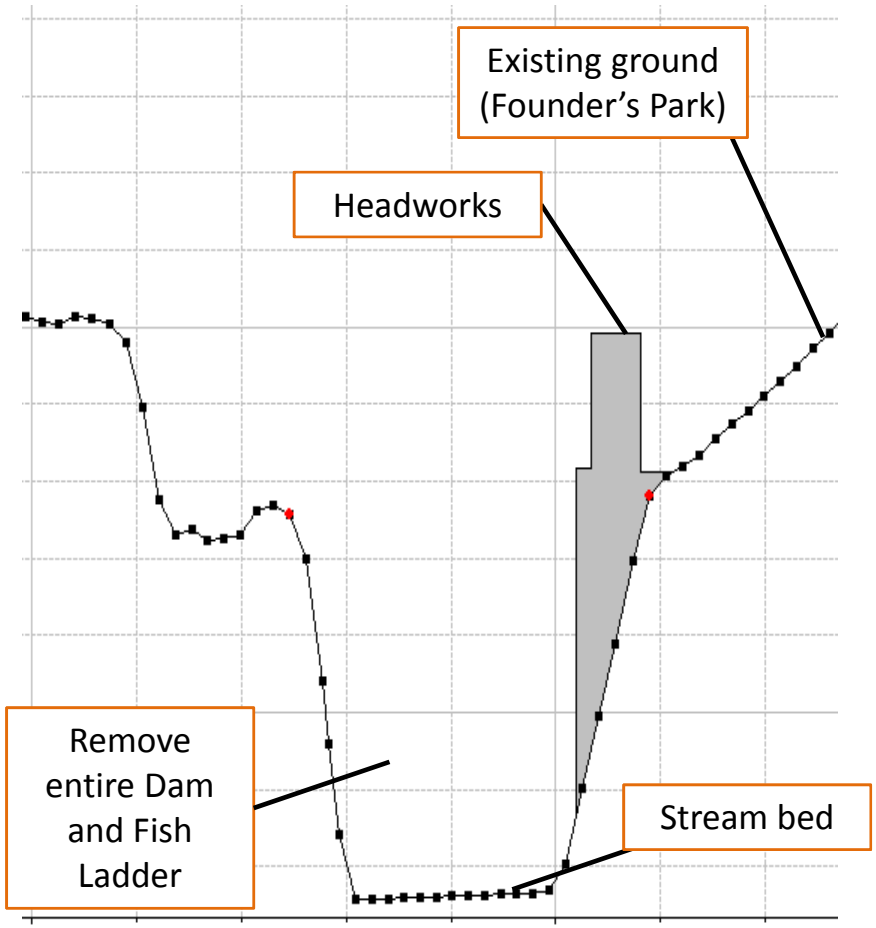
Exeter Mills Penstock

- **Exeter Mills currently withdraws water from Penstock for building cooling, fire suppression, and irrigation**
- **Town in negotiations to disconnect Mill from needing River water**

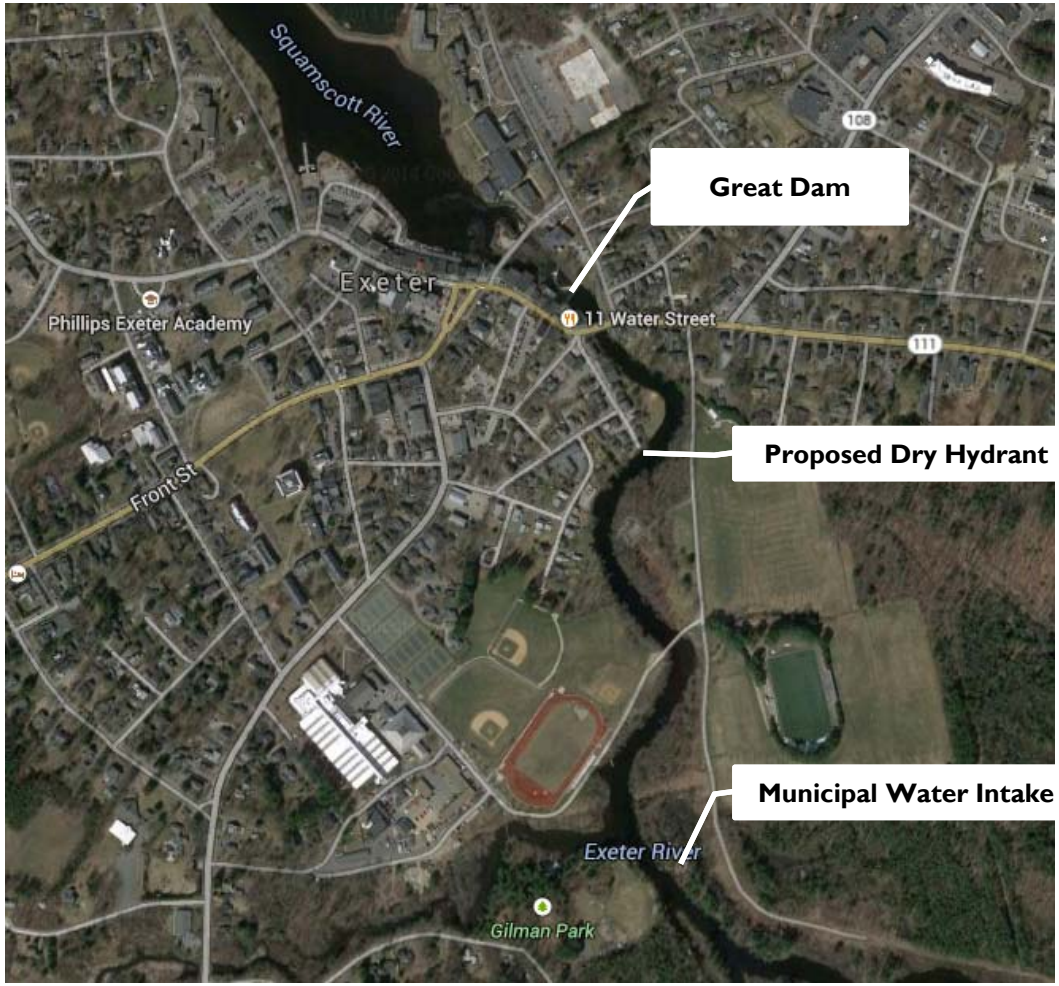


Dam Removal Engineering Design





Water Intake Engineering Designs

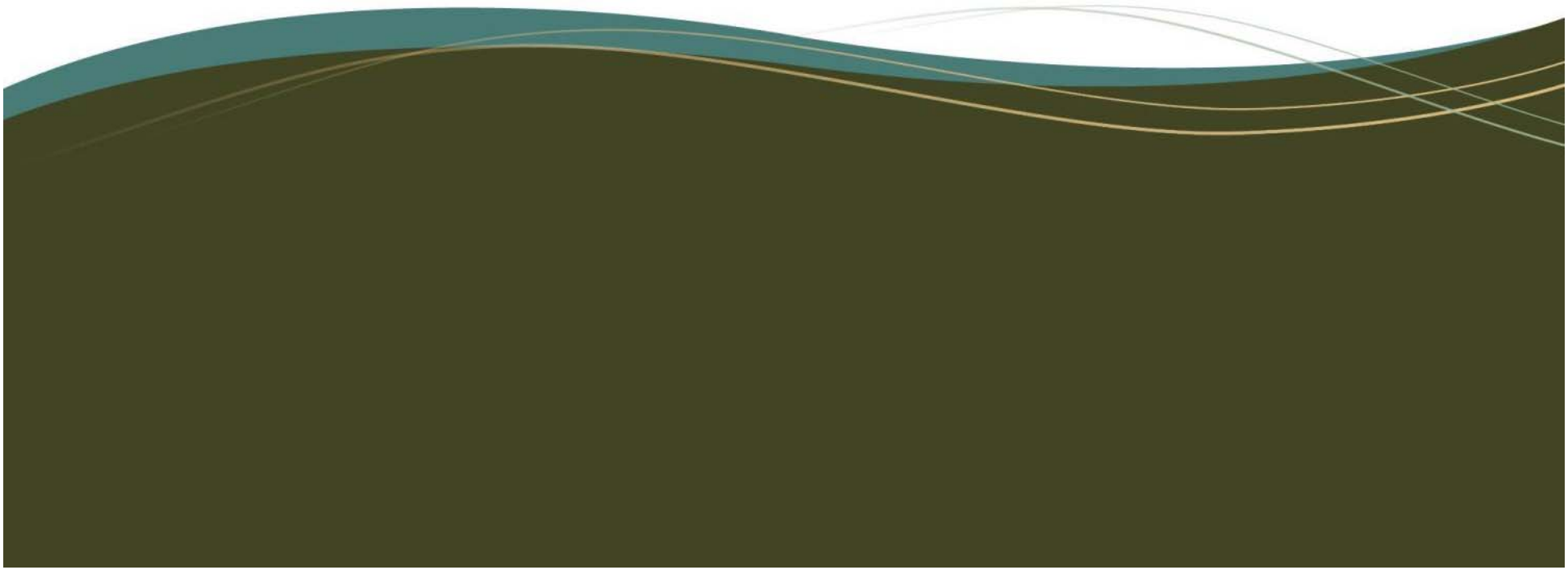


Visual Simulation at Dam Site

Visual Simulation at Dam Site

Great Dam Removal

SEDIMENT MANAGEMENT

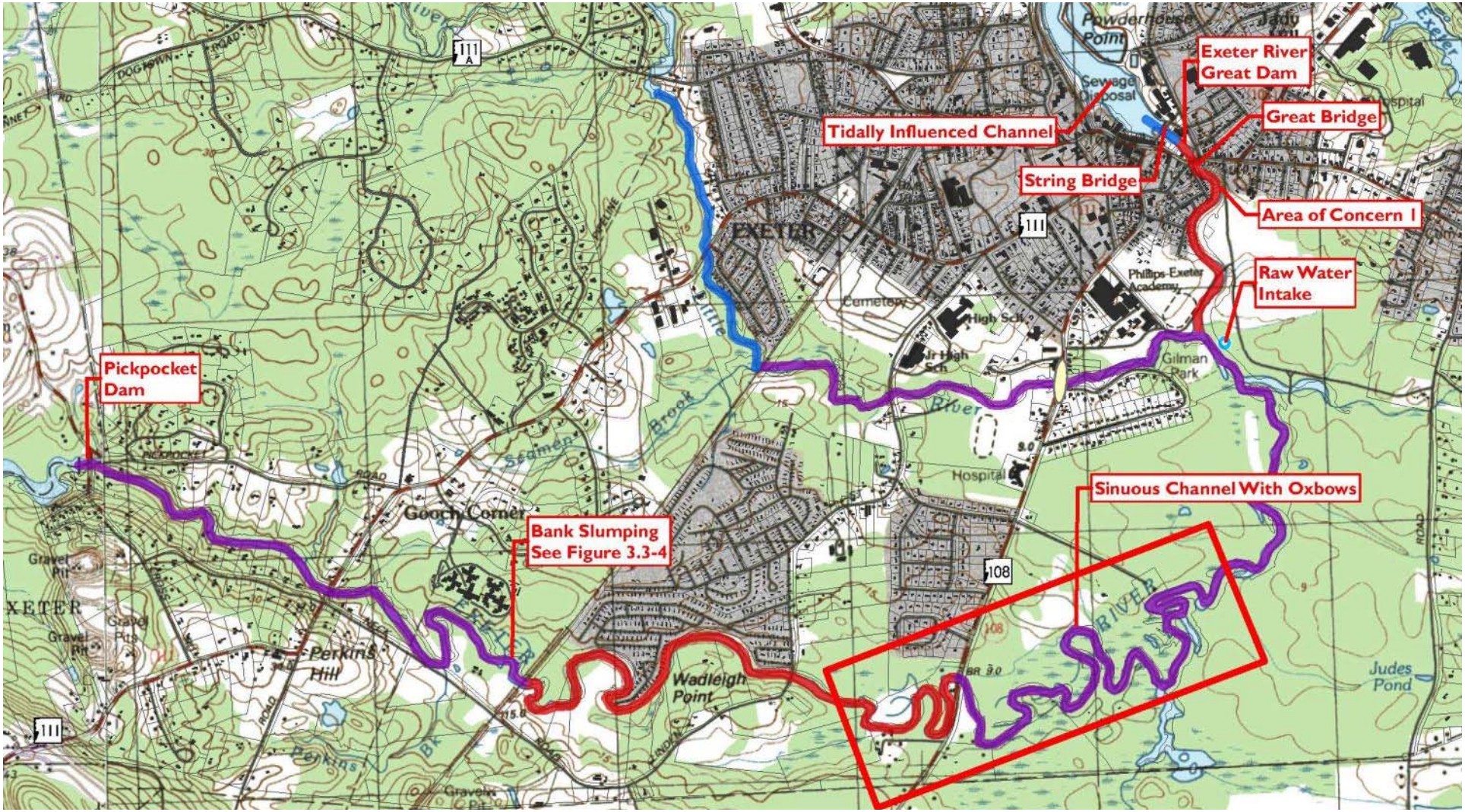


Sediment Sampling Locations

Sediment Analysis

- Sediments were tested for metals, PAHs, PCBs, pesticides, and volatile organics
- PCBs, pesticides and VOCs were below detection limits for all samples
- Metals and PAHs found in multiple samples
- Completed preliminary risk analysis: Calculation of “Hazard Quotients” and “Bioaccumulation Analysis”
- Levels of metals and PAHs were generally lower than downstream, therefore relatively low risk

Sediment Transport and Geomorphic Response

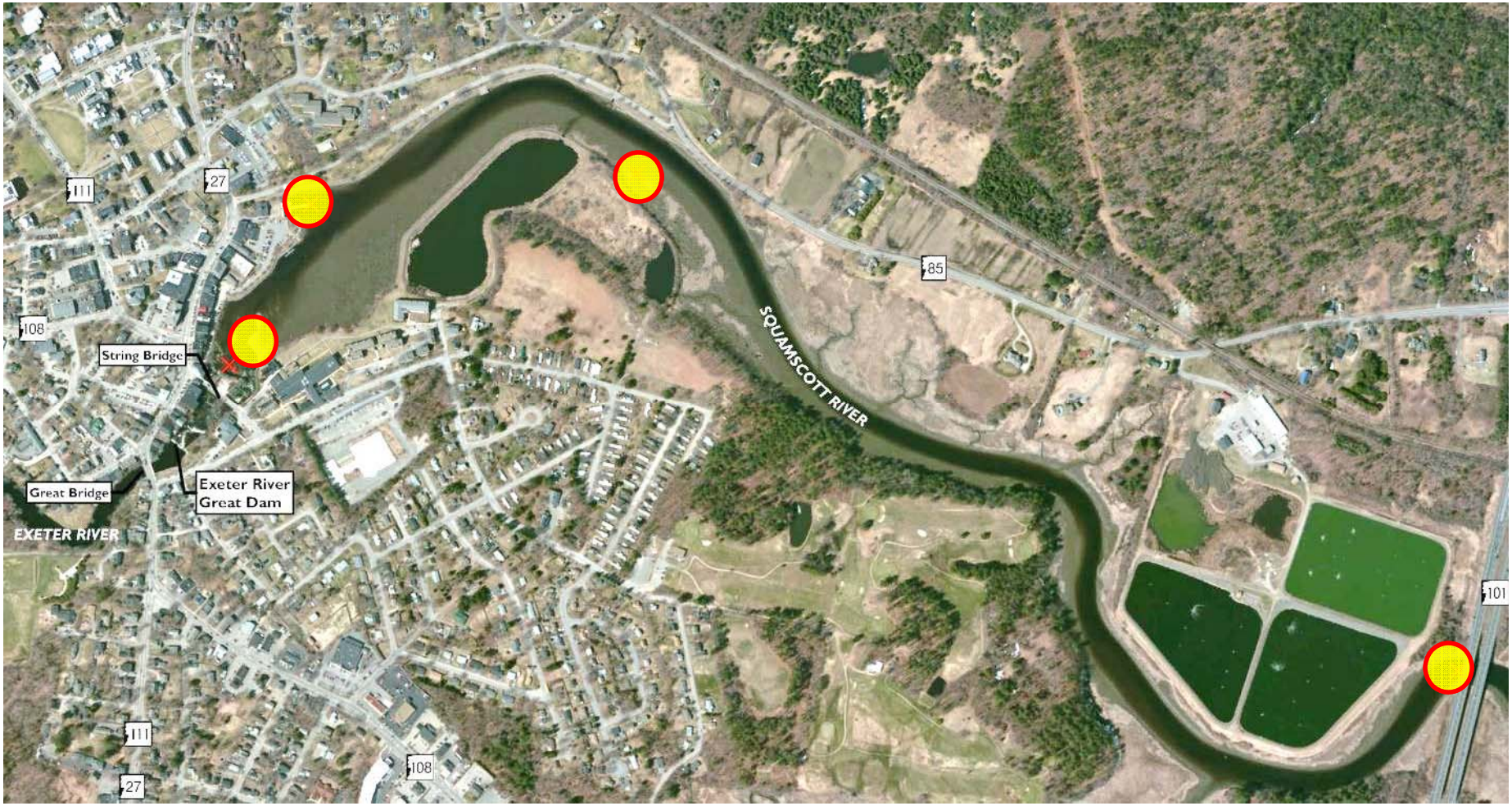


Sediment Transport Findings

- Increased sediment transport associated with Full Removal, Partial Removal and Dam Modification
- Bedrock will prevent headcut
- Exeter River will eventually reach new equilibrium
- Tidal flushing in Squamscott River is likely to remain the dominant process downstream

Action: Understand downstream depositional areas & determine appropriate management

Potential Depositional Areas, Squamscott River



Upper Squamscott River - Resources

Sediment Management Plan

- Passive Strategy – Dredging doesn't make sense
- Early and controlled drawdown
- Strategic seeding of exposed banks
- Consider sediment curtain at boat launch & basin in Squamscott
- Delay smelt habitat restoration for at least a year
- Monitoring

Great Dam Removal Project

DISCUSSION