



Tighe&Bond

Engineers | Environmental Specialists



SAWMILL BROOK / CENTRAL POND RESTORATION

Manchester-by-the-Sea Town Hall – October 18, 2018

Eric Hutchins, Restoration Biologist, NOAA Fisheries
David Loring, P.E., ENV SP, LEED AP, Principal
Dan Buttrick, P.E., Senior Project Manager
Gabrielle Belfit, CFM, Senior Environmental Scientist



PRESENTATION TOPICS

- Introduction
- Flood Mitigation Planning
- Restoration Goals
- Restoration Options
- Bridge Update



**2018 MANCHESTER
BY-THE-SEA
HMP GREATEST FLOOD
RISK:**

**SEVERE WINTER
WEATHER**

NOR' EASTER

**EXTREME
PRECIPITATION**

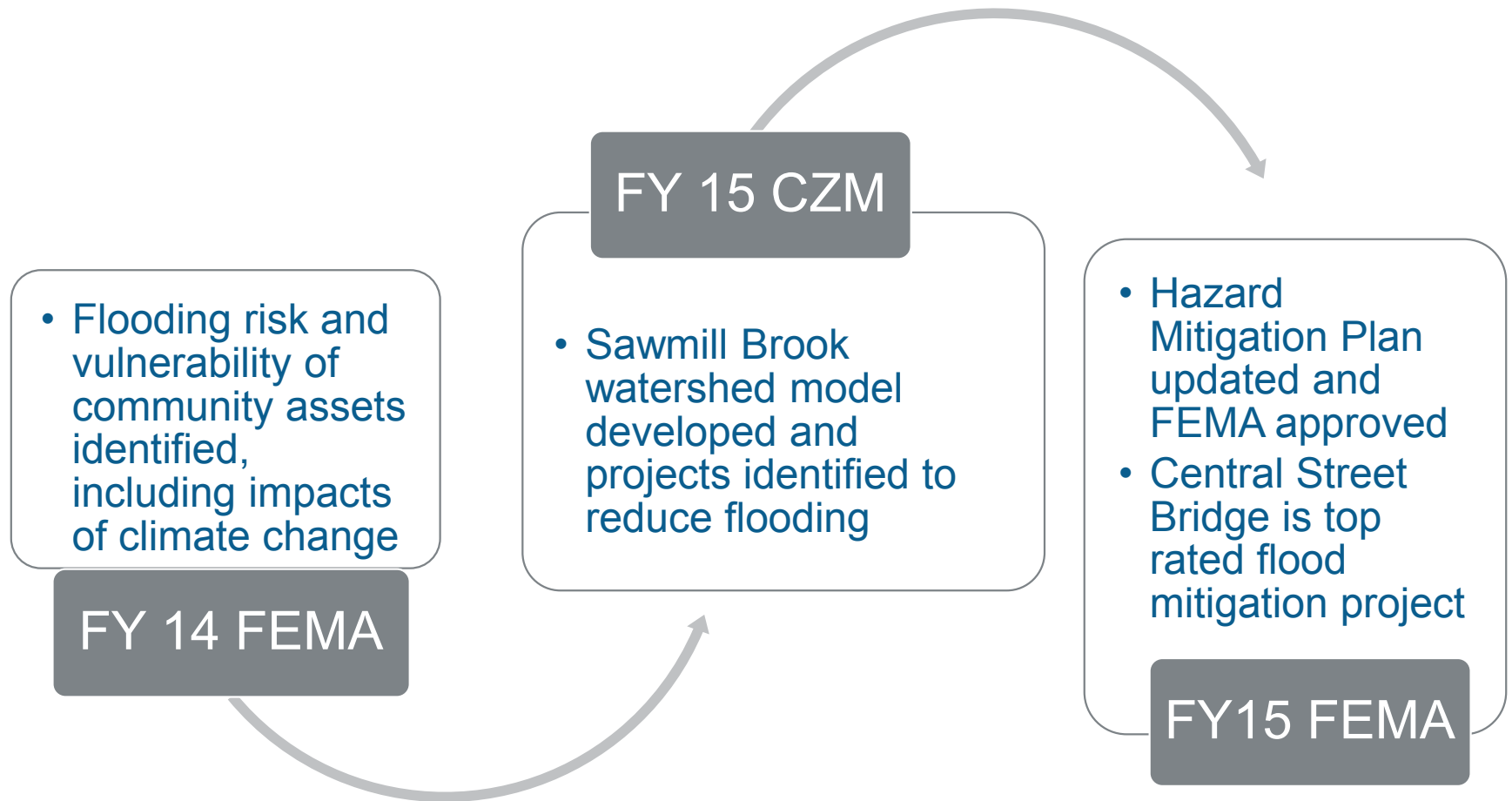
HURRICANES



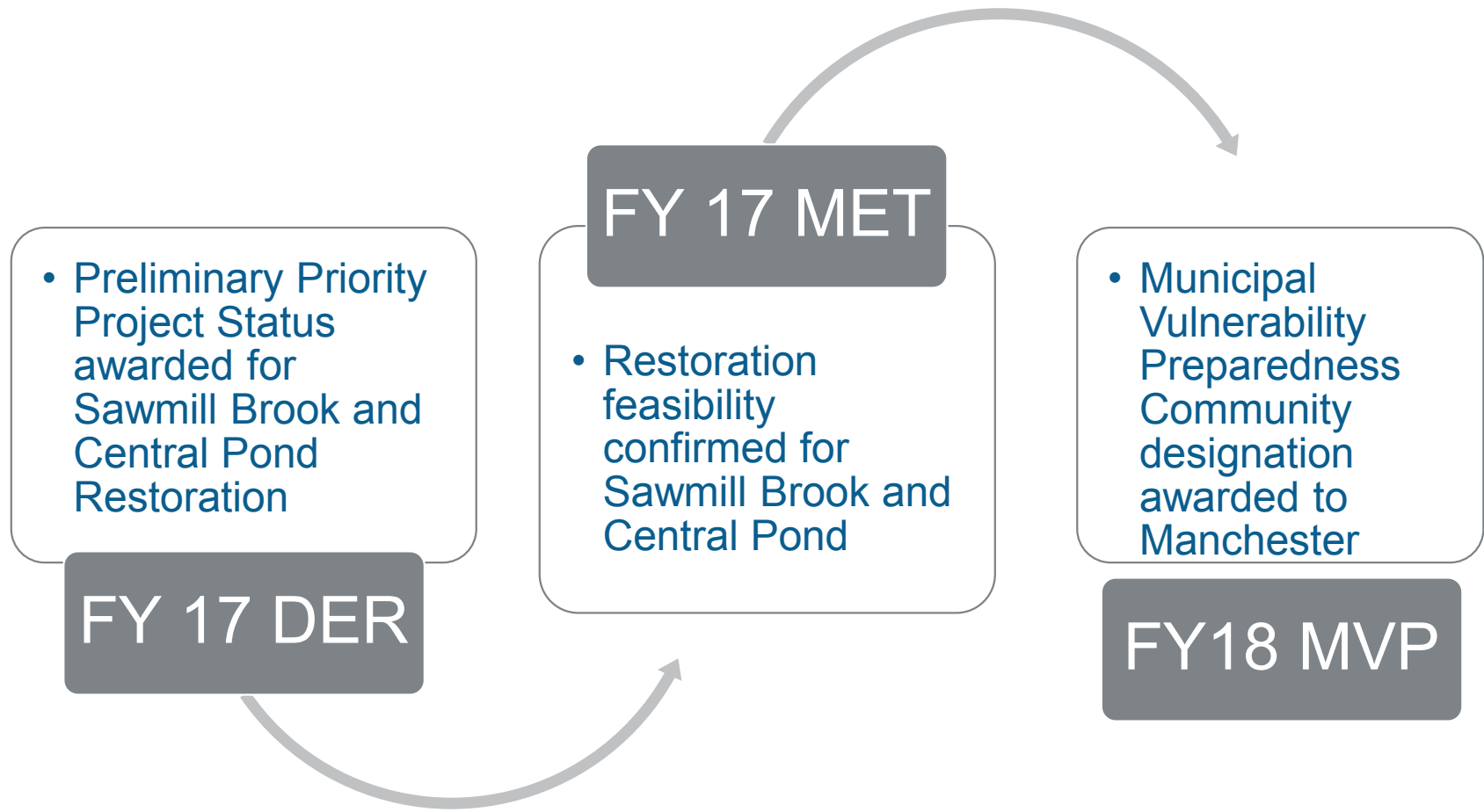
HISTORICAL FLOOD EVENTS

- **9/1938 “The Great New England Hurricane”**
10-17 inches of rain and 20-foot storm surge
- **2/1978 “Blizzard of '78”**
30 inch snowfall, 30-foot waves off shore 2 RL claims
- **10/1991 “Perfect Storm”**
25 foot waves coincided with high tide 9 RL claims
- **5/2006 “Mothers Day Flood”**
12 inches rain, 6 ft flood along the SMB, School St bridge destroyed, 150 homes damaged. 10 RL claims
- **1/2018 Nor’easter “Greyson”**
Peak winds coinciding with high tide broke Boston Harbor 1978 high tide record.
- **3/2018- Nor’easters “Riley & Skylar”**
Blizzard, high wind and storm surge. FEMA DR-4372/ 4379

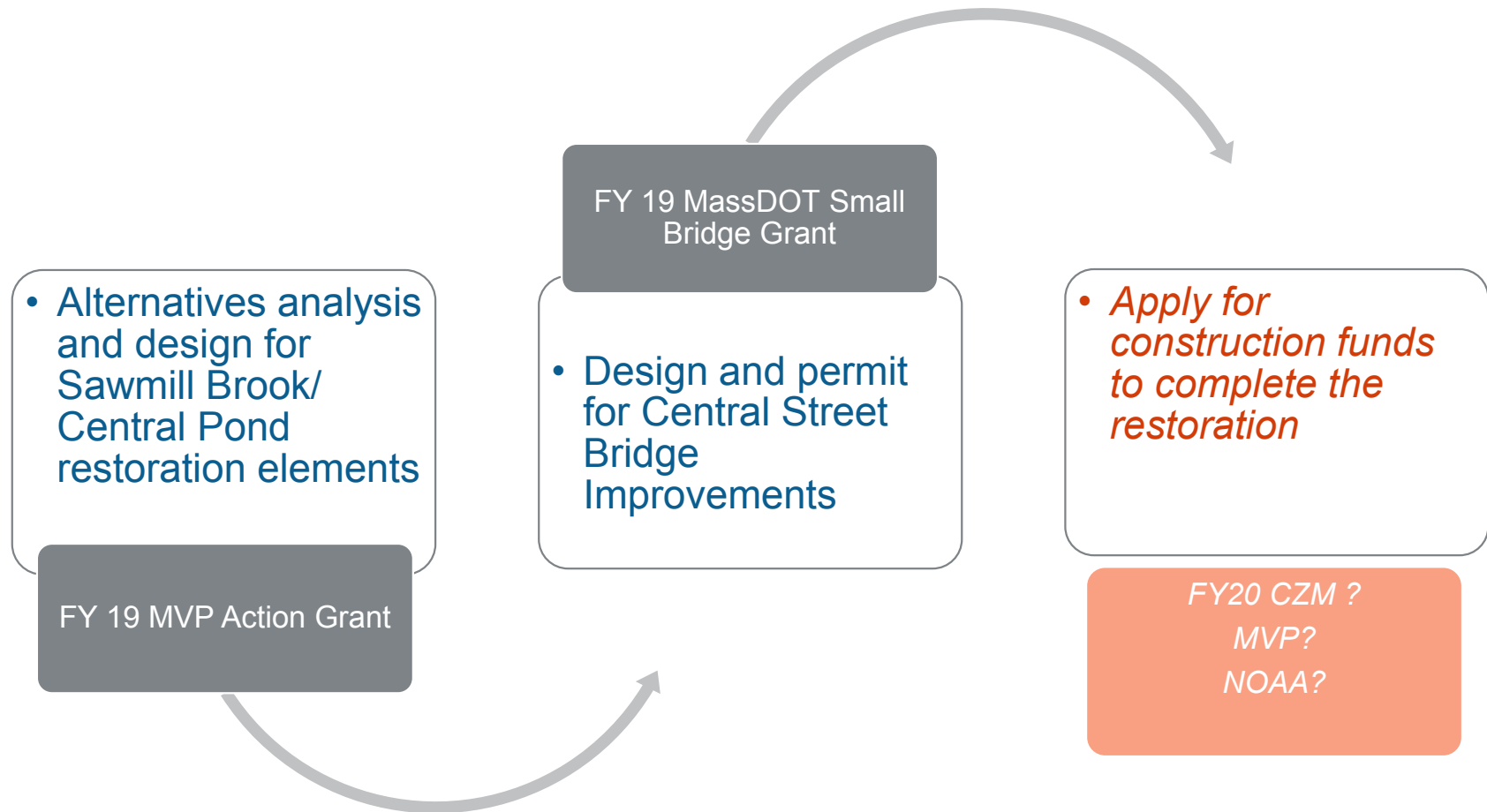
IDENTIFYING FLOOD MITIGATION SOLUTIONS



CONFIRMING FLOOD MITIGATION SOLUTIONS



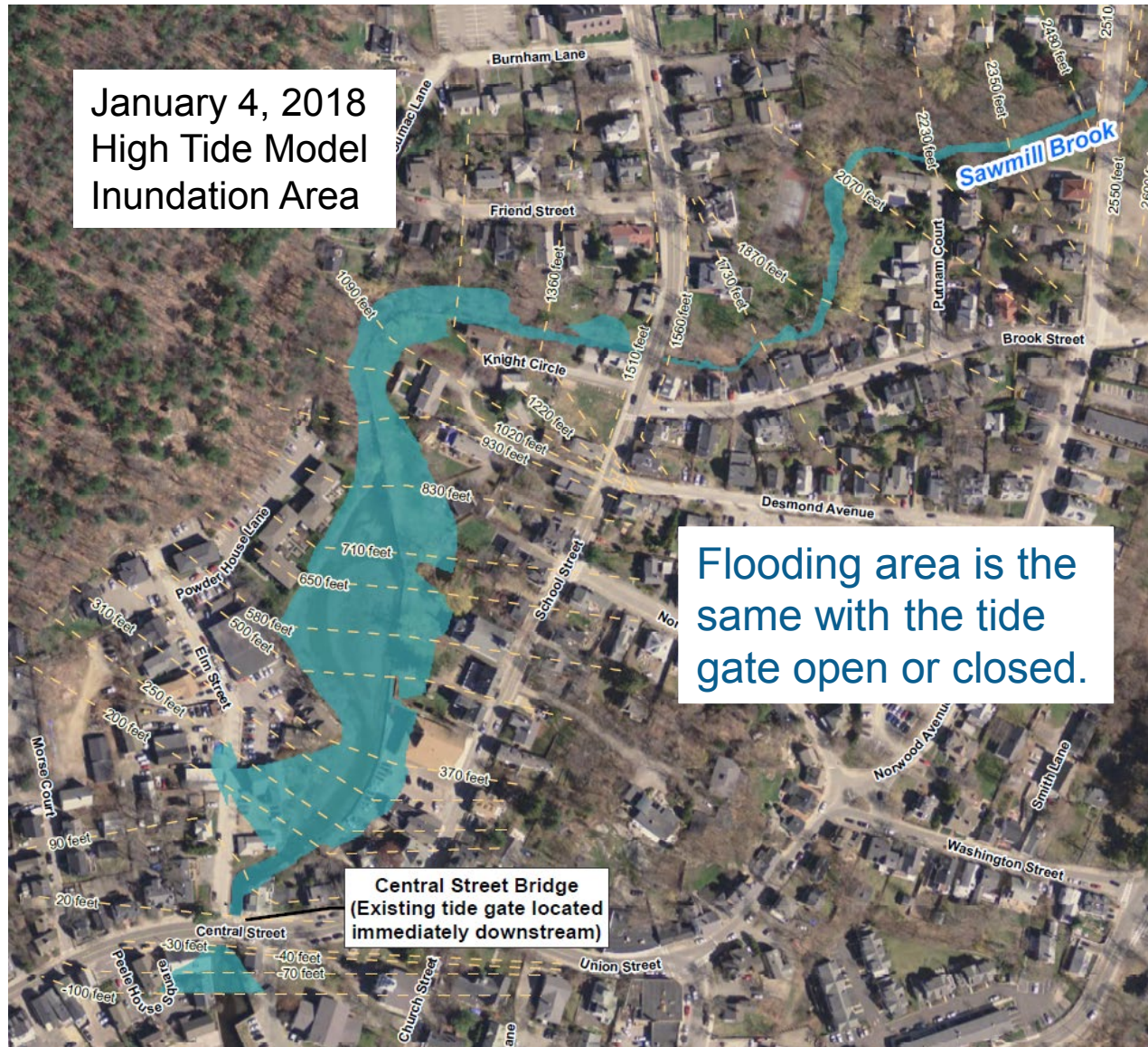
IMPLEMENTING FLOOD MITIGATION SOLUTIONS



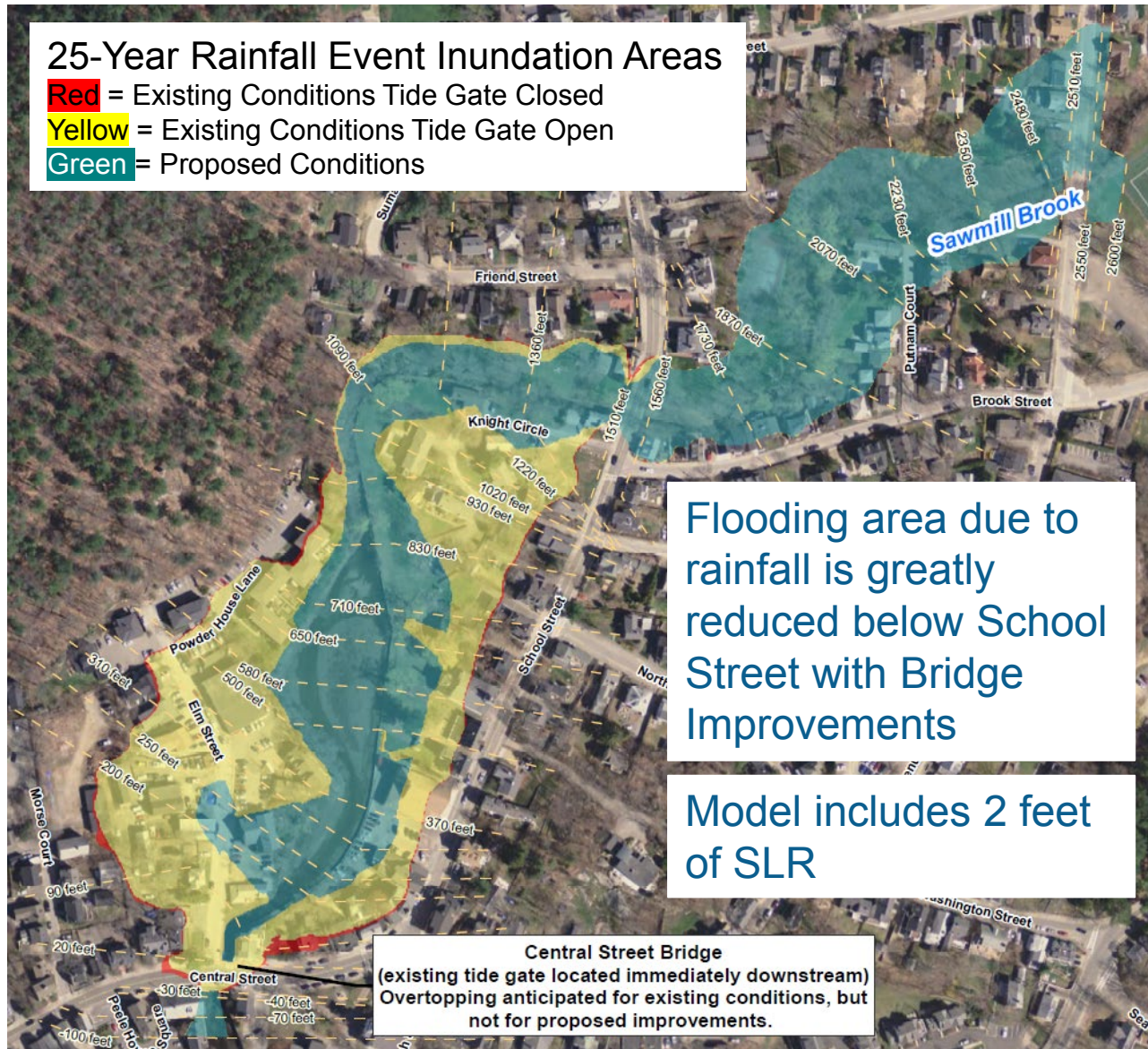
FINDINGS FROM HYDROLOGIC MONITORING



FINDINGS FROM HYDRAULIC MODELING



FINDINGS FROM HYDRAULIC MODELING



FINDINGS FROM SEDIMENT SURVEY



Central Pond

- 5,000 CY of soft sandy sediment
- Sources include bank erosion, stormwater runoff and natural debris
- Pond mudflats are highly saline
- Allowing sediment to naturally flush may be preferred approach to dredging- subject to permitting with state and ACOE



Upstream Channel

- Gravel and sand substrate ideal for fish spawning

FINDINGS FROM WALL SURVEY



- Granite block, poured concrete, brick, field stone and shale revetment and combinations of the above are the dominant structures found around Central Pond.
- Granite block, field stone and combinations of the above are the dominant structures found along Sawmill Brook.
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- Almost 50% of the walls arounds Central Pond are in need of maintenance. Over 60% of the shoreline of Central Pond is privately owned.
- Many locations can benefit from some type of bioengineering to stabilize banks using stone and plantings

SAWMILL BROOK / CENTRAL POND RESTORATION GOALS

❖ Flood Mitigation

❖ Fish Passage

❖ Aesthetics

- Channel Improvements
- Wildlife Habitat
- Wall Improvements
- Public Access



SAWMILL BROOK/ CENTRAL POND RESTORATION CENTRAL STREET BRIDGE IMPROVMENTS



IMPLEMENTING THE RESTORATION PROJECT

1. Identify access to wall structures for survey, repairs and maintenance
2. Geophysical survey
3. Ecological restoration alternatives analysis
4. Public review
5. Technical agency review
6. Final restoration design



RESTORATION ALTERNATIVES

1. Low level water impoundment

- maintain permanent low level water impoundment with a cross-channel berm upstream of Central Street bridge where channel expands

2. Stream w/pools and riffles

- stream restoration connecting low level pools impounded by low level riffle structures

3. Stream Restoration

- unrestricted free flow water
- Provides continuous low level stream

All alternatives provide full passage tidal exchange

STATE PERMITS

1. Massachusetts Wetlands Protection Act Notice of Intent and Stormwater Management Standards
2. Massachusetts Environmental Policy Act (MEPA) Environmental Notification Form (ENF) and/or Environmental Impact Report (EIR)
3. Massachusetts Department of Environmental Protection (MassDEP) Section 401 Water Quality Certification
4. MGL Chapter 91, The Massachusetts Public Waterfront Act - Waterways License
5. Massachusetts Historical Commission Project Notification and Review
6. Massachusetts Endangered Species Act (MESA) Project Review through the Natural Heritage and Endangered Species Program (NHESP)
7. Division of Marine Fisheries (DMF) Consultation
8. Massachusetts Office of Coastal Zone Management Federal Consistency Review

USACOE / EPA PERMITS

1. Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) Construction General Permit
2. EPA NPDES Dewatering General Permit
3. United States Army Corps of Engineers (USACE) Massachusetts General Permit Review/Permitting (Section 10/Section 404)

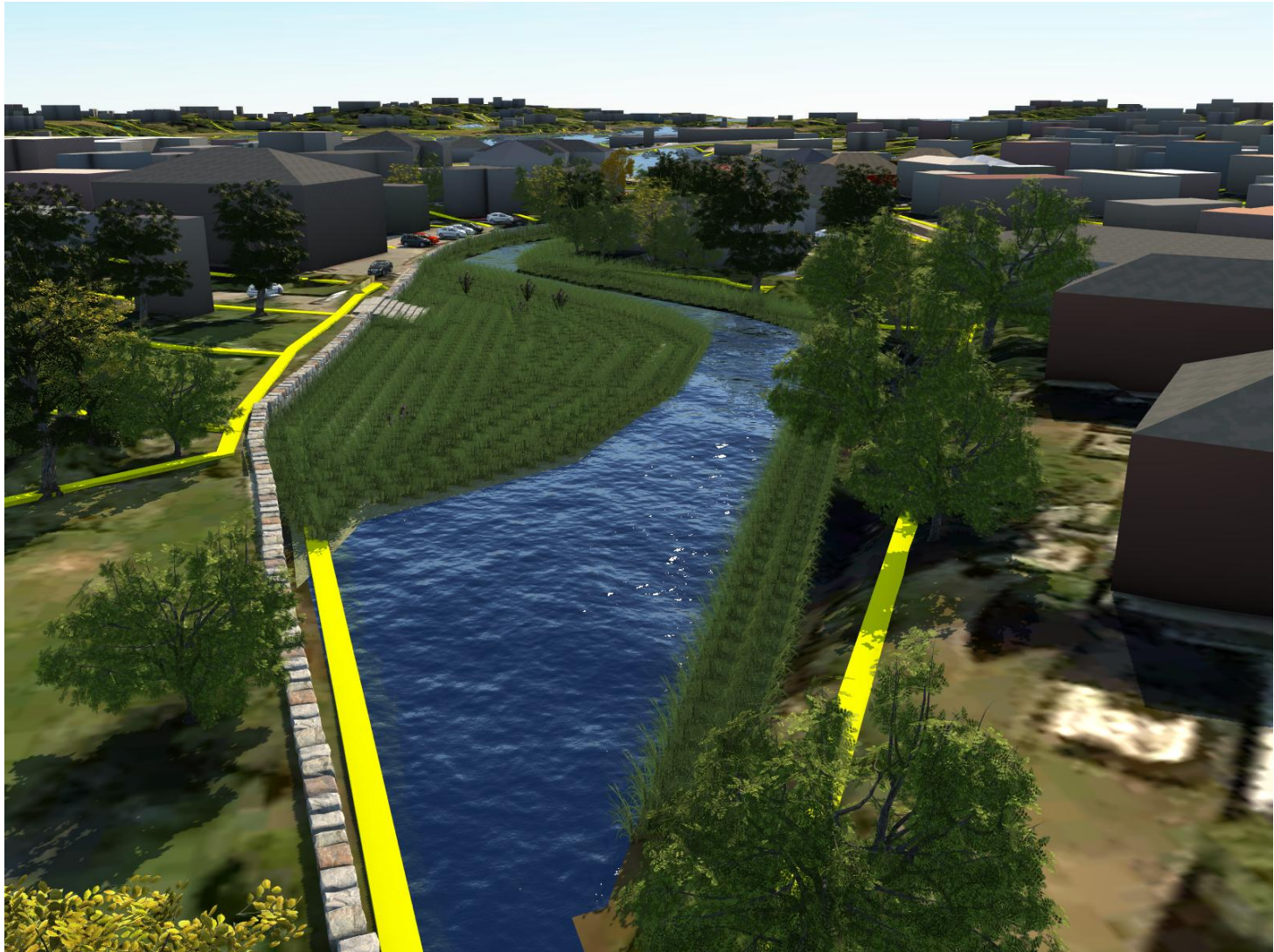
LOCAL (TOWN) PERMITS

1. Wetlands Protection Act Notice of Intent and Stormwater Management Standards
2. Historical Commission Project Notification and Review
3. Planning Board
4. Street Opening
5. Trench Permit

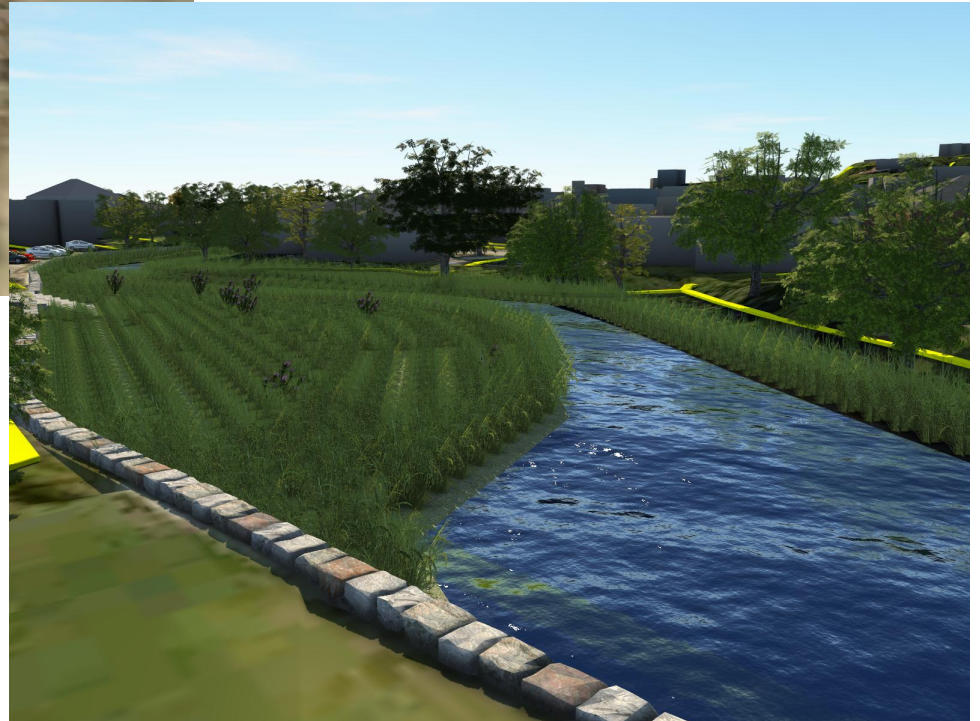
STREAM RESTORATION



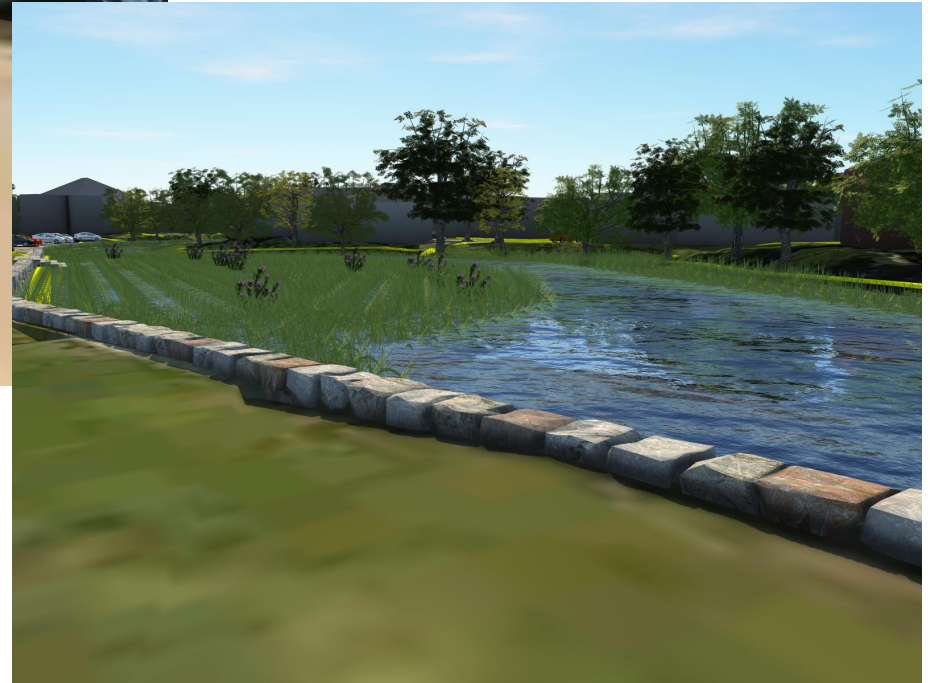
CENTRAL POND STREAM RESTORATION



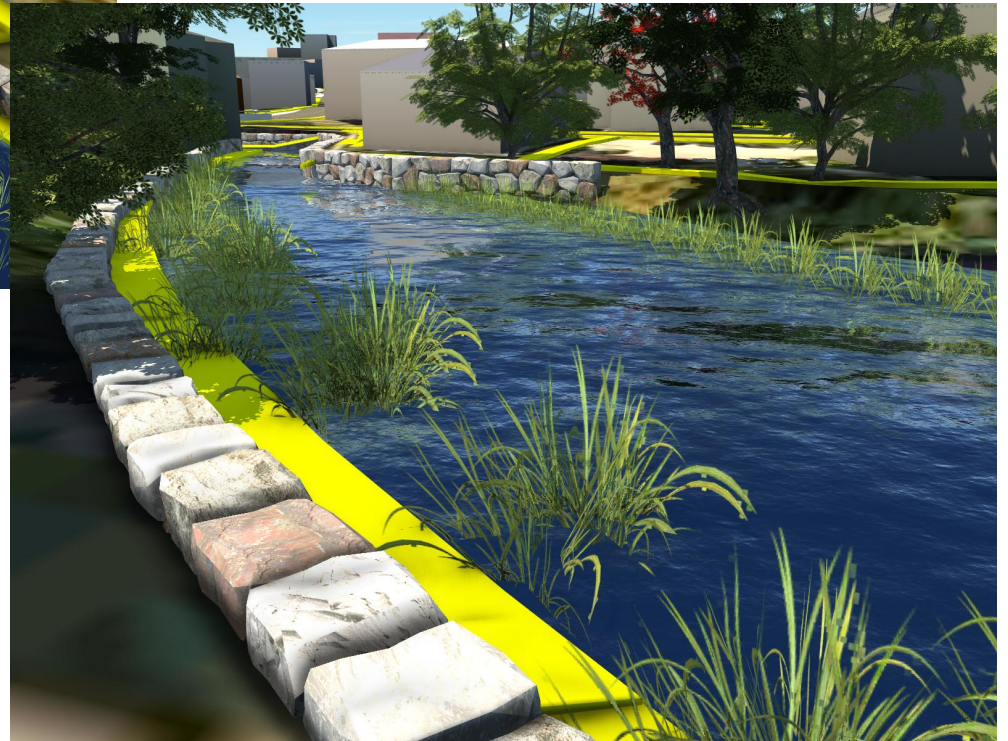
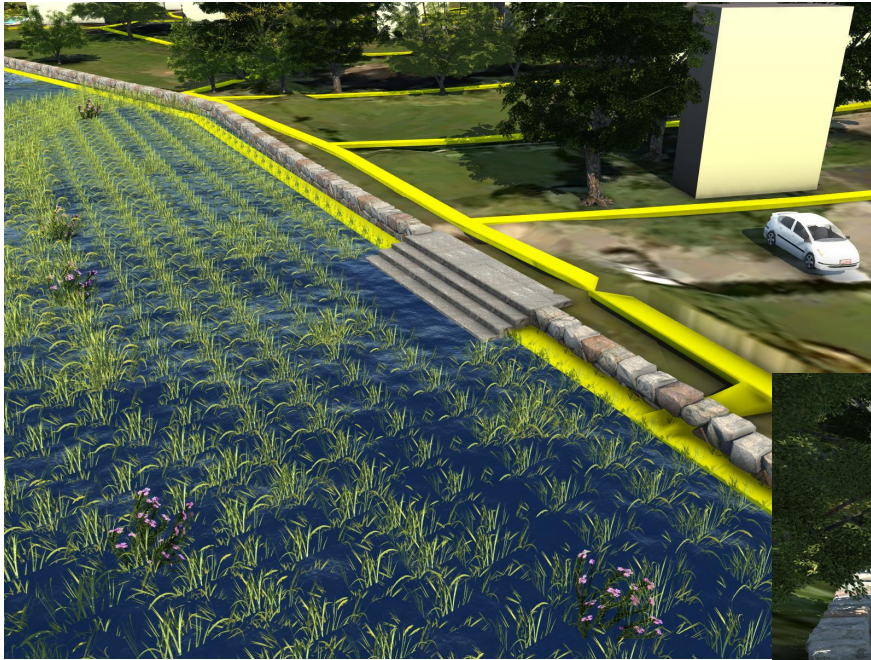
STREAM RESTORATION



STREAM RESTORATION



WALL REPAIRS AND BANK STABILIZED

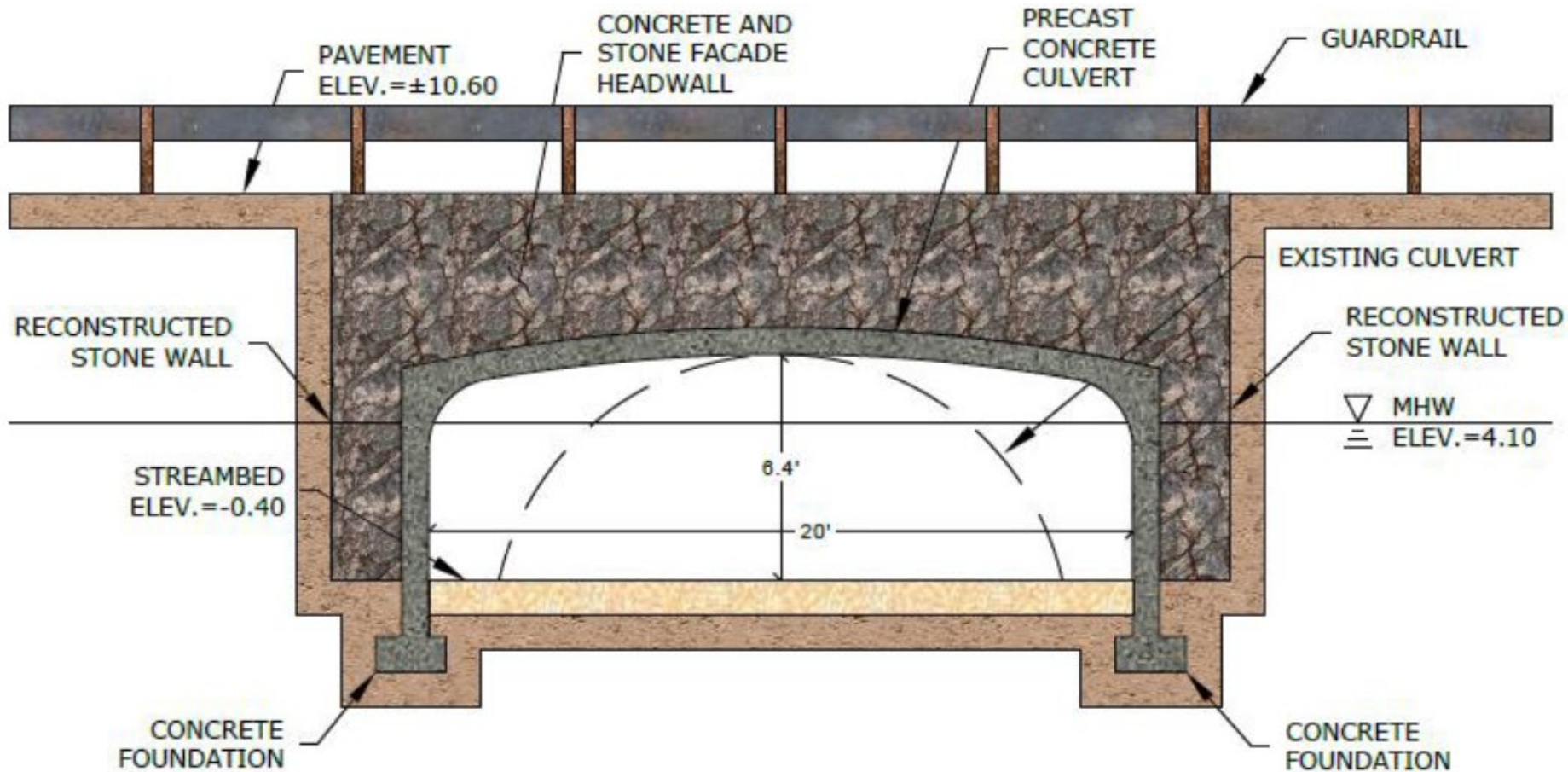


BRIDGE RESTORATION PROJECT



Photo rendering of tide gate removed, new culvert, new granite wall and guard rail

BRIDGE RESTORATION PROJECT





DISCUSSION