

# Pine Grove Restoration and Perimeter Road Improvements



Cambridge Water Board  
12 December 2023



HATCH

# Agenda

- Project Overview
- Priorities and Goals
- Circulation and Access Studies
- Pine Grove Assessment
- Perimeter Road Improvements
- Next Steps



# Our Team

## SOIL SCIENCE EXPERT

– Michael Agonis, Pine & Swallow

## WHITE PINE FOREST - PLANT PATHOLOGIST

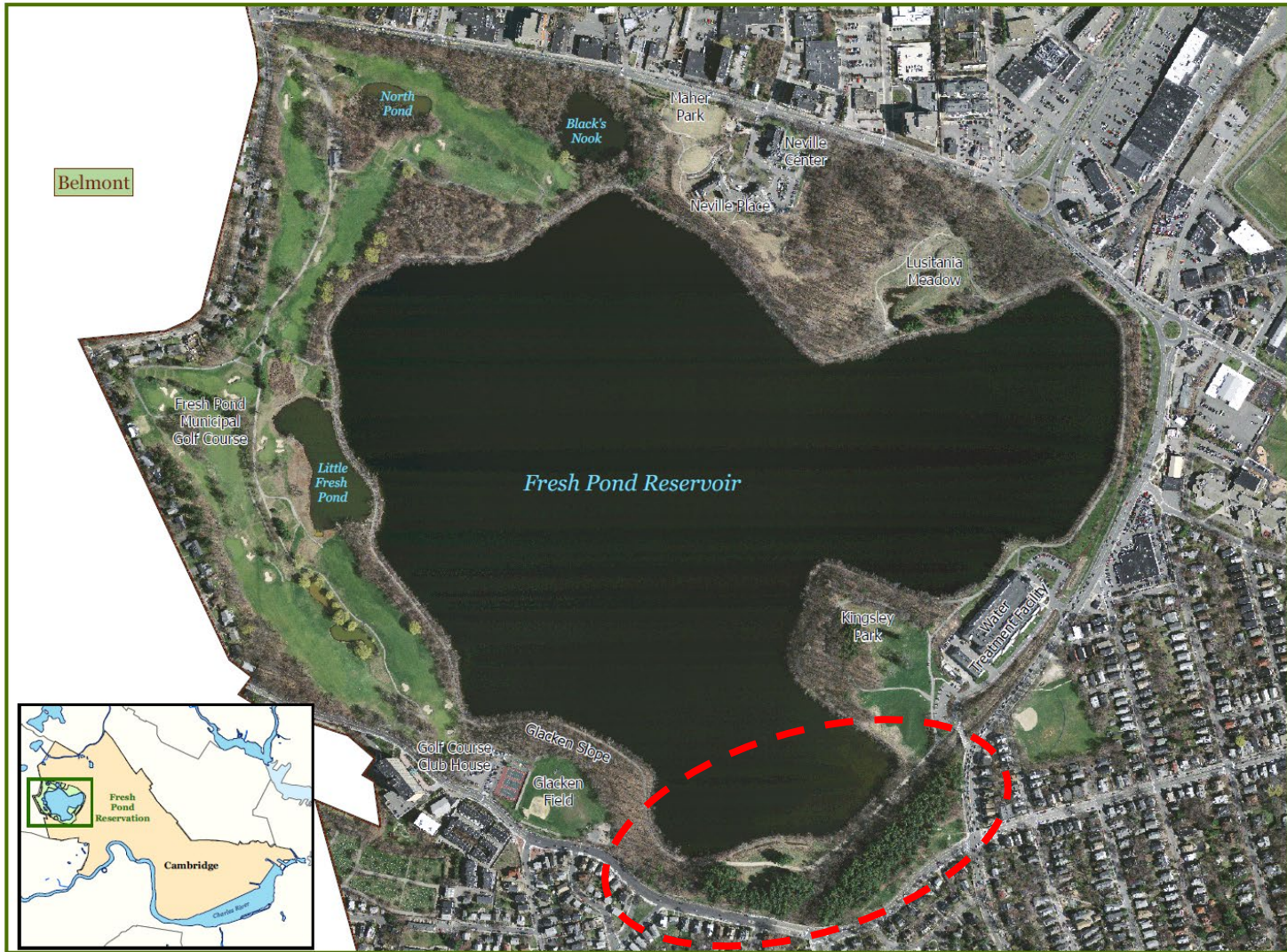
– Nick Brazee, University of Massachusetts

## ECOLOGISTS, CERTIFIED ARBORIST, GREEN INFRASTRUCTURE EXPERTS, & LANDSCAPE ARCHITECTS

– HATCH



# PROJECT AREA



PROJECT  
AREA



# PERIMETER ROAD IMPROVEMENTS

Kingsley Park

Glacken Slope

Fresh Pond



Weir Meadow

Perimeter Road  
Watertown/Cambridge Greenway

Fresh Pond Parkway

Huron Ave

# PINE GROVE RESTORATION



Fresh Pond

Kingsley Park

Glacken Slope

Glacken Field

Weir Meadow

Huron Ave

Perimeter Road  
Watertown/Cambridge Greenway

Fresh Pond Parkway

Google

# Project Areas (Multiple Phases)

WHITE PINE FOREST

HARDWOOD FOREST

Pine Grove Restoration

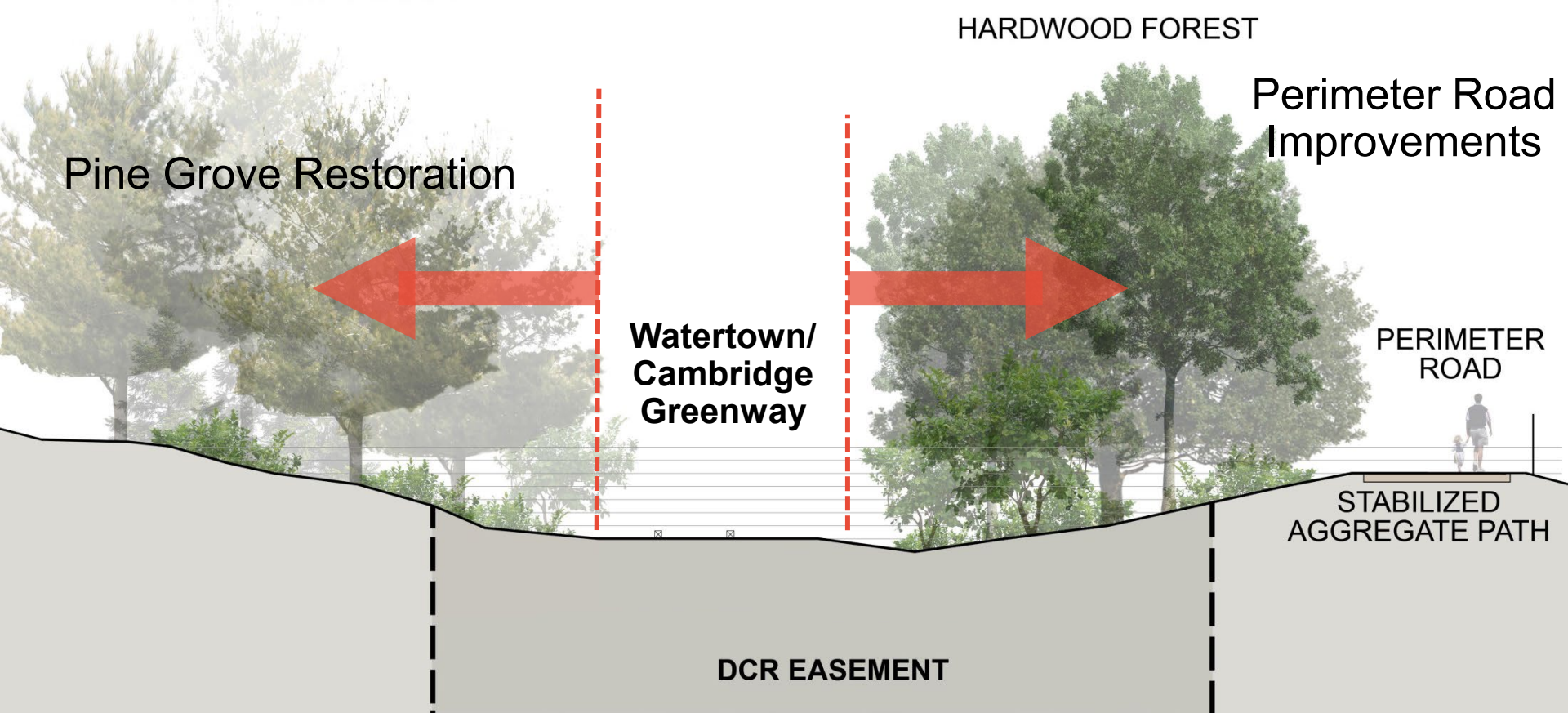
Perimeter Road Improvements

Watertown/  
Cambridge  
Greenway

PERIMETER  
ROAD

STABILIZED  
AGGREGATE PATH

DCR EASEMENT





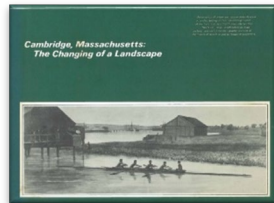
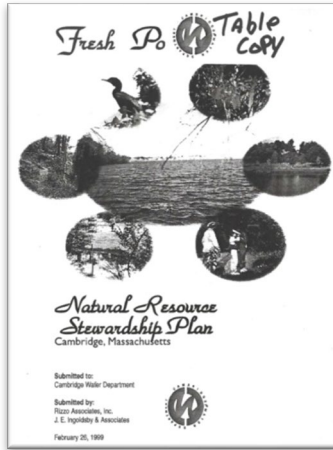
# Watertown/Cambridge Greenway



2019

2023

# Previous Planning Studies/Reference Materials

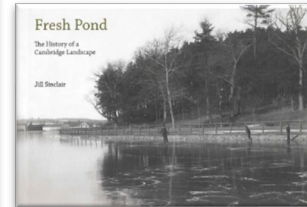
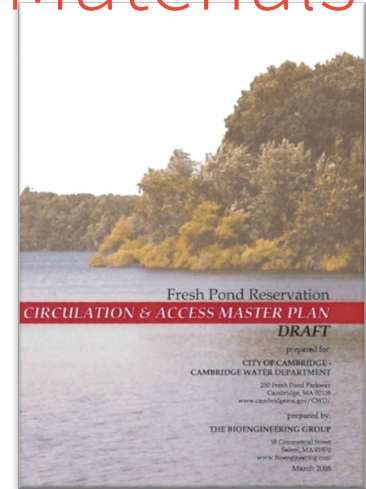
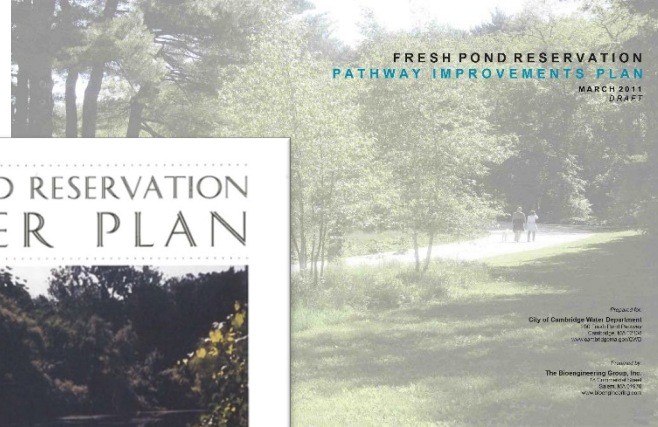
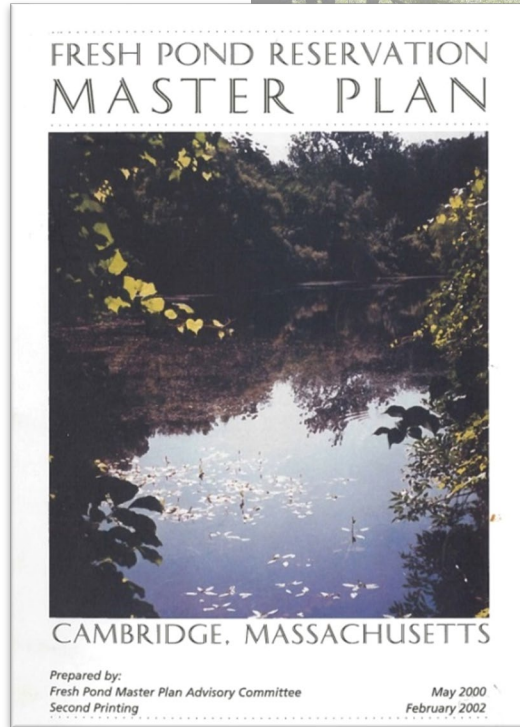


DESIGN GUIDELINES APPENDIX  
FRESH POND RESERVATION  
MASTER PLAN

TABLE OF CONTENTS

I. INTRODUCTION	3
II. SITE FURNISHING GUIDELINES	5
A. Site Furnishing Character Zones	
B. List of Site Furnishings	
C. Site Furnishing Design and Siting Criteria	
D. List of Recommended Products	
E. Recommended Site Furnishing Images	
III. SIGNAGE GUIDELINES	13
A. List of Signage Types	
B. Signage Siting Plan	
C. Signage Details	
D. Signage Typelines	
E. Signage Colors	

Prepared for: The Cambridge Water Department  
Prepared by: Carl F. Johnson Associates, Inc.  
July 15, 2004



# Stewardship Plan Priorities – Pine Grove (1999)

1. Maintain pine grove to prevent & control pests, disease, and damage.
2. Redesign primary trails to reduce impacts of erosion and compaction.
3. Redirect secondary trail traffic to primary trails; revegetate secondary trails.
4. Remove invasive plant species, i.e. buckthorn.

White Pine Regeneration



Glossy Buckthorn



# Stewardship Plan Priorities – Pine Grove (1999)

5. Underplant with native shrubs and groundcovers.
6. Enhance west-facing clearing area surface with porous material(s) to reduce runoff.
7. Enhance the clearing edges with understory plantings.
8. Enhance Reservoir views from the clearing.



Canada Mayflower, Maple-leaf  
Viburnum, and Bracken Fern

# Master Plan Priorities (High) – Weir Meadow and Pine Grove (2000)

1. Shoreline and slope stabilization
2. Forest management
3. Perimeter Road improvements
4. Wetland buffer enhancement
5. Lawn rehabilitation
6. Shared Use Plan (2011) designates Paths for All Users in Pine Grove

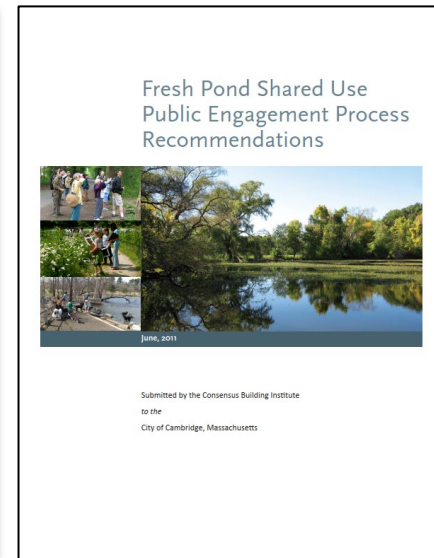
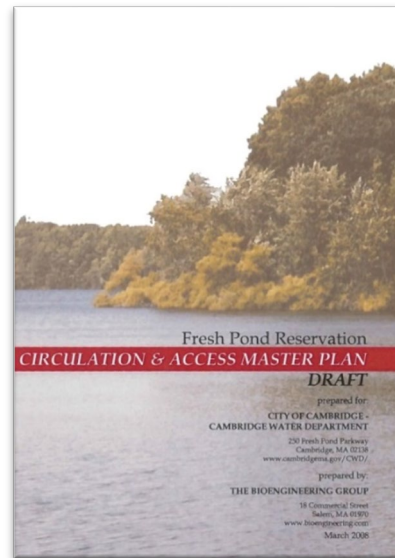
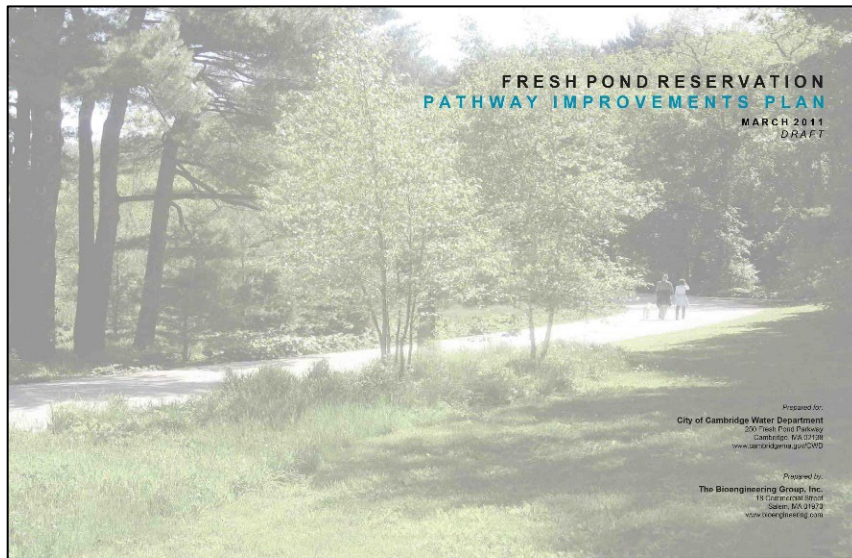


# Project Goals

1. Develop a better understanding of Pine Grove understory and lack of regeneration.
2. Reconstruct uniform path surface connecting Glacken Slope to Kingsley Park (porous bituminous concrete), approx. **0.35 miles**.
3. Meet ADA Compliance standards for new connector paths.
4. Create formal connection between Cambridge/Watertown Greenway and Perimeter Road.
5. Improve drainage and protection of drinking water supply.
6. Restore existing vegetative buffers.

# Circulation and Access Studies

1. FPR Circulation and Access Master Plan (2008)
2. Path Implementation Plan (draft 2010 document)
3. FP Shared Use Recommendations (2011)



# Previous Circulation Studies – Pine Grove

## Existing Trail Conditions and User Conflicts

1. 9 (nine) trail crossings over new Greenway.
2. Steep gradient, erosion and soil compaction.
3. Open to walkers and joggers; closed to cyclists.
4. On- and off-leash dogs are allowed.
5. Dogs vs. slope and forest restoration.
6. Greenway commuter cyclists.














# Circulation Studies

## Existing Unofficial Trails



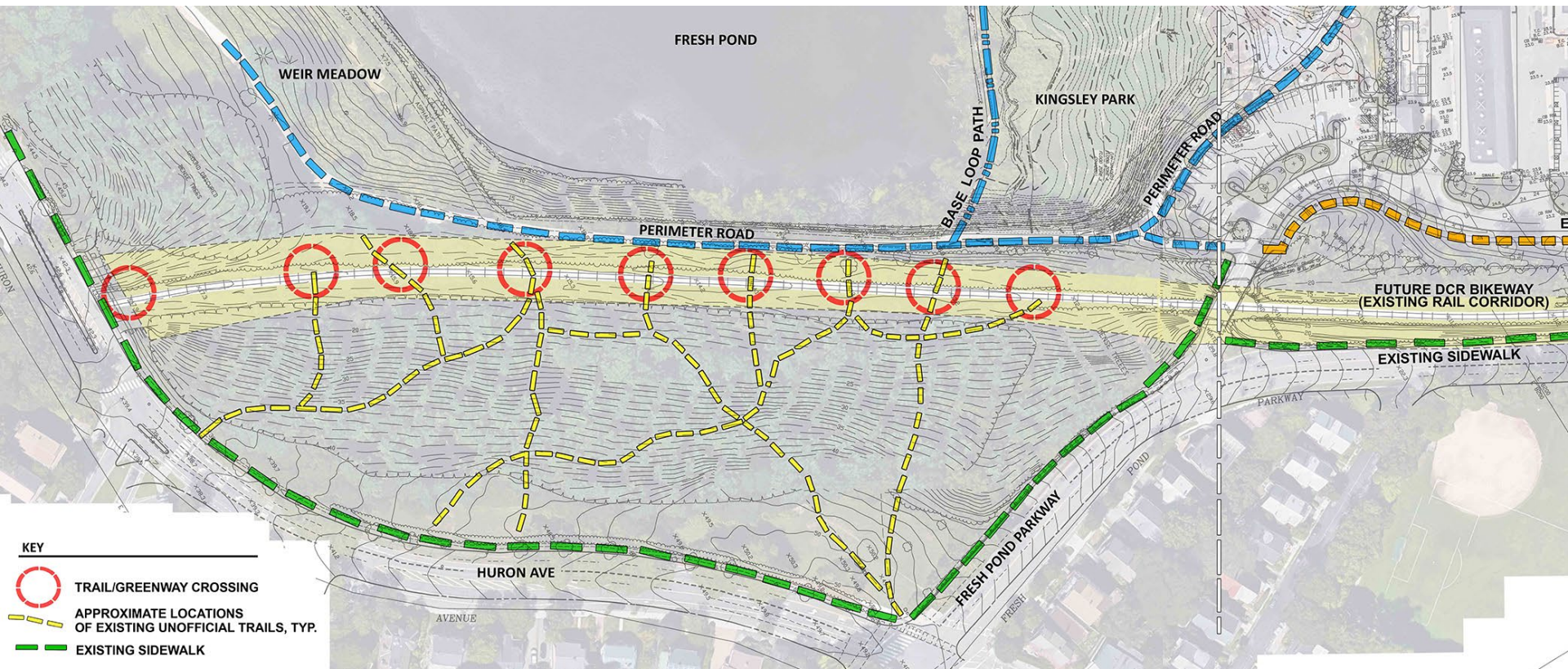
### LEGEND

-  Water Bodies
  -  Wetlands
  -  Open Space
  -  City Boundary
  -  Railway Lines
  -  Major Streets
  -  Crosswalks
  -  Sidewalks
  -  Access Points
- Paths and trails
- Type
-  Official
  -  Unofficial



# Circulation Studies

## Existing Path and Trail Crossings



# Previous Pine Grove Circulation Studies

## Alternative Analysis Elements

1. Closure of minor trails and controlled access points.
2. On-leash trails from Huron Avenue to Perimeter Road.
3. ADA-compliant path/trail from Huron Avenue.
4. Maintenance/snow removal.
5. Emergency vehicles.
6. Restoration (slope and woodland).

# Pine Grove Study

1. Vegetation Assessment
2. White Pine Pathology
3. Soil Testing and Recommendations
4. Begin Pilot Project and Monitoring



# PINE GROVE ASSESSMENT

## Project History:

1. Visual Assessment September and October 2019.
2. Requires updated topo survey for slopes, paths, soils and drainage.
3. Vegetation analysis distinguishes Inner Pine Grove habitat versus Edge habitat.



# Soil Testing and Analysis

1. Soil Characterization (24" depth)
2. Soil Compaction
3. Soil Testing (3-depths):
  - ✓ Physical and Chemical Properties
  - ✓ Permeability (6" depth & bottom)
  - ✓ Biological and Microbiological Analysis\*

\*Soil Foodweb NY Lab analyses forthcoming



# Test Pit Locations



# Test Pits and Soil Analysis

## Test Pit #1



## Soil Compaction Probe Testing





# Soils Analysis Recommendations

1. Direct replanting of white pine using nursery stock and protective fencing.
2. Use of white pine plugs or seedlings.
3. Manual removal and/or chemical treatment (hand wand) to remove invasive species.
4. Soil amendments (limestone) to increase pH not recommended; can cause significant damage within O-horizon and could enter watershed.



# Pine Grove Recommendations

1. Remove Invasive Trees less than 6" caliper.
2. Prune Lower Branches of Existing White Pines.
3. Identify Pilot Project Study Areas (New Plantings).
4. Increase Species Diversity in Pilot Project.
5. Utilize Existing Relationship with Local Citizen Science Group(s).
6. Begin Pilot Project and Monitor over the Next 2-3 Years.



# PERIMETER ROAD IMPROVEMENTS



Kingsley Park

Glacken Slope

Fresh Pond

Perimeter Road

Fresh Pond Parkway

Watertown/Cambridge Greenway

Weir Meadow

Huron Ave

# Kingsley Park and Glacken Slope Slope Porous Asphalt Paving



# Perimeter Road - Porous Asphalt Surfacing



Kingsley Park – Asphalt Surfacing

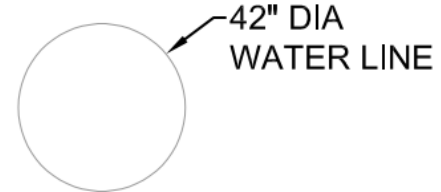
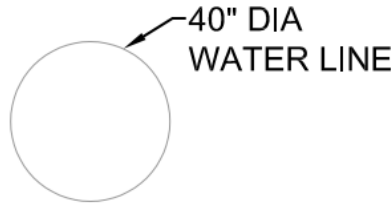
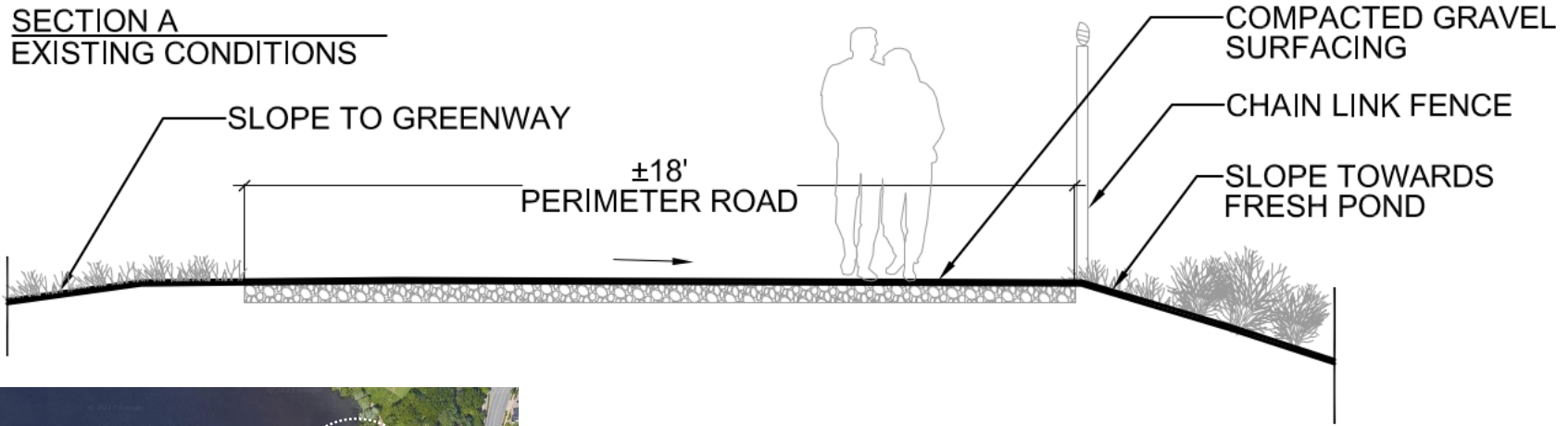


Kingsley Park – Porous Asphalt Surfacing

# Perimeter Road Near Kingsley Park

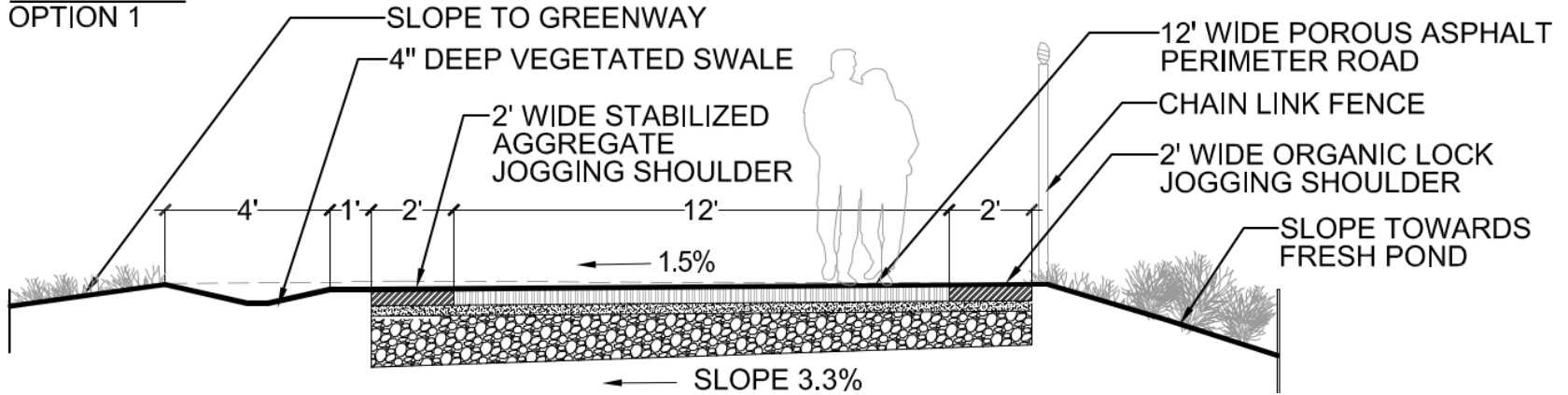
## Existing Conditions

### SECTION A EXISTING CONDITIONS

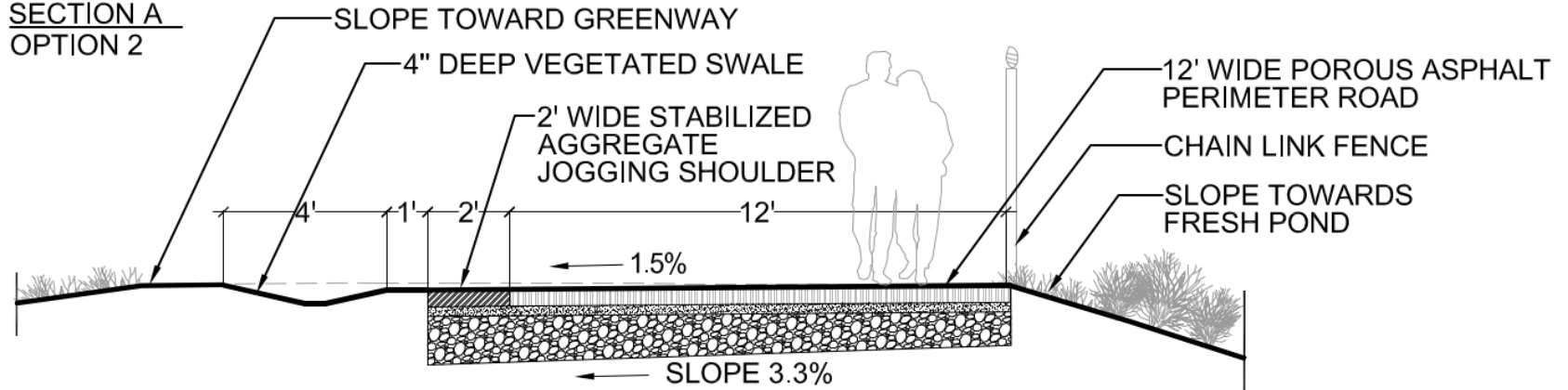


# Perimeter Road Layout and Surfacing Proposed Alternatives

## SECTION A OPTION 1



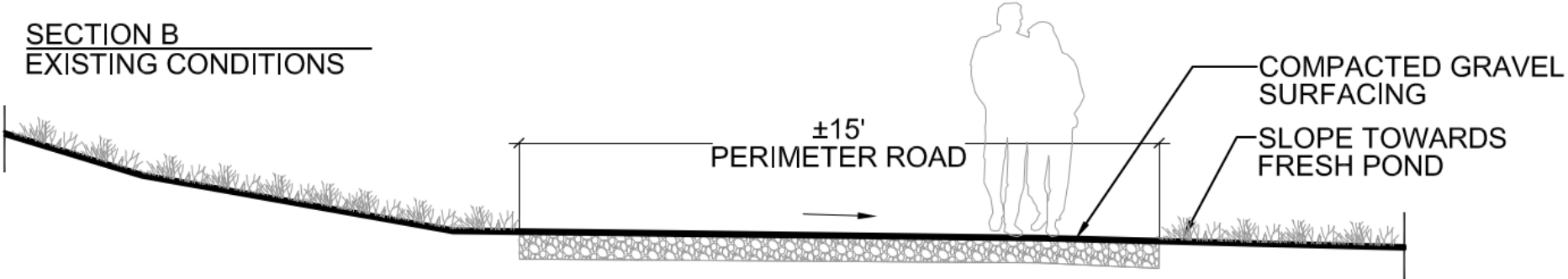
## SECTION A OPTION 2



# Perimeter Road at Weir Meadow

## Existing Conditions

SECTION B  
EXISTING CONDITIONS

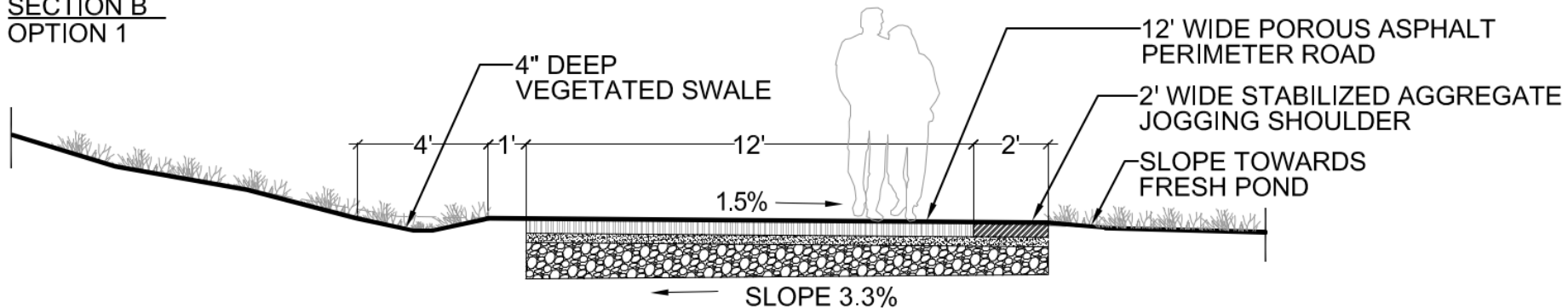




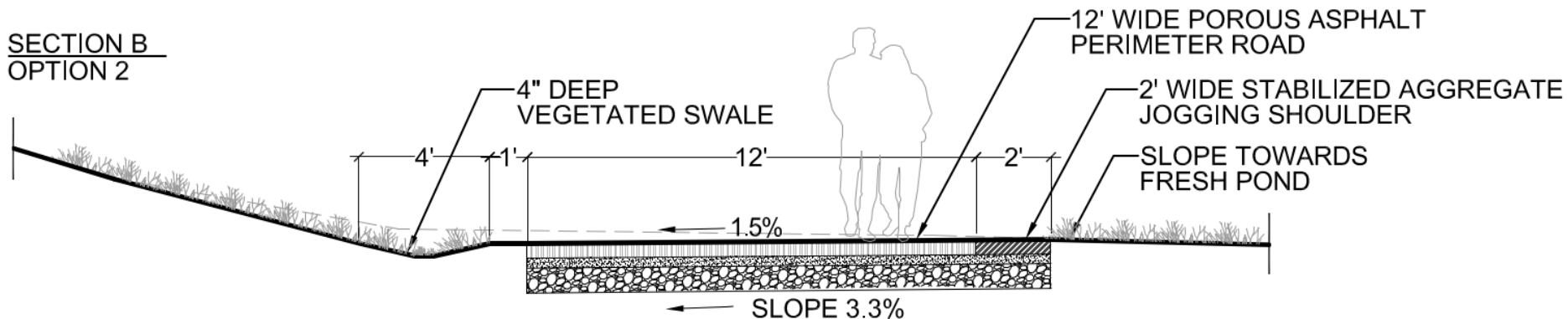
# Perimeter Road at Weir Meadow

## Proposed Alternatives

### SECTION B OPTION 1

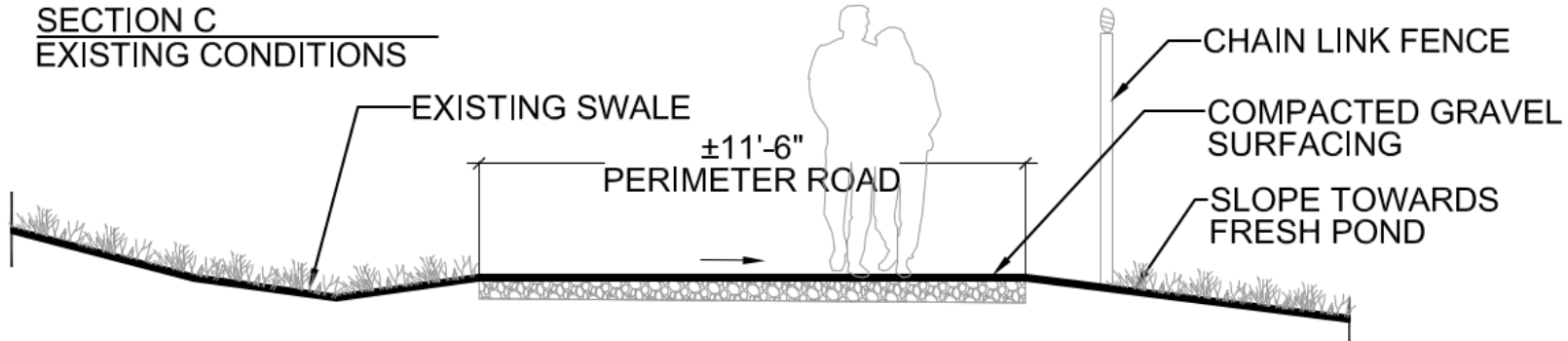


### SECTION B OPTION 2



# Perimeter Road below Glacken Slope

## Existing Conditions



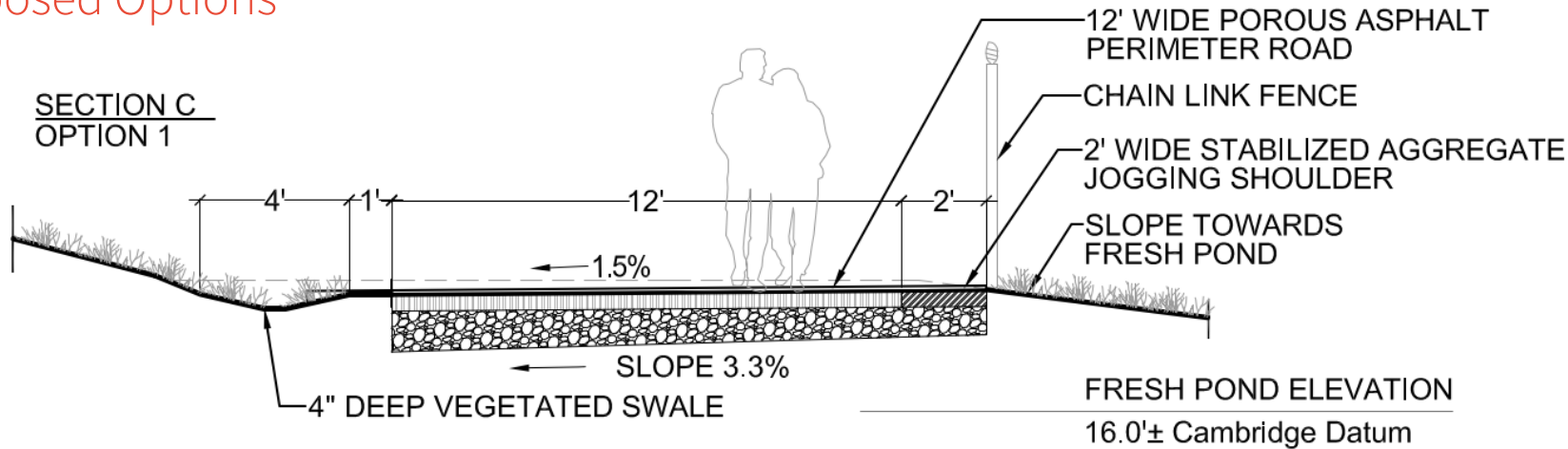
FRESH POND ELEVATION  
16.0± Cambridge Datum



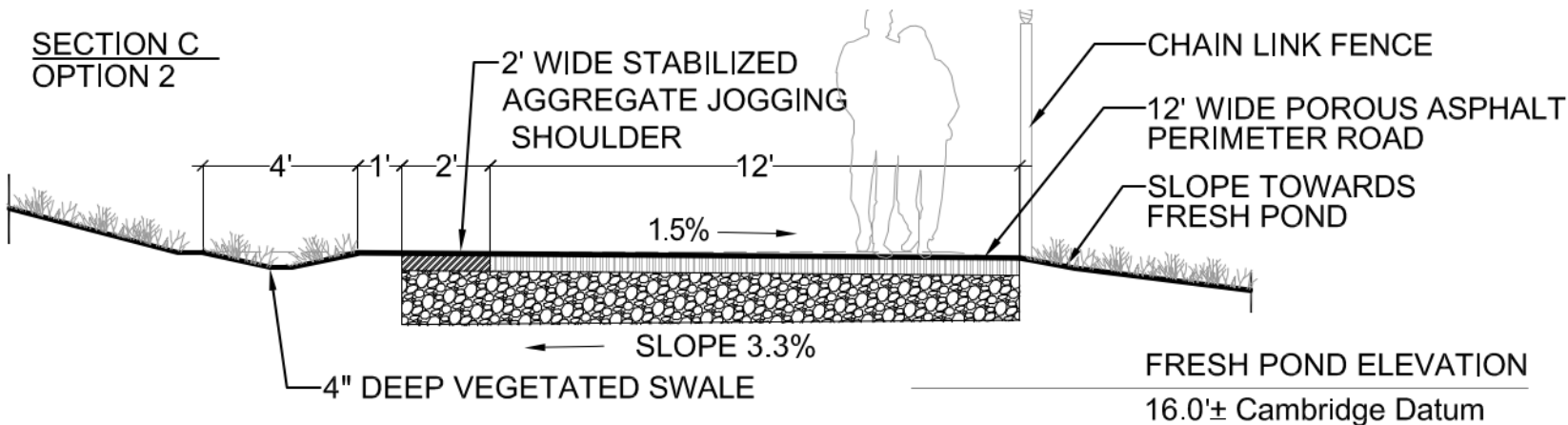
# Perimeter Road below Glacken Slope

## Proposed Options

SECTION C  
OPTION 1



SECTION C  
OPTION 2

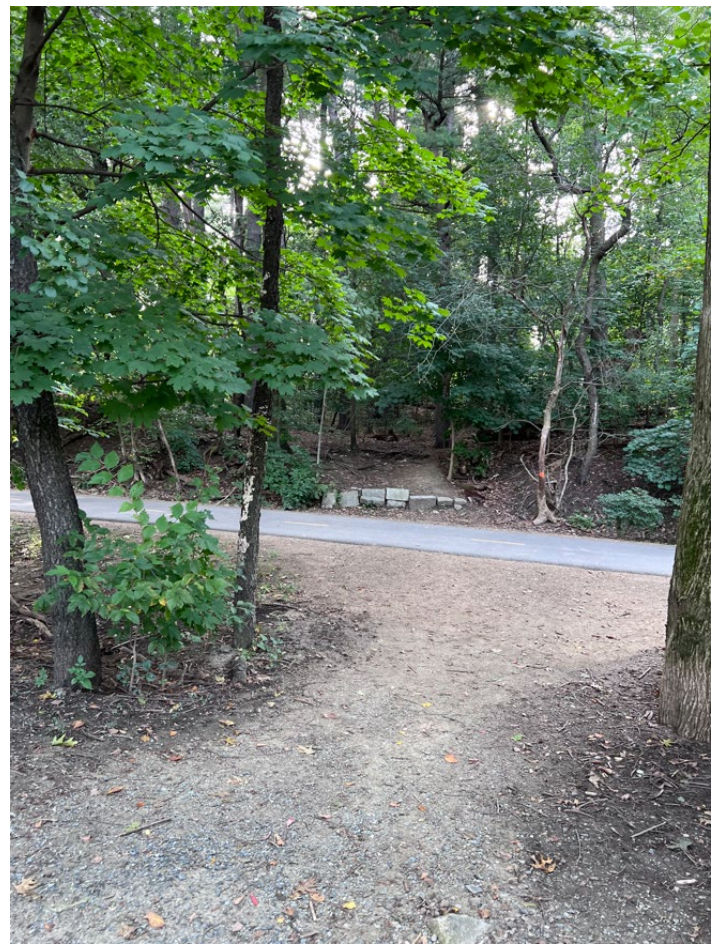


# Proposed Connection Perimeter Road to Greenway



# Proposed Connection Perimeter Road to Greenway

1. Raised connection (asphalt to asphalt).
2. MUTCD and AASHTO bicycle signage and striping (Greenway only).
3. Drainage culvert for greenway swale.
4. Snow plowed (CWD).
5. Reservation signage.



# Perimeter Road / Greenway Connection Signage

1. Best location and siting option.
2. Communicate FPR regulations, goals and vision statement.
3. Wayfinding map; historical, recreational and ecological components (2-sided).

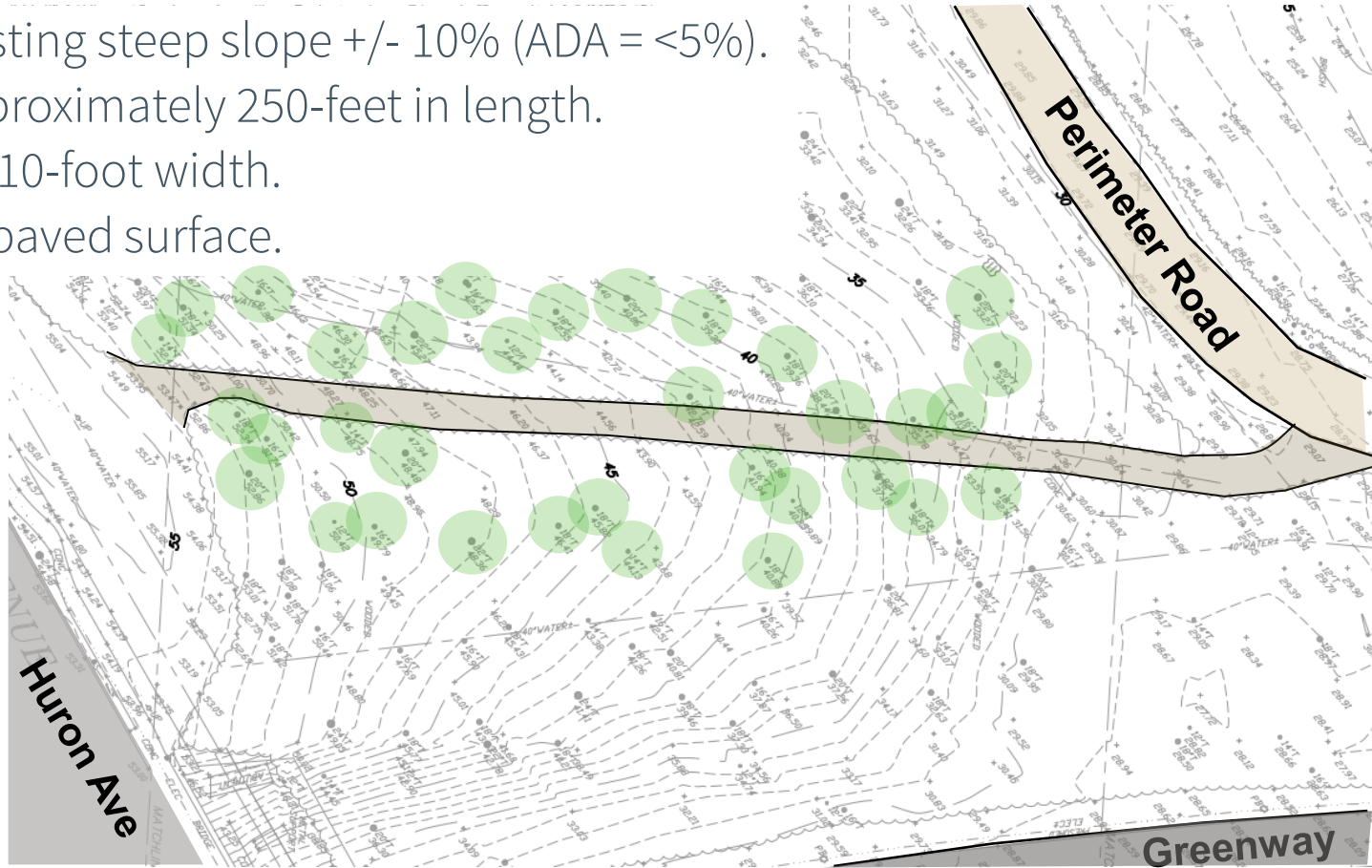


# Strawberry Hill ROW to Perimeter Road (Existing)



# Strawberry Hill ROW to Perimeter Road (Existing)

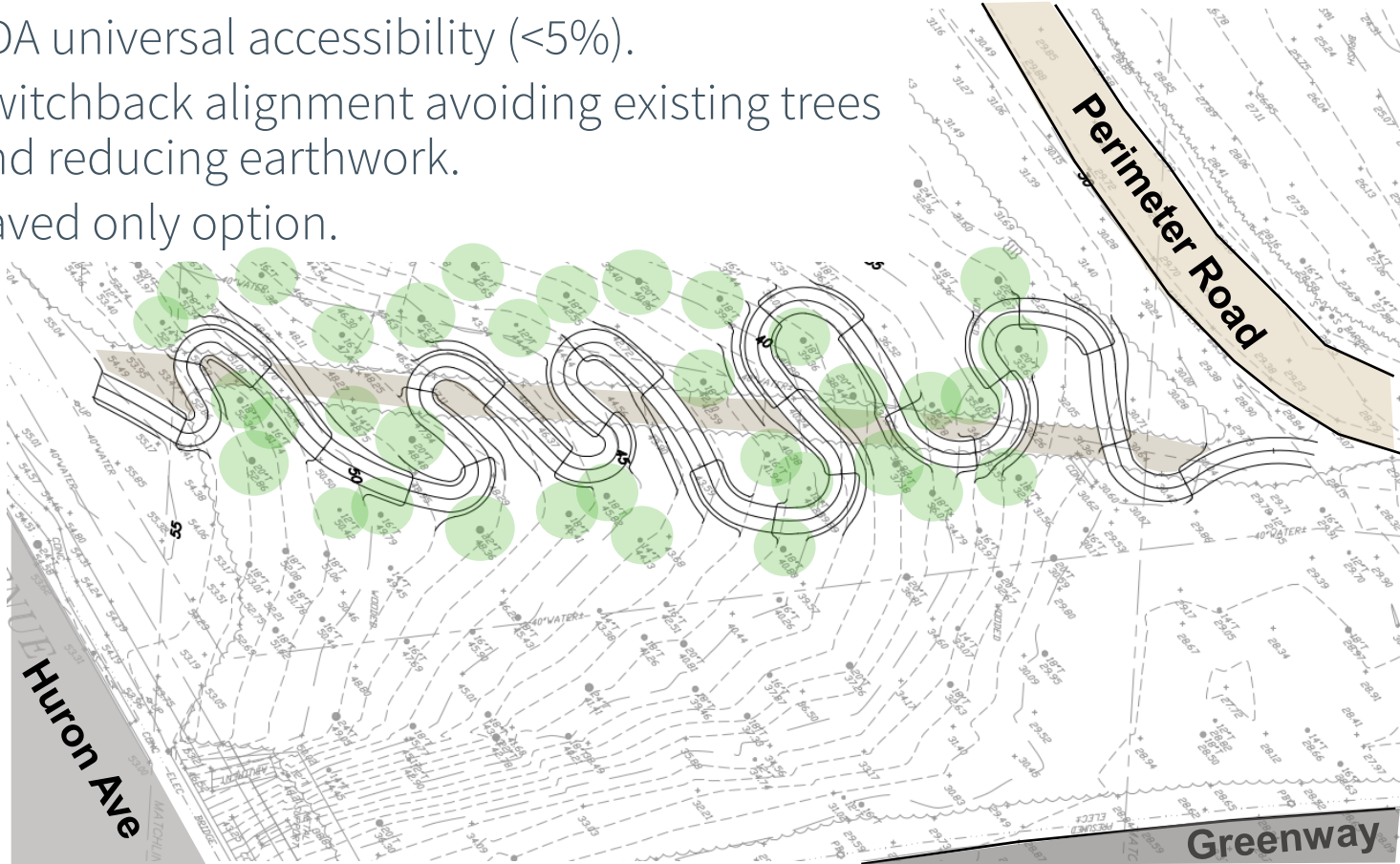
1. Existing steep slope +/- 10% (ADA = <5%).
2. Approximately 250-feet in length.
3. +/- 10-foot width.
4. Unpaved surface.





# Concept 1 – Proposed ADA Connection

1. ADA universal accessibility (<5%).
2. Switchback alignment avoiding existing trees and reducing earthwork.
3. Paved only option.



# Concept 2 – Proposed ADA Connection

1. USDA Forest Service Trail Accessibility Guidelines.
2. Steeper than 5%, but not steeper than 1:12 (8.33%).
3. Resting interval (<2%) at 200 feet.
4. Paved and unpaved surfacing options.



# FPAB Comments (11.16.2023 mtg)

1. Is a high soil pH a concern?
2. Design connection from Greenway to FP Perimeter Road to slow cyclists down/walk.
3. Coordinate any new paths w/ Commission for Persons with Disabilities.
4. Coordinate with City traffic planners for safe connections.
5. Develop signage into Reservation to identify non-motorized use.



# Next Steps

1. Receive Report from Nick Brazee (UMass Plant Pathologist) Site Visit (12/5/2023).
2. Full Soil Testing Results and Recommendations (Pine Grove).
3. 30% Design Development Perimeter Road Improvement Drawings.
4. Pine Grove Pilot Project and Pilot Project (Future Phase).

