KINGSLEY PARK SITE IMPROVEMENTS

Bioengineering GROUP
Building Sustainable Communities on an Ecological Foundation

CAMBRIDGE WATER DEPARTMENT

PUBLIC MEETING #1
INVENTORY AND ANALYSIS

December 7, 2011

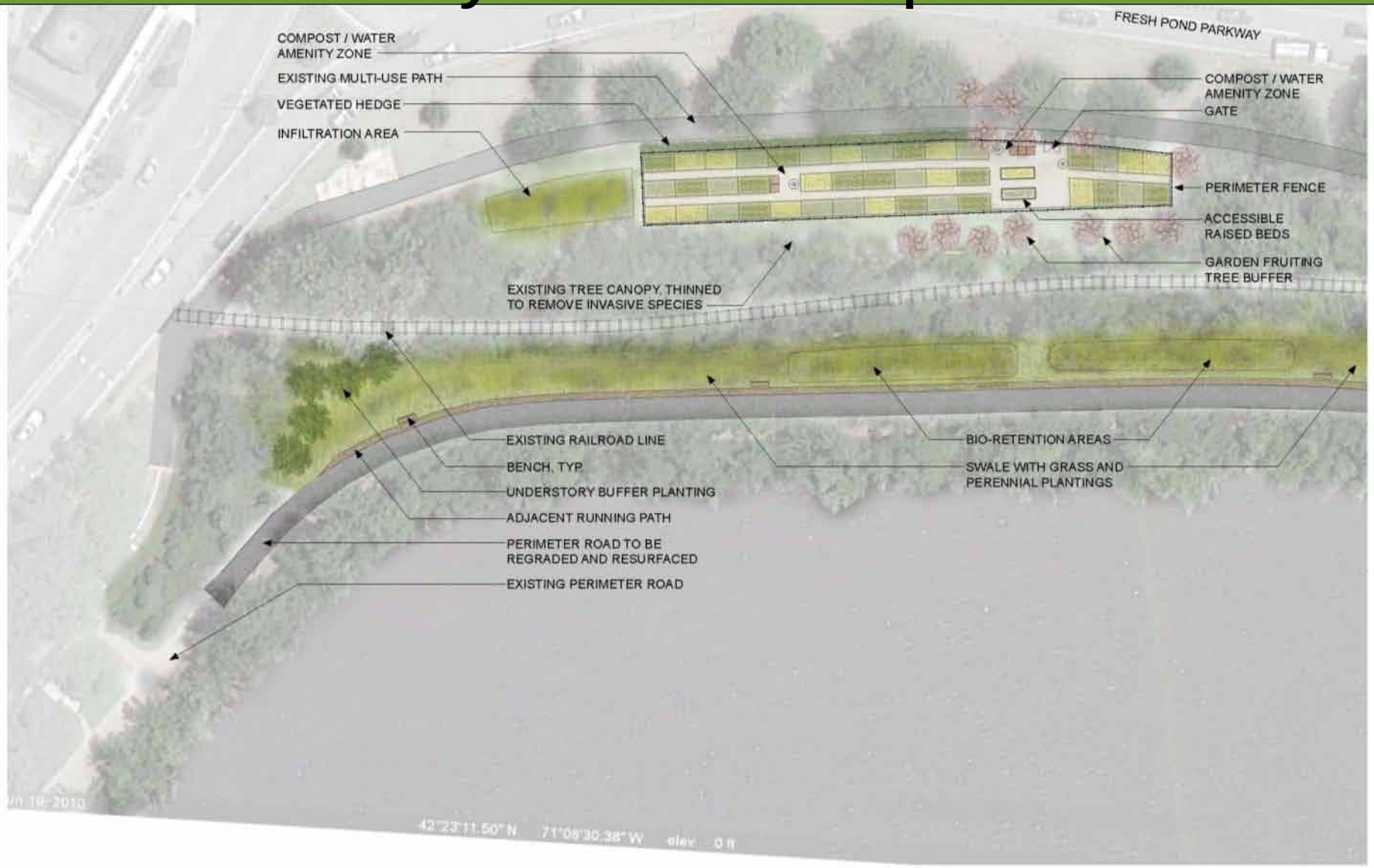
Agenda

- Introduction / Project Updates
- Master Plan Goals
- Inventory and Analysis
- Public Input

Black’s Nook Site Improvements

Glacken Slope Stabilization

Community Garden Improvements



City of Cambridge
Fresh Pond Water Quality & Community Gardens Improvements
OPTION 2

N 0 20 40
1" = 40'

kmdg KLOPFER MARTIN DESIGN GROUP

Shared Use Plan

Report and Public Comments:

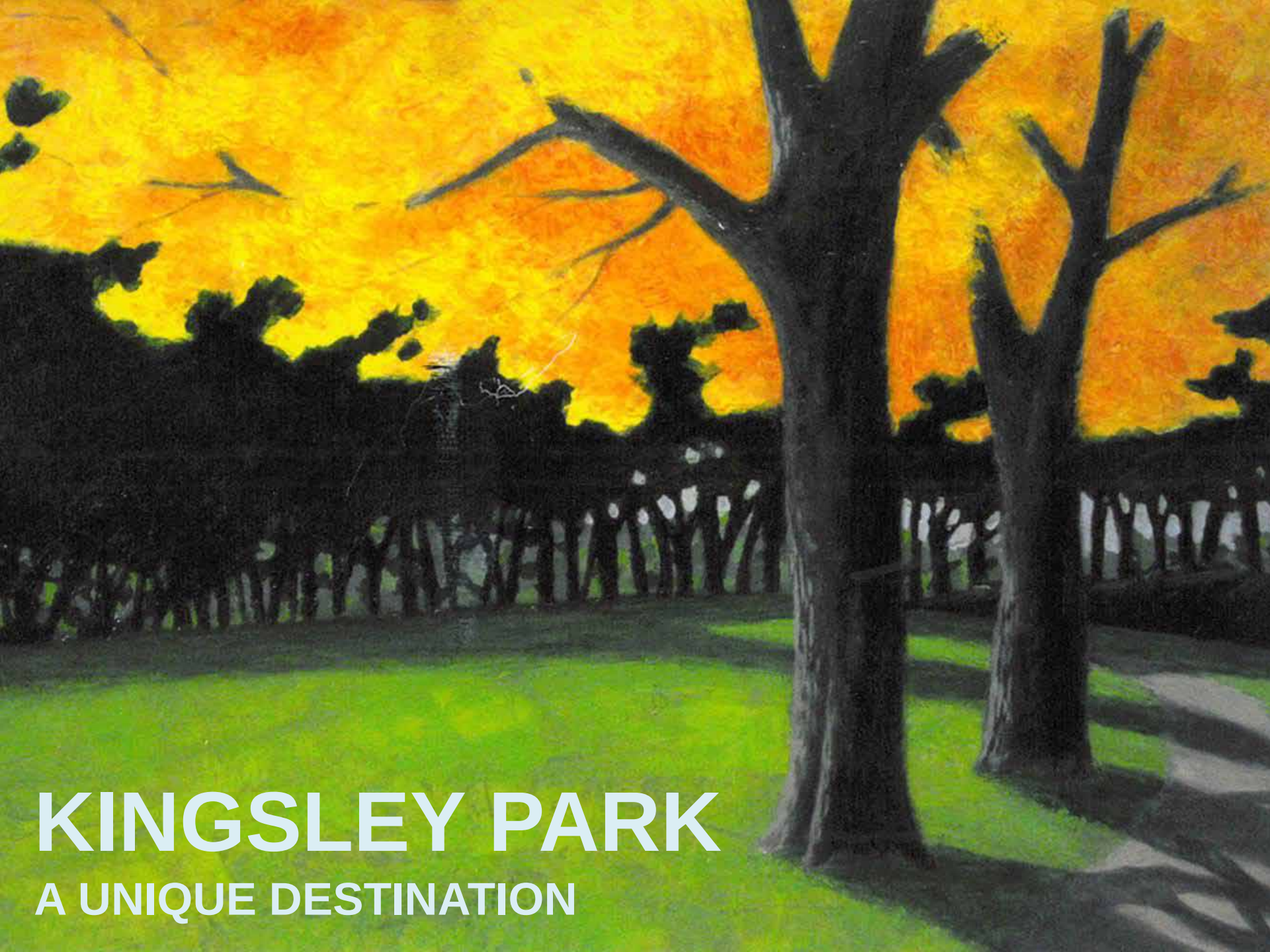
- Fresh Pond Shared Use Public Engagement Process Recommendations, June 2011

Website:

- http://cbuilding.org/freshpond

Next Public Meeting:

- Thursday, February 16, 2012, 6:30-8:30 pm



KINGSLEY PARK

A UNIQUE DESTINATION

Housekeeping Items

Sign-in Sheet

Public Input Sheet:

- Comments due 6 January 2012
- fpr@cambridgema.gov

Project Webpage:

- www.cambridgema.gov/CWD/Kingsley.cfm

Next Public Meeting: April 2012

Vision Statement

"…*the preservation of water quality, recreational open spaces, natural green spaces, wildlife habitat, and a refuge from hectic urban life*…"

Fresh Pond Master Plan

2000

Kingsley Park Improvements (Completed)

- ü Wetland Buffer
- ü Lawn Restoration

Master Plan Recommendations

- Shoreline Stabilization
- Slope Stabilization
- Forest Management
- Naturalize Transition Zone
- Maple Row Enhancement

Recommendations (contd.)

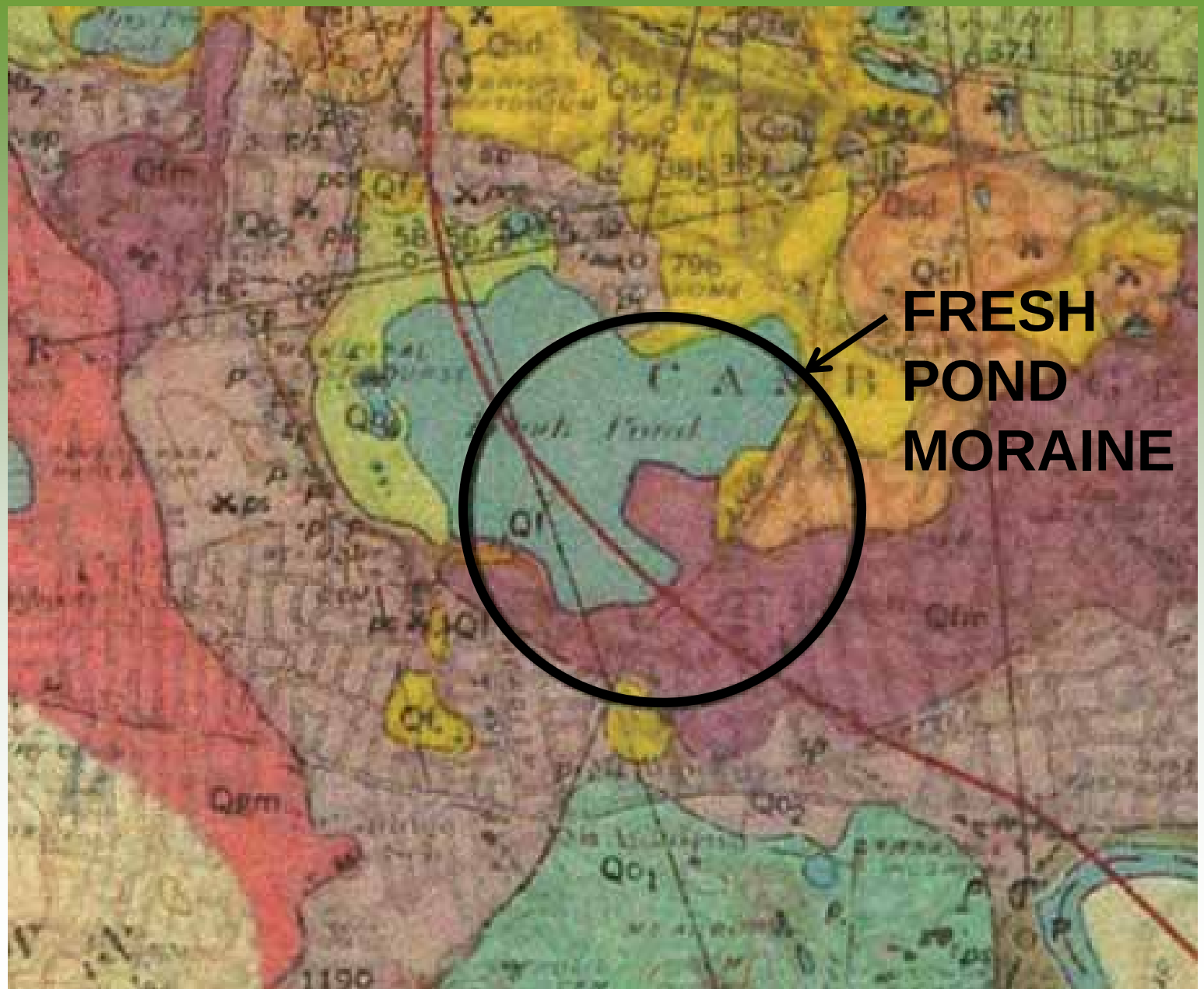
- ADA Compliance for Pathways
- Stormwater Management
- Drainage Improvements
- Perimeter Road Improvements

What makes Kingsley Park Unique?

- Location, location, location
- Park-like setting
- Multiple activities
- Historical land use and design
- Natural features

Existing Site Features

Surficial Geology Map (1944)



Fresh Pond Moraine

- Formed by re-advancement of retreating ice sheet
- Scraped up clay from lowlands
- Clayey till with sand, gravel, pebbles, and cobbles

NRCS Soil Survey - 1995

- Steep Slopes
  - Hinkley excessively drained soils formed in gravelly and cobbly, coarse textured, glacial outwash
- Top of Slopes/Open Areas
  - Udorthents, soil that has been excavated or deposited due to construction operations

Gravel Mining at Kingsley

Uncontrolled Runoff, toe of slope

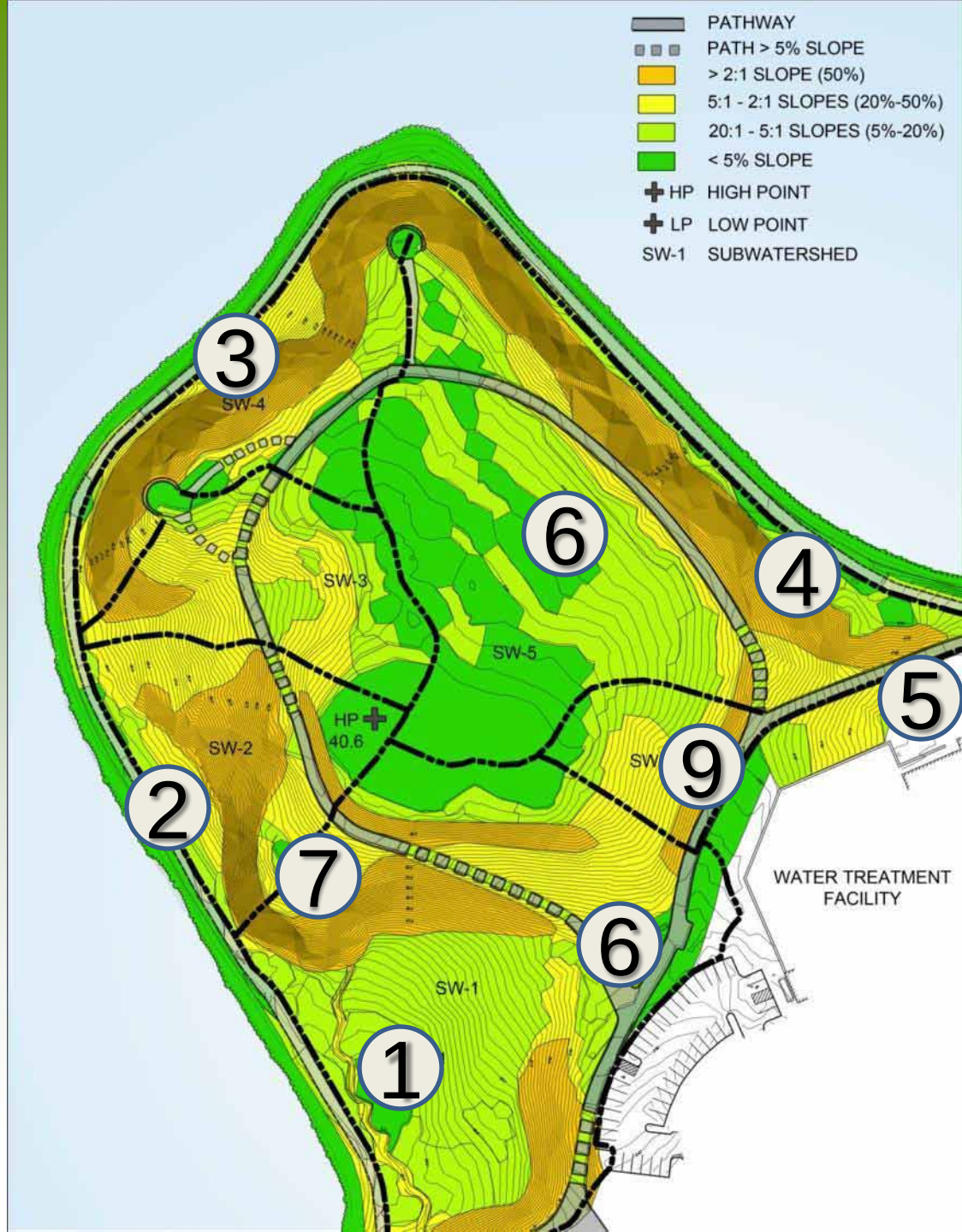
Erosion along mid-slope

Impacts to Water Quality and Accessibility

- Soil Erosion/Nutrient Loss
- Compaction
- Infiltration Rates
- Uncontrolled Runoff
- Other Contaminants

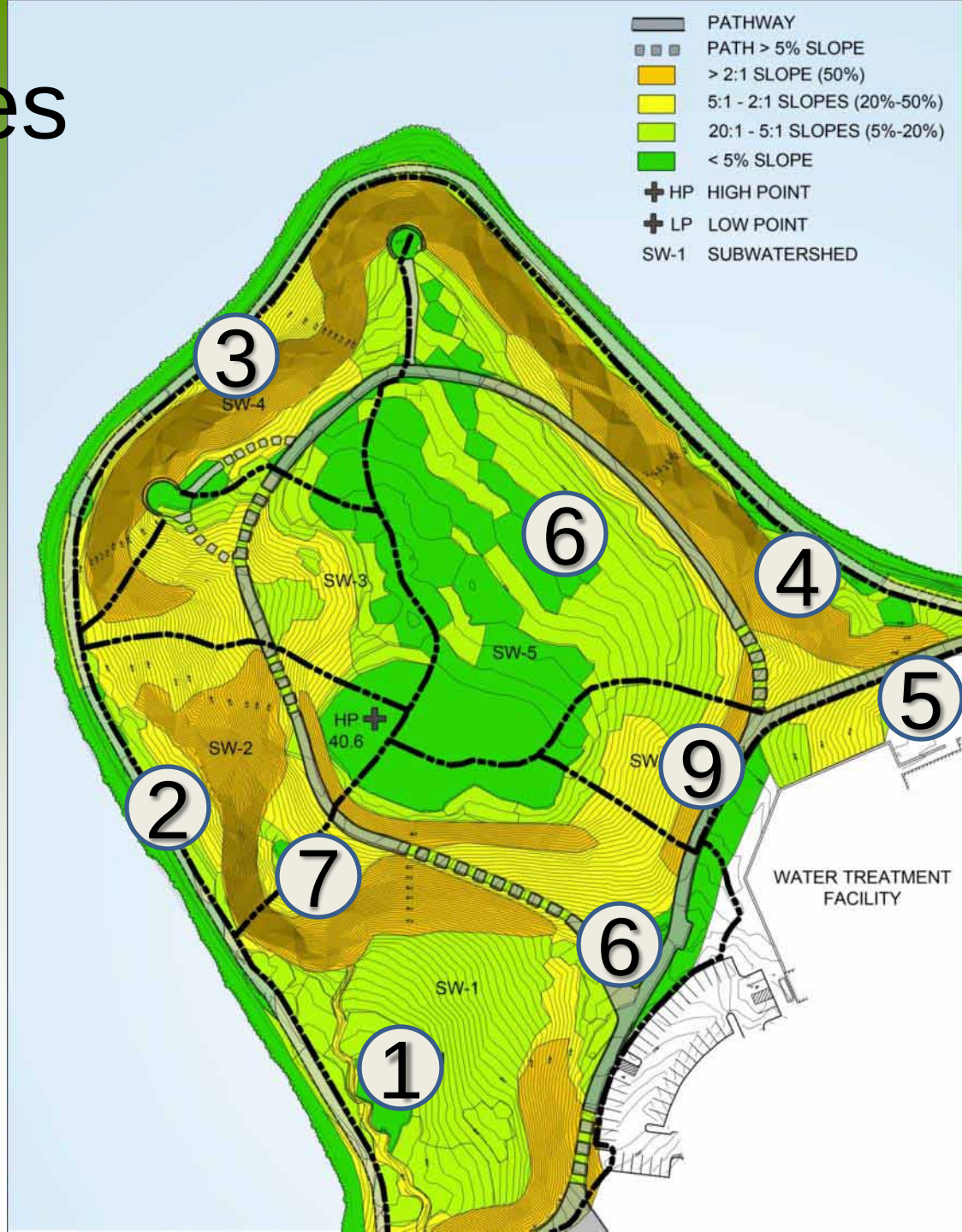
Natural Features

- Slope
- Infiltration Rates
- Watershed



Infiltration Rates

TP-1	0.0 in/hr
TP-2	1.6 in/hr
TP-3	2.3 in/hr
TP-4	15.4 in/hr
TP-5	1.1 in/hr
TP-6	10.8 in/hr
TP-7	7.1 in/hr
TP-8	4.3 in/hr
TP-9	0.0 in/hr



Infiltration at Toe of Slope

TP-2 1.6 in/hr

TP-3 2.3 in/hr

Avg. 1.95 in/hr = 0.163 ft/hr

Potential infiltration area at toe of slope

= 9750 sq ft

(6 feet of width adjacent to path and 1625 feet of length)

Runoff Volume

Areas contributing to Toe of Slope

2 Year Storm(cu ft)		**10 Year Storm (cu ft)**	
SW-2	2444	SW-2	5073
SW-3	2398	SW-3	5564
SW-4	1767	SW-4	4678
SW-5	4493	SW-5	12321
Total	**11,102 cu ft**	**Total**	**27,636 cu ft**

Storage Required for 2 Year Storm

Time	Runoff (ft/hr)	Infiltration (ft/hr)
0-9 hr	.018	.163
9-15	.089	.163
15-24	.020	.163

- **No storage requirement,**
- **Provide depression to facilitate infiltration**

Storage Required for 10-Year Storm

Time	Runoff (ft/hr)	Infil (ft/hr)	Storage (ft)
0-9 hr	.045	.163	0
9-15	.222	.163	.366
15-24	.050	.163	0

- **4.5 inch deep storage area to avoid spillover to pathway at 15 hr rate**
- **Increase of infiltration will remove water within 24 hrs**

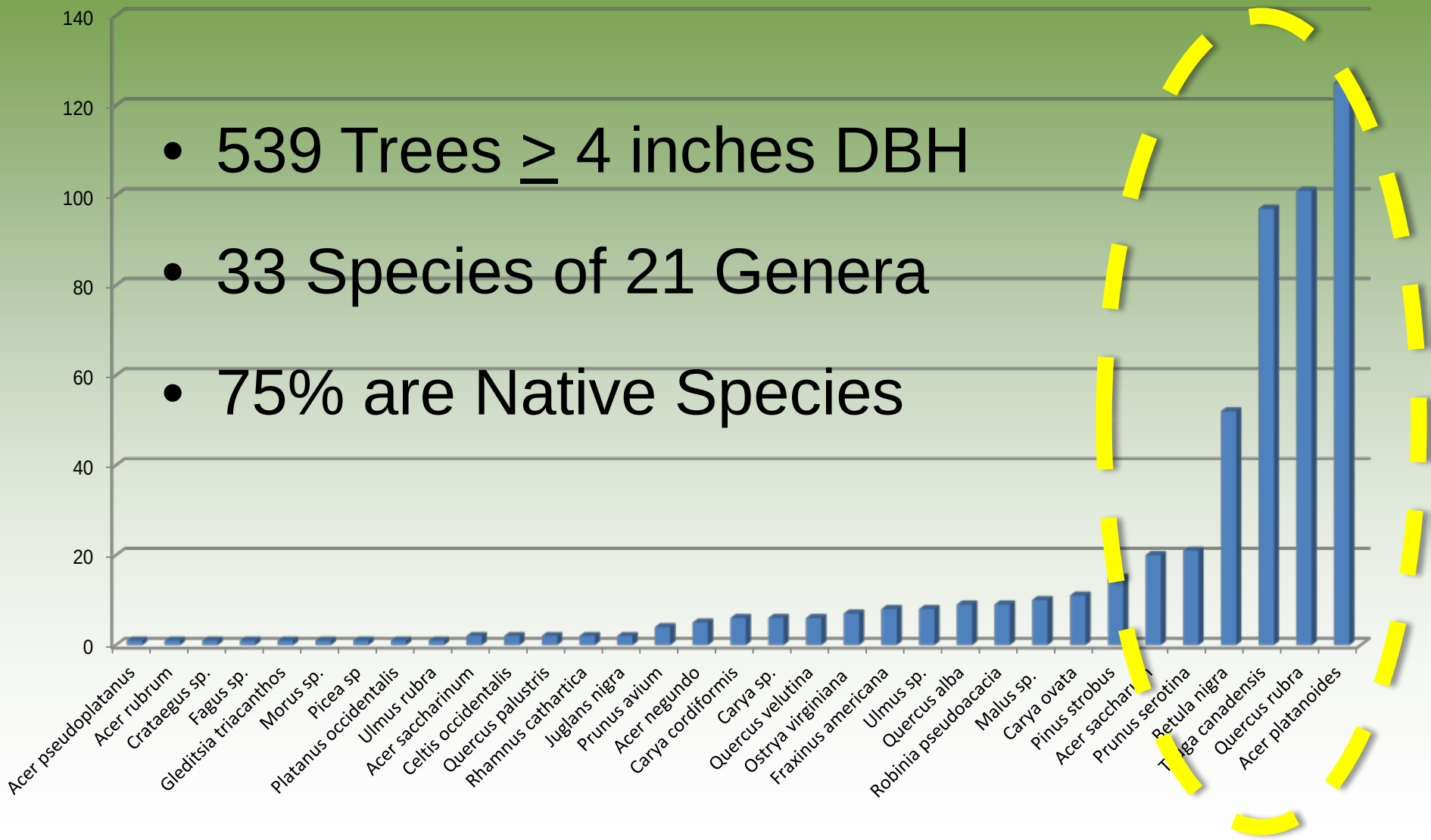
Vegetative Communities

Plant Inventory

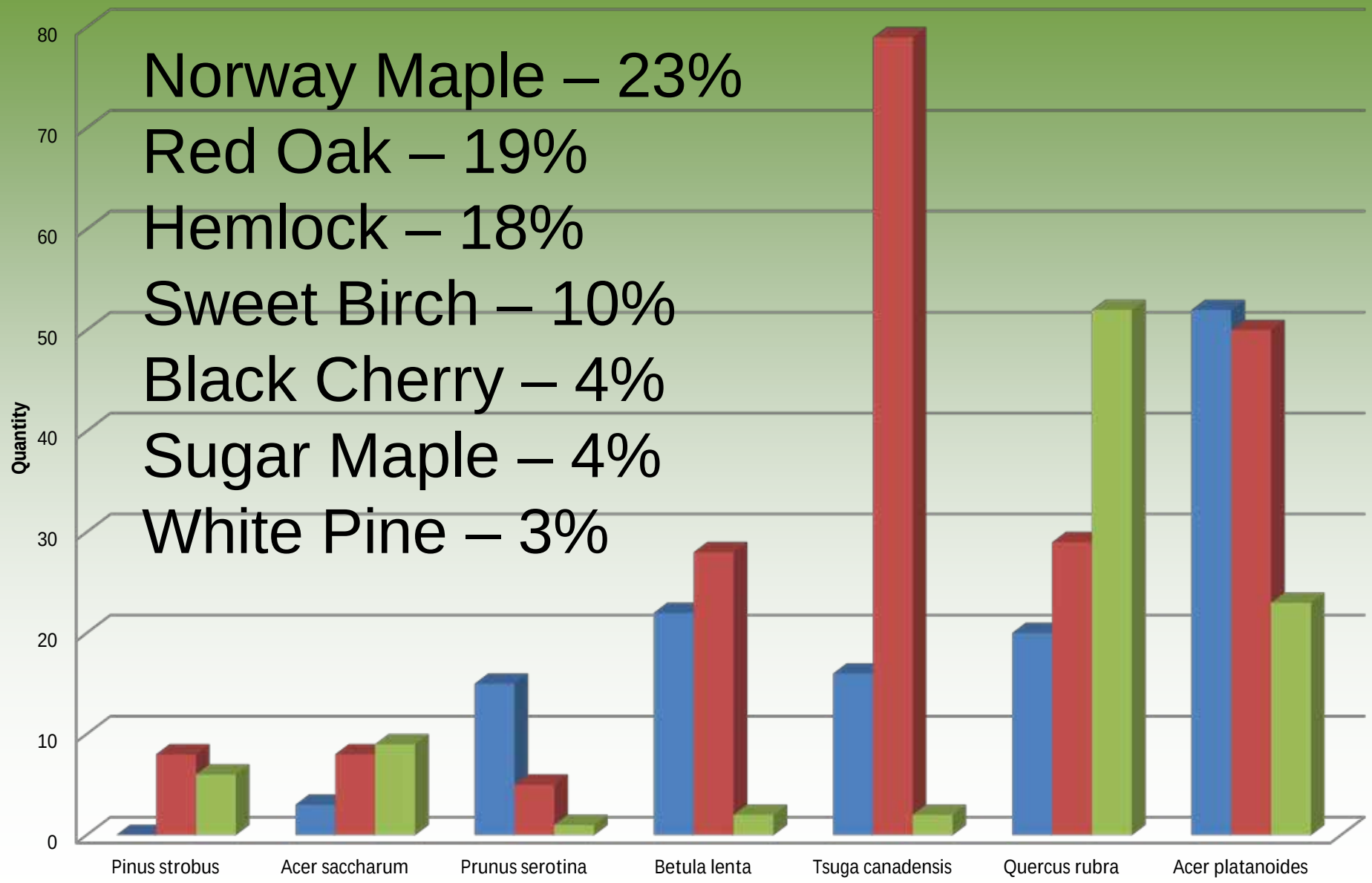
- 25% of trees are Invasive, non-native species
  - All invasives are reproducing

Tree Abundance and Diversity

- 539 Trees ≥ 4 inches DBH
- 33 Species of 21 Genera
- 75% are Native Species



7 Tree Species Comprise 81%

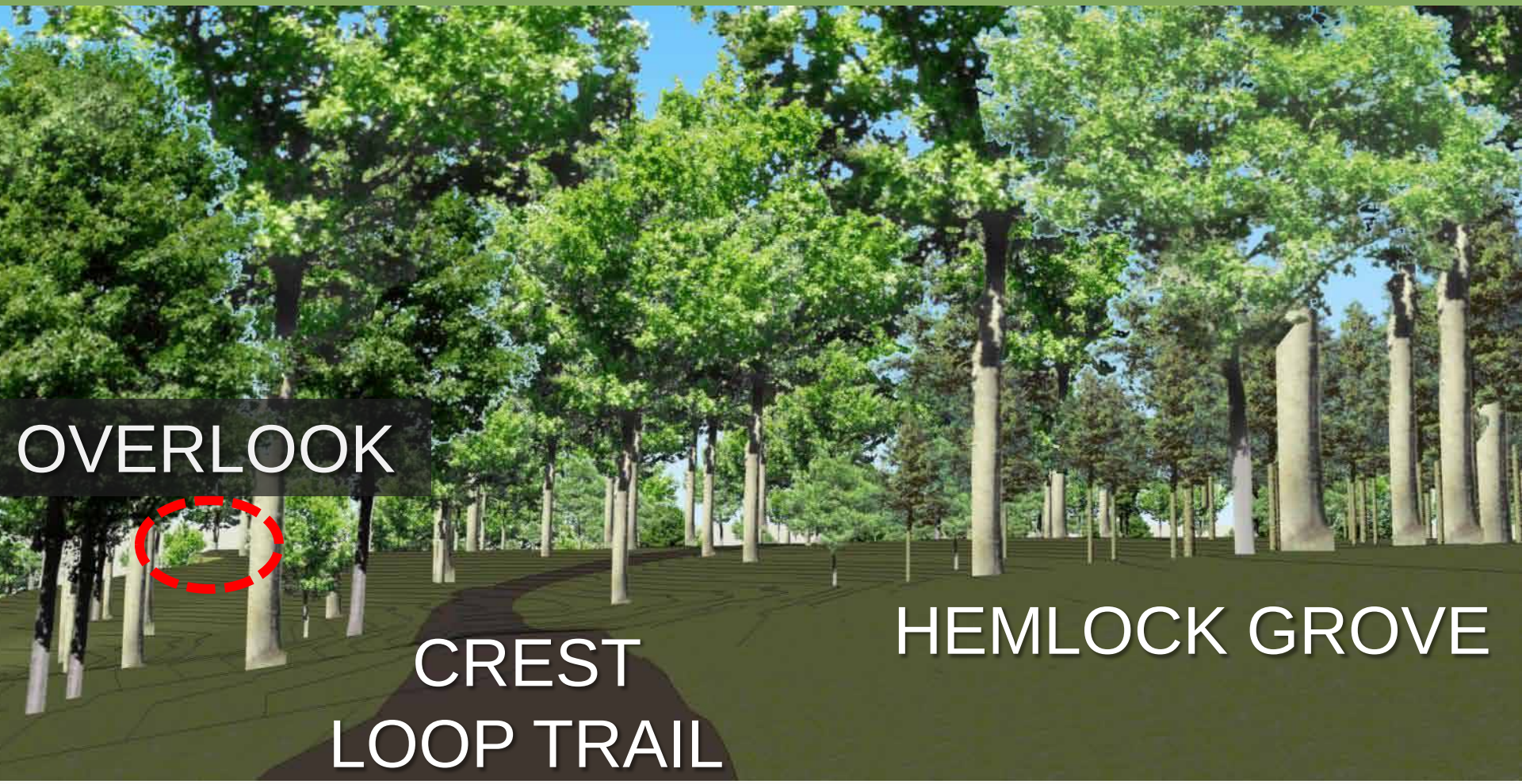


Canopy Trees Supporting *Lepidoptera* Species*

Tree Species (Family)	% Found at Kingsley	Species Supported
Oak	19%	534
Cherry	4%	456
Birch	10%	413
Pine	3%	203
Maple	27%	285

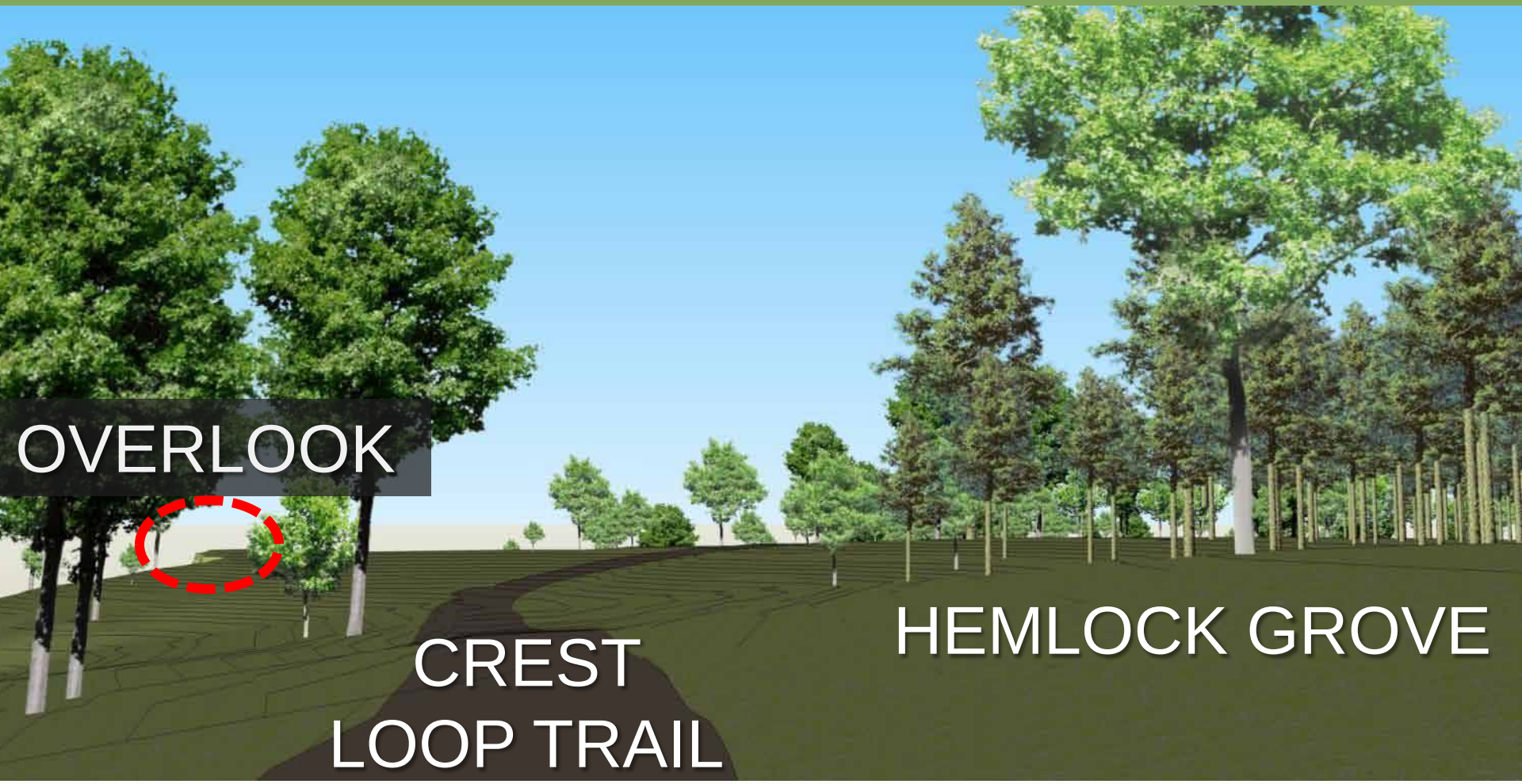
*Tallamy, Bringing Nature Home (2010)

Canopy Cover – All Tree Species



View along Crest Loop Trail looking north

Canopy Cover – Natives Only



View along Crest Loop Trail looking north

Native Species

Hemlock/Pine Grove

Hackberry

Native Species

Historic Specimen Trees

Hop Hornbeam

White Oak

Cherries

Invasive Plant Communities

- Norway Maple-dominated Canopy
- Invasive Shrubs (Toe of Slope/Overlooks)
- Invasives Re-sprout from Stumps
- Ecological Value
  - Ecosystem Functional Integrity
  - Wildlife Food and Cover Resource
- Native vs. Historic Plantings

Invasive Tree Species

- Norway maple
- Black locust
- Buckthorns
- Tree of Heaven

25% of Trees ≥ 4 inches DBH are Invasive Species

Invasive Shrub Species

- Barberries*
- Common Privet*
- Honeysuckles*
- Multiflora Rose
- Japanese Knotweed

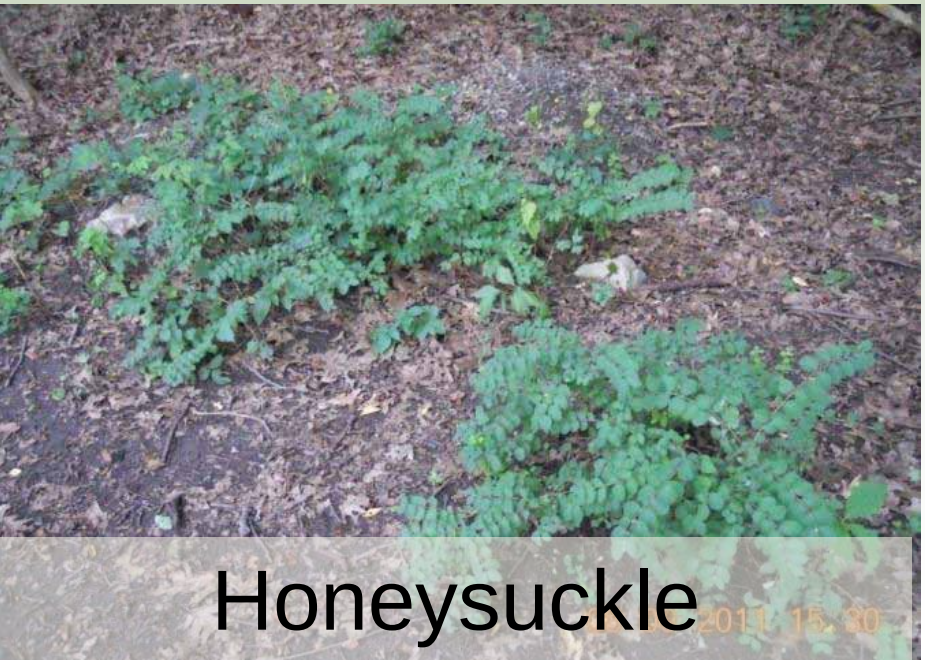
***Olmsted Brother's Planting Plan included Invasive Shrub Species**

Invasive Vine and Herbaceous Species

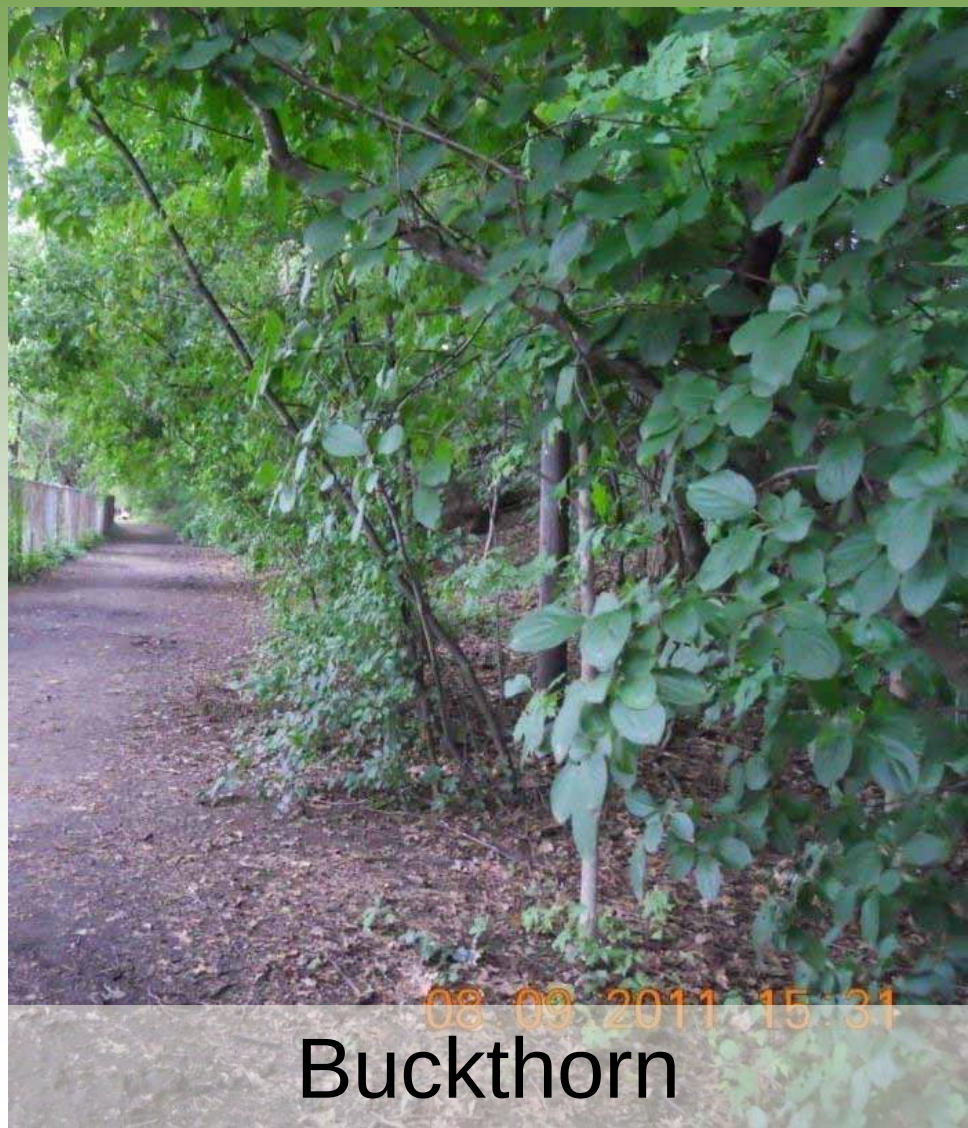
- Oriental Bittersweet
- Poison Ivy
- Black Swallowwort
- Common Wormwood
- Garlic Mustard
- Common Reed

Invasive Species

Bittersweet



Honeysuckle



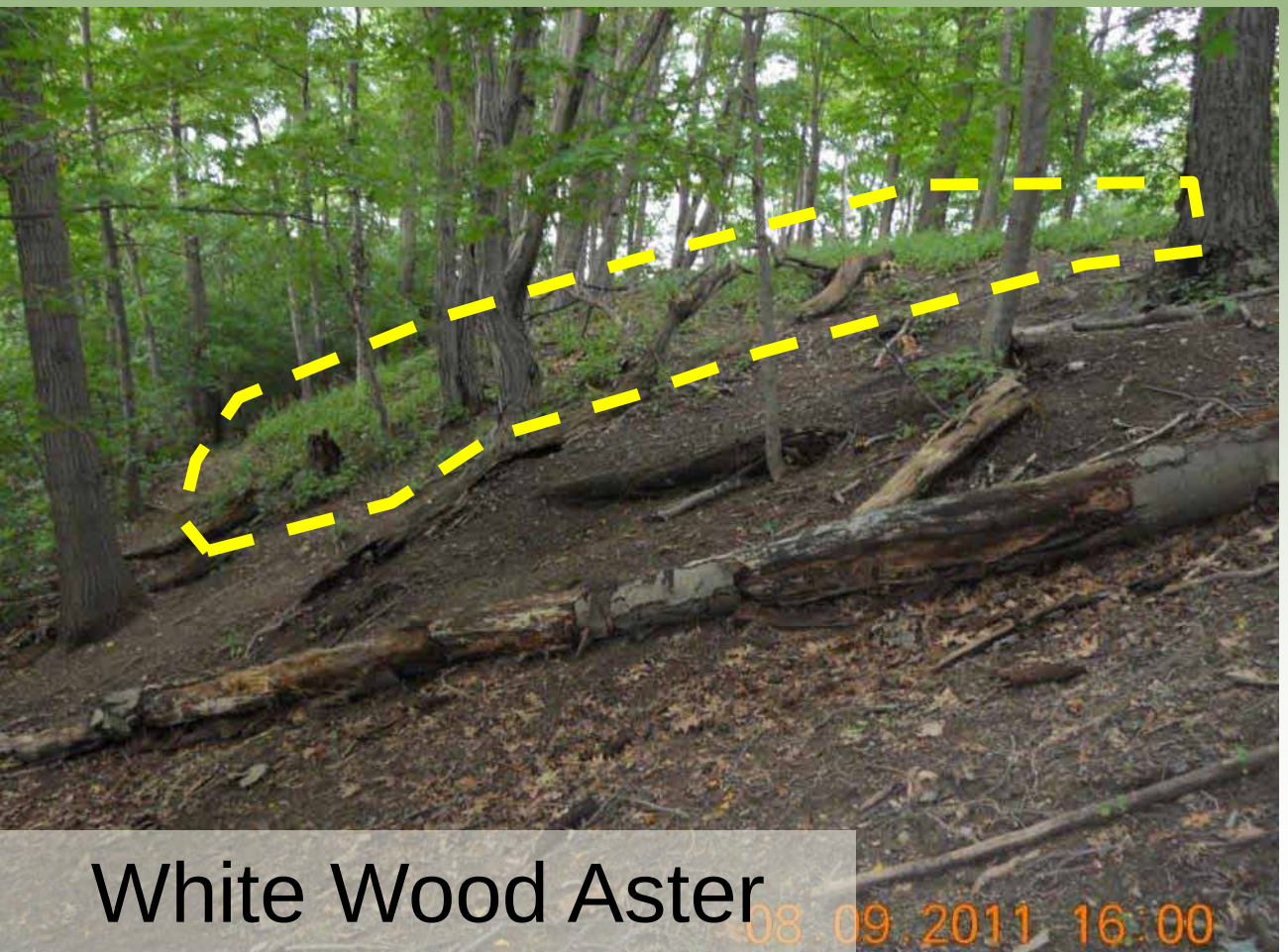
Buckthorn

Impacts to Ecological Health

- Erosion Impacts
  - Loss of Soil Fertility and Invertebrate Community
  - Soil Nutrient Loss
  - Invasive Species Gain Competitive Advantage
  - Gradual Destabilization of Food Webs
- Compaction Impacts
  - Reduced Groundwater Recharge
  - Impairment of Native Biological Communities

Helpful Native Species

Native, Shade-Tolerant Ground Cover Species provide Slope Stabilization



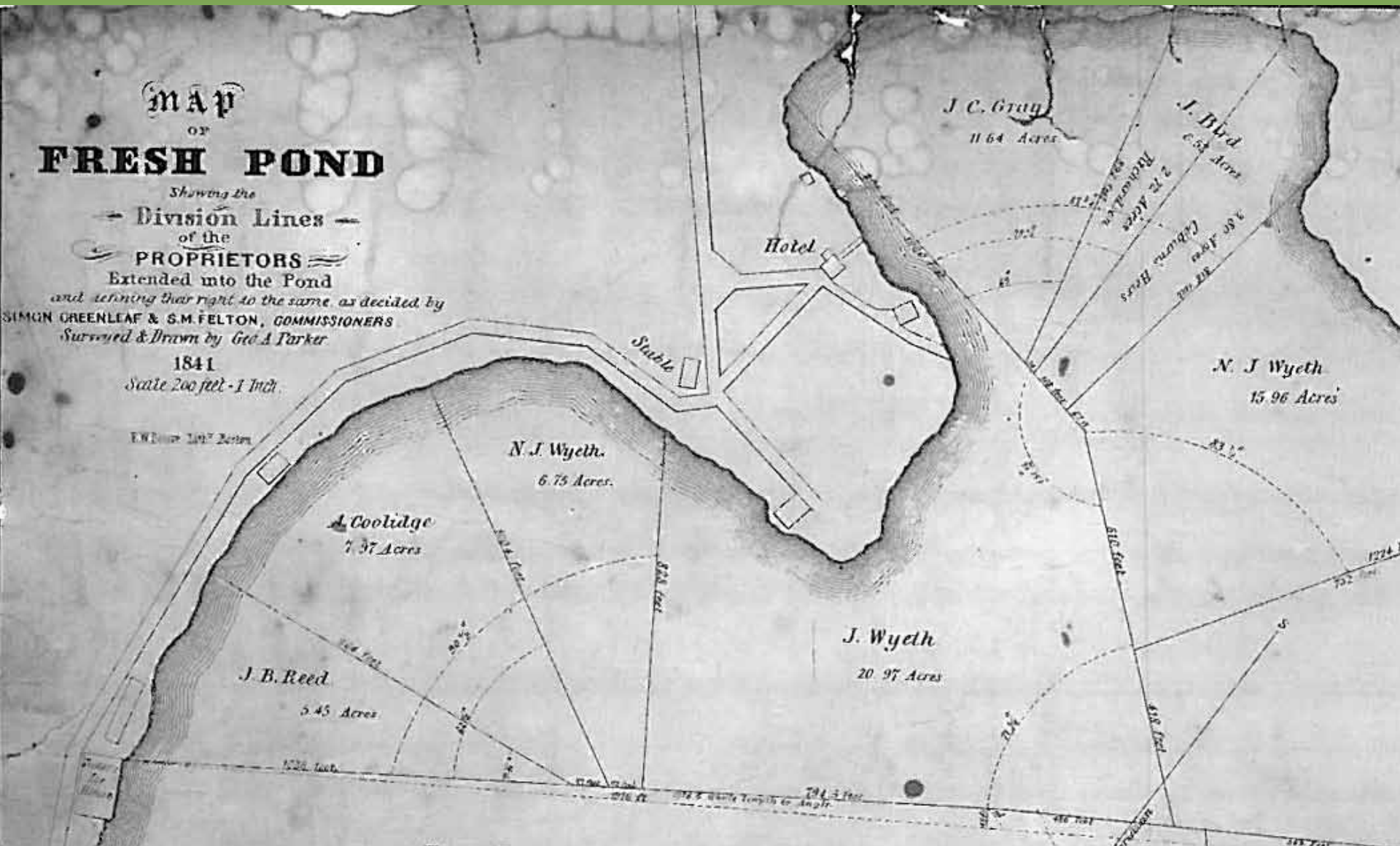
White Wood Aster

Historic Plantings

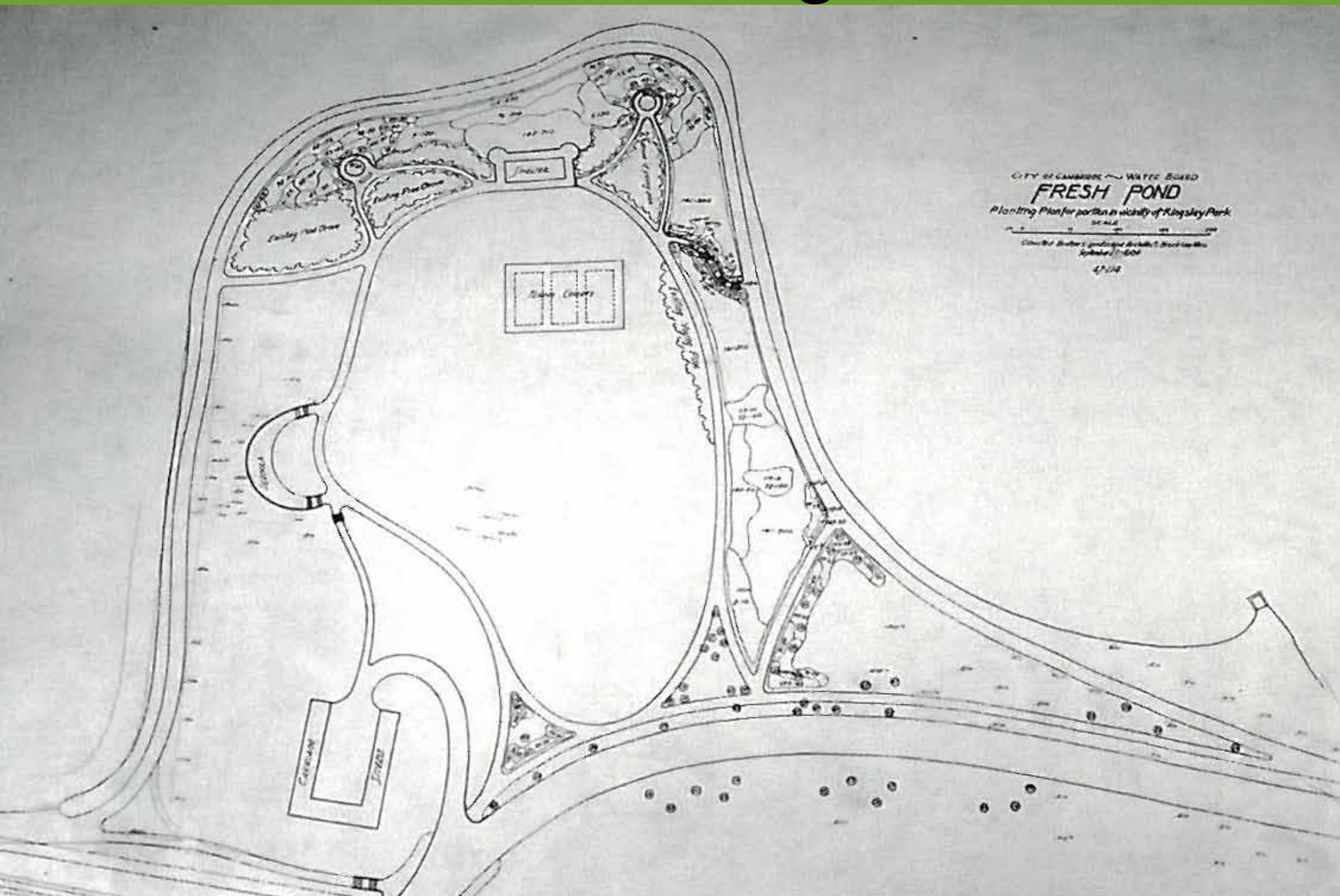
Surviving Trees Planted by Olmsted Brothers:

- American Beech
- Native Oaks and Hickories
- Black, Sweet, and Ornamental Cherries
- Native Sugar and Ornamental Maples
- Sweet Birch and Hop Hornbeam
- White Pine and Canadian Hemlock

1841 Property Map

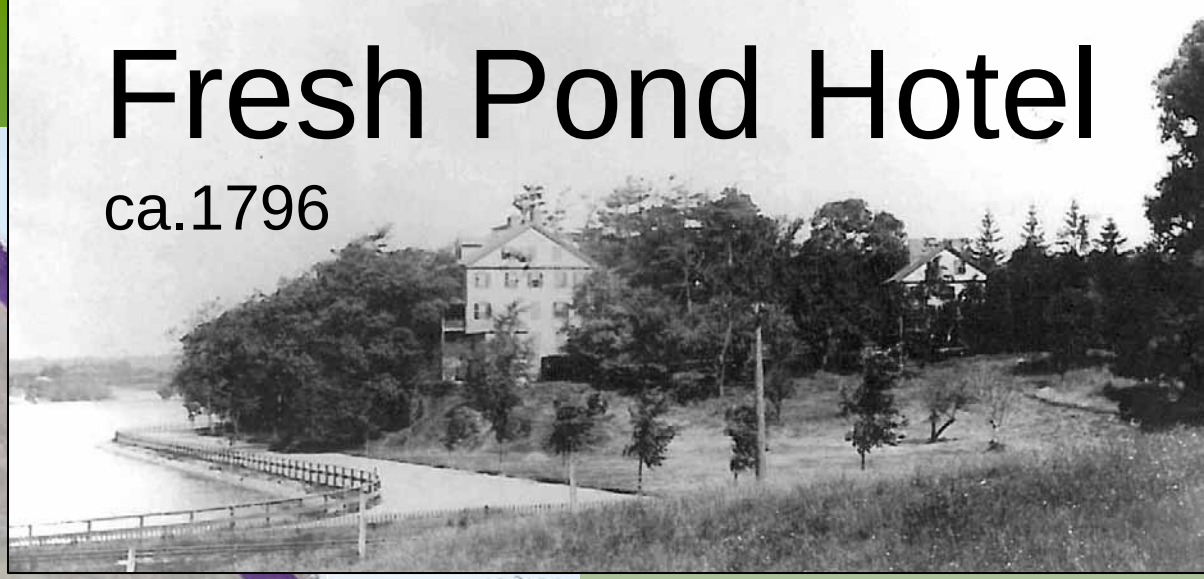


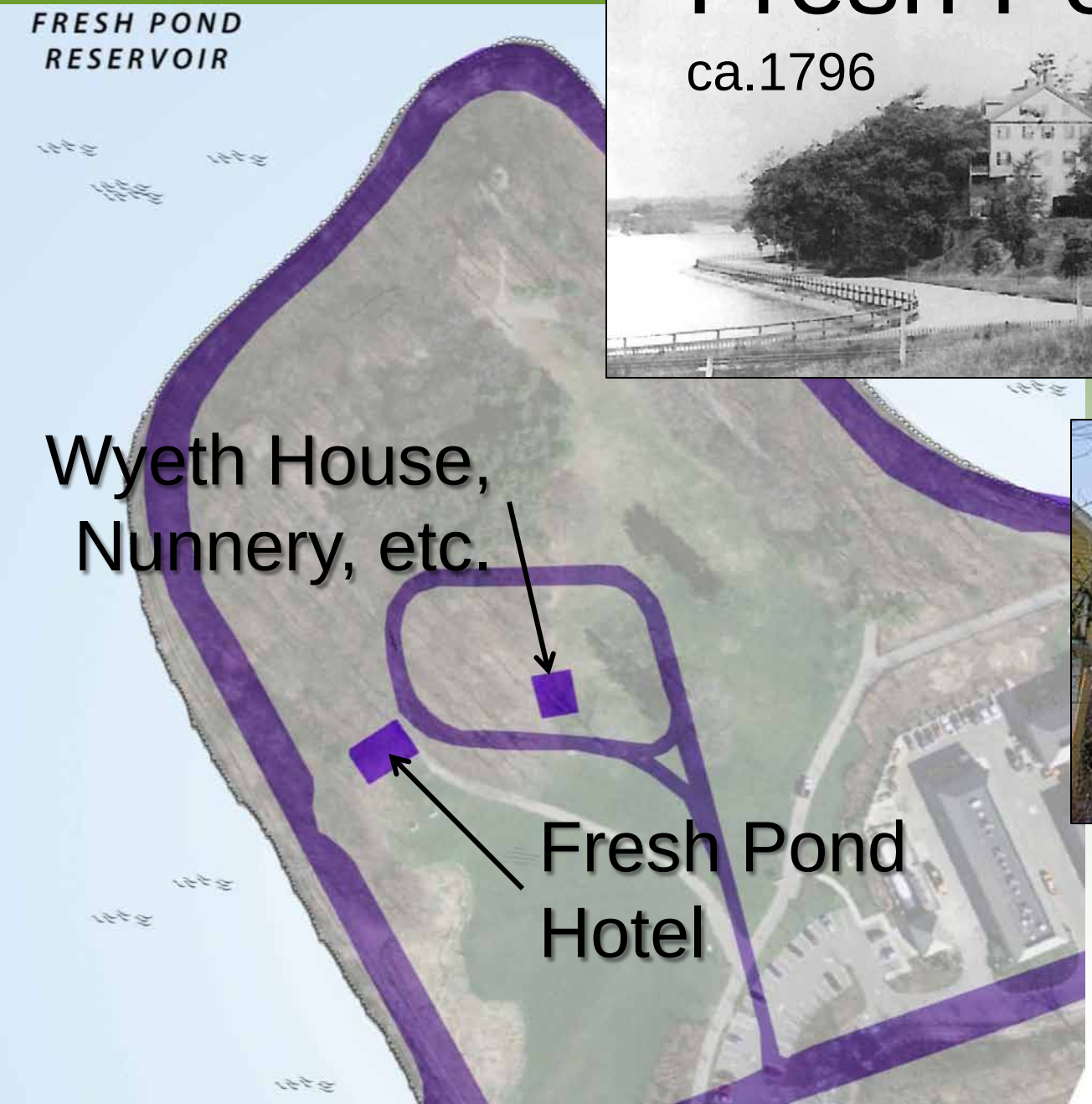
1904 Planting Plan


CITY OF CAMBRIDGE — WATER BOARD
FRESH POND
Planting Plan for portion in vicinity of Kingsley Park
SCALE
Kingsley Park
Kingsley Park Drive
Kingsley Park Drive
Kingsley Park Drive

Fresh Pond Hotel

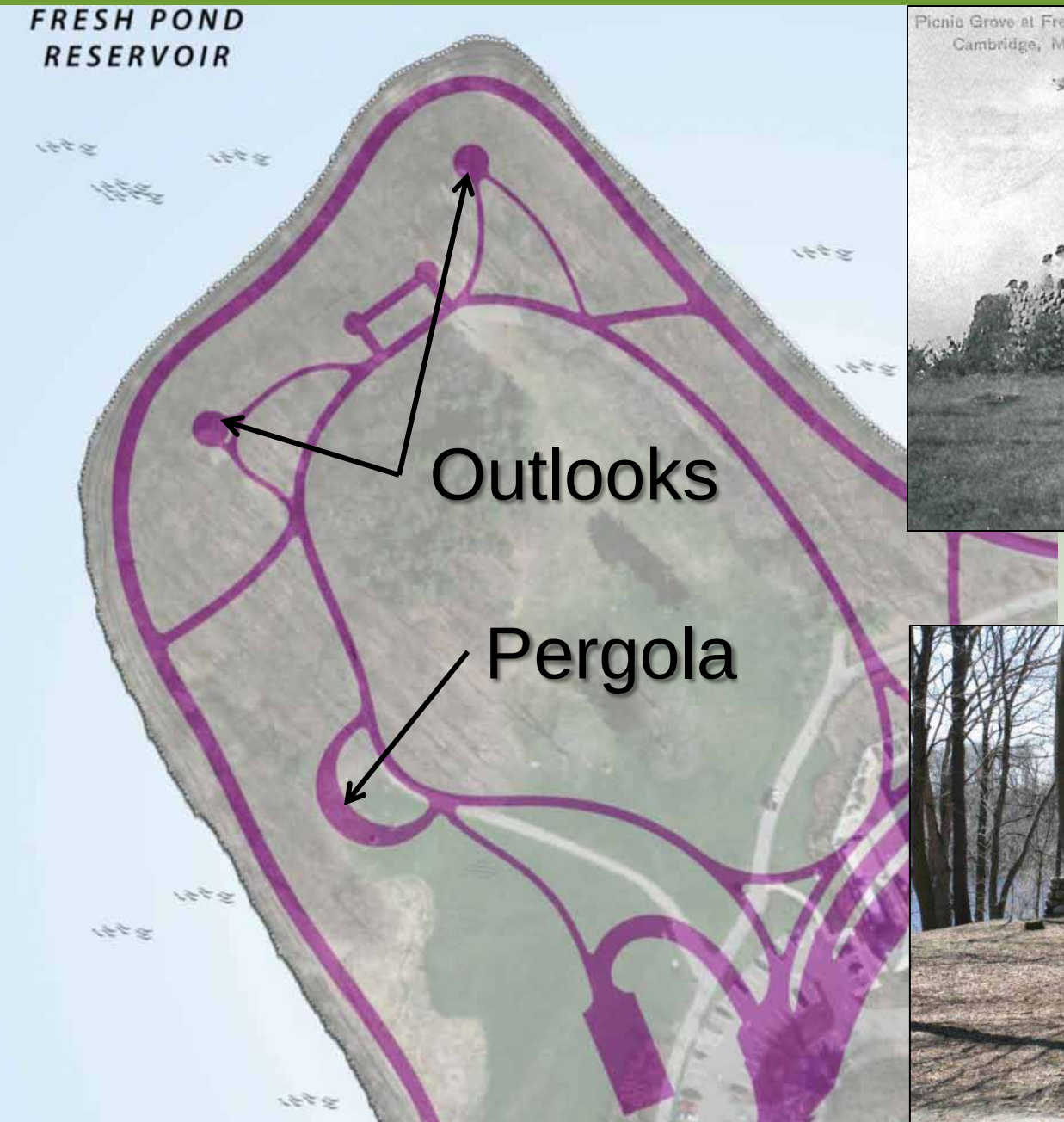
ca.1796

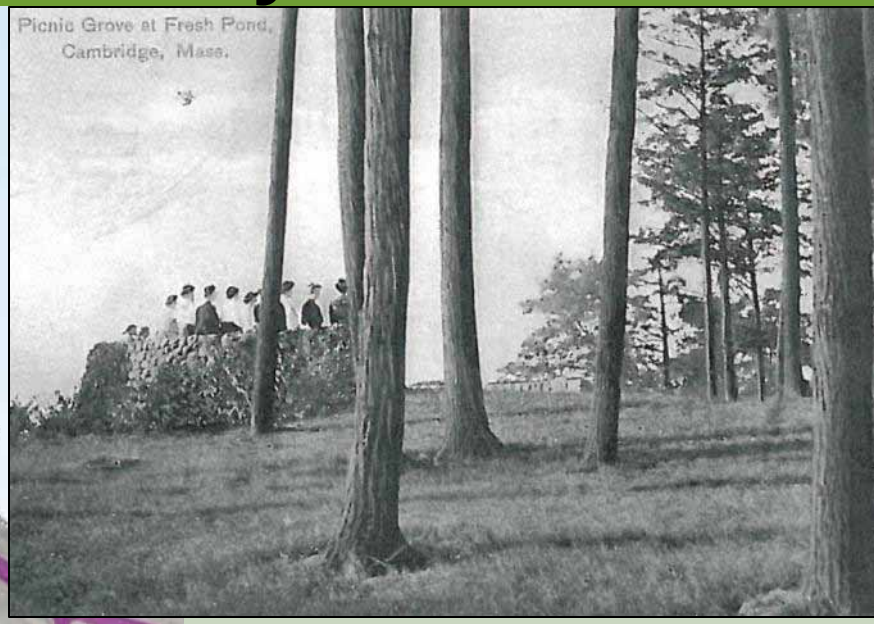




Fresh Pond Hotel today, Lakeview Ave.

1896 Olmsted Bros. Layout Plan





Circulation

Materials

- Asphalt
- Mulch/Gravel
- Stabilized Aggregate

Materials

Stabilized Aggregate

Asphalt

Mulch

Accessibility

- Non-Compliant Materials
- Non-Compliant Slopes (>5%)

Activities

- Sledding
- Jogging
- Walking
- Orienteering
- Sunbathing
- Picnicking
- Gatherings

City Programs

- Nature Programs
- Adaptive Maintenance
- Water Week
- Fresh Pond Kids Walk
- Ranger Walks

Goals for Healthy Parks and Playgrounds

- Integrate play environments
- Balance safety with adventure
- Support curiosity and creativity
- Stimulate physical activity
- Provide activities for all ages & abilities
- Season- and weather- independent

Existing Play Structure

- Accommodates 3 children
- Ages 1 to 3 (2 swings)
- Ages 3+ (1 swing)

Undirected Play

Undirected Play

Public Input