

Nagog Pond Water Supply Water Treatment Plant

**Site Plan Special Permit &
Use Special Permit**
Acton Board of Selectmen
September 12, 2016



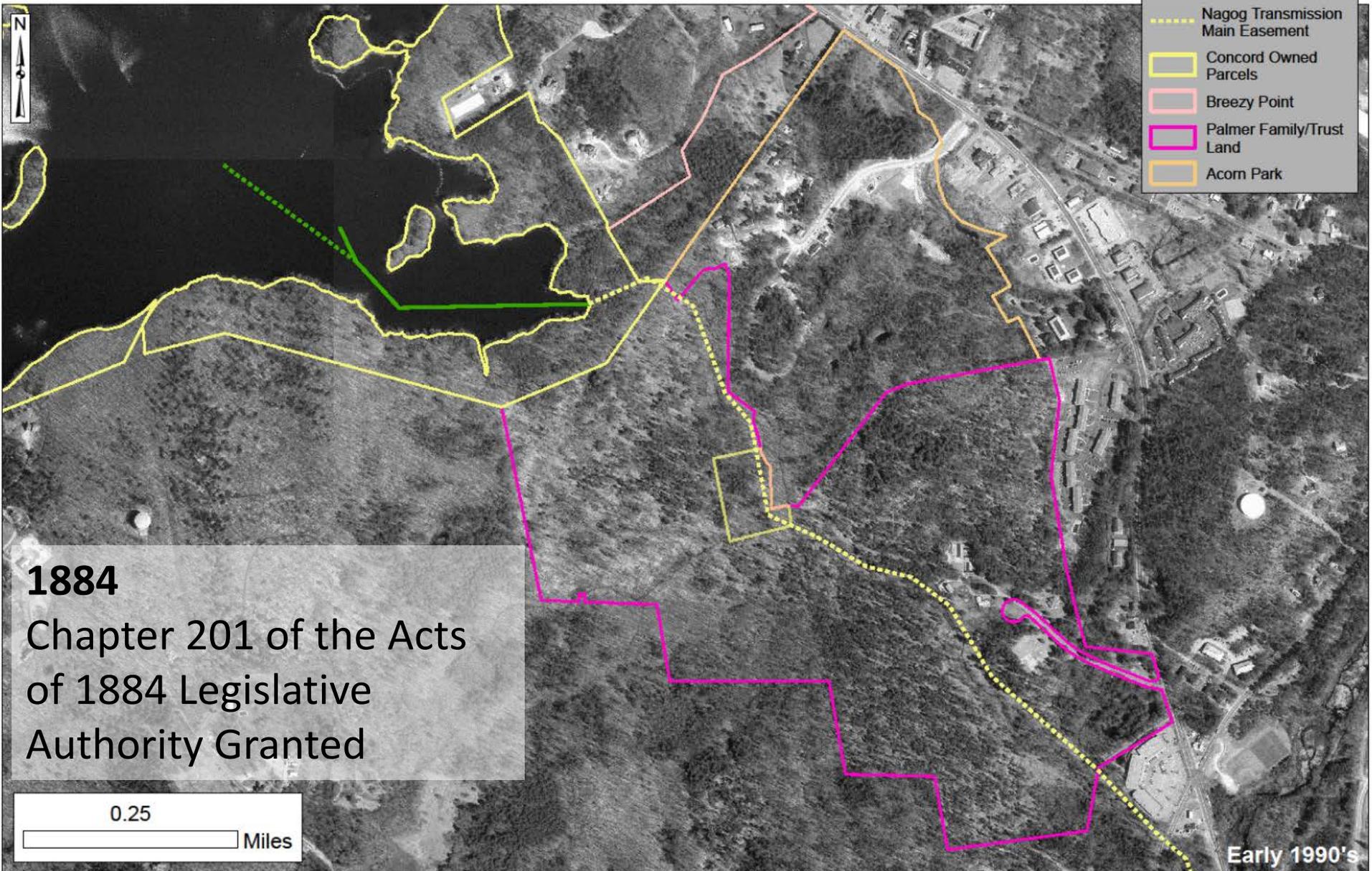


Concord Public Works Nagog Pond Development

c. Early 1990's

Legend

- Nagog Intake
- Proposed Intake
- Nagog Transmission Main Easement
- Concord Owned Parcels
- Breezy Point
- Palmer Family/Trust Land
- Acorn Park



1884
Chapter 201 of the Acts
of 1884 Legislative
Authority Granted

0.25
Miles

Early 1990's

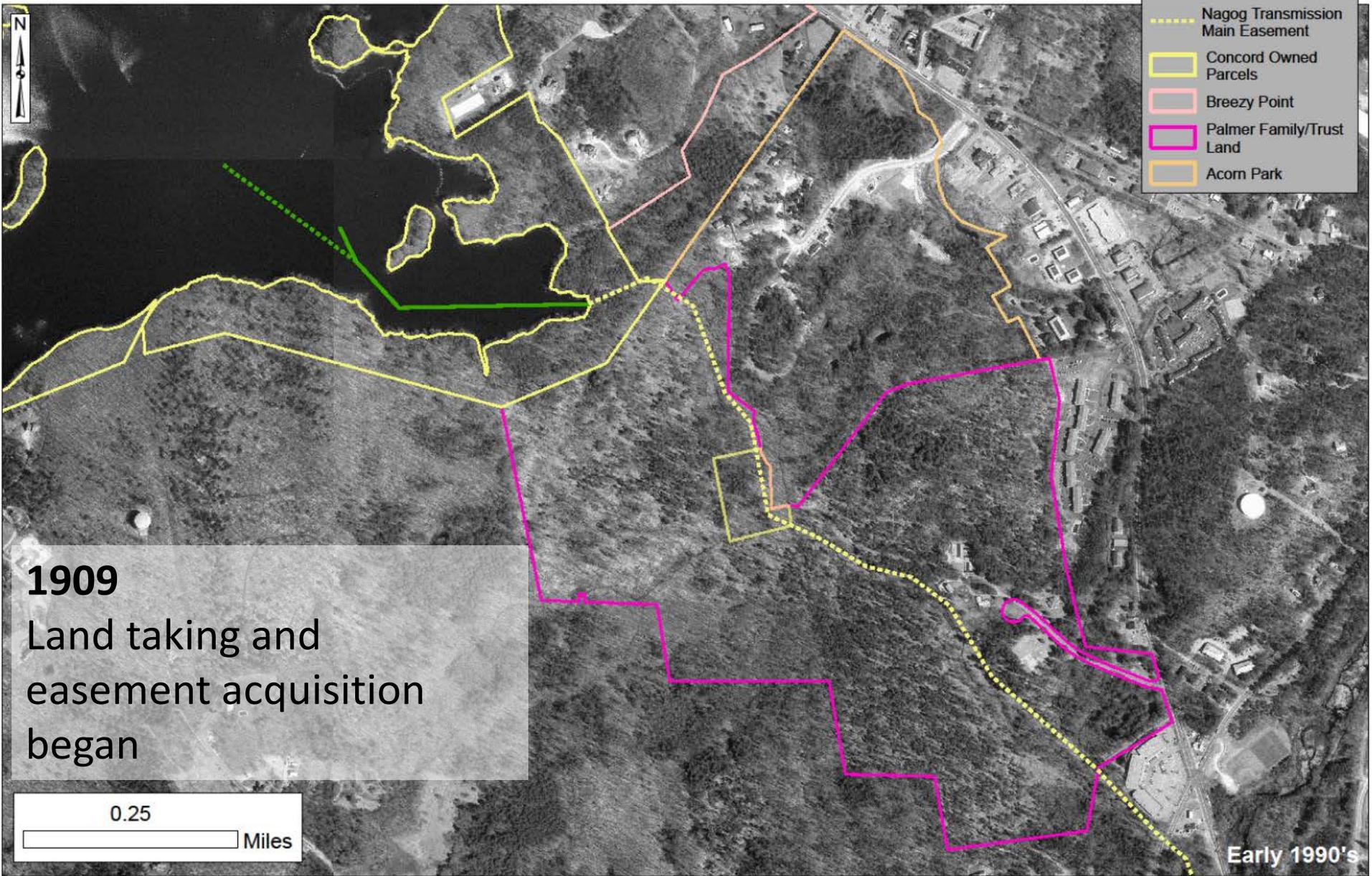


Concord Public Works Nagog Pond Development

c. Early 1990's

Legend

- Nagog Intake
- Proposed Intake
- Nagog Transmission Main Easement
- Concord Owned Parcels
- Breezy Point
- Palmer Family/Trust Land
- Acorn Park



1909
Land taking and
easement acquisition
began

0.25
Miles

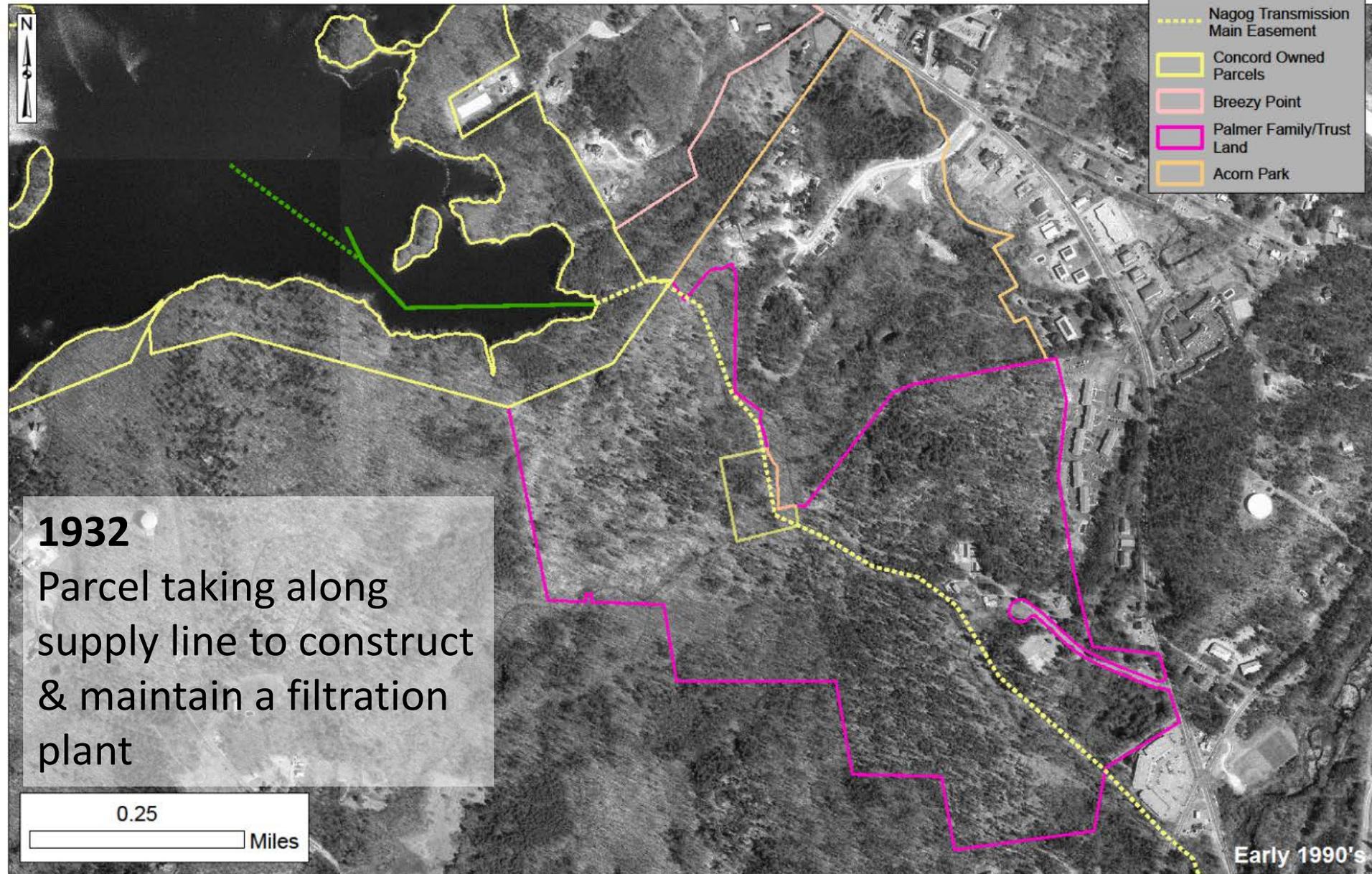
Early 1990's



Concord Public Works Nagog Pond Development

c. Early 1990's

- Legend**
- Nagog Intake
 - Proposed Intake
 - Nagog Transmission Main Easement
 - Concord Owned Parcels
 - Breezy Point
 - Palmer Family/Trust Land
 - Acorn Park



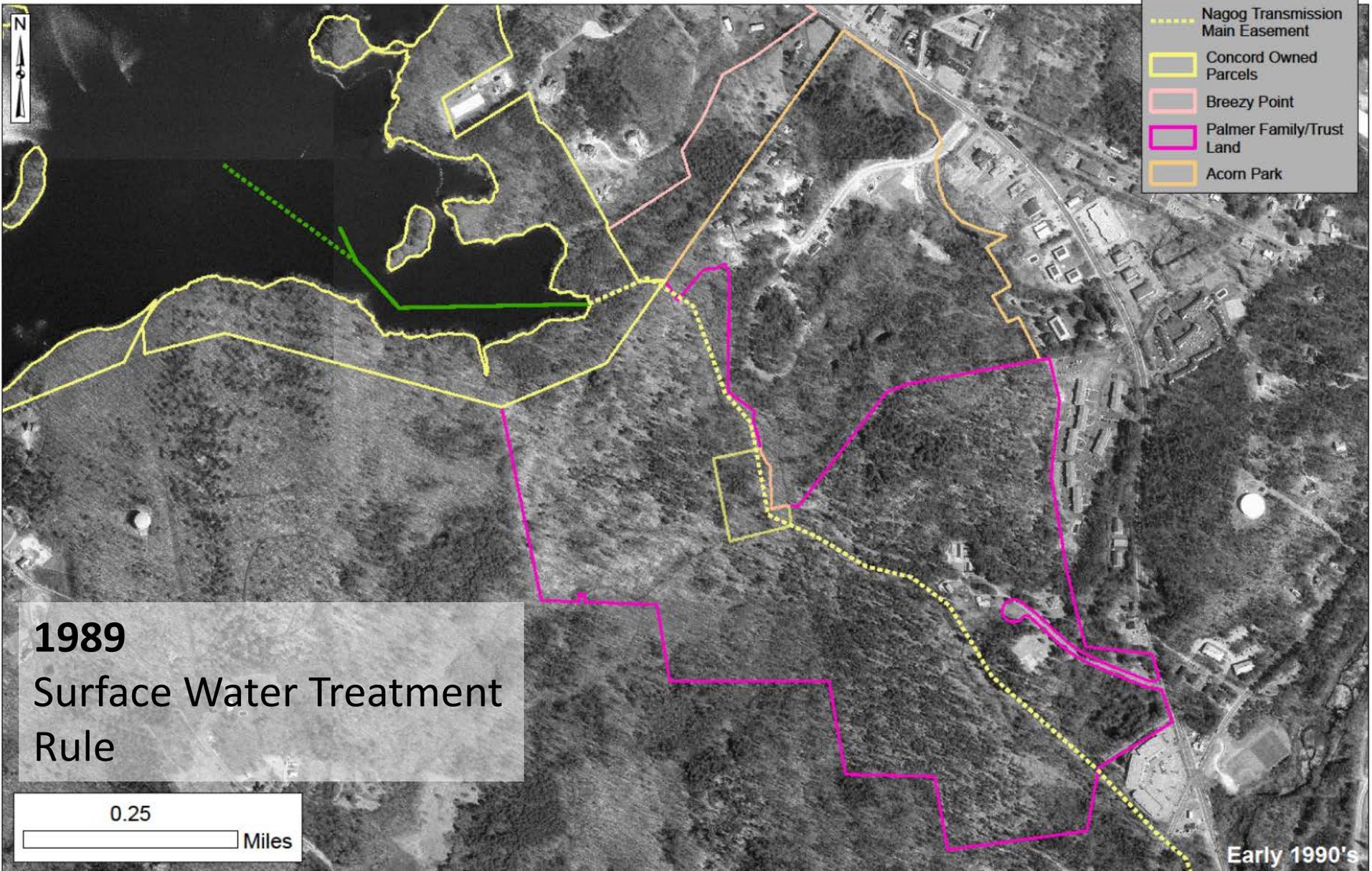


Concord Public Works Nagog Pond Development

c. Early 1990's

Legend

- Nagog Intake
- Proposed Intake
- Nagog Transmission Main Easement
- Concord Owned Parcels
- Breezy Point
- Palmer Family/Trust Land
- Acorn Park



1989
Surface Water Treatment
Rule

Early 1990's

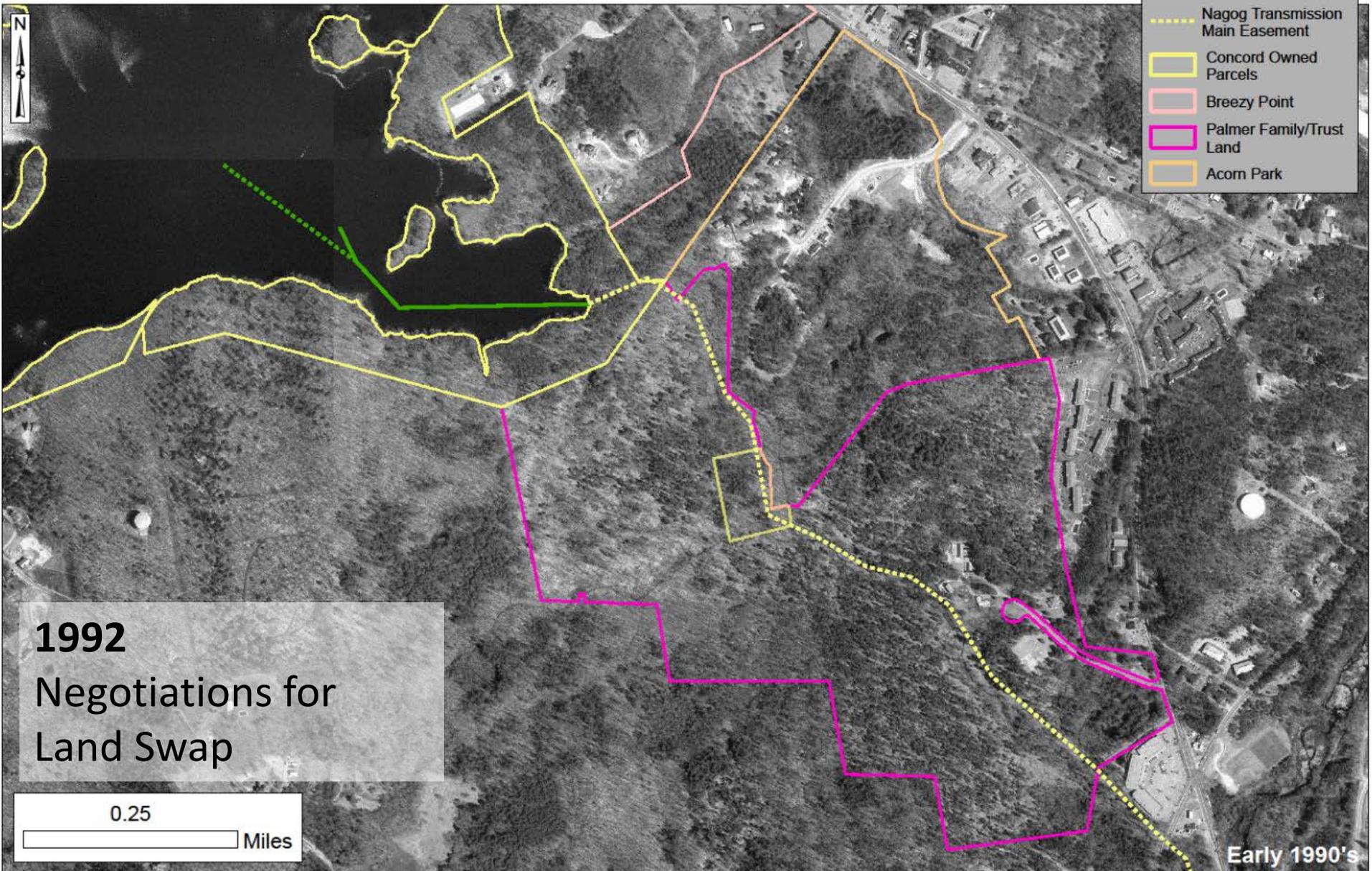


Concord Public Works Nagog Pond Development

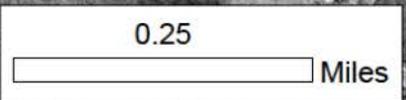
c. Early 1990's

Legend

- Nagog Intake
- Proposed Intake
- Nagog Transmission Main Easement
- Concord Owned Parcels
- Breezy Point
- Palmer Family/Trust Land
- Acorn Park



1992
Negotiations for
Land Swap



Early 1990's

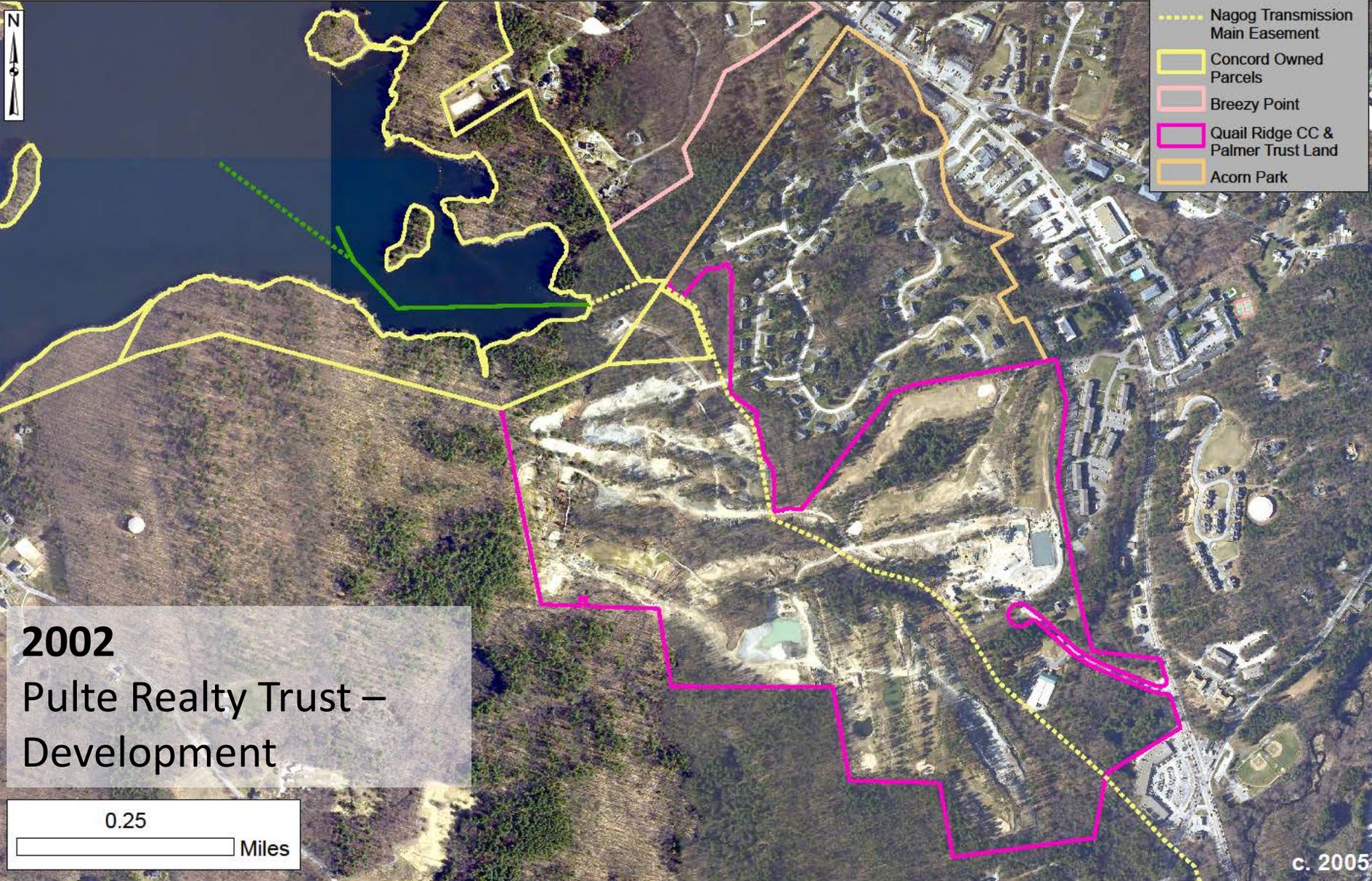


Concord Public Works Nagog Pond Development

c. 2005

Legend

- Nagog Intake
- Proposed Intake
- Nagog Transmission Main Easement
- Concord Owned Parcels
- Breezy Point
- Quail Ridge CC & Palmer Trust Land
- Acorn Park



2002
Pulte Realty Trust –
Development

0.25
Miles

c. 2005

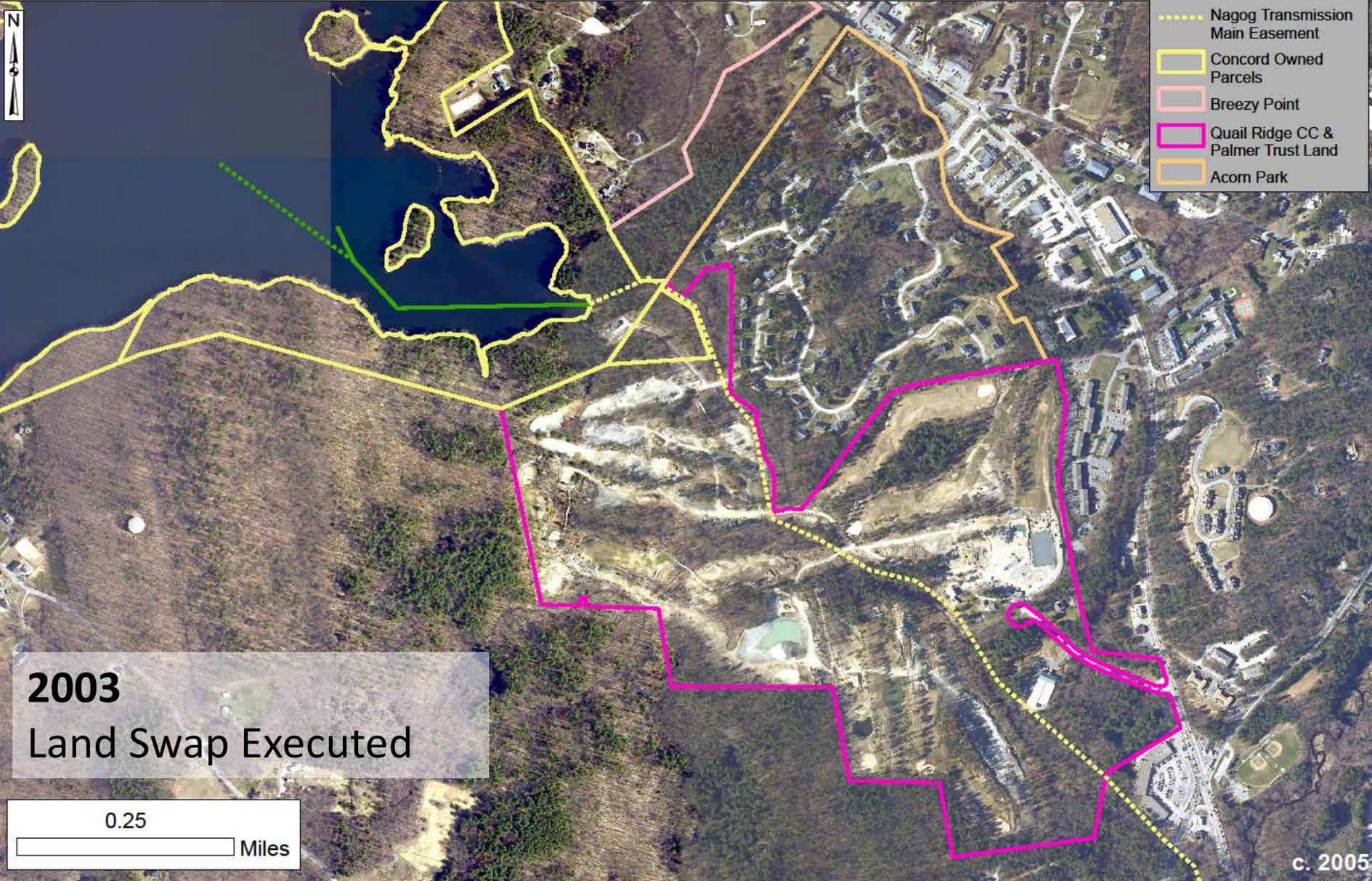


Concord Public Works Nagog Pond Development

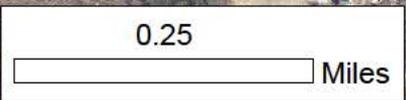
c. 2005

Legend

-  Nagog Intake
-  Proposed Intake
-  Nagog Transmission Main Easement
-  Concord Owned Parcels
-  Breezy Point
-  Quail Ridge CC & Palmer Trust Land
-  Acorn Park



2003
Land Swap Executed



c. 2005

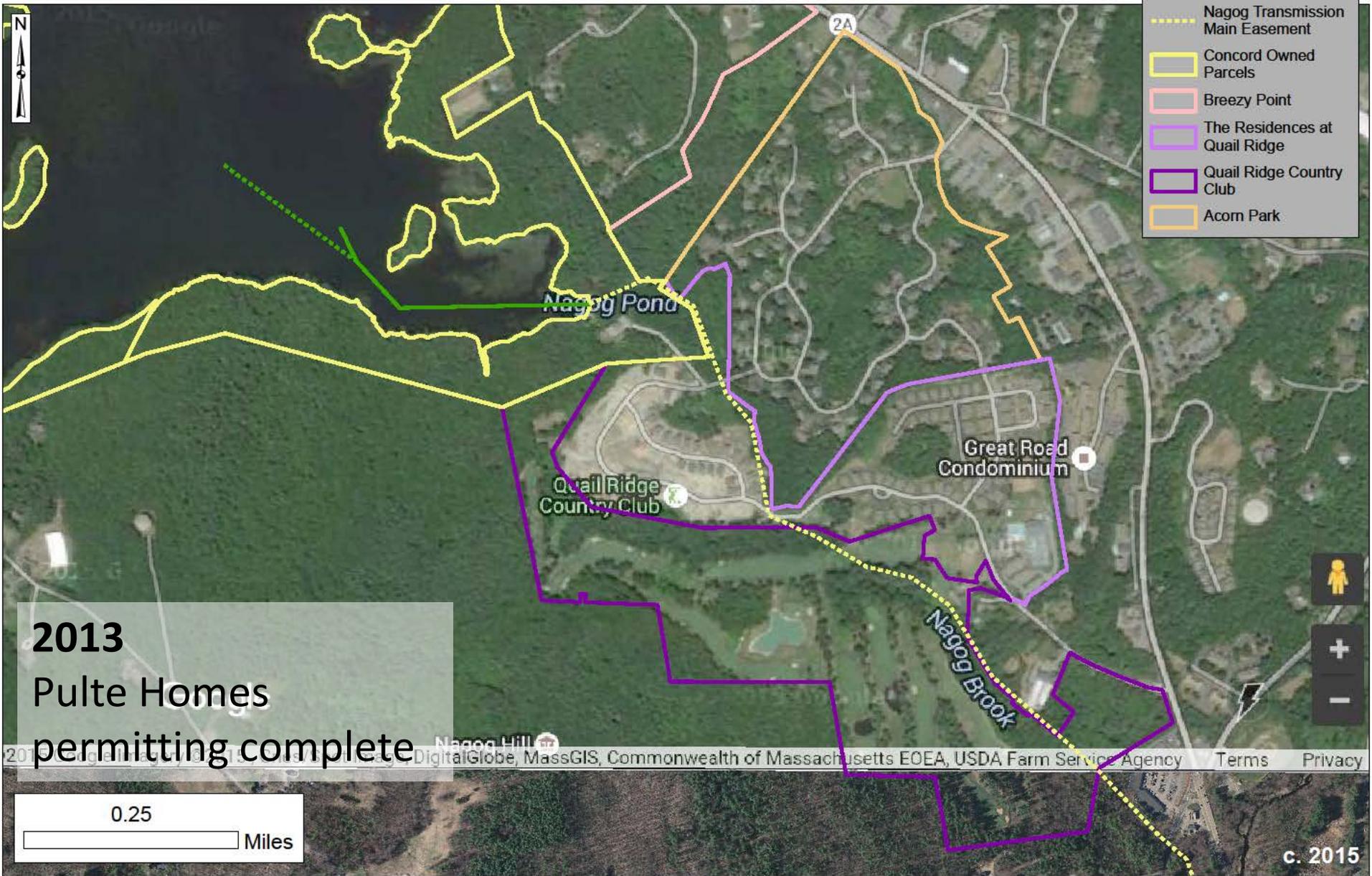


Concord Public Works Nagog Pond Development

c. 2015

Legend

- Nagog Intake
- Proposed Intake
- Nagog Transmission Main Easement
- Concord Owned Parcels
- Breezy Point
- The Residences at Quail Ridge
- Quail Ridge Country Club
- Acorn Park



2013
Pulte Homes
permitting complete

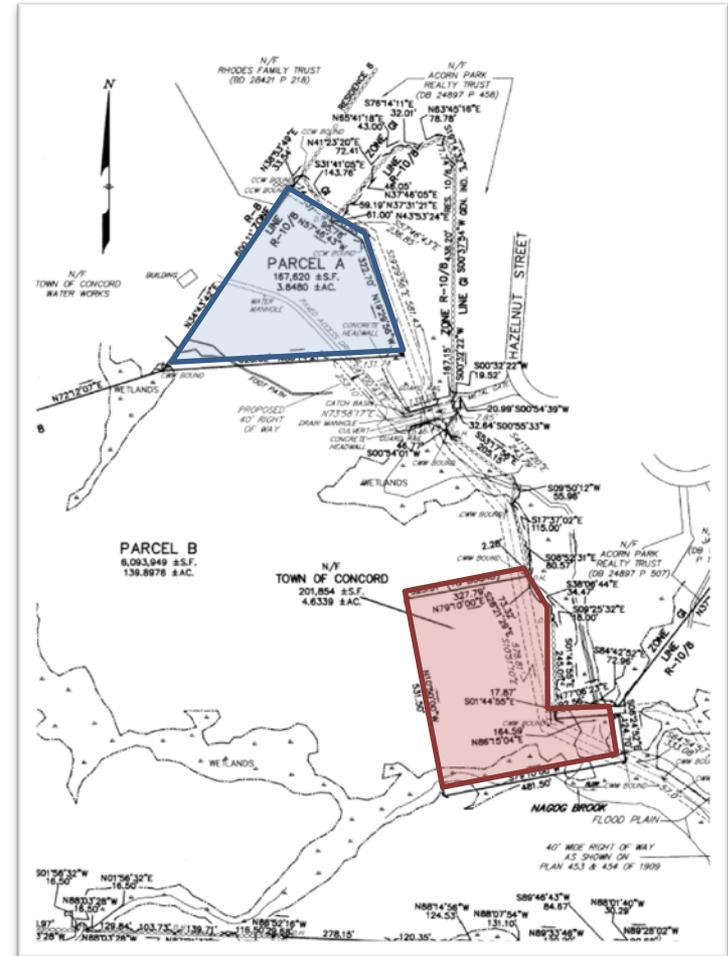


c. 2015

Safe Drinking Water Act

Federal Mandate (310 CMR 22.20A)

- **1989** – Federal Promulgation of Rule
- **1991** – Consent Order issued to Concord
- **1991** - Watershed Protection Plan
- **1996** – Enhanced Disinfection (ozone)
- **2006** – Long-Term 2 Enhanced SWTR
- **2011-2012** – Nagog Dam Rehabilitation
- **2013-2014** – Pilot Treatment
 - Acton Conservation Commission (RDA)
 - Mass DEP Drinking Water Program



Acton Board of Selectmen

Application for Use Special Permit (Zoning)

- Other Public Use (3.4.7)

Application for Site Plan Special Permit

- Other Public Use (3.4.7)
- Net Floor Area increase/Accessory Use (10.4.1.2)



Project Overview

- 1. Water Treatment Plant Upgrade**
- 2. Raw Water Intake Improvements**
- 3. Site Security**
- 4. Other design features**
 - Site access and traffic**
 - Site lighting**
 - Power supply**
- 5. Zoning**





Nagog Pond Water Treatment Plant Area Parcels & Easements



Nagog Pond Water Treatment Plant

Existing Facility



Nagog Pond Water Treatment Plant Exterior Rendering



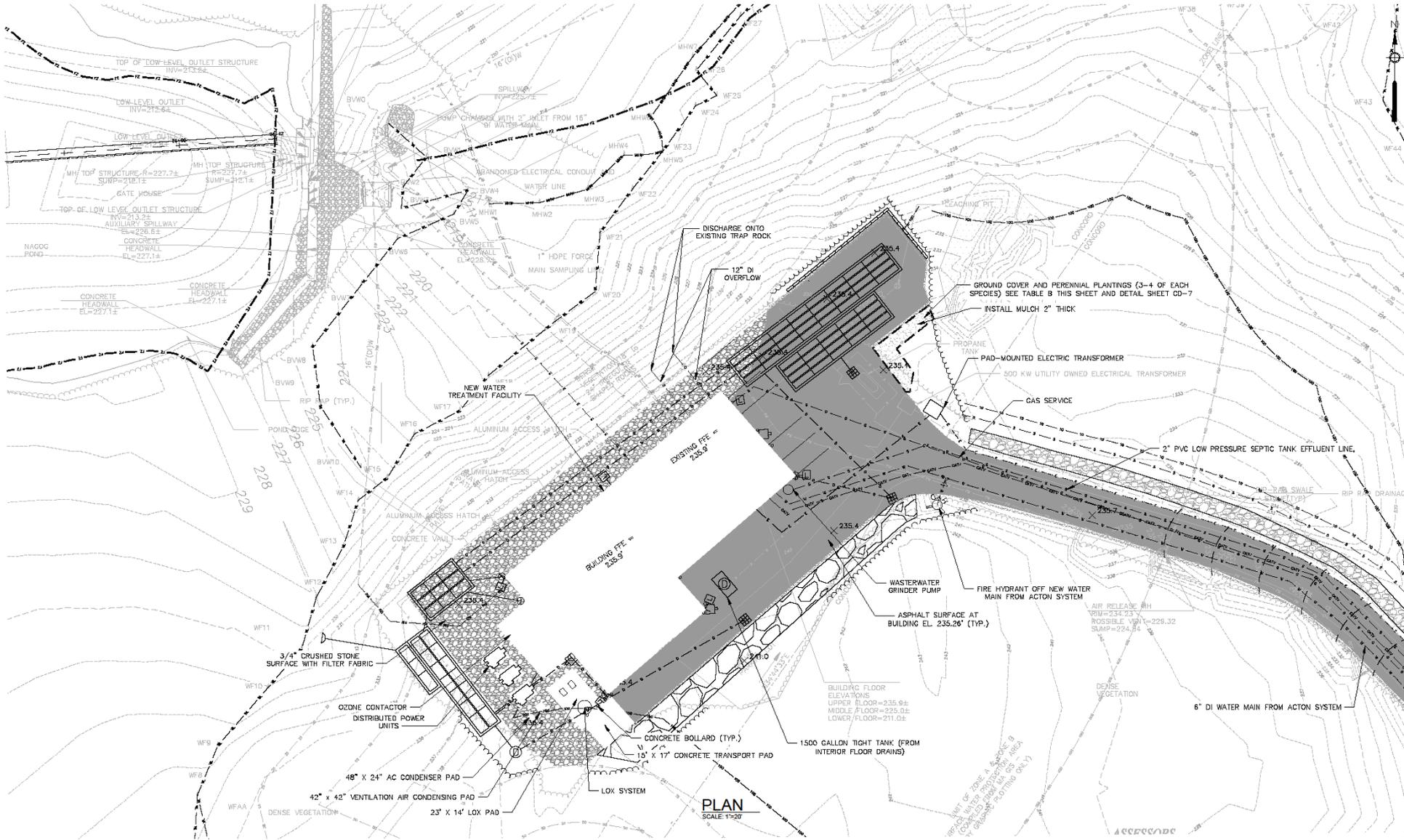
Nagog Pond Water Treatment Plant

Exterior Rendering



Nagog Pond Water Treatment Plant

Site Plan



Nagog Pond Water Treatment Plant

Chemical Usage

- Eight chemicals: 5 liquid; 3 dry
- Liquid
 - Potassium Hydroxide (pH adjustment)
 - Polyaluminum chloride (coagulant)
 - Sodium hypochlorite (disinfection)
 - Calcium thiosulfate (ozone quenching)
 - Liquid Oxygen (ozone generation)
- Dry
 - Potassium permanganate (iron and manganese oxidation)
 - Zinc metaphosphate (corrosion control)
 - Sodium fluoride (fluoridation)

Nagog Pond Water Treatment Plant

Chemical Usage

- Similar chemicals as used in Acton, Littleton and Westford
- Chemicals deliveries
 - 7 trips/month (max of 2 deliveries/day)
 - Equivalent to max of 4 trip ends/day

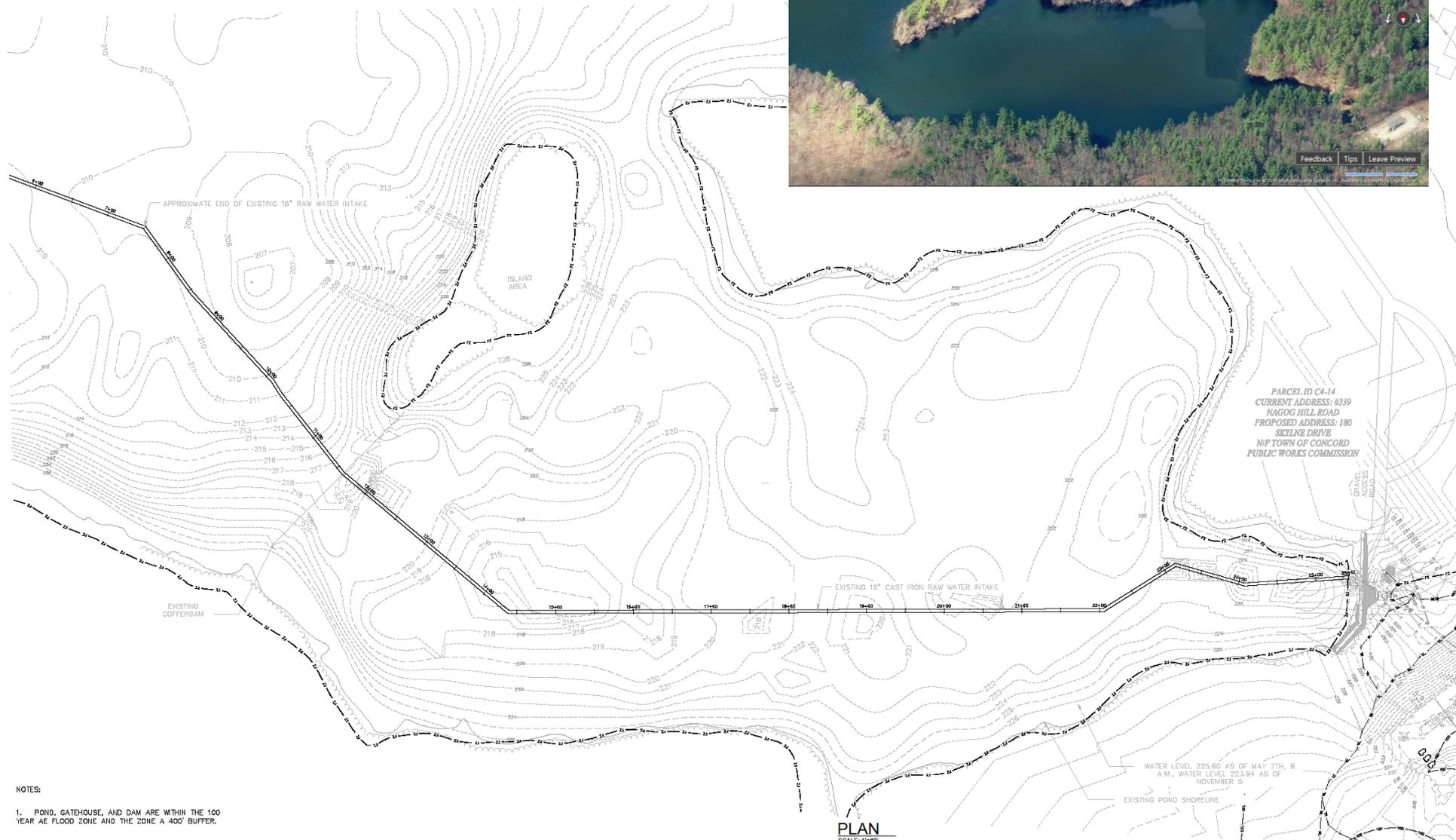
Nagog Pond Water Treatment Plant

Raw Water Intake – Existing Conditions



Nagog Pond Water Treatment Plant

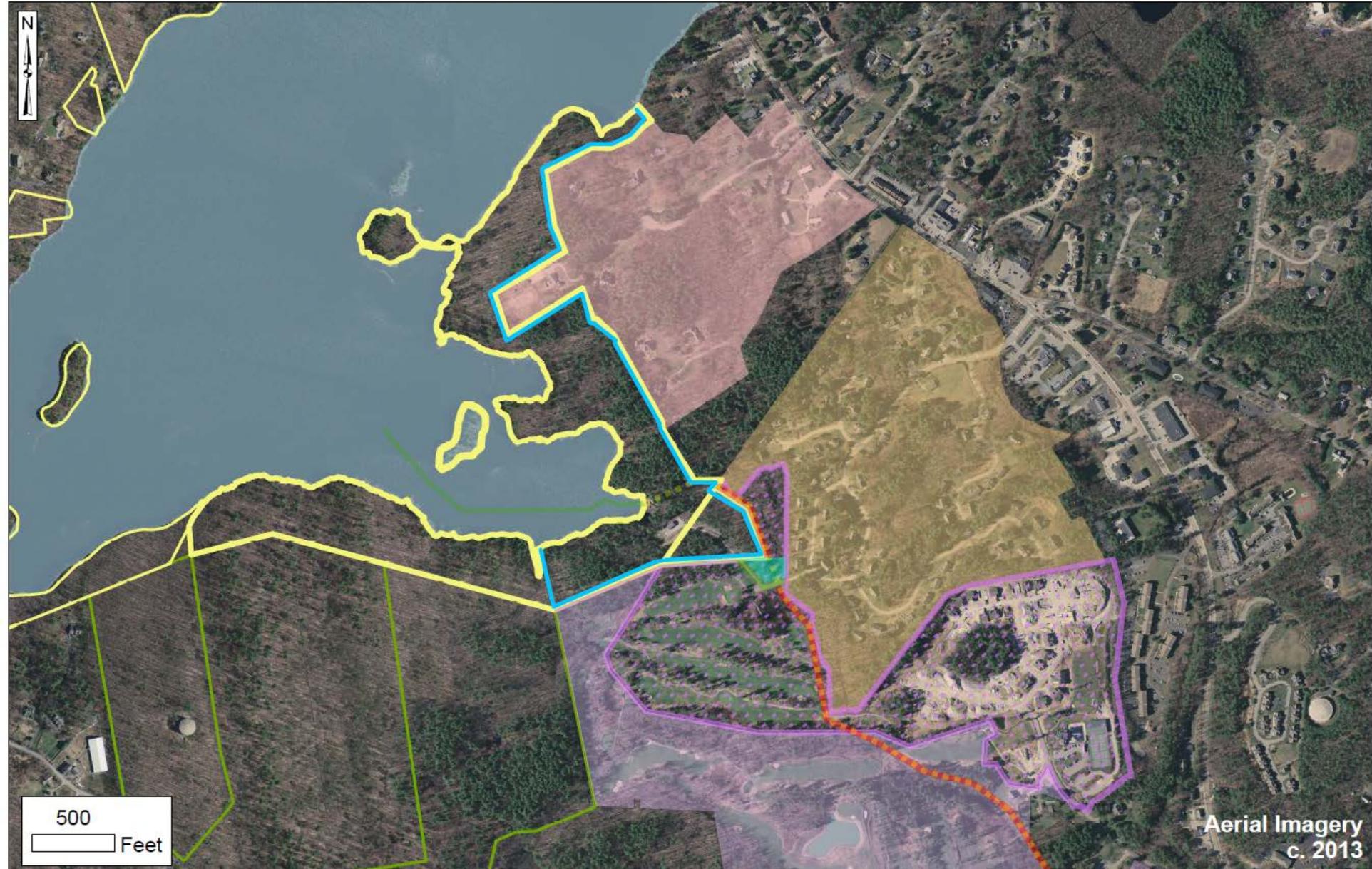
Raw Water Intake



NOTES:
1. POND, GATEHOUSE, AND DAM ARE WITHIN THE 100
YEAR AE FLOOD ZONE AND THE ZONE A 400' BUFFER.

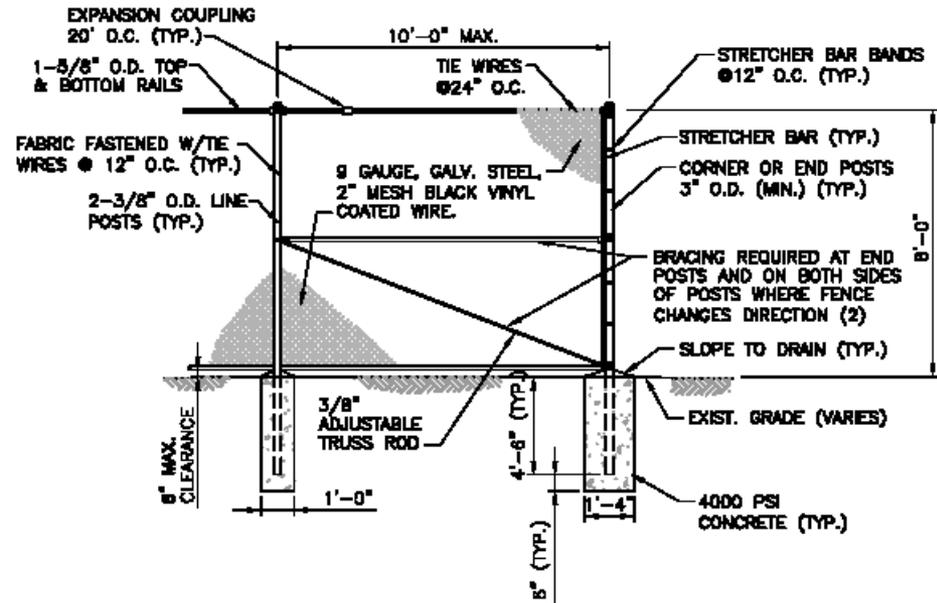


Nagog Pond Water Treatment Plant Site Security



Nagog Pond Water Treatment Plant

Security Fence



- Material – PVC coated wire mesh
- Installation intended to minimize disturbance
- Remove vegetation only as necessary to install
- Gap left at ground for small animal movement



Nagog Pond Water Treatment Plant

Traffic Volume and Type

- Access: via Acorn Park (public road)
- Maximum 10-15 vehicle trips/day
- Staff (3 expected): 6 staff trips/day
- Chemicals deliveries
7 trips/month (maximum of 2 deliveries/day)
Equivalent to max of 4 trip ends/day



Nagog Pond Water Treatment Plant Access Route



Nagog Pond Water Treatment Plant

Traffic Volume and Type

- Conventional delivery vehicles
- Similar vehicles as used for Acton and Littleton treatment plants as part of regional consortium



Nagog Pond Water Treatment Plant

Lighting

- All lights on motion detectors with timers
- Exterior lights are mounted on building
- Exterior lights are fully shielded, pointed down
- Illumination area: maximum 70' from building
- No pole-mounted lights along driveway or in parking area
- Complies with Section 10.6 of Zoning Bylaw



Nagog Pond Water Treatment Plant

Exterior Lighting



Light Fixture
(fully shielded)



Nagog Pond Water Treatment Plant

Alternative Energy

Solar

Benefits

- Clean renewable energy
- Lower carbon footprint

Public Concerns

- Viewscape
- Clearing
- Archaeologically sensitive areas
- Would still require grid power

Distributed Energy

Benefits

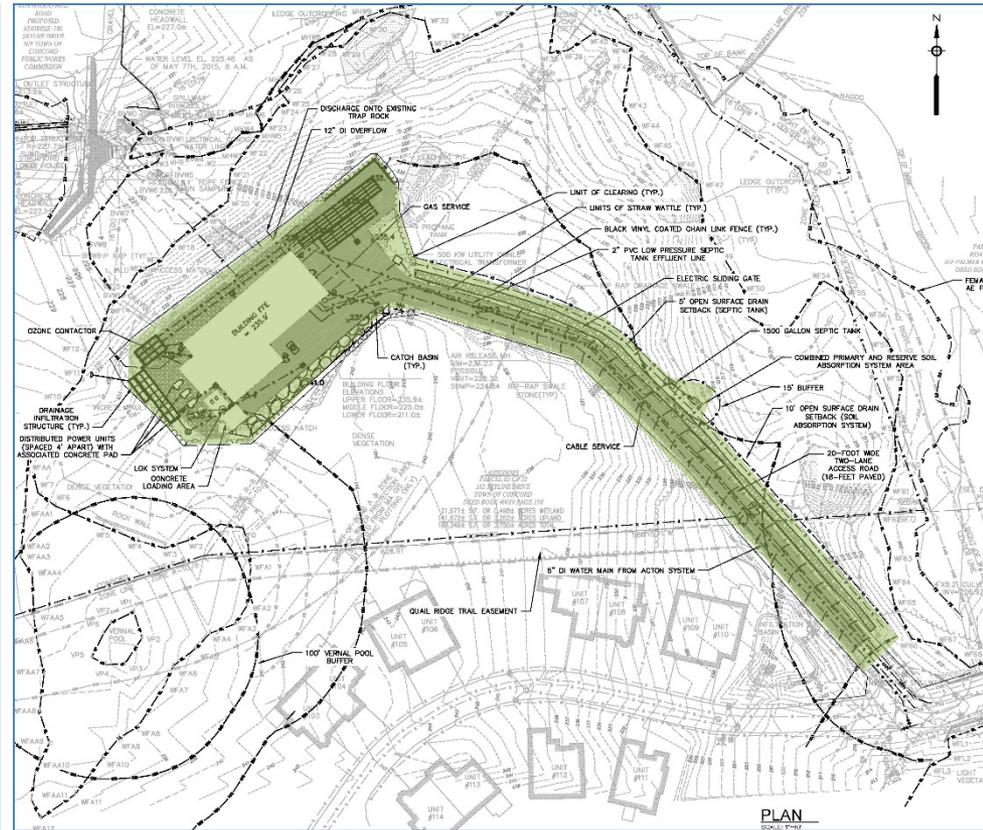
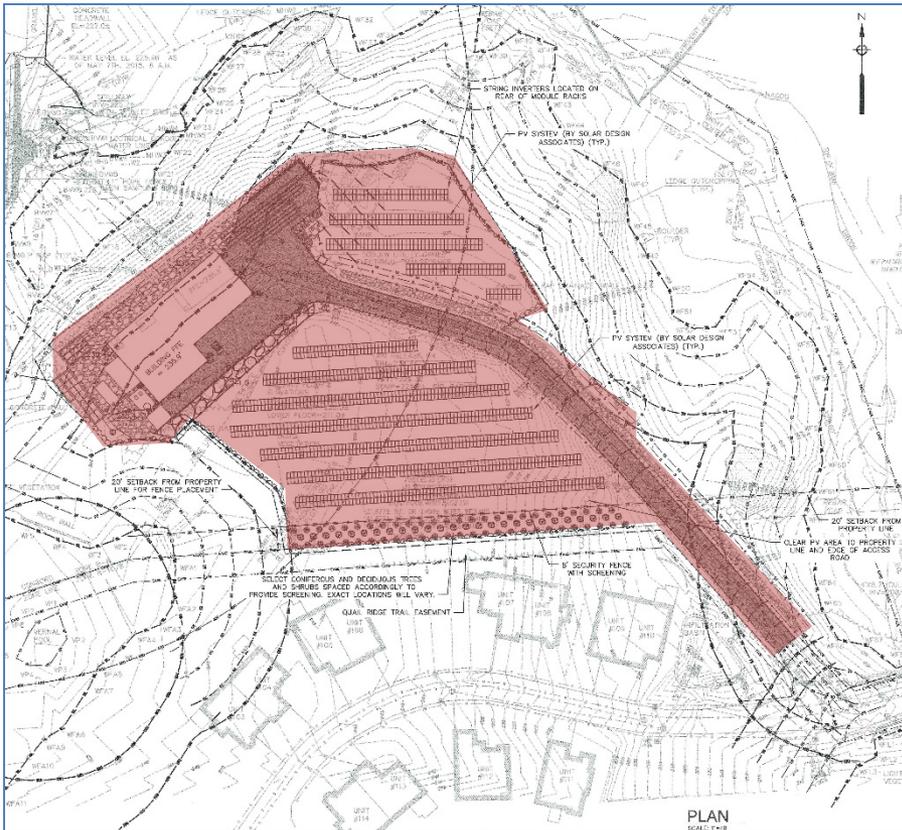
- Preserves forested site
- Powered by natural gas
- Generates power onsite
- Limits use of grid power with no loss due to transmission

Public Concerns

- Sound
- Emissions



Nagog Pond Water Treatment Plant



Nagog Pond Water Treatment Plant

Distributed Energy Units

- Exterior generators (3)
- Pad mounted
- Outdoor weather tight enclosure



Nagog Pond Water Treatment Plant

Distributed Energy Units – Noise Conditions

- DEP Noise Policy
 - An increase in sound level of no more than 10 dBA above ambient
 - No pure tone condition
- Ambient sound level measurements
- Acoustic modeling analysis
- Predicted sound levels equivalent to from “Quiet Rural Area” to “Quiet Suburban Area at night”



Zoning Analysis

Peter F. Durning, Esq. – Mackie Shea, PC

- **Article 97**
- **Variances**
- **Special Permit Criteria**
- **Site Plan Special Permit Criteria**



Article 97

The Town of Concord acquired Parcels C4-14 and C4-32 for the express purpose of establishing and maintaining a public water supply system.

The parcels were not acquired for Article 97 purposes, and neither Concord nor Acton has taken any steps to designate these lands as Article 97 lands by deed or any other recorded restriction. Accordingly, the parcels are not subject to Article 97. *See Mahajan v. Dep't of Env'tl Prot.*, 464 Mass. 694, 613-17 (2013).



1994 Variances

For the proposed project, Concord relies on two of the 1994 Variances:

- Section 5.2.2 – Frontage
- Section 6.7.3 – Driveway Width

The variances became effective when Concord obtained a building permit in August 1995. *See Grady v. ZBA of Peabody*, 465 Mass. 725 (2013).

The current project does not increase the non-conformity approved in the variance. *See Palitz v. ZBA of Tisbury*, 470 Mass. 795, 801-03 (2015).



Special Permit Criteria - § 10.3.5

- **10.3.5.1 - is consistent with the Master Plan**
- **10.3.5.2 - is in harmony with the purpose and intent of this Bylaw**
- **10.3.5.3 - will not be detrimental or injurious to the neighborhood**
- **10.3.5.4 - is appropriate for the site in question**
- **10.3.5.5 - complies with all applicable requirements of this Bylaw.**



Site Plan Special Permit - Standards

- **10.4.3.1 – Storm Water Runoff**
- **10.4.3.2 - Outdoor Lighting**
- **10.4.3.3 – Common Driveway**
- **10.4.3.4 – Sidewalks**
 - **To the extent necessary, Concord requests a waiver pursuant to § 10.4.3.4(d)**
- **10.4.3.5 – Open Space Landscaping**
- **10.4.3. 7 and 10.4.3. 8 are not applicable to this project.**

Other Bylaw sections concern other zoning districts.



Site Plan Special Permit - Findings

- **10.4.5.1 – is consistent with the Master Plan**
- **10.4.5.2 – protects the neighborhood and the Town against seriously detrimental or offensive uses on the site and against effects on the natural resources**
- **10.4.5.3 – provides for convenient and safe vehicular and pedestrian movement and that the locations of driveway openings are convenient and safe in relation to vehicular and pedestrian traffic, including emergency vehicles, on or adjoining the site**



Site Plan Special Permit – Findings con't

- **10.4.5.4 – provides an adequate arrangement of parking and loading spaces**
- **10.4.5.5 – provides adequate methods of disposal of refuse or other wastes**
- **10.4.5.6 – will not derogate from the intent of the Bylaw to limit adverse effects of the use and development of land on the surface and groundwater resources in Acton**
- **10.4.5.7 – complies with all applicable requirements of the Bylaw**



Special Permit & Site Plan Special Permit

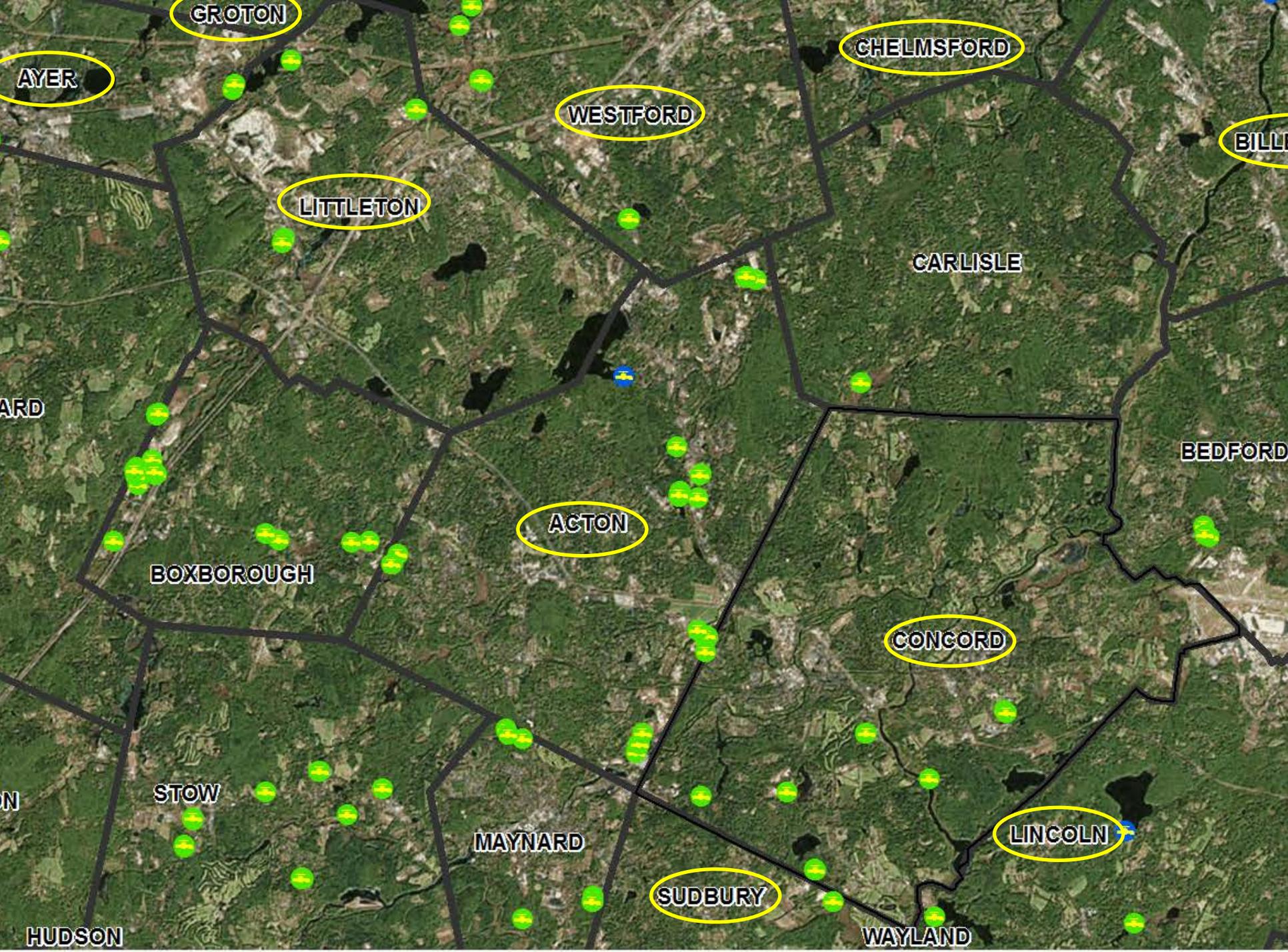
Through its written submissions and presentation this evening, the Town of Concord has demonstrated that the proposed improvements to the Nagog Pond Water Treatment Plant meet the requirements of Use Special Permit pursuant to Section 3.4.7 and the requirements for a Site Plan Special Permit pursuant to Section 10.4 of the Acton Zoning Bylaw.

Accordingly, the Town of Concord respectfully requests that the Board of Selectmen approve the Special Permit and Site Plan Special Permit for the improvements to the Nagog Pond Water Treatment Plant.



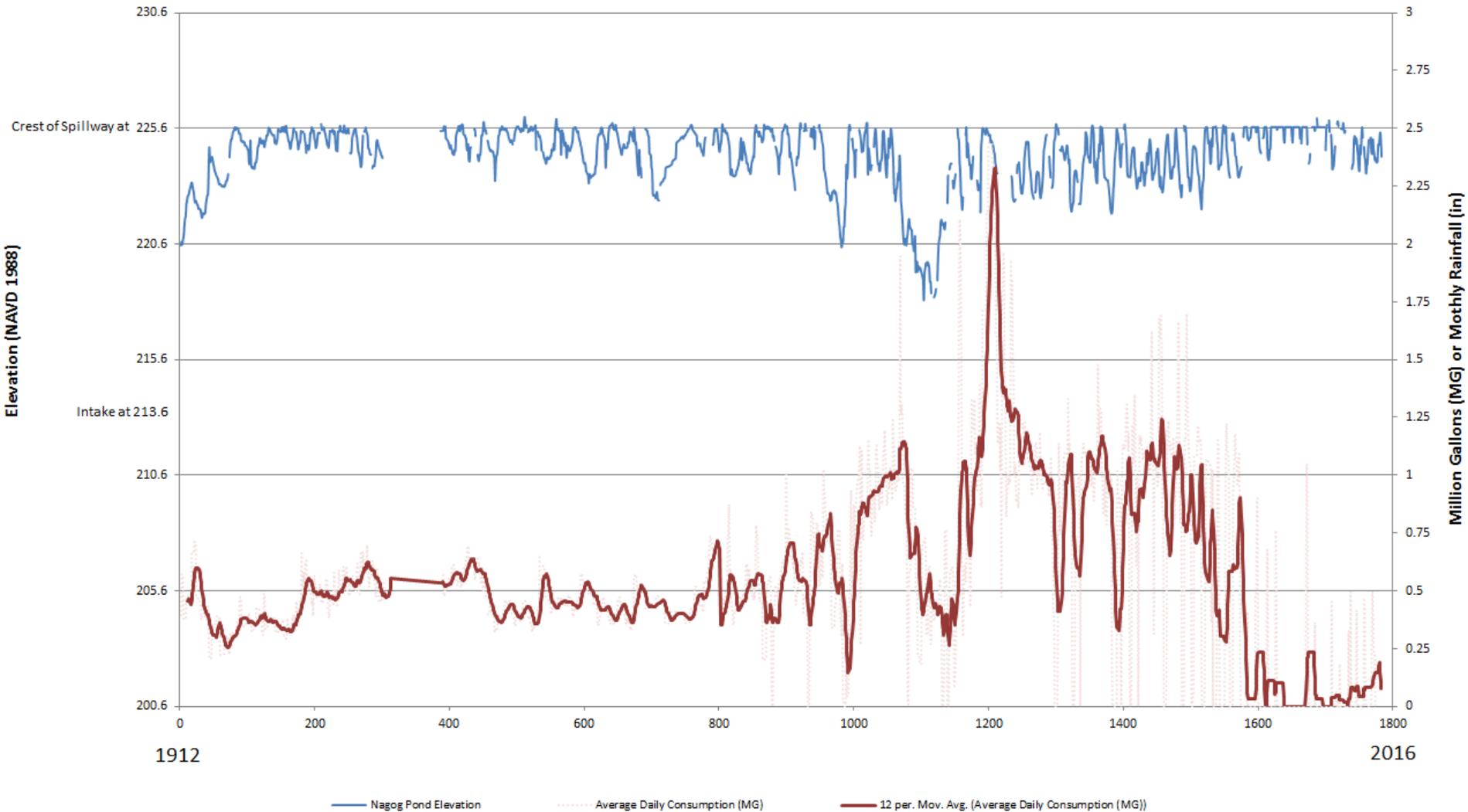
Nagog Pond Water Supply Water Treatment Plant

DISCUSSION

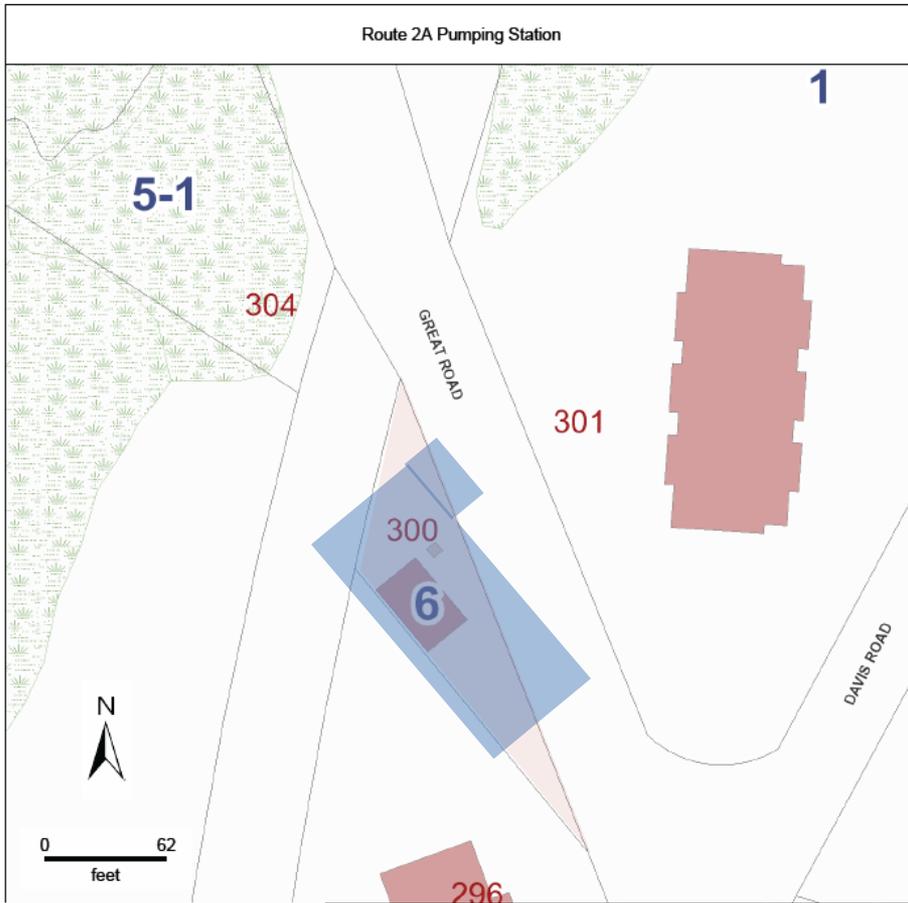


Nagog Pond Withdrawal

Nagog Pond Elevation (NAVD 1988)



Treatment Plant Location

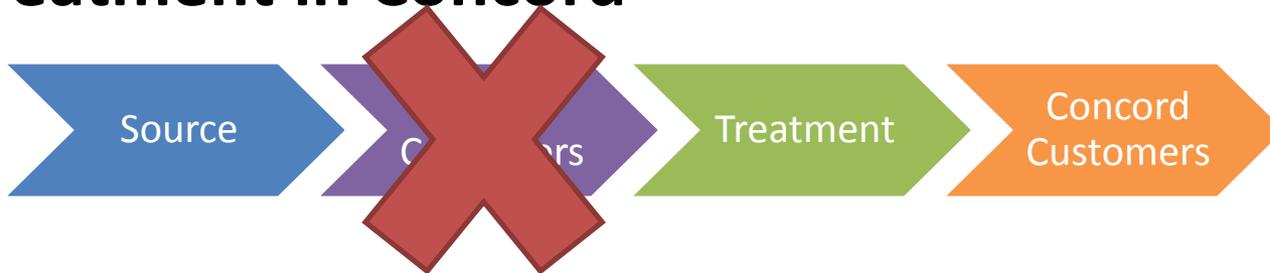


Treatment Plant Location

Water Treatment at Nagog Pond

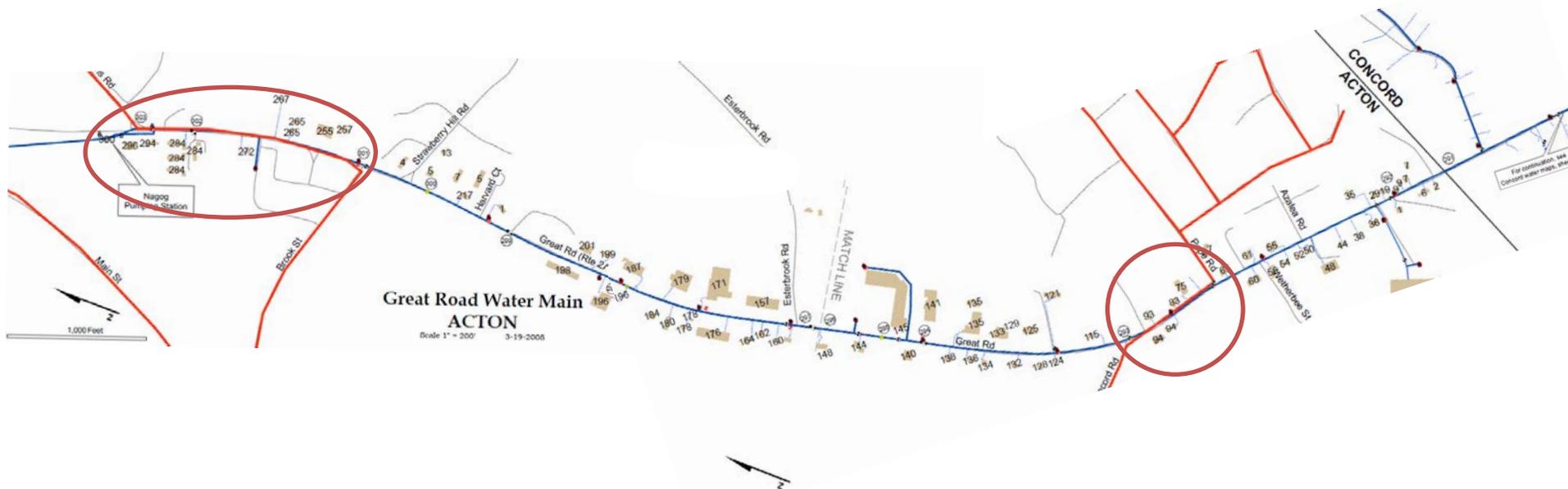


Water Treatment in Concord



Acton Water District Customers

140 Residential Units
38 Commercial



Blue Concord Water Main
Red Acton Water District Main





- Fire Pits & Peat Fires
- Horse Manure
- Swimming & Bathing
- Paint Ball Course
- Vandalism
- Boating/Water Craft Storage
- Underage Drinking
- Illegal Cutting
- Ice Fishing/Ice Skating
- Fishing

Sound Level (dBA)	Common Indoor Sounds	Common Outdoor Sounds
110	Rock Band	Jet Takeoff at 1000'
100	Inside NYC Subway Train	Chain Saw at 3'
90	Food Blender at 3'	Impact Hammer (Hoe Ram) at 50'
80	Garbage Disposal at 3'	Diesel Truck at 100'
70	Vacuum Cleaner at 10'	Lawn Mower at 100'
60	Normal Speech at 3'	Auto (40 mph) at 100'
50	Dishwasher in Next Room	Busy Suburban Area at night
40	Empty Conference Room	Quiet Suburban Area at night
25	Empty Concert Hall	Rural Area at night