

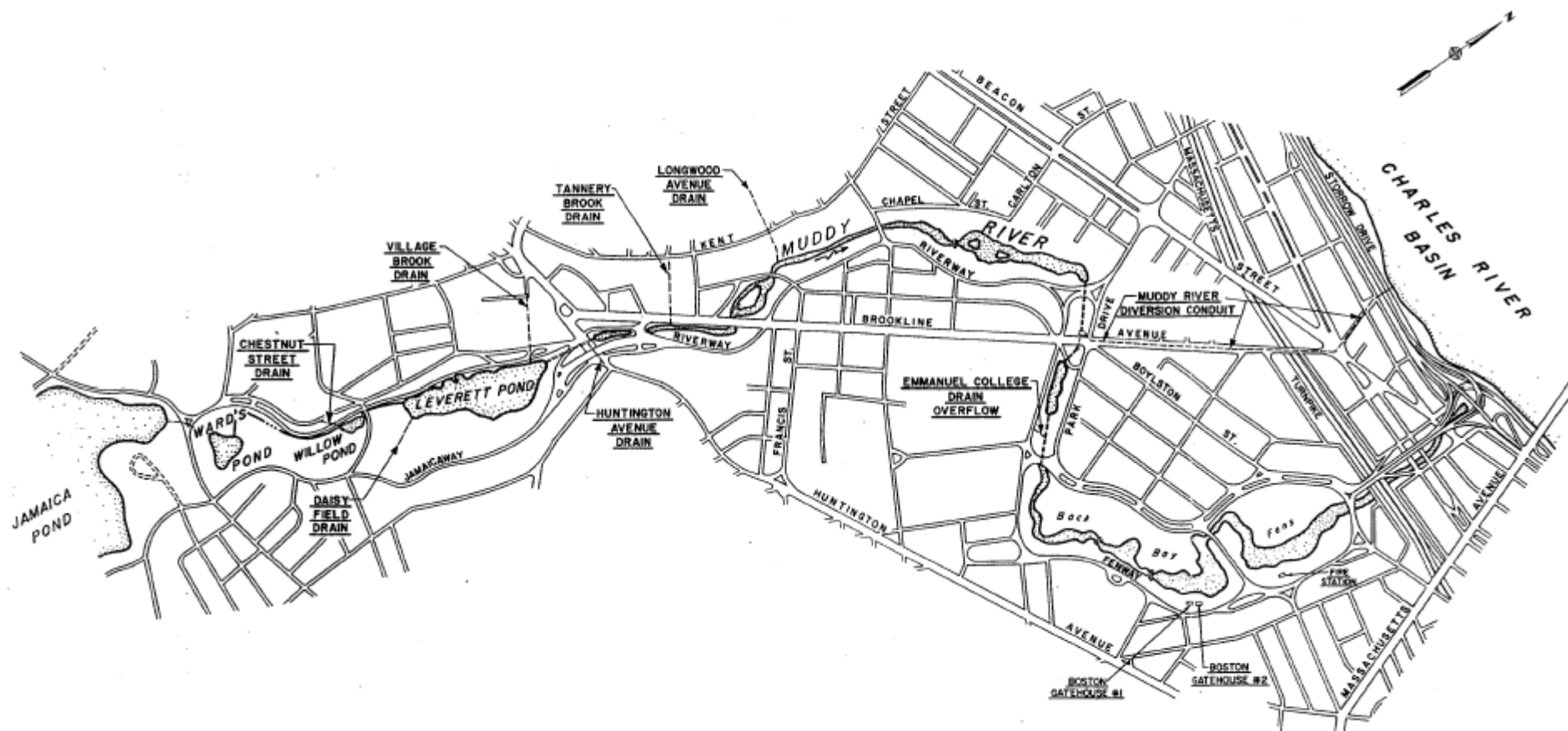
Muddy River Flood Damage Reduction and Ecosystem Restoration Project

January 31, 2013

Mike Keegan

Project Manager

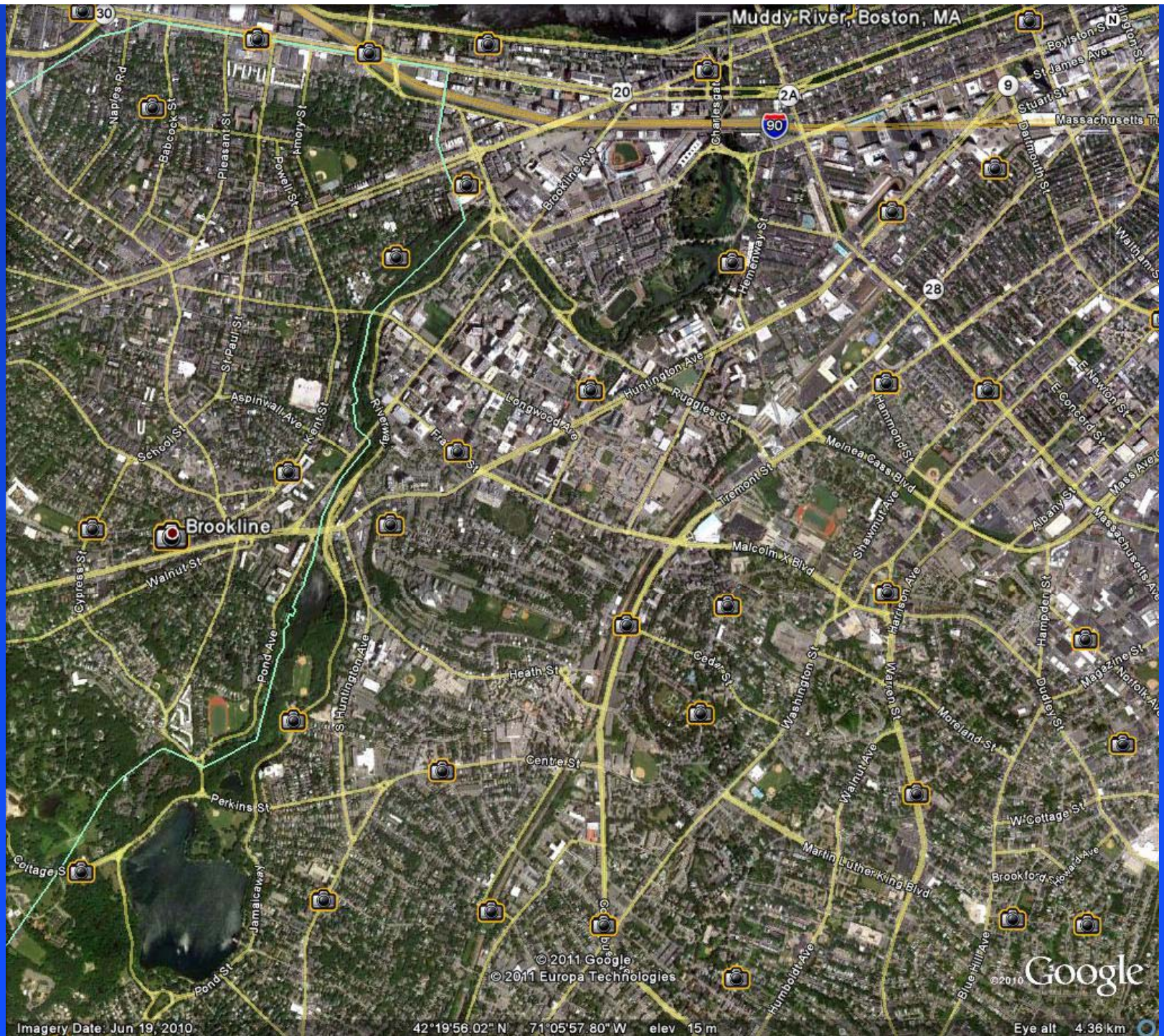
New England District



SCALE
400' 0 400' 800'

DEPARTMENT OF THE BUREAU
NEW ENGLAND DIVISION
CHART OF THE BUREAU
MAY 1964, 1965

MUDDY RIVER FEASIBILITY STUDY
MUDDY RIVER
DETAILED VICINITY MAP



Imagery Date: Jun 19, 2010

42°19'56.02" N 71°05'57.80" W elev 15 m

Eye alt 4.36 km

Muddy River Problems

- Periodic Flooding
- Major damage to public and private buildings including flooding at numerous universities.
- Major damage to the MBTA transit system.
- Flooding Closes D Line and Inconveniences Commuters
- Primary causes are undersized culverts and channel restrictions.
- Degraded Aquatic Habitat
- Filling in of Portions of Olmsted's Waterway
- Traffic Congestion



Flooding Riverway Boston 1996

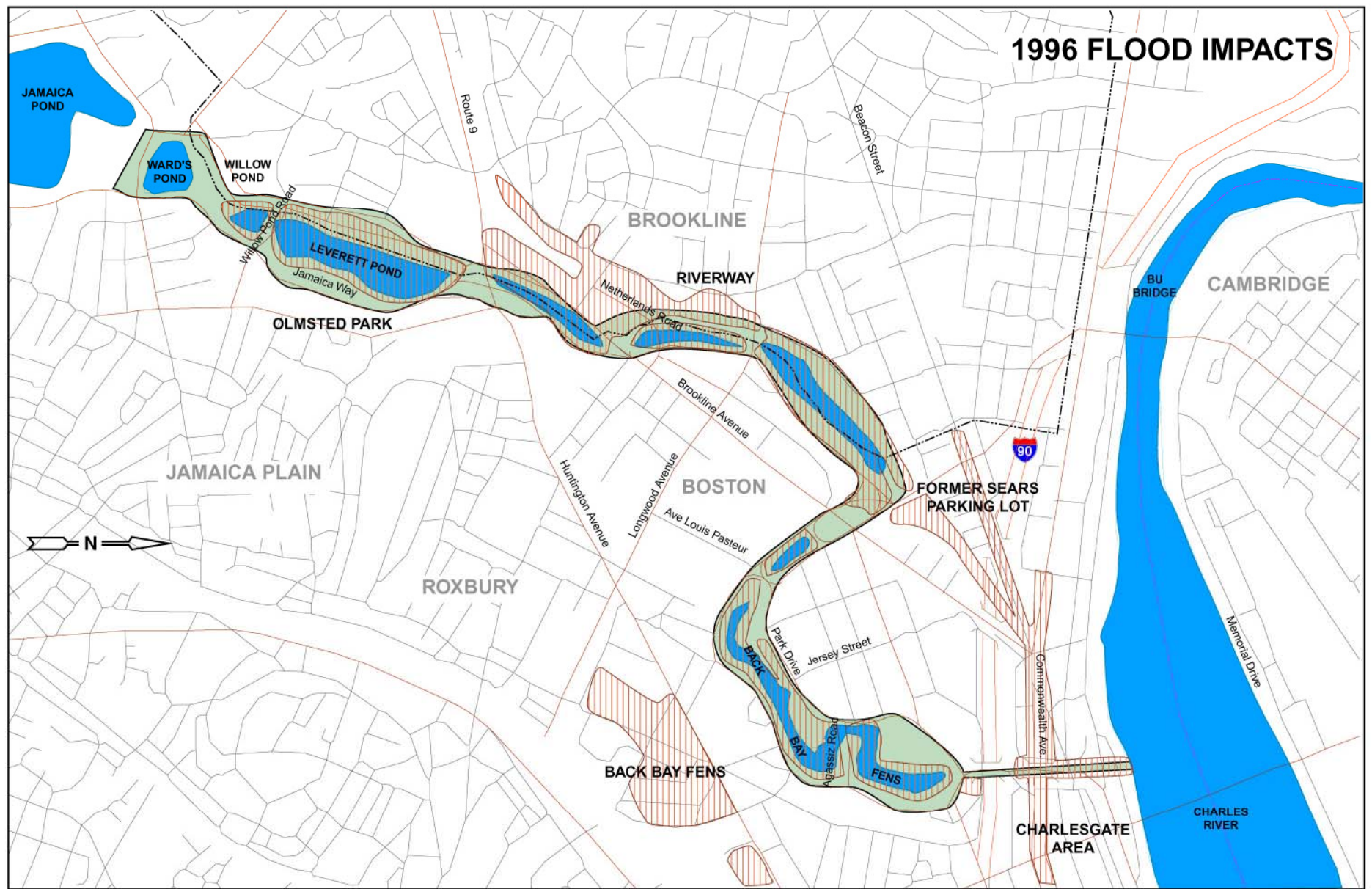


Kenmore Station Flooded up to the Signs 1996



**Riverway Park
and Road
Flooded
Boston 1996**



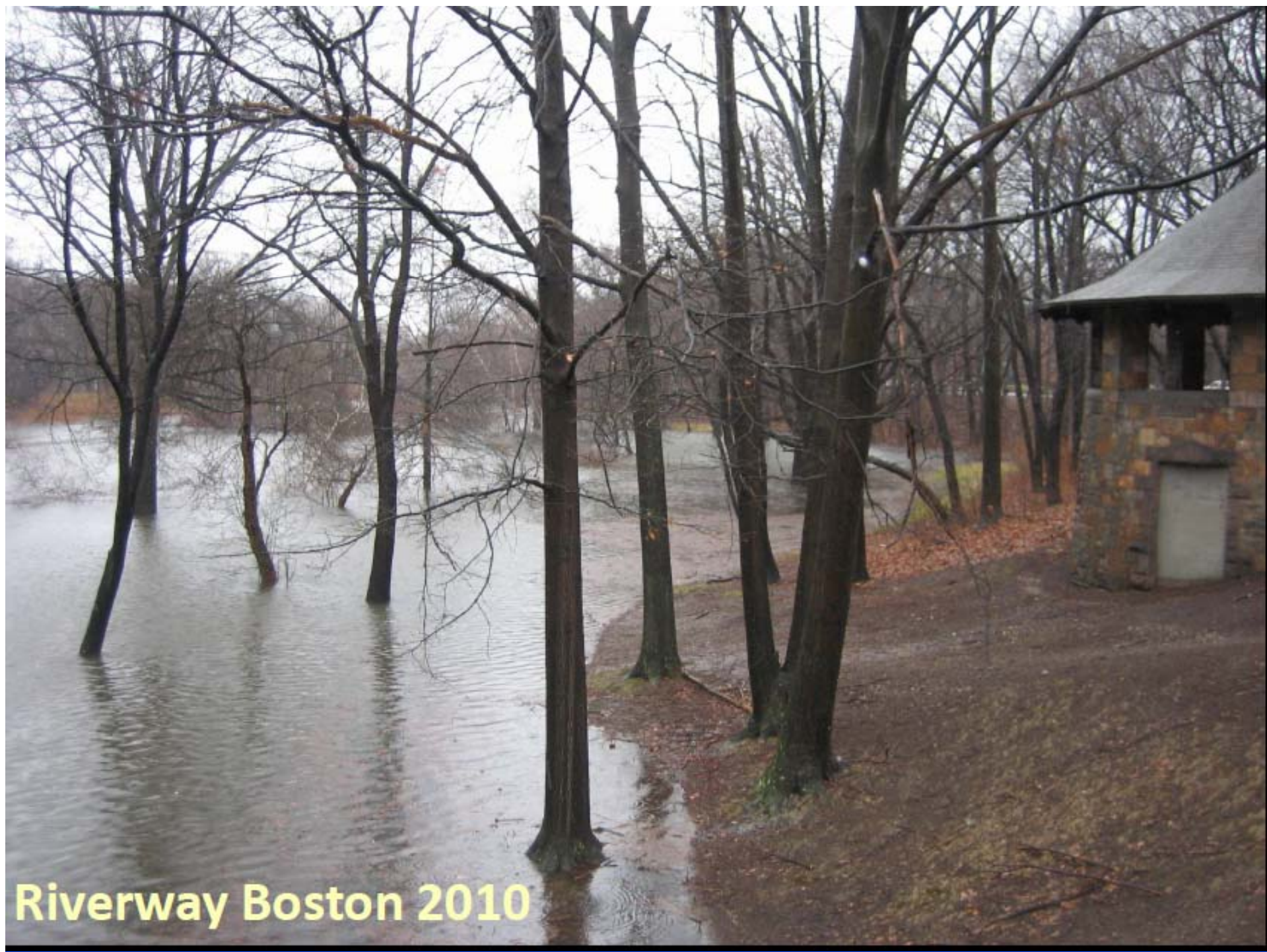


March 22, 2001 rainfall event



March 22, 2001 rainfall event





Riverway Boston 2010





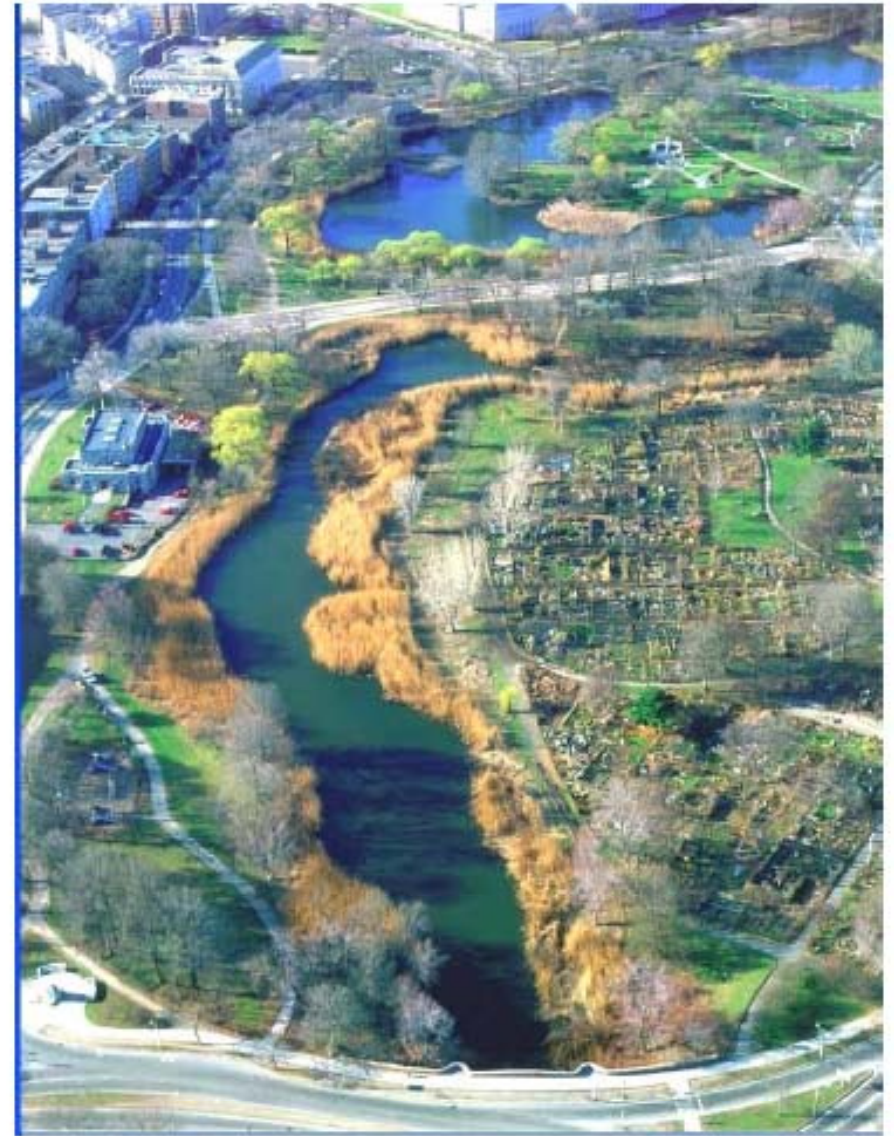




Environmental Problems

- Accumulated sediment impacting aquatic and benthic habitats (High SOD, low DO).
- Contaminated sediments pose a risk to aquatic life and wildlife (metals, PCB's, PAH's).
- Invasive species (*Phragmites*) impacting riparian biodiversity and encroaching on open water.
- Aquatic weed (*fanwort*) infestation in the Fens.







Recommended Plan Description

- Improvements to protect against a flood with a return frequency of 20 years to include channel improvements, removal of undersized culverts and installation of two new culverts.
- Day lighting 2 sections of river (Restoring Olmsted's waterway).
- Environmental dredging of the river and ponds.
- Eradication of *Phragmites* from wetland and riparian areas.
- Preservation and restoration of the historic shoreline in construction areas.

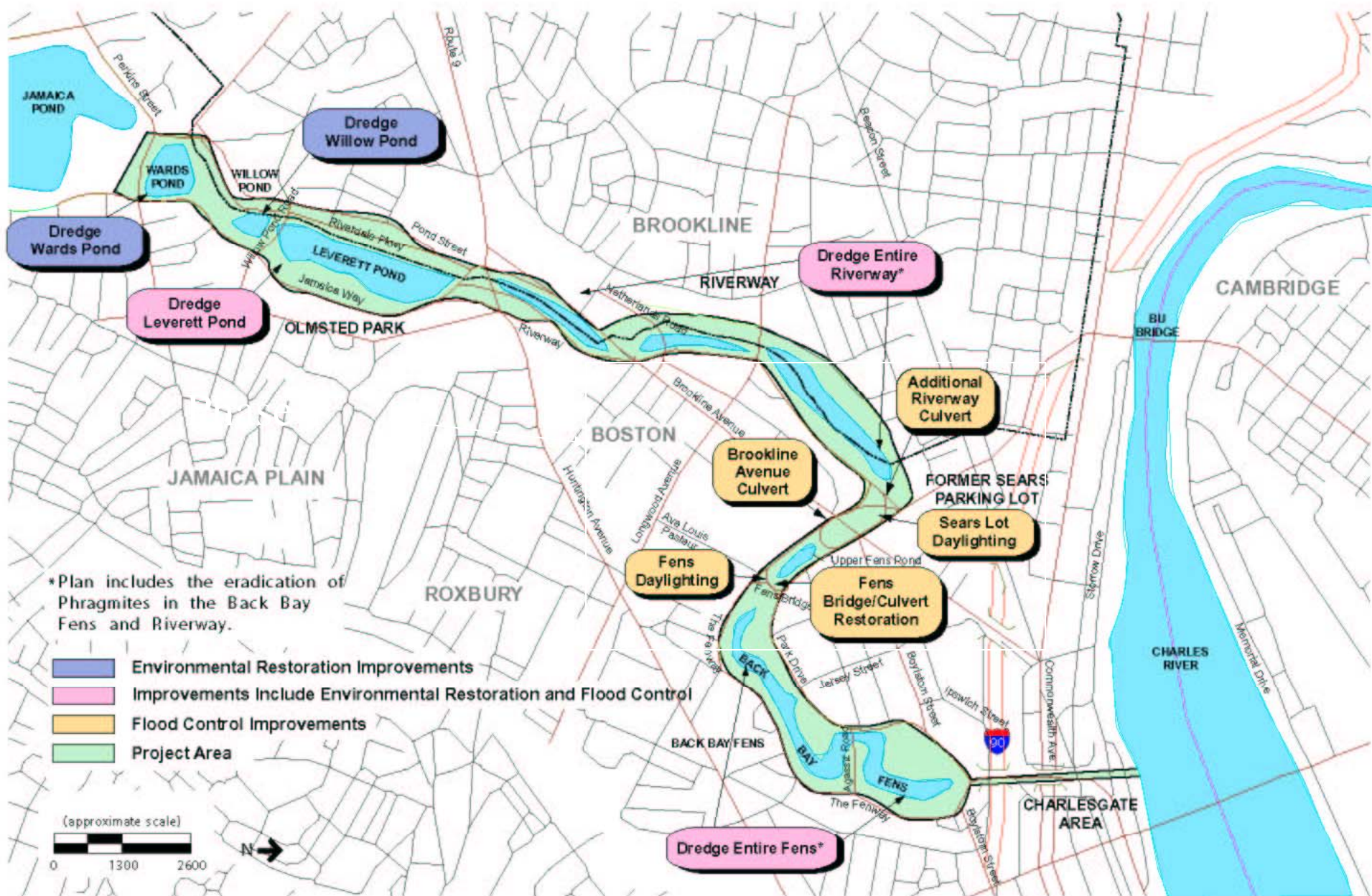


Figure 2: Recommended Plan

Plan Accomplishments

Flood Control

- Protects against recurrence of Oct 1996 Flood (20-Year Event)
- Significantly reduces flood stages for all events including tributaries

Environmental Restoration

- Restores over 40 acres of scarce urban aquatic habitat
- Restores anadromous fish spawning habitat (Fed. Significant Resource)
- Enhances diversity & productivity of benthic and warmwater fish communities
- Enhances biodiversity by eradicating extensive stands of *Phragmites* and restoring riparian edges.

Plan Accomplishments

Flood Control

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- Significantly reduces flood stages for all events including tributaries

Stage Reductions @ Riverway for 20-Yr Project			
Frequency	Existing Flood Elevation (BCB)	Elevation with 20 - Year Plan	Stage Reduction (feet)
10-Year	16.5	13.2	3.3
20-Year	18.0	13.3	4.0
50-Year	21.0	16.5	4.5
100-Year	22.0	17.5	4.5

Plan Accomplishments/Benefits (con't)

■ Other

- Unique opportunity to combine flood damage reduction and ecosystem restoration in a highly urban environment.
- Provides extensive benefits to public, institutional and social resources.
- Enhances diversity and productivity of the benthic and warmwater fish communities.
- Enhances value of over 140 acres of associated upland park areas.
- Allows restoration of urban recreational fishery (PCB levels in fish reduced).

Plan Accomplishments/Benefits (con't)

■ Other

- Modification of Traffic Patterns Will Reduce Congestion and Eliminate Safety Issues**
- Improved Pedestrian and Bicycle Flow in the Area**
- Day lighting Will Provide More Parkland for Residents and Restore Some of Olmsted's Original Design**

Public and Private Support

- Outstanding public and private support for the project.
- Unanimous consensus among agencies for a comprehensive solution.
- Parallel study underway to secure funding for associated work – Non Corps funds expended to date exceed \$5 million.
- The initial phase of the Muddy River restoration (dredging and riparian restoration of the Charlesgate area) has been undertaken by the sponsors and is complete.

Muddy River Phased Implementation

- Project is being broken into two Phases for design and construction.
- Phase 1 is located from Riverway to Avenue Louis Pasteur and consists of:
 - Riverway Culvert
 - Brookline Culvert
 - Daylighting of Sears lot and Fens area
 - Reconstruction of Avenue Louis Pasteur headwall

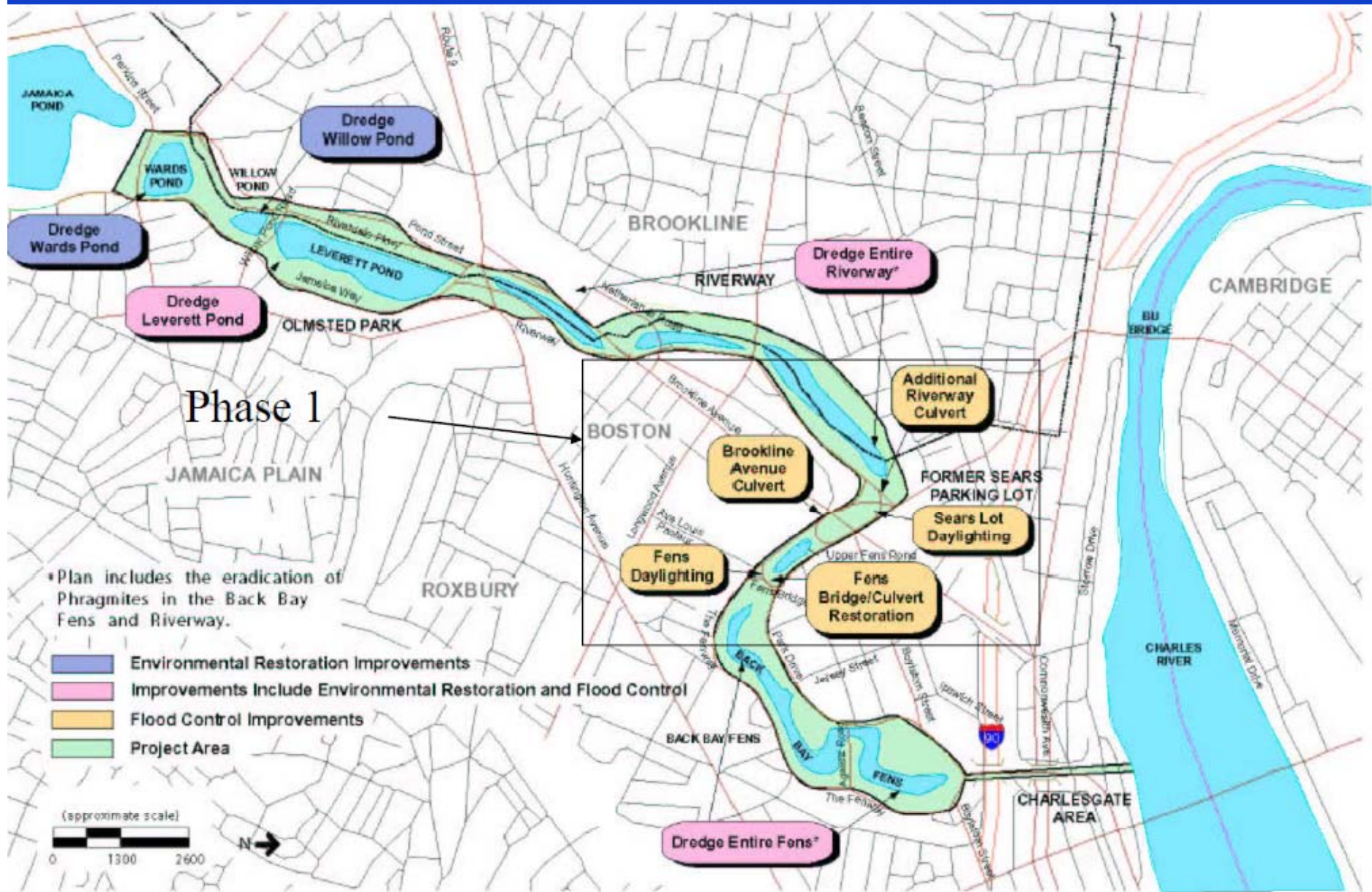
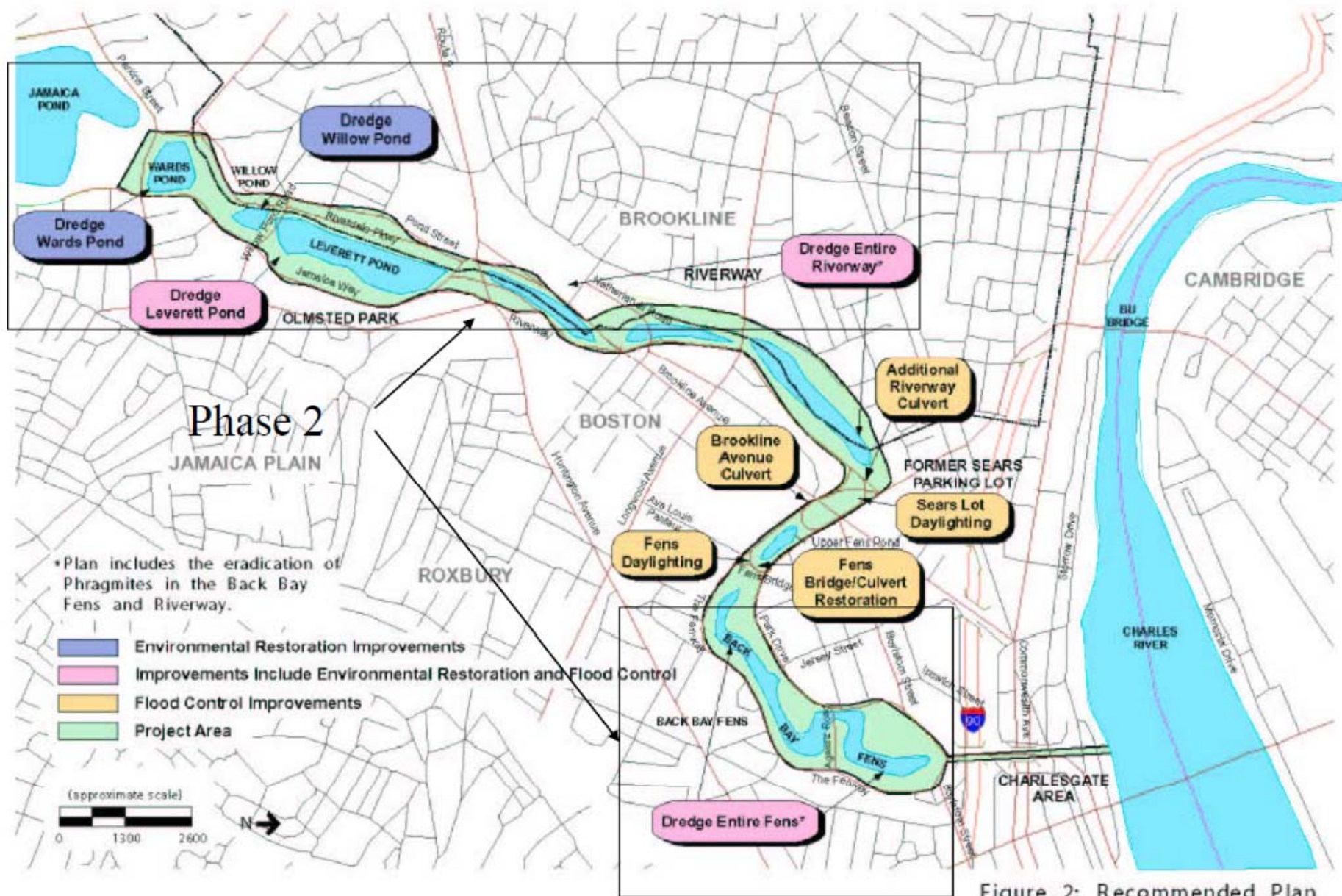
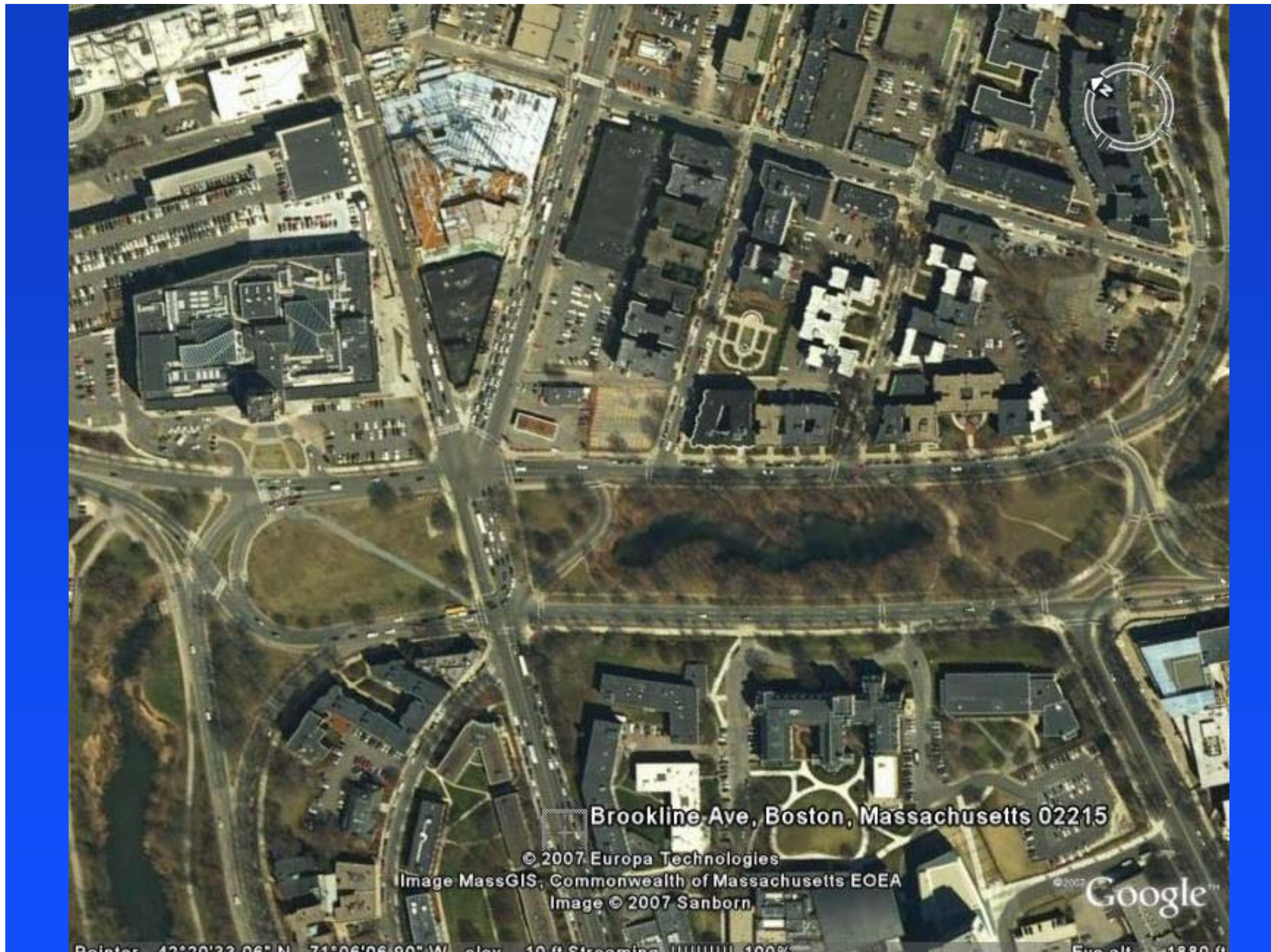
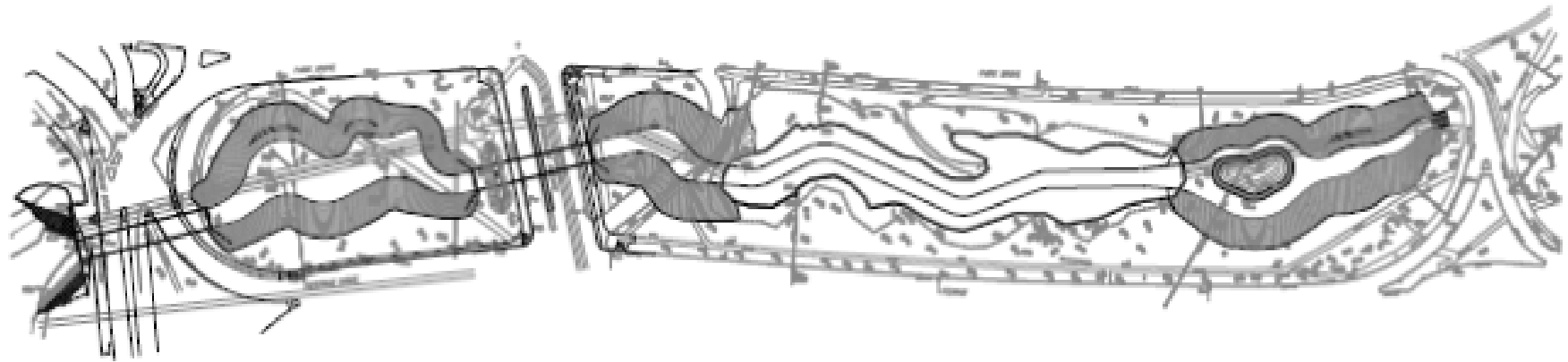


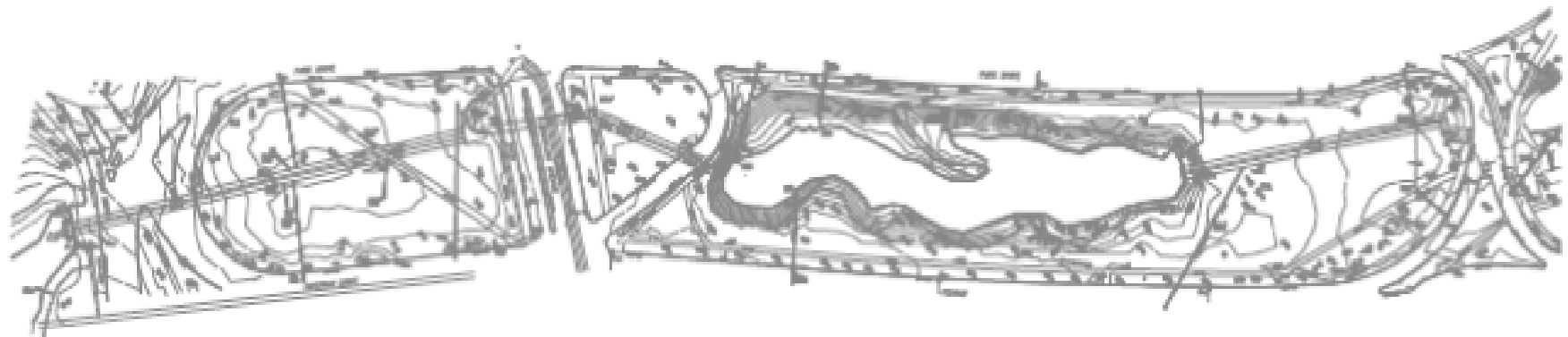
Figure 2: Recommended Plan







MAJESTY RIVER FLOOD DAMAGE
REDUCTION AND ENVIRONMENTAL
RESTORATION PROJECT
FIGURE 1
PROPOSED PROJECT, ENVIRONMENTAL



MAJESTY RIVER FLOOD DAMAGE
REDUCTION AND ENVIRONMENTAL
RESTORATION PROJECT
FIGURE 1
PROPOSED PROJECT, ENVIRONMENTAL

Items of Work in the Next 90 Days

- **Erosion Control**
- **Tree Removal**
- **Fencing of Construction Area**
- **Relocation of BWSC Sewer Line**
- **Traffic Management Changes**
- **Installation of Test Piles**
- **Installation of Observation Wells**
- **Borings, Sampling**

January – March Activities

- Starting 28 January Erosion Control Measures will be Installed.
- Starting on or about 4 February 2013, tree removal efforts will begin. The only trees being removed are those removals necessary to conduct the construction activities. These removals have been coordinated with the City of Boston, Town of Brookline and Mass DCR. Since some of the branches of these trees overhang the roadways, there will be periodic roadway lane closures to protect the traveling public. Police details will be used to assist in traffic management.
- Additionally, for safety reasons, pedestrian traffic will need to be re-routed around the work areas associated with the tree removal efforts. Proper signage will be employed to direct the pedestrians around active work areas until such a time that they are enclosed with fence and barrier.

January – March Activities

- Immediately following the completion of the tree removal effort, the construction areas will begin to be enclosed with fence and barrier to prevent access to active work areas by the public.
- Once the old Sears parking area (also known as the Sears rotary) is enclosed by a barrier with fencing, efforts to relocate a Boston Water & Sewer Commission sewer line will begin. Most of this effort will take place off of the roadways. Some short-term roadway lane closures will be made when the new line is cut into the existing manholes. These lane closures will be planned for off-peak travel periods and police details will be used to assist in traffic management.

January – March Activities

- Starting on approximately 1 March 2013 traffic management changes will be started that will allow for the installation of the culvert under Brookline Avenue. Traffic on Brookline Avenue between Fenway and Park Drive will be one way only headed inbound. Traffic coming down Brookline Avenue or Boylston Street outbound that want to continue down Brookline Avenue to the medical center will need to travel around the rotary between Brookline Avenue, the Riverway and along Fenway. New traffic signals will be installed to ease the congestion that occurs when traffic traveling down Park Drive from Brookline tries to merge with traffic exiting the Riverway. A figure showing the new traffic pattern for this period is shown on the next page.
- On or about 1 March 2013 work will begin on relocating the driveway exit out of the Landmark Center onto Park Drive. This relocation is being done to allow traffic exiting to have access to the various roadways as they do now throughout the construction period and beyond.



TRAFFIC MANAGEMENT DURING INITIAL BROOKLINE AVENUE CULVERT INSTALLATION

January – March Activities

- Once the traffic management changes have been completed, work will begin on the installation of the Brookline Avenue culvert. This work will initially be conducted in the Sears rotary area. As the work progresses further downstream, traffic pattern changes will need to be made to Brookline Avenue.
- Installation of test piles/drilled shafts will be initiated as part of the Brookline Avenue culvert effort.
- During the entire construction period, sidewalks will be maintained to allow safe passage of pedestrians. There will be some pathways, such as the diagonal path across the Sears Rotary that will be eliminated.

January – March Activities

- Other early incidental work activities scheduled to happen during the upcoming 90 day period include soil borings and sampling, survey, and observation well installation. These activities will also require periodic roadway lane closures and pedestrian re-direction to allow for the work. All roadway lane closures will be supported by police details to assist in traffic management.
- Information on the 90-Day Look Ahead Activities Can Be Found at:
- <http://www.nae.usace.army.mil/projects/muddyRiver/ConstructionActivities.pdf>

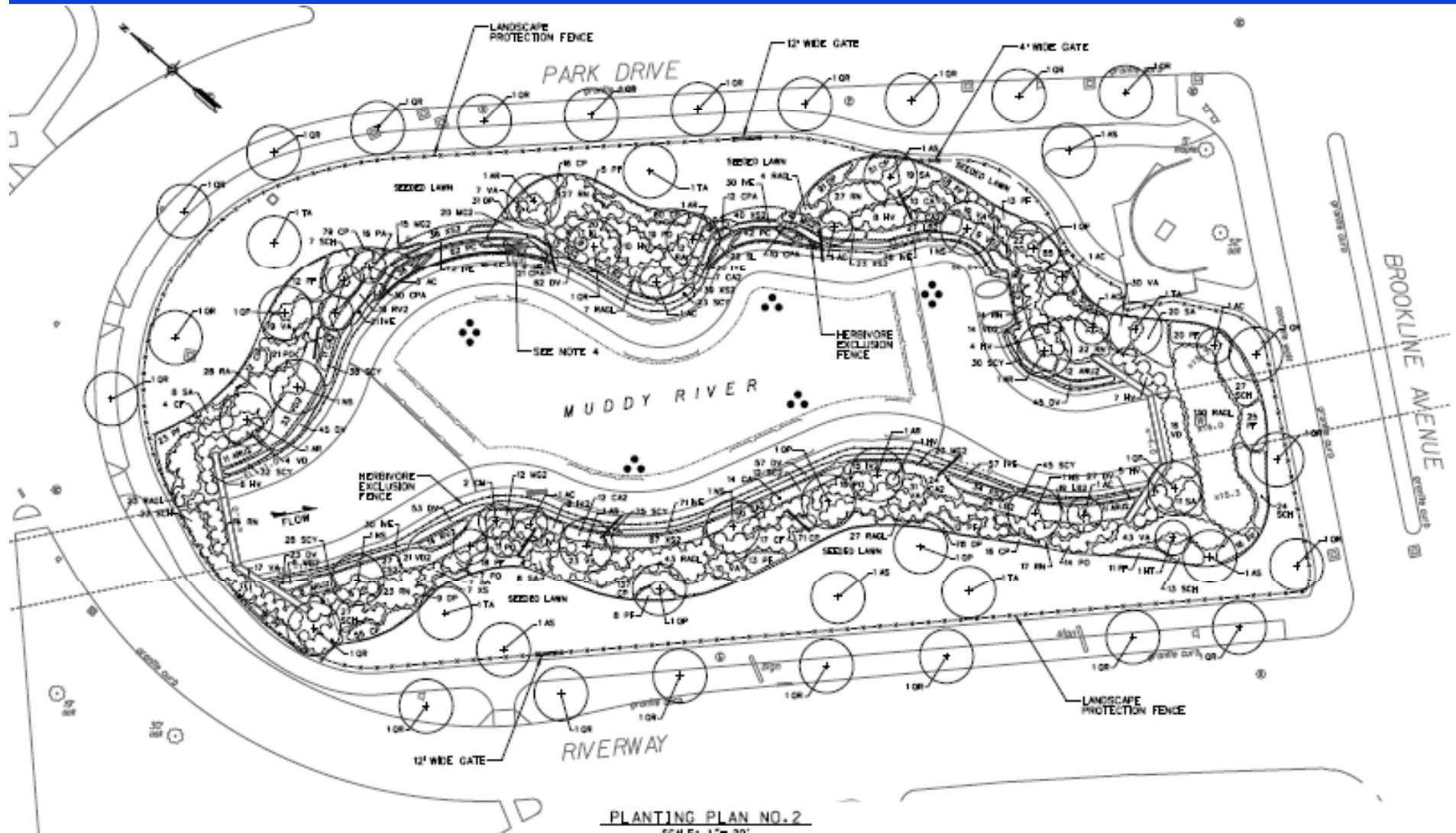
Tree Removal

- **Approximately 200 Trees Will Be Removed.**
- **Trees Need to Be Removed For Day Light Efforts, Traffic Modifications and the Restoration of Upper Fens Ponds**
- **The Trees to be Removed from Lower Elevations in the Upper Fens Pond need to be cleared to facilitate bank stabilization.**
- **Several Mature Trees are Remaining and the Design was Modified During the Development of the Plans to Protect These Trees**

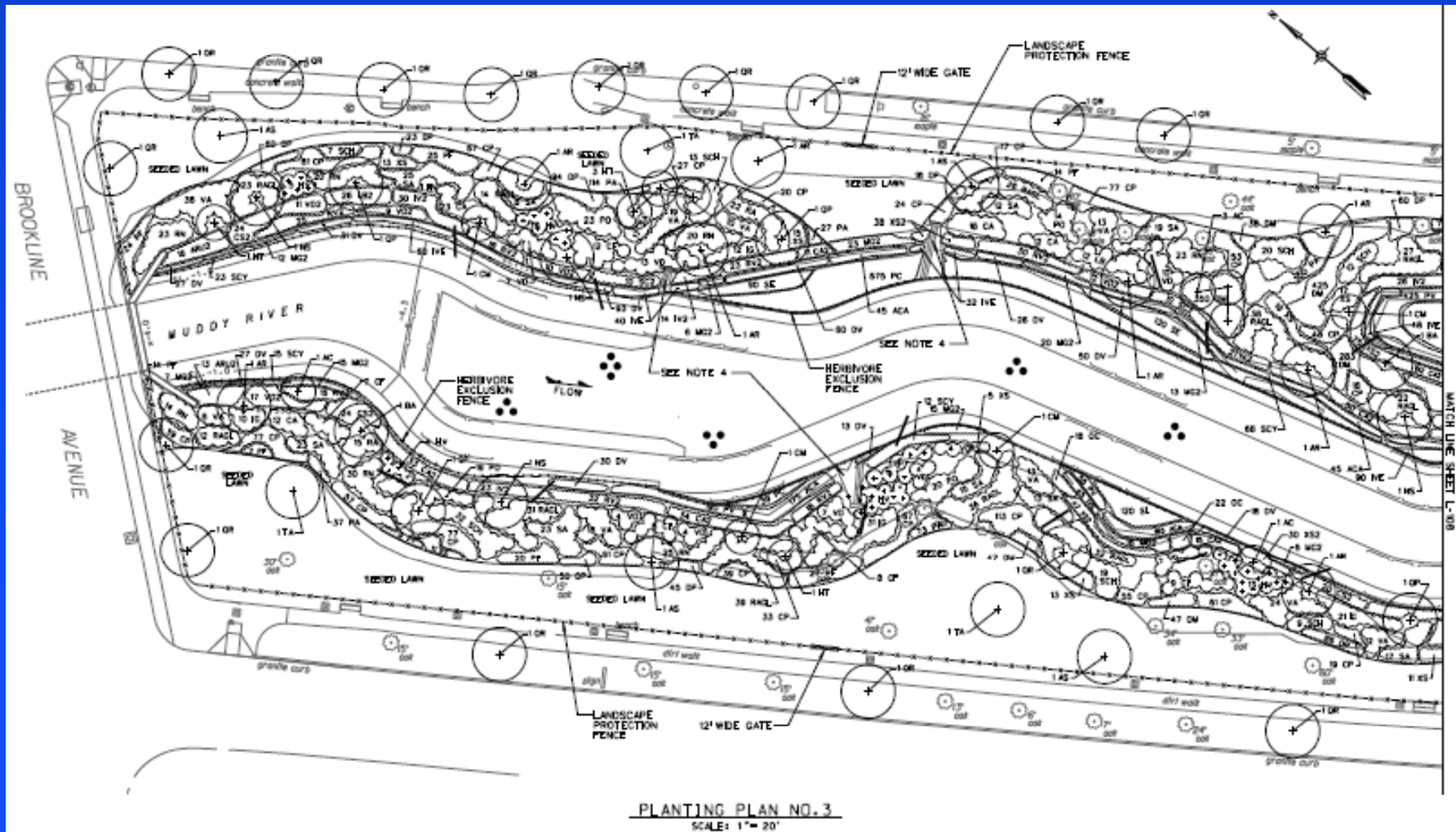
Proposed Vegetation Plan

- Approximately 200 Trees will Be Installed.
- Trees to be Planted Will Be representing 10 species. These include 77 oak, 40 maple, and 21 Tupelo
- Plans call for planting 11,508 small, medium, and large sized shrubs, representing 22 species.

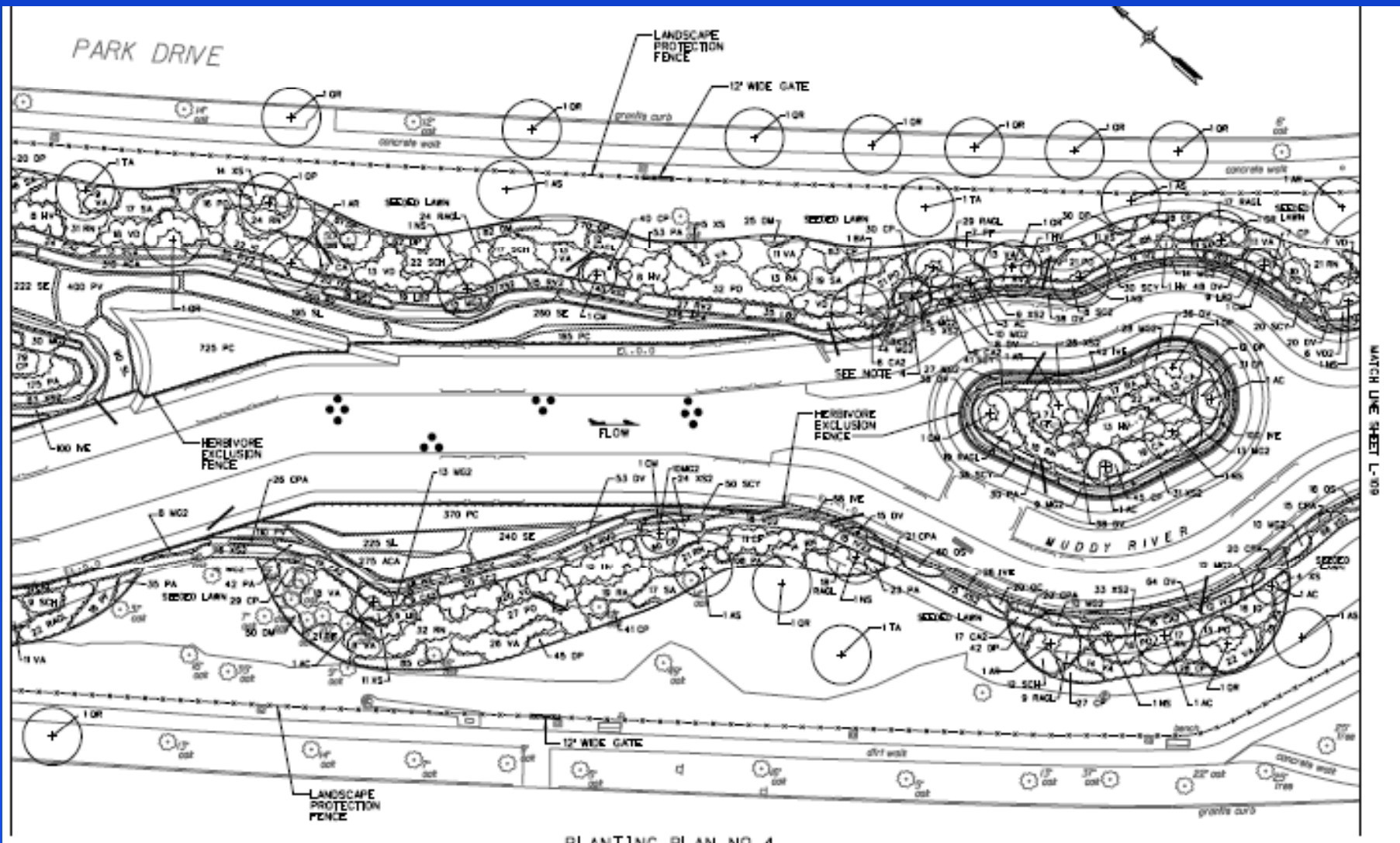
Tree & Shrub Plantings Proposed Day Lighted Sears Area



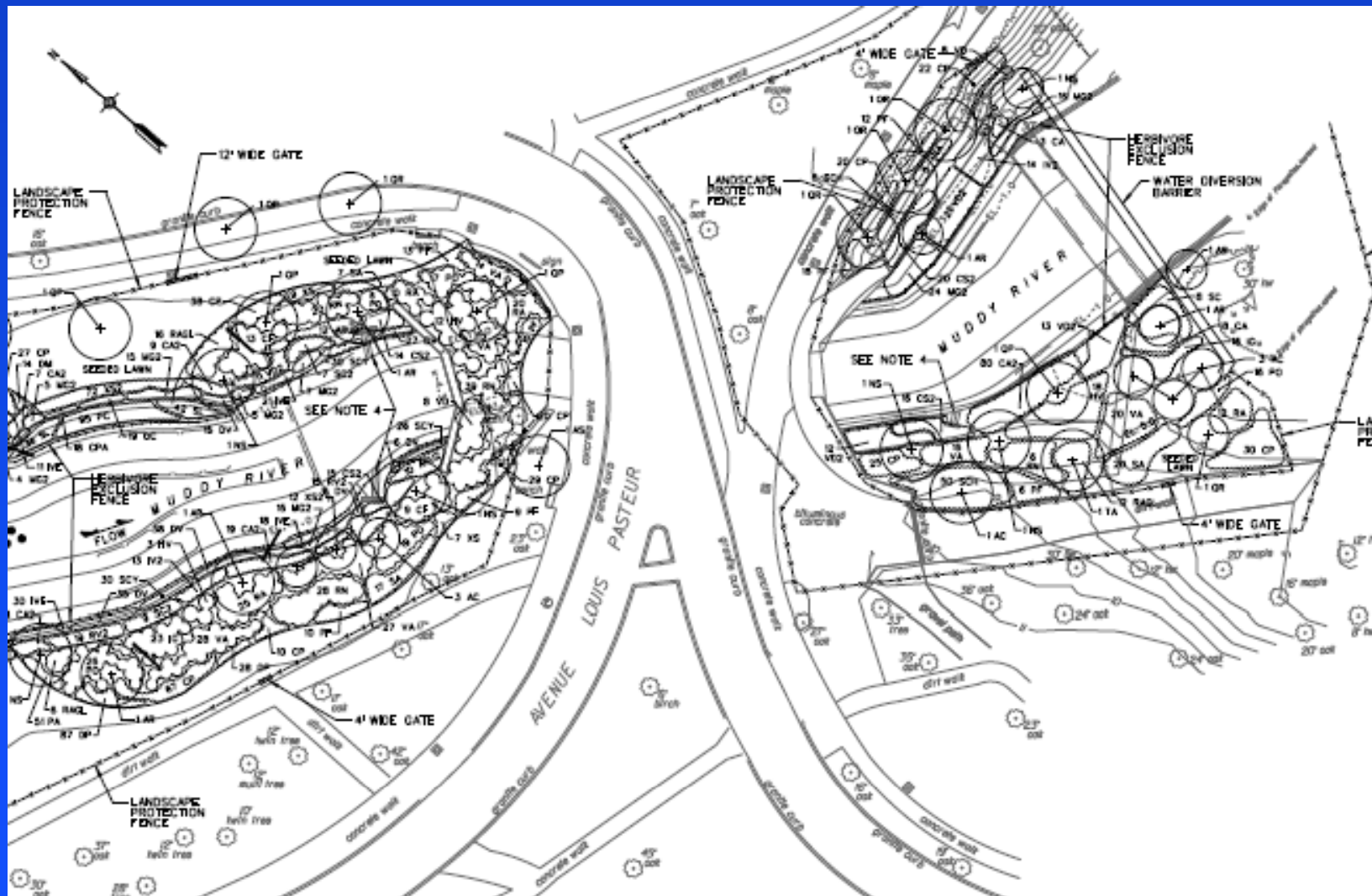
Tree & Shrub Plantings Proposed Day Lighted Jug Handle Area



Tree & Shrub Plantings Proposed Upper Fens Pond & New Island Area



Tree & Shrub Plantings Proposed Louis Pasteur Avenue Area

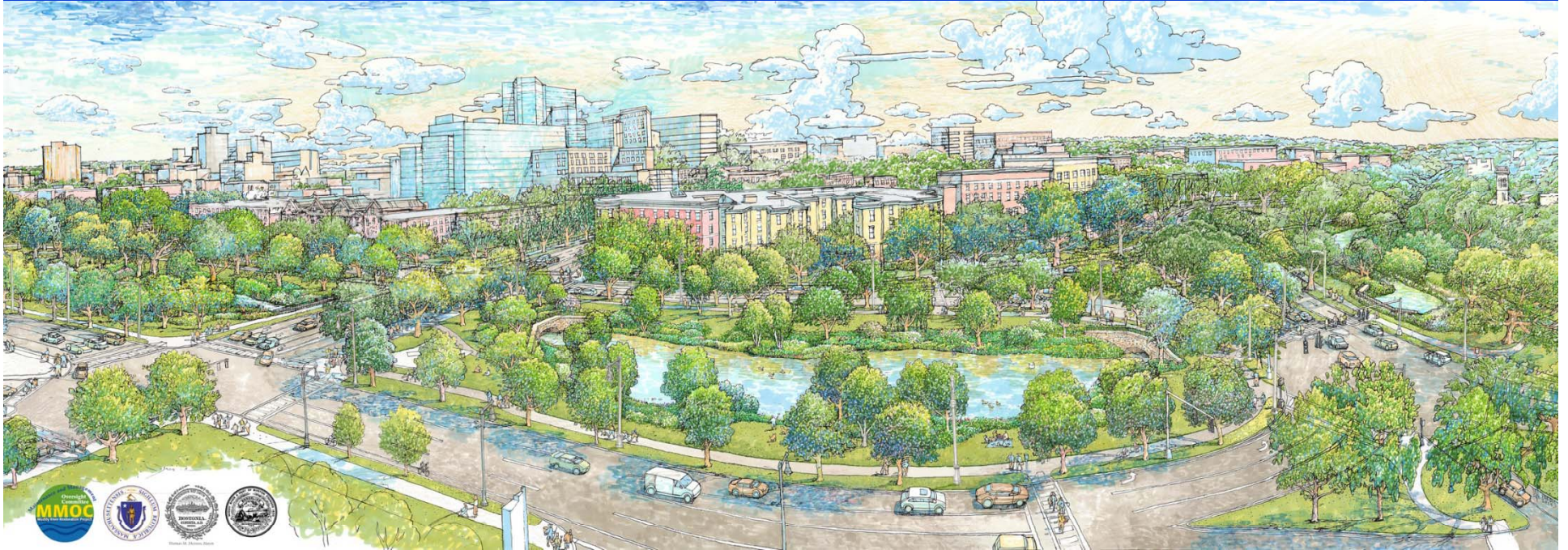




RIVERWAY @ LONGWOOD BRIDGE - VIEW DURING CONSTRUCTION - 1892







Questions?

- <http://www.nae.usace.army.mil/projects/muddyRiver/ConstructionActivities.pdf>