Notice of Intent

dcr
Massachusetts

SOUTH BANK BRIDGE PROJECT

Contract No. P13-2843-C1A
Boston, Massachusetts

Submitted to:

Boston Conservation Commission
Boston City Hall / Room 805
Boston, MA 02201

Applicant:

Department of Conservation and Recreation
251 Causeway Street, 7th Floor
Boston, MA 02114

Prepared by:

Greenman-Pedersen, Inc.
181 Ballardvale Street, Suite 202
Wilmington, MA 01887

GPI

February 2, 2018

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Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Boston
City/Town

Important:
When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

Note:
Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

A. General Information

1. Project Location (**Note:** electronic filers will click on button to locate project site):

Nashua Street / Charles River — a. Street Address
Boston — b. City/Town
02114 — c. Zip Code

Latitude and Longitude:
42 22' 06" — d. Latitude
71 53' 00" — e. Longitude

f. Assessors Map/Plat Number
ID# 0301929000, 0301913000, 0301911000 — g. Parcel /Lot Number

2. Applicant:

Karl — a. First Name
Haglund — b. Last Name
Massachusetts Department of Conservation and Recreation — c. Organization
251 Causeway Street — d. Street Address
Boston, MA — e. City/Town
MA — f. State
02114 — g. Zip Code
617-626-1492 — h. Phone Number
617-626-1349 — i. Fax Number
karl.haglund@state.ma.us — j. Email Address

3. Property owner (required if different from applicant): ☒ Check if more than one owner

Priscilla — a. First Name
Geigis — b. Last Name
Massachusetts Department of Conservation and Recreation — c. Organization
251 Causeway Street — d. Street Address
Boston, MA — e. City/Town
MA — f. State
02114 — g. Zip Code
617-626-4986 — h. Phone Number
i. Fax Number
Priscilla.geigis@state.ma.us — j. Email address

4. Representative (if any):

John — a. First Name
Watters — b. Last Name
Greenman-Pedersen, Inc. (GPI) — c. Company
181 Ballardvale Street, Suite 202 — d. Street Address
Wilmington — e. City/Town
MA — f. State
01887 — g. Zip Code
978-570-2978 — h. Phone Number
i. Fax Number
jwatters@gpinet.com — j. Email address

5. Total WPA Fee Paid (from NOI Wetland Fee Transmittal Form):

2112.5 — a. Total Fee Paid
612.5 — b. State Fee Paid
1500 — c. City/Town Fee Paid

A. General Information (continued)

6. General Project Description:

The project includes the installation of the South Bank Pedestrian Bridge, a component of the mitigation measures of the Central Artery/Tunnel project. The proposed bridge and associated park work will improve pedestrian connectivity and provide additonal surface restoration along the Charles River. (See attachment A for details).

7a. Project Type Checklist: (Limited Project Types see Section A. 7b.)

1. ☐ Single Family Home
2. ☐ Residential Subdivision
3. ☐ Commercial/Industrial
4. ☐ Dock/Pier
5. ☐ Utilities
6. ☐ Coastal engineering Structure
7. ☐ Agriculture (e.g., cranberries, forestry)
8. ☒ Transportation
9. ☐ Other

7b. Is any portion of the proposed activity eligible to be treated as a limited project (including Ecological Restoration Limited Project) subject to 310 CMR 10.24 (coastal) or 310 CMR 10.53 (inland)?

1. ☒ Yes ☐ No

If yes, describe which limited project applies to this project. (See 310 CMR 10.24 and 10.53 for a complete list and description of limited project types)

• 10.53(3)(j): The construction..footbridges…provided, however…constructed on pilings;10.53(3)(l): The construction…of water dependent uses…;10.53(6): Construction…bikepaths…

If the proposed activity is eligible to be treated as an Ecological Restoration Limited Project (310 CMR10.24(8), 310 CMR 10.53(4)), complete and attach Appendix A: Ecological Restoration Limited Project Checklist and Signed Certification.

8. Property recorded at the Registry of Deeds for:

a. County	b. Certificate # (if registered land)
Suffolk	
c. Book	d. Page Number

B. Buffer Zone & Resource Area Impacts (temporary & permanent)

1. ☐ Buffer Zone Only – Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.
2. ☒ Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Bank	0 (1. linear feet)	0 (2. linear feet)
b. ☐ Bordering Vegetated Wetland	(1. square feet)	(2. square feet)
c. ☒ Land Under Waterbodies and Waterways	54 Permanent, 40 Temporary (1. square feet) 54 CF/6 CY (3. cubic yards dredged)	0 (2. square feet)

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
d. ☐ Bordering Land Subject to Flooding	(1. square feet) (3. cubic feet of flood storage lost)	(2. square feet) (4. cubic feet replaced)
e. ☐ Isolated Land Subject to Flooding	(1. square feet) (2. cubic feet of flood storage lost)	(3. cubic feet replaced)
f. ☒ Riverfront Area	Charles River - coastal (1. Name of Waterway (if available) - **specify coastal or inland**)	

2. Width of Riverfront Area (check one):

☒ 25 ft. - Designated Densely Developed Areas only

☐ 100 ft. - New agricultural projects only

☐ 200 ft. - All other projects

3. Total area of Riverfront Area on the site of the proposed project: 31,650 square feet

4. Proposed alteration of the Riverfront Area:

a. 3,197 Permanent. 13,372 Temporary	b. 3,197 Permanent. 13,372 Temporary	c. 0 square feet between 100 ft. and 200 ft.

5. Has an alternatives analysis been done and is it attached to this NOI? ☒ Yes ☐ No

6. Was the lot where the activity is proposed created prior to August 1, 1996? ☒ Yes ☐ No

3. ☒ Coastal Resource Areas: (See 310 CMR 10.25-10.35)

Note: for coastal riverfront areas, please complete **Section B.2.f**. above.

B. Buffer Zone & Resource Area Impacts **(temporary & permanent)** (cont'd)

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Designated Port Areas	Indicate size under Land Under the Ocean, below	
b. ☐ Land Under the Ocean	1. square feet 2. cubic yards dredged	
c. ☐ Barrier Beach	Indicate size under Coastal Beaches and/or Coastal Dunes below	
d. ☐ Coastal Beaches	1. square feet	2. cubic yards beach nourishment
e. ☐ Coastal Dunes	1. square feet	2. cubic yards dune nourishment

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
f. ☐ Coastal Banks	1. linear feet	
g. ☐ Rocky Intertidal Shores	1. square feet	
h. ☐ Salt Marshes	1. square feet	2. sq ft restoration, rehab., creation
i. ☐ Land Under Salt Ponds	1. square feet 2. cubic yards dredged	
j. ☐ Land Containing Shellfish	1. square feet	
k. ☐ Fish Runs	Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above 1. cubic yards dredged	
l. ☒ Land Subject to Coastal Storm Flowage	21,027 1. square feet	

4. ☐ Restoration/Enhancement

If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please enter the additional amount here.

a. square feet of BVW _____ b. square feet of Salt Marsh _____

5. ☒ Project Involves Stream Crossings

1
a. number of new stream crossings _____ b. number of replacement stream crossings _____

C. Other Applicable Standards and Requirements

☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section C and complete Appendix A: Ecological Restoration Limited Project Checklists – Required Actions (310 CMR 10.11).

Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

1. Is any portion of the proposed project located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)? To view habitat maps, see the *Massachusetts Natural Heritage Atlas* or go to http://maps.massgis.state.ma.us/PRI_EST_HAB/viewer.htm.

   a. ☐ Yes ☒ No

   If yes, include proof of mailing or hand delivery of NOI to:

   Natural Heritage and Endangered Species Program
   Division of Fisheries and Wildlife
   1 Rabbit Hill Road
   Westborough, MA 01581

   b. Date of map

   If *yes*, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.c, and include requested materials with this Notice of Intent (NOI); *OR* complete Section C.2.f, if applicable. *If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).*

   c. Submit Supplemental Information for Endangered Species Review*

      1. ☐ Percentage/acreage of property to be altered:

         (a) within wetland Resource Area _____ percentage/acreage

         (b) outside Resource Area _____ percentage/acreage

      2. ☐ Assessor's Map or right-of-way plan of site

2. ☐ Project plans for entire project site, including wetland resource areas and areas outside of wetlands jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work **

   (a) ☐ Project description (including description of impacts outside of wetland resource area & buffer zone)

   (b) ☐ Photographs representative of the site

* Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/). Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

** MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.

C. Other Applicable Standards and Requirements (cont'd)

(c) ☐ MESA filing fee (fee information available at http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/mesa/mesa_fee_schedule.htm). Make check payable to "Commonwealth of Massachusetts - NHESP" and ***mail to NHESP*** at above address

*Projects altering **10 or more acres** of land, also submit:*

(d) ☐ Vegetation cover type map of site

(e) ☐ Project plans showing Priority & Estimated Habitat boundaries

(f) OR Check One of the Following

1. ☐ Project is exempt from MESA review.
Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/mesa/mesa_exemptions.htm; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)

2. ☐ Separate MESA review ongoing. a. NHESP Tracking # b. Date submitted to NHESP

3. ☐ Separate MESA review completed.
Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.

3. For coastal projects only, is any portion of the proposed project located below the mean high water line or in a fish run?

a. ☐ Not applicable – project is in inland resource area only b. ☒ Yes ☐ No

If yes, include proof of mailing, hand delivery, or electronic delivery of NOI to either:

South Shore - Cohasset to Rhode Island border, and the Cape & Islands:

Division of Marine Fisheries -
Southeast Marine Fisheries Station
Attn: Environmental Reviewer
1213 Purchase Street – 3rd Floor
New Bedford, MA 02740-6694
Email: DMF.EnvReview-South@state.ma.us

North Shore - Hull to New Hampshire border:

Division of Marine Fisheries -
North Shore Office
Attn: Environmental Reviewer
30 Emerson Avenue
Gloucester, MA 01930
Email: DMF.EnvReview-North@state.ma.us

Also if yes, the project may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional Office.

C. Other Applicable Standards and Requirements (cont'd)

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

4. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?

   a. ☐ Yes ☒ No If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations). **Note:** electronic filers click on Website.

   b. ACEC

5. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?

   a. ☐ Yes ☒ No

6. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?

   a. ☐ Yes ☒ No

7. Is this project subject to provisions of the MassDEP Stormwater Management Standards?

   a. ☒ Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:

      1. ☐ Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3)

      2. ☒ A portion of the site constitutes redevelopment

      3. ☐ Proprietary BMPs are included in the Stormwater Management System.

   b. ☐ No. Check why the project is exempt:

      1. ☐ Single-family house

      2. ☐ Emergency road repair

      3. ☐ Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

D. Additional Information

☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section D and complete Appendix A: Ecological Restoration Notice of Intent – Minimum Required Documents (310 CMR 10.12).

Applicants must include the following with this Notice of Intent (NOI). See instructions for details.

Online Users: Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department.

1. ☒ USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)

2. ☒ Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.

D. Additional Information (cont'd)

3. ☐ Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.

4. ☒ List the titles and dates for all plans and other materials submitted with this NOI.

South Bank Bridge Project Contract No. P13-2843-C1A Boston Ma
a. Plan Title

Greenman-Pedersen, Inc
b. Prepared By

Timothy Letton
c. Signed and Stamped by

02/02/2018
d. Final Revision Date

Varies
e. Scale

f. Additional Plan or Document Title

g. Date

5. ☒ If there is more than one property owner, please attach a list of these property owners not listed on this form.

6. ☐ Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.

7. ☒ Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.

8. ☒ Attach NOI Wetland Fee Transmittal Form

9. ☒ Attach Stormwater Report, if needed.

E. Fees

1. ☐ Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment:

1712379
2. Municipal Check Number

02/02/2018
3. Check date

1712380
4. State Check Number

02/02/2018
5. Check date

Greenman-Pedersen, Inc
6. Payor name on check: First Name

7. Payor name on check: Last Name

F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

1. Signature of Applicant — 2. Date: 2/2/18

3. Signature of Property Owner (if different) — 4. Date: 2-2-18

5. Signature of Representative (if any) — 6. Date: 2-2-18

For Conservation Commission:
Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

For MassDEP:
One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

Other:
If the applicant has checked the "yes" box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements.

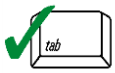
The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

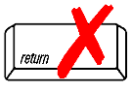
Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

NOI Wetland Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.





A. Applicant Information

1. Location of Project:

a. Street Address	b. City/Town
Nashua Street / Charles River	Boston
c. Check number	**d. Fee amount**
1712380	612.50

2. Applicant Mailing Address:

a. First Name	b. Last Name
Karl	Haglund

c. Organization: Massachusetts Department of Conservation and Recreation

d. Mailing Address: 251 Causeway Street

e. City/Town	f. State	g. Zip Code
Boston	MA	02114

h. Phone Number	i. Fax Number	j. Email Address
617-626-1492	617-626-1349	karl.haglund@state.ma.us

3. Property Owner (if different):

a. First Name	b. Last Name
Priscilla	Geigis

c. Organization: Massachusetts Department of Conservation and Recreation

d. Mailing Address: 251 Causeway Street

e. City/Town	f. State	g. Zip Code
Boston	MA	02114

h. Phone Number	i. Fax Number	j. Email Address
617-626-4986		Priscilla.geigis@state.ma.us

B. Fees

To calculate filing fees, refer to the category fee list and examples in the instructions for filling out WPA Form 3 (Notice of Intent).

Fee should be calculated using the following process & worksheet. ***Please see Instructions before filling out worksheet.***

Step 1/Type of Activity: Describe each type of activity that will occur in wetland resource area and buffer zone.

Step 2/Number of Activities: Identify the number of each type of activity.

Step 3/Individual Activity Fee: Identify each activity fee from the six project categories listed in the instructions.

Step 4/Subtotal Activity Fee: Multiply the number of activities (identified in Step 2) times the fee per category (identified in Step 3) to reach a subtotal fee amount. Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

Step 5/Total Project Fee: Determine the total project fee by adding the subtotal amounts from Step 4.

Step 6/Fee Payments: To calculate the state share of the fee, divide the total fee in half and subtract $12.50. To calculate the city/town share of the fee, divide the total fee in half and add $12.50.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
NOI Wetland Fee Transmittal Form
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Fees (continued)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee
Cat. 2(e)- Limited Project: Const. pile supp. footbridge 10.53(3)(j)	1	500	500
Cat. 2(e)- Limited Project: Const. water dependent use 10.53(3)(l)	1	500	750

Step 5/Total Project Fee: 1250

Step 6/Fee Payments:

Total Project Fee:	1250 (a. Total Fee from Step 5)
State share of filing Fee:	612.5 (b. 1/2 Total Fee **less $**12.50)
City/Town share of filling Fee:	City has own fee $1500 (c. 1/2 Total Fee **plus** $12.50)

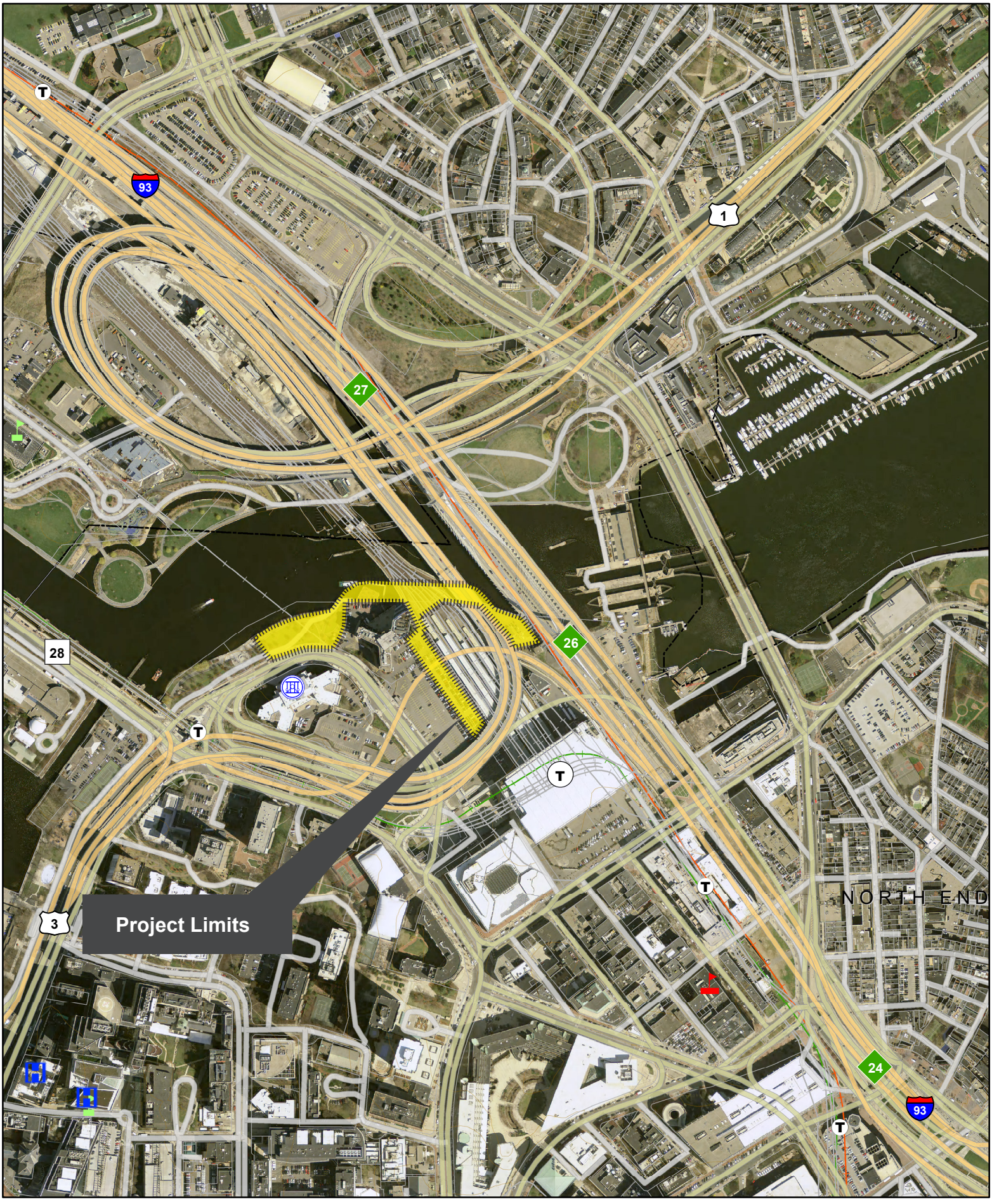
C. Submittal Requirements

a.) Complete pages 1 and 2 and send with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts.

Department of Environmental Protection
Box 4062
Boston, MA 02211

b.) **To the Conservation Commission:** Send the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and the city/town fee payment.

To MassDEP Regional Office (see Instructions): Send a copy of the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and a **copy** of the state fee payment. (E-filers of Notices of Intent may submit these electronically.)



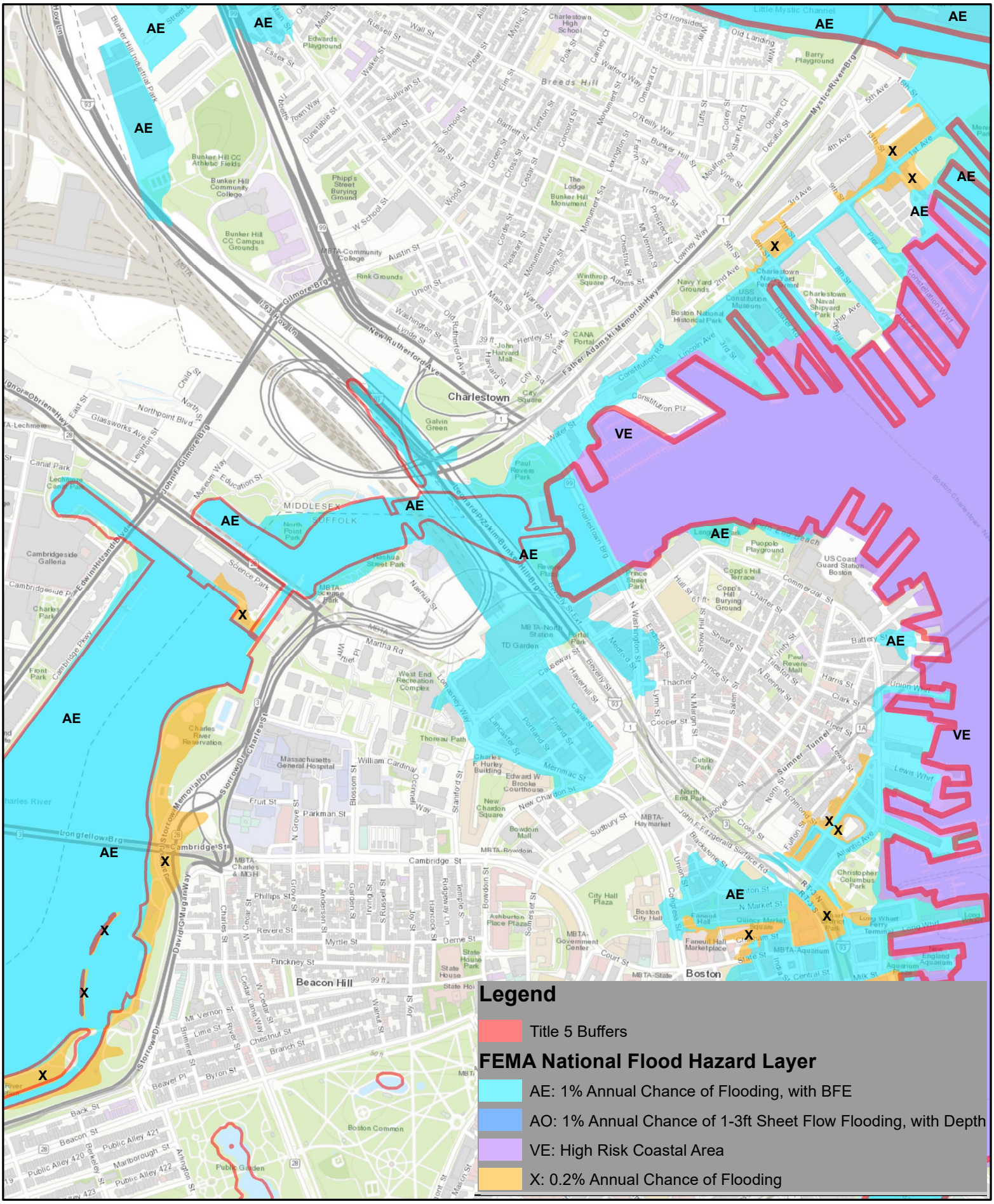
0 500 1,000 2,000 Feet

GPI

Figure 1:
Ortho Photo with
Project Limits
Source: MassGIS

GPI

Figure 2:
Primary Resources Map
Source: MassGIS



GPI

Figure 3:
FEMA Flood Zones
Source: MassGIS

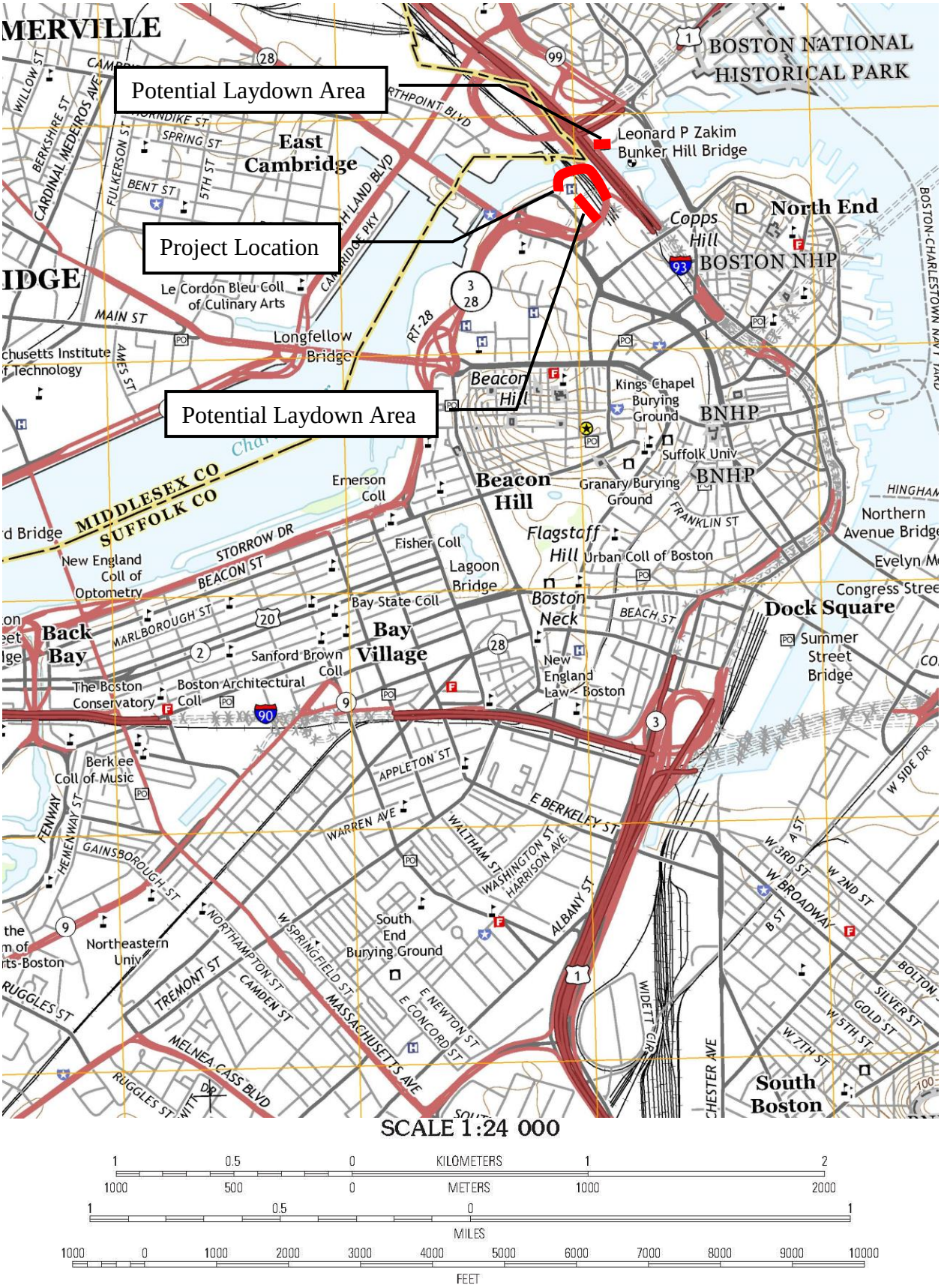
Figure 4:
Chapter 91 Jurisdiction
Source: MassGIS

N

0 500 1,000 2,000 Feet

GPI

Figure 5:
Soils Maps
Source: MassGIS



Project Location Map

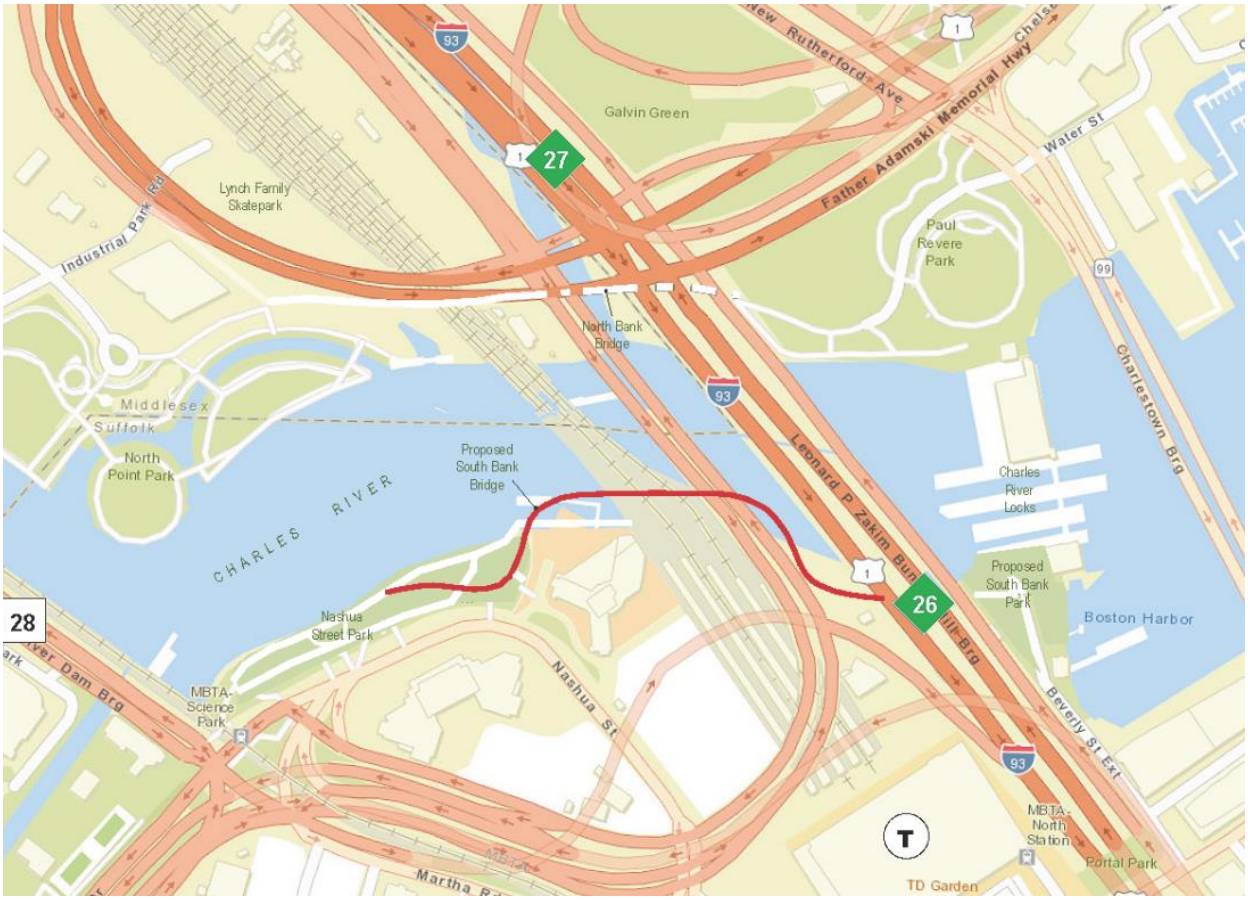
Figure 6: USGS Map

Appendix A
Notice of Intent Narrative

Table of Contents

1.0 INTRODUCTION

This project is fully described in Section 3.0 and illustrated in the drawings.



Plan of the proposed South Bank Bridge in relation to the New Charles River Basin Parks.

On behalf of the Department of Conservation and Recreation (DCR), Greenman-Pedersen, Inc. (GPI) is pleased to submit this Notice of Intent (NOI) to the Boston Conservation Commission, pursuant to the *Massachusetts Wetlands Protection Act* (MWPA; MGL Ch. 131, § 40), *Wetlands Protection Act Regulations* (310 CMR 10.00), for work within Riverfront Area, Land Under Water (LUW), Land Subject to Coastal Storm Flowage (LSCSF), and the 100-foot Buffer Zone to Bank.

DCR is proposing to construct the South Bank Bridge, which is a required mitigation measure for the Charles River Crossing project of the Central Artery/Tunnel Project (CA/T). As shown in the figure above, the proposed pedestrian bridge will link Nashua Street Park to the proposed South Bank Park. The bridge and path connections will accommodate both pedestrians and cyclists, and will comply fully with the Americans with Disabilities Act (ADA).

1.1 PROJECT PURPOSE

In the federal and state approvals of the permit applications for the Charles River Crossing (CRC) component of the Central Artery/Tunnel (CA/T) Project, the required mitigation included the completion of a Master Plan for the New Charles River Basin and the construction of public open space on lands disturbed for construction, laydown, and storage related to the Leonard P. Zakim Bunker Hill Bridge (Zakim Bridge) and the Leverett Connector Bridge and viaducts. This Notice of Intent (NOI) covers the implementation of a long-planned element of that mitigation to provide pedestrian connections and open space improvements.

1.2 PROJECT NEED

The Master Plan for the New Charles River Basin calls for the creation of pedestrian promenades, sitting areas, and landscape areas to create an extension of the Charles River Esplanade. The South Bank Bridge is one of several remaining required projects of the Master Plan. Already completed projects as part of the Central Artery mitigation include North Point Park, Paul Revere Park, the North Bank Bridge and Nashua Street Park. When finished, this multi-use pedestrian bridge will connect Nashua Street Park with the proposed South Bank Park and the Charles River Dam. This “Lost Half-Mile” of the Charles has historically been inaccessible to the public for generations due to heavy industrial use.

2.0 EXISTING CONDITIONS

2.1 GENERAL

The project area is located in historically filled tideland. This entire area was filled beginning in the late 1800s for use by the four railroads that each built bridges across the Charles, with separate terminals facing Causeway Street. Today, seawalls and rip-rap define the edge of river.

As such, the Riverfront Area within the limits of the project contains no natural features. Until recently, much of the riverfront area along the project limits would have been characterized as “degraded” due to a predominance of gravel or asphalt surfacing, and an absence of vegetation or topsoil.

2.2 PROJECT LOCUS

The project is located along a 1200-foot section of the Charles River, and includes approximately 1300 LF of new path and bridge as follows:

- 350 LF West Approach (currently Nashua Street Park)
- 750 LF Elevated pedestrian bridge
- 250 LF East Approach

The pedestrian bridge, a section of which passes beneath the elevated Leverett Connector ramps, will be partly over water and partly over the railroad trestle. The bridge landings on both ends require path realignment and embankment construction to provide access to the new bridge.

The proposed improvements will occur on property owned and controlled by DCR, the Massachusetts Bay Transit Authority, the Massachusetts Department of Transportation – Highway Division and over waters of the Commonwealth.

2.3 WETLAND RESOURCE AREAS

This NOI has been submitted under the Massachusetts Wetlands Protection Act, M.G.L. Chapter 131, Section 40 (the Act). Work is proposed within areas Subject to Protection under the Act as well as their 100-foot buffer zones. The following wetland resource areas are found within, or immediately adjacent to the project limits:

2.3.1 Riverfront Area (RA)

The Riverfront Area is defined in 310 CMR 10.58 (2) as the area between a river's annual highwater line and a parallel line measured horizontally. As per 310 CMR 10.58 (2)(3), the riverfront boundary in Boston is located 25 feet from the river edge. The riverfront may overlap other resource areas or their buffer zones; however, the riverfront does not have a buffer zone of its own.

Boston's waterfront is considered densely developed due to a predominance of built features. The entirety of the waterfront has been filled and altered such that all features are considered manmade. Land use in this area consists of DCR Nashua Street Park, the Massachusetts General Hospital (MGH) office building (formerly Spaulding Rehabilitation Hospital) and adjacent boardwalk, the MBTA Commuter Rail tracks, and DCR parkland under the Zakim Bridge. There are 31,650 SF of Riverfront Area located within project limits.

2.3.2 Inland Bank

The definition of Inland Bank in 310 CMR 10.54 (2) is that portion of land surface that normally abuts and confines a water body. In the absence of other indicators (i.e. wetlands, floodplain), it occurs between the water body and an upland. Along the length of the project, there is approximately 1200 feet of riverbank. This consists of 300 feet of stone rip-rap slope at Nashua Street Park, while the remainder of the waterfront is protected by a vertical bulkhead/seawall. The highwater line is readily discernable along the rip-rap and seawall.

2.3.3 Land Under Water (LUW)

Land Under Water (LUW) is defined in 310 CMR 10.56 (2) as the land beneath any creek, river, stream, pond or lake and may be composed of organic muck or peat, fine sediments, rocks or bedrock. LUW exists within the project limits below the Charles River. The boundary of Land Under Water Bodies and Waterways is the mean annual low water level.

2.3.4 Land Subject to Coastal Storm Flowage (LSCSF)

The definition of Land Subject to Coastal Storm Flowage (LSCSF) in 310 CMR 10.04 is the land subject to any inundation caused by coastal storms up to and including that caused by the 100-year storm. The March 16, 2016 FEMA Flood Insurance Rate Maps (FIRM) for the South Bank Bridge project limits are designated as map numbers 25025C0077 and 25025C0081J. The FIRM maps indicate that portions of the proposed project area are located within 100-year flood limits (zone AE – flat water flooding with elevations determined to be 10.0 NAVD88). The FEMA Flood Zones are included in Figure 3.

The project is located immediately downstream of the 1910 Charles River Dam. Most of the land along this half mile of river consists of former tidelands that were filled to accommodate the City's early railroad and industrial uses. The mouth of the Charles River was tidal until the completion of the new Charles River Dam in 1978. The dam currently impounds water for navigation, flood control, and recreation. The dam is required by the U.S. Army Corps of Engineers to maintain the elevation of the New Charles River Basin within a 2-foot range between EL. 106.5 to EL. 108.5 (MDC Base) or EL. 0.08 to EL. 2.08 (NAVD88). The harbor has a normal tidal range of approximately 9.49 ft. between MLW and MHW. As a result of the tidal fluctuations, and during some storm conditions, the dam sometimes acts as a tidal flood control structure, when the Boston Harbor water elevation exceeds the required Charles River Basin water elevation. Refer to Table 2.1 for basin and harbor elevations.

Table 2.1 Charles River Basin Datum

	NGVD29	NAVD88	CA/T	MDC Base	
Charles River					**Boston Harbor**
Top of Bank / Top of Dam	12.35	11.55	112.35	118.00	
100 Yr. Flood	10.80	10.00	110.80	116.45	
	8.00	7.20	108.00	113.65	*HTL*
	7.35	6.55	107.35	113.00	*DHW*
	5.55	4.75	105.55	111.20	*MHHW*
	5.13	4.33	105.13	110.78	*MHW*
Dam Spillway Design Flood Pool	4.85	4.05	104.85	110.50	
	3.50	2.70	103.50	109.15	*OHW*
Dam Normal (Design) Pool	**2.35**	**1.55**	**102.35**	**108.00**	
NAVD88	0.80	0.00	100.80	106.45	
	0.38	-0.42	100.38	106.03	*MTL*
NGVD29	0.00	-0.80	100.00	105.65	*MSL*
	-4.36	-5.16	95.64	101.29	*MLW*
	-4.75	-5.55	95.25	100.90	*MLLW*

The 2011 Inspection/Evaluation Report for the dam states that "the design high tide for the dam is 113.0 ft. MDC base (6.55 ft. NAVD88) according to US Army Corps of Engineers records. At this high tide stage, the effectiveness of the dam's gravity outlets (i.e., sluiceways and locks) will be reduced. Thus, it is assumed that the maximum outlet capacity is restricted to the capacity of the six pumps, which is 8,400 cfs. The pump capacity is about 126 percent of the 500-year flood of 6,690 cfs at the dam. Adequate discharge capacity is predicated on the pumps being and remaining operational during a flood."[1]

The dam has the capacity to pump the volume of water from a 500-year storm event affecting the Charles River out to the harbor. Conversely, flood elevations in this locale appear to be predominantly influenced by the tidal conditions and storm surge within the harbor. The top elevation of the dam is recorded at EL. 11.55 ft., suggesting that 100-year coastal flood events would come perilously close to topping the structure, and likely leaking into low-lying areas via backwater flows into gravity storm drains.

[1] New Charles River Dam Phase 1 Inspection/Evaluation Report, GZA GeoEnvironmental, Inc., June 23, 2011

2.4 100-FOOT BUFFER ZONE TO INLAND BANK

The definition of Buffer Zone is that area of land extending 100-feet horizontally outward from the boundary of any area specified in 310 CMR 10.02(1)(a), which includes bank.

The linear nature of the Project and its adjacency to the Charles River makes nearly the entire project location (approximately 56,686 SF) within the 100-foot buffer to Inland Bank. As more fully detailed in Section 3.0, the work proposed within Inland Bank will include portions of the pedestrian bridge, abutments, and embankments, new and realigned paths, new sitting areas, and landscape plantings.

2.5 SOILS

According to the Natural Resources Conservation Services (NRCS), the soil classification for the project area consists of Urban Land (603), with wet substratum and 0-3 percent slopes. Urban land typically consists of excavated or filled land. Historic shoreline maps and records indicate the project site was filled in its entirety. The NRCS Web Soil Survey data is included in Figure 5.

3.0 PROPOSED CONDITIONS

3.1 PROPOSED DESIGN

The proposed project consists of the construction of a 750-foot-long pedestrian bridge that will provide uninterrupted pedestrian and bicycle access along the south shore of the Charles River from Nashua Street Park to the New Charles River Dam and to the proposed South Bank Park (a required mitigation measure for the Charles River Crossing). The proposed bridge will span over the river on the water side of the Massachusetts General Hospital (MGH) offices (the former Spaulding Rehabilitation Hospital) and over the MBTA North Station Commuter Rail tracks. The project limits are shown in Section 1.0 as well as in the Notice of Intent Figures (Refer to Figure 1). The proposed path will allow for increased public access to open space and waterfront areas for passive recreational purposes. The design includes the following elements:

- A 12’ paved multi-use path
- Accessible bridge and path that meets ADA/AAB requirements
- Pedestrian-level lighting
- Benches and landscaping

The proposed improvements include modifications to the existing drainage systems to maintain stormwater conveyance. The proposed drainage system, consisting of deep sump catch basins, manholes, and drainage pipe, will provide treatment and reduce erosion and sedimentation to resource areas. The project also proposes to install two leaching structures to infiltrate runoff from some of the new impervious area created by the project.

3.1.1 West Approach (Nashua Street Park)

Opened in 2004, this 2-acre park was a mitigation measure for the CA/T project. The park includes accessible walking paths, granite walls, seating, and a nautilus-shaped granite fountain. The park also includes accessible connections and seating for use by MGH staff and the public.

The new bridge connection requires modifications to the eastern end of the park to realign the pathways and construct the bridge abutment. Halverson Design Partnership, the designer of the 2004 park is developing the required modifications.

The work includes grading, landscaping, and lighting improvements to achieve an accessible path that meets the requirements of ADA and AAB. The design details will closely match the existing park.

3.1.2 South Bank Bridge

The following is a brief description of the main bridge components:

3.1.2.1 Tubular Steel Structure

The new pedestrian bridge will closely match the North Bank Bridge on the opposite bank, in its structural design, appearance and, detailing. The main structure includes a sinusoidal tubular steel truss system, that undulates above and below the walking deck. The vertical and horizontal alignment has been carefully crafted to avoid conflicts with surrounding infrastructure, including the MBTA tracks and the Leverett Connector ramps.

3.1.2.2 Concrete Deck

The walking/riding surface of the deck will be precast concrete panels. The deck will be pitched to one side to move stormwater off the bridge, where it will be collected at deep sump catchbasins. The entire walking/riding surface of the bridge will be ADA/AAB compliant.

3.1.2.3 Concrete Abutments

The bridge will terminate at both ends on raised concrete abutments. These abutments provide the transition from the structure to the parks.

3.1.2.4 Bridge Piers

A total of 6 concrete piers are required to support the structure. These piers will be constructed in the Charles River. Each pier is supported by a concrete footing which will be built at the water line. The footings will be either 12'x12' or 15'x15' and will be 5' thick. The footings will be supported by an array of nine or sixteen 12-inch diameter piles. Each pile will be driven into the river bottom to bearing depth. As the footing will be partially exposed above the water line, water will be able to flow under the footing and around the piles.

3.1.3 East Approach

This half-acre site was designated during the Charles River Crossing design to accommodate the future pedestrian bridge landing. The work includes grading, landscaping, and lighting improvements to achieve an accessible path that meets the requirements of ADA and AAB.

3.1.4 Stormwater Management

The proposed stormwater management system will collect, treat, and discharge runoff in accordance with the standards contained in the Massachusetts Stormwater Management Policy. Details of the proposed

stormwater management system (including supporting calculations) are included in the Stormwater Management Report in Appendix B.

The existing parkland spaces contain formal stormwater management systems. The project design connects to these systems as follows:

3.1.4.1 West Approach

This section of the path will pitch to the northern side of the path and runoff will be collected along a granite curb leading to catch basins and a subsurface drainage system. An existing outlet pipe will discharge any overflow towards the Charles River via an existing pipe.

3.1.4.2 Pedestrian Bridge

The pedestrian bridge will have both a cross slope and a running slope. Any stormwater that collects on the bridge will be directed towards either end of the bridge, where it will be collected at catchbasins in the parks.

3.1.4.3 East Approach

This section of the path will pitch to the northern side of the path, and runoff will be collected along a granite curb leading to catch basins and a subsurface drainage system. An existing outlet pipe will discharge any overflow towards the Charles River via an existing pipe.

3.2 CONSTRUCTION ACCESS

Construction access to the project site is limited by adjacent buildings and overhead structures, active rail lines, vertical seawalls, and the presence of resource areas. Four construction access points have been identified, as shown in Table 3.1. It is anticipated that the Contractor will require the use of each of these access points to complete the work.

Table 3.1 Proposed Construction Access Points

Access Point	Access Description	Work Zone
AP#1	Nashua Street	West Approach Site
AP#2	Beverly Street	East Approach Site
AP#3	MGH Parking Lot	MBTA Tracks-Main Bridge Span
AP#4	Boston Harbor	Charles River

3.3 CONSTRUCTION STAGING AREAS

Due to the space constraints at the site, the opportunities for locating staging and material storage within the project area are limited. All staging areas will be located in upland areas or on barges and will be

enclosed with erosion and sediment controls where needed to define limits and minimize movement of soils. All areas disturbed for construction staging will be restored upon project completion. Anticipated staging areas are included in table 3.2.

Table 3.2 Anticipated Staging Areas		
Staging Area	**Staging Area**	**Work Description**
SA#1	West Approach Site	Park Construction
SA#2	East Approach Site	Park Construction
SA#3	MGH Parking Lot	Bridge lay down and assemblage
SA#4	Paul Revere Park/Floating Barge	Pier and bridge erection

3.4 CONSTRUCTION SEQUENCE AND METHODS

While means and methods will ultimately be determined by the selected Contractor, a review of potential construction scenarios suggests the following approach:

SITE PREPARATION

- Begin bridge fabrication offsite.
- Install tree protection fencing and erosion control measures at park areas.
- Remove designated light poles, benches, granite curbing, etc.
- Remove designated trees and stumps, stockpile topsoil at designated park locations.

PRELIMINARY SITE CONSTRUCTION

- Begin excavation for bridge abutments at East and West Approaches.
- Begin installation of piers foundations in river.
- Construct bridge abutments, begin drainage improvements.
- Construct walls at East Approach.
- Construct embankments and place fill at East and West Approaches.
- Complete drainage improvements at East and West Approaches.
- Provide new electrical service and lighting.

BRIDGE CONSTRUCTION

- Complete bridge pier construction.
- Establish sub-grade along path corridor.
- Install bridge trusses.
- Install bridge deck panels.

FINAL SITE CONSTRUCTION

- Finish bridge railings and lighting.

- Construct stairway at Nashua Street.
- Install granite seatwalls and curbing.
- Install sub-base and establish final grades along pathways.
- Install base course asphalt.
- Add topsoil, grade shoulders.
- Install fencing and add landscape plantings.
- Install top course asphalt.
- Add pavement markings and signage.
- Provide final grading and seeding.
- Remove erosion and sediment control devices after site is stabilized.

3.5 EMPLOYMENT OF BEST MANAGEMENT PRACTICES

3.5.1 Avoidance and Minimization

The project has been designed to avoid and minimize impacts to the Riverfront Area to the greatest extent practicable. Considerations include:

- Minimize removal of existing trees and provide protection to mature trees located in close proximity to project elements.
- Avoid locating additional structures or fill in the Riverfront Area where possible.
- Locate all features as far from the edge of the river as feasible
- Minimize parkland disturbance.

3.5.2 Construction Phase Mitigation

3.5.2.1 Sediment and Erosion Control Measures

As the project will alter more than one acre of land, a National Pollutant Discharge Elimination System (NPDES) l construction general permit for storm water discharges and construction dewatering activities is required. A Stormwater Pollution Prevention Plan (SWPPP) will be prepared and the project contractor will be responsible for the maintenance and repair of all erosion control devices onsite. All erosion control devices will be regularly inspected. At no time will sediment-laden water be allowed to enter sensitive areas, including the river and drainage systems. Any runoff from disturbed surfaces will be directed through a sedimentation process prior to being discharged to existing jurisdictional areas.

The contractor is responsible for erosion control on the site and will utilize erosion control measures where needed, regardless of whether the measures are specified on the construction plans or in supplemental plans prepared for the SWPPP. In addition, the Contractor will employ an environmental monitor to ensure that proper procedures are being followed relative to resource protection and sedimentation and erosion controls.

To protect Resource Areas during construction, a combination of silt sacks at catchbasins and compost filter tube barriers are proposed to protect resource areas during construction. The barriers also function as visual and physical delineators of the work boundary. The erosion control will be maintained in working order until on-site soils are stabilized. Any accumulated sediment in the silt sacks or against the filter tubes will be removed and all disturbed areas will be stabilized prior to removing the erosion control barrier.

Typical details are provided in the project drawings. In addition:

- The Contractor will be required to maintain a reserve supply of erosion and sedimentation controls on-site to make repairs, as necessary.
- Protective measures will be inspected after significant precipitation events and repaired, as necessary.

E&S barriers will be maintained in good condition until on-site soils are stabilized and the Boston Conservation Commission approves their removal.

3.5.2.2 Seeding & Mulch

Disturbed areas will be seeded with an appropriate seed mix and mulched with straw. The seed and mulch will be applied concurrently, and a final inspection of the project corridor after completion of the work will be completed to identify any and all exposed soils that remain. The erosion control barriers will remain in place until all soils are stabilized.

3.6 PROJECT PLAN LIST

The following design plans are included as part of the NOI submission:

Sheet	Title	Dated
1	Title Sheet	02/02/2018
2	Site Plan	02/02/2018
3	Existing Conditions	02/02/2018
4	Wetland Resource Area Impacts (1 of 2)	02/02/2018
5	Wetland Resource Area Impacts (2 of 2)	02/02/2018

4.0 REGULATORY COMPLIANCE

Portions of the project are located within the Riverfront Area (RA), 100-foot Inland Bank buffer zone, Land Under Water (LUW) and Land Subject to Coastal Storm Flowage (LSCSF). Temporary and permanent impacts related to grading, drainage improvements, and stormwater management will occur within RA, LUW, and LSCSF. As the bridge structure will pass overhead, no impacts to bank are anticipated.

4.1 MASSACHUSETTS WETLANDS PROTECTION ACT (MAWPA)

4.1.1 Limited Project Provision Applicability

This project meets several criteria of the Limited Project provisions of the Massachusetts Wetland Protections Act (“MWPA”) listed in 310 CMR 10.00. Limited Projects are required to meet the applicable performance standards of the MWPA only to the extent practicable, provided that there are no adverse effects on the habitat of rare species. The following Limited Project provisions are applicable to this project:

- 310 CMR 10.53(3)(j): "The construction and maintenance of catwalks, footbridges, wharves, docks, piers, boathouses, boat shelters, duck blinds, skeet and trap shooting decks and observation decks; provided, however, that such structures are constructed on pilings or posts so as to permit the reasonably unobstructed flowage of water and adequate light to maintain vegetation."

- 310 CMR 10.53(3)(l): "The construction, reconstruction, operation or maintenance of water dependent uses; provided, however that:

  1. any portion of such work which alters a bordering vegetated wetland shall remain subject to the provisions of 310 CMR 10.55,
  2. such work in any other resource area(s) found to be significant to flood control or prevention of storm damage shall meet the performance standards for that interest(s), and
  3. adverse impacts from such work in any other resource area(s) shall be minimized regarding the other statutory interests for which that resource area(s) is found to be significant."

- 310 CMR 10.53(6) Limited Project: "Notwithstanding the provisions of 310 CMR 10.58, the issuing authority may issue an Order of Conditions for the construction, rehabilitation, and maintenance of footpaths, bikepaths, and other pedestrian or non-motorized vehicle access to or along riverfront areas but outside other resource areas, provided that adverse impacts from the work are minimized and that the design specifications are commensurate with the projected use and are compatible with the character of the riverfront area. Generally, the width of the access shall not exceed ten feet of pavement, except within an area that is already altered (e.g., railroad beds within rights of way). Access shall not be located in vernal pools or fenced in a manner which would impede the movement of wildlife."

4.1.2 Alternatives Analysis

4.1.2.1 No Action

The no-action alternative does not meet the Charles River Crossing mitigation requirements. It would leave the current path system incomplete, and would not address the need for accessible public connections or park improvements in the existing and designated parkland. Therefore, the no action alternative is not considered a viable option and design options have been reviewed and are discussed below.

4.1.2.2 Alignment Options

As the mitigation requirement of the project is the provision of waterfront access and connectivity between existing parkland, this project is largely a point-to-point connection along the river's edge. The alignment is constrained by the adjacent infrastructure, development, and abutting land ownership.

While widely varied options are not present, a number of smaller design variations were studied and reviewed. The preferred alignment was selected and achieves the required bridge clearances and slopes, but also minimizes impacts to environmental resources.

4.1.3 Summary of MAWPA Jurisdictional Alterations

The project has been designed to avoid wetland Resource Area impacts to the maximum extent practicable, and to mitigate unavoidable resource area impacts in accordance with the General Performance Standards for each Resource Area. Proposed impacts to Resource Areas are summarized below, in Table 4.1.

		Wetland Resource Area Impacts							
ROW STA #	River Name	Bank (lf)	LSCSF (sf)	LSCSF (cf)	LUW		Previously Developed/Degraded Riverfront Area (sf)		Comments
					Perm. (sf)	Temp. (sf)	Perm. (sf)	Temp. (sf)	
Sta. 0+00 to Sta. 3+50	Charles River	0	2,425	2376	0	0	1191	2795	Permanent and temporary impacts to Riverfront Area and LSCSF required to construct bridge approaches (shared use path, bridge abutments, and earthen embankments). All bridge approach areas will be restored/enhanced to parkland.
Sta. 3+50 to Sta. 10+50	Charles River	0	0	0	54	40	0	0	Permanent impacts to LUW resulting from construction of 6 bridge columns on 1' diameter pile supports. Temporary impacts from Barge Spud Piles
Sta. 10+50 to Sta. 13+00	Charles River	0	18,602	8023	0	0	2006	4534	Permanent and temporary impacts to Riverfront Area required to construct bridge approaches (shared use path, bridge abutments, and earthen embankments). All bridge approach areas will be restored/enhanced to parkland.
North side of Charles River	Charles River	0	0	0	0	0	0	6043	Temporary impacts to Riverfront Area and LSCSF required due to potential laydown area. Once contract is complete, laydown area will be restored to parkland.
TOTAL		0	21,027	10,399	54	40	3,197	13,372	

Notes:
1. The total Riverfront Area within the project limits is 31,650 SF.
2. All impacts to Riverfront Area occur within Previously Developed/Degraded Riverfront Area.
3. In total, the project will result in 16,569 SF of impact to Previously Developed Riverfront Area, including potential laydown area, of which 3,197 SF is permanent.
4. The project will result in 38,951 SF of temporary impact to Land Subject to Costal Storm Flowage, including potential laydown area on the north bank.

Table 4.1: Summary of Impacts to MAWPA Resource Areas

Work within wetland resource areas is generally related to work within the Riverfront Area (RA), work within Land Under Water (LUW), and work within Land Subject to Coastal Storm Flowage (LSCSF).

4.1.3.1 25-ft. Riverfront Area (RA)

As shown in Table 4.1, approximately 16,569 SF (0.38 Acres) of RA will be altered by this project with approximately 3,197 SF (0.07 Acres) estimated as permanent impact and 13,372 SF (0.31 Acres) of temporary impact. The permanent impacts consist of modifications within the parkland to accommodate the new bridge landings, such as embankments and bridge abutments, as well as regrading and planting behind the existing seawall path on the East Approach. The temporary work includes repaving of existing paths and the potential laydown area on the north bank of the Charles River.

All work proposed within RA is located within Previously Developed/Degraded areas as no RA is considered undisturbed or pristine. All temporary RA impacts will be restored in place with parkland improvements similar to or better than what exists today.

4.1.3.2 Inland Bank

The pedestrian bridge spans across areas of inland bank (seawall), but is vertically elevated. As such, this project does not impact any of the inland bank located adjacent to the project.

4.1.3.3 Land Under Water (LUW)

The project as proposed results in 54 SF of unavoidable permanent alteration to LUW to accommodate work associated with the placement of six (6) pile supported bridge piers. Each bridge pier will be supported by an array of nine or sixteen 12-inch diameter piles.

The use of barges is required to accomplish work within the river, including pile driving, pier construction, and main bridge truss erection. To hold the barges in position, the use of spud piles (a movable vertical pipe or H-section placed through a strong frame on a floating pile driver or dredge) is driven down into the river bottom. Based on the use of two 1-foot diameter spud piles per barge and approximately 20 setup occurrences, the temporary impacts from spud piles is estimated to be approximately 40 SF.

4.1.3.4 Land Subject to Coastal Storm Flowage (LSCSF)

The project limits are located within two areas of LSCSF, identified as Zone AE, based on the FEMA Firm Maps discussed in the previous section. Work within these areas generally consists of bridge abutment placement, embankment grading, path and curbing installation, guardrail, drainage structures, landscaping and park features. The total project area within LSCSF includes 18,602 SF at the East Approach and 2,425 SF at the West Approach. Temporary impacts due to path repaving, replanting and installing sod in the Nashua Street Park amount to approximately 19,360 SF, and the potential laydown area also contributes to temporary impacts of 19,591 SF.

The improvements proposed at both areas of LSCSF result in minor changes in elevation due to a resulting net fill in each area as shown in Table 4.1.

Table 4.1 LSCSF Impacts

Location	Elevation (FT)	Fill (SF)	Cut (SF)	Net Change (SF)
West Approach	9-10	-3168	499	-2669
West Approach	8-9	0	293	293
East Approach	9-10	-4840	0	-4840
East Approach	8-9	-1153	62	-1091
East Approach	7-8	-919	0	-919
East Approach	6-7	-1083	0	-1083
East Approach	5-6	-90	0	-90

4.1.3.5 Work in Buffer Zones

Due to the nature of this linear path project and its adjacency to the Charles River, portions of the project area are located within buffer zone to Bank. All of the buffer zone work is in previously disturbed area associated with existing development. Buffer zone will be left unaltered to the maximum extent practicable, and quickly restored to prevent erosion sedimentation. The total area of Bank buffer within the project limits is 56,686 SF, all of which consists of reconstruction and work within previously disturbed buffer zone.

4.1.4 Compliance with General Performance Standards

The following subsections outline the applicable general performance standards for each resource area (in italics), followed by a discussion of how they will be complied with (in gray text).

4.1.4.1 Riverfront Area (RA, 310 CMR 10.58)

The Performance Standards for Redevelopment within Previously Developed Riverfront Area (RA) are set forth at 10.58(5).

(a) Improvement Over Existing Conditions. The proposed design will modify and improve existing park space, including vegetated areas that include planting of native species. Permanent impacts (e.g., paving) will modify and/or replace existing pavements.

(b) Compliance with Stormwater Management Standards. The project proposes to meet the applicable stormwater management standards to address increased impervious areas resulting from the proposed

bridge deck and pathways. Refer to the Stormwater Report for further details on the project's compliance with the standards outlined in the Massachusetts Stormwater Handbook.

(c) Within 25-foot Riverfront Areas, proposed work shall not be located closer to the river than existing conditions. Due to the location and width of the project property, all of the proposed project is within historically filled tidelands which have been recently redeveloped as parkland. With the exception of the elevated sections of bridge that span over the river, all abutment and grading work is not any closer to the river than existing pathways.

(d) Proposed work, including expansion of existing structures, shall be located outside the Riverfront Area or toward the Riverfront Area boundary and away from the river. Due to the nature of the project (waterfront park and public access) as well as the location of the project property, there is no practicable alternative that would allow for the necessary work to occur outside of Riverfront Area or further away from the river than currently proposed. As noted in paragraph 4.1.1, portions of this work qualify as a limited project.

(e) The area of proposed work shall not exceed the amount of degraded area. All of the land within the project limits is historically filled and developed as parkland. Roughly 270 linear feet of the path is located in the Riverfront Area, and crosses the RA boundary at two locations, whose sum total is approximately 3780 sf (0.087 acres).

The project proper will alter 10,464 SF (0.24 Acres) of land within Riverfront Area. This includes 3,197 SF of permanent alteration (pavement), and 7,217 SF of temporary alteration (areas to be restored back to existing parkland with path and/or landscaped areas).

As all of the permanent impacts of the project will occur within existing degraded areas (i.e., paved, gravel, or otherwise developed), no new degraded riverfront area will result from this project. As such, this standard is satisfied.

10.58(5)(f) Restoration of Degraded Riverfront Area: As noted above, the project proposes approximately 10,464 sf (0.24 acres) of restoration within the Riverfront Area through the improvement of parkland and vegetated areas that include planting of native species. Therefore, this standard is satisfied.

10.58(5)(g) Mitigation within the Riverfront Area. Additional mitigation for unavoidable impacts within the riverfront area is not proposed as the project is able to meet all of the applicable Performance Standards.

4.1.4.2 Land Under Water (LUW, 310 CMR 10.56)

The Performance Standards for work within Land Under Water Bodies or Waterways are set forth at 10.56(4).

10.56(4)(a)(1) The Water carrying capacity within the defined channel, which is provided by said land in conjunction with the banks. The New Charles River basin is an artificial impoundment that does not reflect the true river channel. The navigation channel likely has the lowest river elevations and would therefor pass much of the flow.

The bridge piers will be located on foundations supported on drilled micro-piles. It should be noted the bottom of the foundation will be approximately 13 to 17 feet above the river bottom. Water will be able to flow around the micro-piles.

The project will not impact the water carrying capacity of the defined channel.

10.56(4)(a)(2) Ground and surface water quality. There is no evidence that the piles will have any permanent impact to ground or surface water quality.

10.56(4)(a)(3) The capacity of said land to provide breeding habitat, escape cover and food for fisheries. The project will not impact the capacity of land under water to provide breeding habitat, escape cover, or food for fisheries. The project will construct footings at the water surface, which will sit on micro-piles that extend to depths under the riverbed. This configuration allows approximately 13.5 to 17.5 feet of water below the footing. The footings will provide escape cover not currently found in the river. The surface area penetrated by the drilled micro-piles is minimal compared to the width of the Charles River and land available within the New Basin.

10.56(4)(a)(4) The capacity of said land to provide important wildlife habitat functions. The project will not impact the capacity of land to provide important wildlife habitat functions. The surface area penetrated by the drilled micro-piles is minimal compared to the width of the Charles River and land available within the New Basin.

4.1.4.3 Land Subject to Coastal Storm Flowage (LSCSF, 310 CMR 10.04)

There are no published performance standards for Land Subject to Coastal Storm Flowage.

Although there are minor amounts of filling within the delineated 100-year flood zone (between EL. 6.0 and 10.0), this is not a significant issue at this location. Mitigating for the minor amounts of fill is both unfeasible and unnecessary, as the dam controls flooding within the basin, and there is no gain to mitigating against the ocean's unlimited capacity.

As discussed in Paragraph 2.3.4, the Charles River is not prone to river flooding at this location, as the river elevation is controlled by the operations of the New Charles River Dam. The pumping capacity of the dam reportedly has the operational capacity to maintain the design water elevation (EL. 1.55 NAVD, Dam Normal Pool) of the New Basin within a foot +/-, even during a 500-year storm event.

The threat of flooding comes from coastal storms (e.g., hurricanes) that bring wind-driven high tides and wave action. The threat of wave and water damage is tempered significantly by the New Charles River Dam, which acts as a tidal control structure. However, extreme high tides within the harbor have the potential to top the dam or seep into low lying areas via storm drains.

All stormwater connections within the project limits have been reviewed and none of them provide backwater connections to low-lying areas.

4.1.5 Stormwater Management

The project is a redevelopment project that will result in an increase in impervious surface. Per the Massachusetts Stormwater Handbook in Volume 1, Chapter 1, page 3: "The Stormwater Management Standards shall apply to the maximum extent practicable to […] footpaths, bikepaths and other paths for pedestrian and/or non-motorized vehicle access…" As such, the construction of the South Bank Bridge and connecting paths is subject to meet Standards 2, 3, 4, 5 and 6 only to the maximum extent practicable.

Consult Appendix B for the Stormwater Management Checklist and Report.

4.1.6 Abutter Notification

Abutters within 100 feet of the project corridor were notified in accordance with the Massachusetts Wetlands Protection Act. A copy of the list of abutters, assessor's maps, and the abutter notification form are provided in Appendix C.

4.1.7 Charles River Total Maximum Daily Load (TMDL)

The U.S. EPA and MassDEP have established a "Total Maximum Daily Load" (TMDL) for the discharge of phosphorus into the New Charles River Basin. A TMDL determines how much of a pollutant that a water body can receive before harmful effects occur.

Acceptable techniques to reduce phosphorus in stormwater include the following:

- Construction of Infiltration Chambers

The project will be constructing infiltration structures to infiltrate impervious runoff from the bridge at the East Approach. These structures will allow the first flush of runoff to be infiltrated instead of discharged to the Charles River.

4.2 OTHER PERTINENT REGULATORY PROGRAMS

4.2.1 Massachusetts Public Waterfront Regulations 310 CMR 9.00

This half mile of the Charles River was once tidal, and all of the land within the project limits is comprised of "Filled Tidelands". This triggers the need for review under Chapter 91 Waterways regulations (310 CMR 9.00). In addition, discrete activities below the mean annual high-water mark of the river include: 1) bridge pier foundation construction, and 2) temporary spud pile use related to barge work. This project constitutes a water-dependent use per 310 CMR 9.12(2)(a)(4), and, as such, also represents a "Proper Public Purpose" as defined at 310 CMR 9.31. An application for a Chapter 91 Waterways License has been concurrently submitted to MassDEP.

4.2.2 U.S. Army Corps of Engineers: Pre-Construction Notification (PCN)

This project is subject to Section 10 of the Rivers and Harbors Act of 1899, and Section 404 of the Clean Water Act. The U.S. Army Corps of Engineers (USACE) has jurisdiction under the Massachusetts General Permit for GP No. 10, Linear Transportation Projects including Stream Crossings, in accordance with USACE Regulations 33 CFR 320-332. The Charles River is considered by the USACE to be navigable all the way to the Watertown Dam. As such, the project involves activities that do not qualify for Self-Verification (SV), which requires the applicant to submit a PCN and obtain written verification before starting work in USACE jurisdiction.

The USACE will coordinate review of all activities requiring PCN with Federal and State agencies and Federally recognized tribes, as appropriate. To be eligible and subsequently authorized, an activity must result in no more than minimal individual and cumulative effects on the aquatic environment as determined by the Corps in accordance with the criteria listed within these General Permits. This may require project modifications involving avoidance, minimization, or compensatory mitigation for unavoidable impacts to ensure that the net adverse effects of a project are no more than minimal.

4.2.3 NPDES Construction General Permit

The project will require coverage under the National Pollution Discharge Elimination System (NPDES) Construction General Permit (CGP), as it will involve the disturbance of greater than one acre of land. To gain coverage under the CGP, a stormwater pollution prevention plan (SWPPP) will be developed for the project and an electronic notice of intent (e-NOI) will be submitted to the US Environmental Protection Agency. The Contractor will be responsible to secure this permit prior to disturbing any earth on the site.

5.0 SUMMARY

The proposed South Bank Bridge project provides partial fulfillment of the environmental commitments made as part of the CA/T project, and provides improved connectivity and access to the New Charles River Basin. This project will result in park and pedestrian improvements while also maintaining the natural resources along this stretch of the river.

The project has been designed to meet all local and state standards to the maximum extent possible and has minimized resource area impacts to the greatest extent practical and feasible. The applicant respectfully requests that the Boston Conservation Commission find these measures adequately protective of the interests identified within the WPA and issue an Order of Conditions approving the work described in this NOI and shown on the accompanying plans.

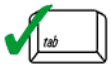
Appendix B
Stormwater Management Checklist and Report

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature

02.02.18

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☐ New development

☐ Redevelopment

☒ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- ☐ No disturbance to any Wetland Resource Areas
- ☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☐ Reduced Impervious Area (Redevelopment Only)
- ☒ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
  - ☐ Credit 1
  - ☐ Credit 2
  - ☐ Credit 3
- ☐ Use of “country drainage” versus curb and gutter conveyance and pipe
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☐ Other (describe): _____

Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges
- ☐ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☐ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☐ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☐ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☒ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☒ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☐ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☐ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☐ The BMP is sized (and calculations provided) based on:

- ☐ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☒ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☒ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☒ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☒ Bike Path and/or Foot Path
- ☒ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☒ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☒ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☐ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☐ Description and delineation of public safety features;
- ☐ Estimated operation and maintenance budget; and
- ☐ Operation and Maintenance Log Form.

☒ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☒ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☐ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☐ An Illicit Discharge Compliance Statement is attached;

☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

DEPARTMENT OF CONSERVATION AND RECREATION
CITY OF BOSTON
SOUTH BANK BRIDGE PROJECT

PROPOSED DRAINAGE AND STORMWATER MANAGEMENT PLAN

PREPARED BY:
GREENMAN-PEDERSEN, INC.
181 BALLARDVALE STREET, SUITE 202
WILMINGTON, MA 01887

February 2018

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SECTION I

INTRODUCTION

A. Project Purpose

The South Bank Bridge Project is a required mitigation measure for the Charles River Crossing (CRC) of the Central Artery/Tunnel Project (CA/T). The proposed multi-use pedestrian bridge and park project will close one of the last gaps in the parks and pedestrian links of the New Charles River Basin.

In the federal and state approvals of the permit applications for the Charles River Crossing (CRC) of the CA/T Project, federal and state agencies required mitigation that included the creation of public open space on lands disturbed for construction, laydown, and storage related to the Leonard P. Zakim Bunker Hill Bridge (Zakim Bridge) and the Leverett Connector Bridge and viaducts. The South Bank Bridge project implements a long-planned mitigation measure that provides pedestrian connections and open space improvements.

The Master Plan for the New Charles River Basin calls for the creation of pedestrian promenades, sitting areas, and landscape areas as an extension of the Charles River Esplanade. The South Bank Bridge is one of several remaining projects of the New Charles River Basin Master Plan. Adjacent projects completed as part of the CA/T mitigation include North Point Park, Paul Revere Park, the North Bank Bridge, and Nashua Street Park. When finished, this multi-use pedestrian bridge will complete the "lost half-mile" of the Charles, that stretch of the river between the Museum of Science and the Charlestown Bridge, historically inaccessible to the public for generations due to heavy industrial use.

B. Project Description

The Department of Conservation and Recreation proposes to construct a multi-use pedestrian bridge with a 12-foot-wide path, to reconfigure travel paths and parkland at the West Approach of the bridge and to create parkland and seating areas at the East Approach. The work will begin in Nashua Street Park, and include reconfiguring walking paths, constructing an overlook, stairs and an access ramp. The bridge will extend from Nashua Street Park out over the river, cross the MBTA Commuter Railroad trestle and touch down on the open area between North Station and the Zakim Bridge. A landscaped area with plantings and seating will be constructed in this area, and the path will connect to the previously constructed plaza under the Zakim Bridge. The bridge and path connections will accommodate both pedestrians and cyclists, and will comply fully with the Americans with Disabilities Act (ADA).

The existing drainage patterns will not be altered with the construction of the bridge and parkland. All new drainage will conform to MassDOT and DCR criteria.

C. Stormwater Management

Stormwater from the South Bank Bridge project in areas subject to regulation under M.G.L.c.131, sec.40 will runoff to adjacent waterways. This runoff must meet the Stormwater Management Standards established in the Massachusetts Wetland Regulations, 310 CMR 10.00 to the *maximum extent practicable* since the project is a footpath, bikepath and path for pedestrian and/or non-motorized vehicle access. This Stormwater Report and supplemental plans and details demonstrate compliance with some or all the Stormwater Management Standards to the maximum extent practicable and that:

1) The project proponent has made all reasonable efforts to meet each of the Standards;
2) The project proponent has made a complete evaluation of possible stormwater management measures; and
3) If full compliance with the Standards cannot be achieved, the project proponent is implementing the highest practicable level of stormwater management.

The Stormwater Management Standards defined and specified in the Massachusetts Stormwater Handbook require best management practices to minimize pollutants from reaching receiving wetland resources. Siltation and erosion controls will be installed prior to commencement of work and will be maintained during construction to protect the resources. At the west approach, part of the runoff is directed as sheet flow over lawn areas to the Charles River. Where paths intersect, the runoff is collected in new catch basins, which will be directed to the parks existing closed drainage system to discharge at the Charles River. Due to the presence of contaminated soils, no further treatment is proposed. At the east approach, runoff on the primary pedestrian path is collected in catch basins and directed to leaching structures to be infiltrated. Runoff from the remainder of the new parkland is directed as sheet flow over lawn and planted areas to the Charles River, similar to current conditions.

SECTION II

STORMWATER MANAGEMENT REPORT

Standard #1: Untreated Discharges

No new Stormwater conveyances (e.g. outfalls) may discharge untreated Stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

The existing flow patterns are being maintained. All existing drainage is being retained and adjusted as necessary to accommodate the new path networks. No new stormwater point source discharges are being created.

Unlike urban runoff conditions associated with roadways or surfaces traversed by automobiles, the runoff from the pedestrian bridge and path networks should not be a source of heavy metal deposits, oils and grease, sand or de-icing chemicals. As motorized vehicle traffic (other than emergency vehicles) on the bridge and path network will be restricted, untreated stormwater is much less of a concern.

Standard #2: Peak Rate and Flood Prevention

> *Stormwater management systems shall be designed so that the post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.*

A TR-20 analysis was performed using HydroCAD and the pre-development and post-development peak discharge rates are shown below. See the Appendix for the full HydroCad output. Due to the offline nature of the leaching structures, they are not included in the HydroCAD analysis. If included, runoff for the smaller storm events would have been reduced; however, due to their small size, the leaching structures would have limited impacts on larger storm events. As this project will construct footpaths, bikepaths and paths for pedestrian and/or non-motorized vehicle access, the project must meet the stormwater standards to the maximum extent practicable. Coupled with the use of leaching structures, any increase in runoff is expected to be negligible in comparison with the existing flow from the entire watershed area.

Analysis Point #1 (West Approach)		
Storm	Pre-Development	Post-Development
2-Year	2.94	3.81
25-Year	7.29	8.62
100-Year	11.24	12.91

Analysis Point #2 (East Approach)		
Storm	Pre-Development	Post-Development
2-Year	0.78	0.89
25-Year	2.05	2.25
100-Year	3.21	3.50

Totals (CFS)		
Storm	Pre-Development	Post-Development
2-Year	3.72	4.70
10-Year	9.34	10.87
100-Year	14.45	16.41

Standard #3: Recharge to Groundwater

> *Loss of annual recharge to groundwater shall be eliminated or minimized through the use of management practices, and good operation and maintenance. At a minimum, the annual recharge from the post- development site shall approximate the annual recharge from predevelopment conditions based on soil type. This Standard is met when the Stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.*

The project will result in an increase of 11,111 SF of impervious surface, with the increase due to additional paths at the West and East Approaches. The leaching structures proposed at the East Approach will infiltrate flows from roughly 6,540 SF of impervious surfaces. Due to the contaminated soils at the West Approach and the limited additional impervious area that can be captured at the East Approach, no further recharge to groundwater is possible.

According to the Natural Resources Conservation Service Web Soil Survey, the entire site is composed of soils classified as "Urban Land" and is not rated. No test pits were performed at the East Approach to verify soil types. This report assumes the leaching structures proposed at the East Approach will be in Hydrologic Souls Group Type C.

> Per the Stormwater Handbook, the target depth factor for Type B soils is 0.25". This would give a project wide Required Recharge Volume of 231.5 CF.
>
> The 3 leaching structures and surrounding crushed stone will provide a total of 348 CF of storage. See leaching structure recharge system sizing calculations in the appendix.

As this project is considered a redevelopment project, this standard must be met to the maximum extent practicable. As the available storage volume exceeds the Required Recharge Volume, this standard has been satisfied.

Standard #4: TSS Removal

Stormwater management systems shall be designed to remove 80% of the average annual postconstruction load of Total Suspended Solids (TSS). This Standard is met when:

A. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;

B. Structural Stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and

C. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

All new catch basins on this project will have deep (4' minimum) sumps. In addition, 6,540 SF of impervious surface will be directed to leaching structures, which will provide a total of 80% TSS removal for that runoff. As this project is considered a redevelopment project, this standard must be met to the maximum extent practicable.

Standard #5: Higher Potential Pollutant Loads (HPPL)

For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of Stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and Stormwater runoff, the proponent shall use the specific structural Stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.

A footpath, bikepath or path for pedestrian and/or non-motorized vehicle access are not considered land uses with higher potential pollutant loads. Construction of the bridge and pedestrian paths does not qualify as an area with higher potential pollutant loads.

Therefore, this standard is not applicable.

Standard #6: Critical Areas

Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and Stormwater discharges near or to any other critical area,

require the use of the specific source control and pollution prevention measures and the specific structural Stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.

The discharges that will convey the runoff from the project site to the Charles River will still discharge to the same watershed areas. There are no discharges to a Zone II, Interim Wellhead Protection Area, Outstanding Resource Waters (ORWs,) Coldwater Fisheries, Areas of Critical Environmental Concern (ACECs), NHESP-designated endangered species habitats or certified vernal pools within the project extent.

Therefore, this standard is not applicable.

Standard #7: Redevelopment of a Previously Developed Site

A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing Stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

To improve existing conditions, the project proposes to expand the existing drainage systems by adding new deep sump (4 feet) catch basins and leaching structures where possible.

Standard #8: Erosion, Sediment Control

A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

The erosion and sediment control measures have been included on the construction plans and in the Operation and Maintenance Plan. These measures include compost filter tubes and silt sacks (catch basin inserts).

In addition, since the project will disturb more than one acre of land, a Notice of Intent will be submitted to the Environmental protection Agency for coverage under the national Pollution Discharge Elimination System (NPDES) Construction General Permit. As part of this application the Applicant is required to prepare a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP will be prepared by the Contractor and will include erosion and sediment controls, temporary stormwater management measures, Contractor inspection schedules, materials management, waste disposal, spill prevention and response, sanitation, and non-stormwater discharges.

Standard #9: Operation and Maintenance

A long-term operation and maintenance plan shall be developed and implemented to ensure that Stormwater management systems function as designed.

Operation and Maintenance plans for project specific BMPs have been included in the Appendix.

Standard #10: Illicit Discharges

All illicit discharges to the Stormwater management system are prohibited.

All drainage inlets within the project area have been recently constructed as part of follow-on Central Artery contracts and there are no illicit connections to the systems within the project area.

N

CHARLES RIVER

CF 114'
0.024 FT/FT
12" RCP

CF 14'
0.024 FT/FT
36" RCP

SCF 11'
0.024 FT/FT
PAVE

SF 35'
0.013 FT/FT
SHORT GRASS

CF 60'
0.011 FT/FT
12" RCP

SCF 43'
0.002 FT/FT
PAVE

1

2

DMH
RIM=8.98'

NASHUA STREET

125 NASHUA STREET

MBTA NORTH STATION

ZAKIM BRIDGE
(ABOVE)

CHARLES RIVER

SF 25'
0.033 FT/FT
SHORT GRASS

SCF 50'
0.033 FT/FT
SHORT GRASS

SF 7'
0.027 FT/FT
PAVE

HEAD HOUSE

LEVERETT CIRCLE
CONNECTOR (ABOVE)

VENT BUILDING

0 40 100 160

SCALE: 1" = 40'

NO.	DATE	ISSUE / REVISION	MADE BY

DESIGNED BY:	W. MURPHY
DRAWN BY:	R. LEMIRE
CHECKED BY:	W. MURPHY
SCALE:	1"=40'-0"
JOB NO.:	MAX-2012032.00
SUBMITTAL DATE:	12/18/2017

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181 BALLARDVALE STREET, SUITE 202
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Engineering | Design | Planning | Construction Management

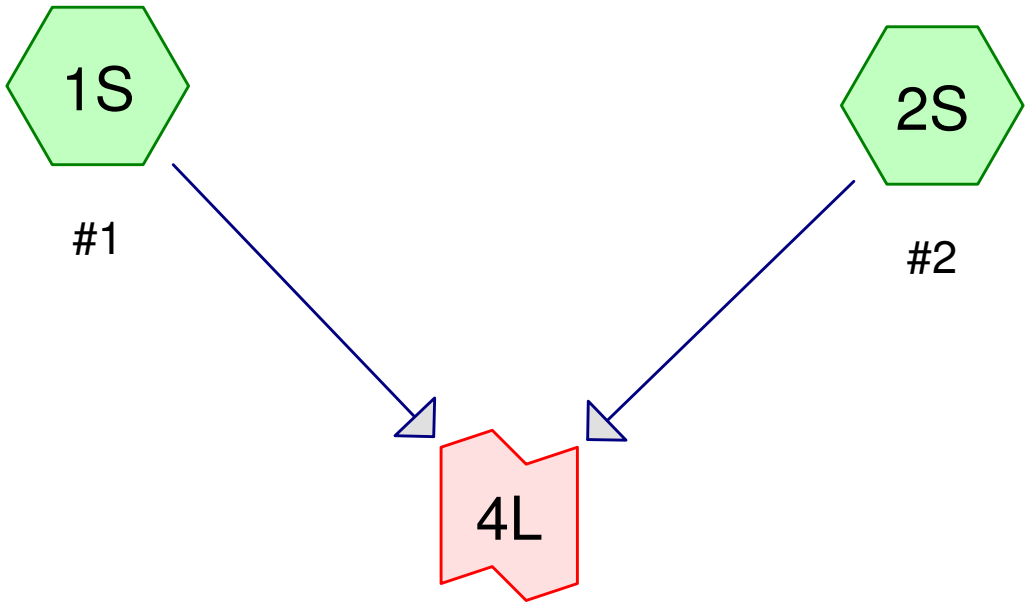
dcr Massachusetts
Commonwealth of Massachusetts
Department of Conservation and Recreation

South Bank Bridge Project
Contract No. P13-2843-C1A
Boston, Massachusetts

PRE-DEVELOPMENT CONDITIONS

DWG NO. 1 OF 2

REV 0



Subcat Reach Pond Link

Routing Diagram for SBB Existing
Prepared by Microsoft, Printed 1/19/2018

Time span=5.00-36.00 hrs, dt=0.05 hrs, 621 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: #1 Runoff Area=64,077 sf 43.61% Impervious Runoff Depth=1.73"
Flow Length=277' Tc=5.8 min CN=84 Runoff=2.94 cfs 0.212 af

Subcatchment 2S: #2 Runoff Area=18,276 sf 32.06% Impervious Runoff Depth=1.59"
Flow Length=82' Tc=4.9 min CN=82 Runoff=0.78 cfs 0.055 af

Link 4L: Charles River Inflow=3.72 cfs 0.268 af
Primary=3.72 cfs 0.268 af

Total Runoff Area = 1.891 ac Runoff Volume = 0.268 af Average Runoff Depth = 1.70"
58.95% Pervious = 1.115 ac 41.05% Impervious = 0.776 ac

Summary for Subcatchment 1S: #1

Runoff = 2.94 cfs @ 12.09 hrs, Volume= 0.212 af, Depth= 1.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.26"

Area (sf)	CN	Description
36,132	74	>75% Grass cover, Good, HSG C
27,945	98	Paved parking, HSG C
64,077	84	Weighted Average
36,132		56.39% Pervious Area
27,945		43.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	35	0.0130	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.26"
0.1	11	0.0235	3.11		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	43	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	60	0.0110	5.15	4.05	**Pipe Channel, RCP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
0.2	72	0.0240	7.61	5.98	**Pipe Channel, RCP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
0.1	42	0.0240	7.61	5.98	**Pipe Channel, RCP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
0.0	14	0.0240	15.84	111.94	**Pipe Channel, RCP_Round 36"** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 Concrete pipe, finished
5.8	277	Total			

Summary for Subcatchment 2S: #2

Runoff = 0.78 cfs @ 12.08 hrs, Volume= 0.055 af, Depth= 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.26"

Area (sf)	CN	Description
12,416	74	>75% Grass cover, Good, HSG C
5,860	98	Paved parking, HSG C
18,276	82	Weighted Average
12,416		67.94% Pervious Area
5,860		32.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.0330	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.26"
0.3	25	0.0330	1.27		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	7	0.0270	3.34		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.9	82	Total			

Summary for Link 4L: Charles River

Inflow Area = 1.891 ac, 41.05% Impervious, Inflow Depth = 1.70" for 2-Year event
Inflow = 3.72 cfs @ 12.09 hrs, Volume= 0.268 af
Primary = 3.72 cfs @ 12.09 hrs, Volume= 0.268 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs

Time span=5.00-36.00 hrs, dt=0.05 hrs, 621 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: #1 Runoff Area=64,077 sf 43.61% Impervious Runoff Depth=4.37"
Flow Length=277' Tc=5.8 min CN=84 Runoff=7.29 cfs 0.536 af

Subcatchment 2S: #2 Runoff Area=18,276 sf 32.06% Impervious Runoff Depth=4.16"
Flow Length=82' Tc=4.9 min CN=82 Runoff=2.05 cfs 0.146 af

Link 4L: Charles River Inflow=9.30 cfs 0.682 af
Primary=9.30 cfs 0.682 af

Total Runoff Area = 1.891 ac Runoff Volume = 0.682 af Average Runoff Depth = 4.33"
58.95% Pervious = 1.115 ac 41.05% Impervious = 0.776 ac

Summary for Subcatchment 1S: #1

Runoff = 7.29 cfs @ 12.09 hrs, Volume= 0.536 af, Depth= 4.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (sf)	CN	Description
36,132	74	>75% Grass cover, Good, HSG C
27,945	98	Paved parking, HSG C
64,077	84	Weighted Average
36,132		56.39% Pervious Area
27,945		43.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	35	0.0130	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.26"
0.1	11	0.0235	3.11		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	43	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	60	0.0110	5.15	4.05	**Pipe Channel, RCP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
0.2	72	0.0240	7.61	5.98	**Pipe Channel, RCP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
0.1	42	0.0240	7.61	5.98	**Pipe Channel, RCP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
0.0	14	0.0240	15.84	111.94	**Pipe Channel, RCP_Round 36"** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 Concrete pipe, finished
5.8	277	Total			

Summary for Subcatchment 2S: #2

Runoff = 2.05 cfs @ 12.07 hrs, Volume= 0.146 af, Depth= 4.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (sf)	CN	Description
12,416	74	>75% Grass cover, Good, HSG C
5,860	98	Paved parking, HSG C
18,276	82	Weighted Average
12,416		67.94% Pervious Area
5,860		32.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.0330	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.26"
0.3	25	0.0330	1.27		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	7	0.0270	3.34		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.9	82	Total			

Summary for Link 4L: Charles River

Inflow Area = 1.891 ac, 41.05% Impervious, Inflow Depth = 4.33" for 25-Year event
Inflow = 9.30 cfs @ 12.08 hrs, Volume= 0.682 af
Primary = 9.30 cfs @ 12.08 hrs, Volume= 0.682 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs

Time span=5.00-36.00 hrs, dt=0.05 hrs, 621 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: #1 Runoff Area=64,077 sf 43.61% Impervious Runoff Depth>6.89"
Flow Length=277' Tc=5.8 min CN=84 Runoff=11.24 cfs 0.844 af

Subcatchment 2S: #2 Runoff Area=18,276 sf 32.06% Impervious Runoff Depth>6.65"
Flow Length=82' Tc=4.9 min CN=82 Runoff=3.21 cfs 0.233 af

Link 4L: Charles River Inflow=14.39 cfs 1.077 af
Primary=14.39 cfs 1.077 af

Total Runoff Area = 1.891 ac Runoff Volume = 1.077 af Average Runoff Depth = 6.84"
58.95% Pervious = 1.115 ac 41.05% Impervious = 0.776 ac

Summary for Subcatchment 1S: #1

Runoff = 11.24 cfs @ 12.09 hrs, Volume= 0.844 af, Depth> 6.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.83"

Area (sf)	CN	Description
36,132	74	>75% Grass cover, Good, HSG C
27,945	98	Paved parking, HSG C
64,077	84	Weighted Average
36,132		56.39% Pervious Area
27,945		43.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	35	0.0130	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.26"
0.1	11	0.0235	3.11		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	43	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	60	0.0110	5.15	4.05	**Pipe Channel, RCP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
0.2	72	0.0240	7.61	5.98	**Pipe Channel, RCP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
0.1	42	0.0240	7.61	5.98	**Pipe Channel, RCP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
0.0	14	0.0240	15.84	111.94	**Pipe Channel, RCP_Round 36"** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 Concrete pipe, finished
5.8	277	Total			

Summary for Subcatchment 2S: #2

Runoff = 3.21 cfs @ 12.07 hrs, Volume= 0.233 af, Depth> 6.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.83"

Area (sf)	CN	Description
12,416	74	>75% Grass cover, Good, HSG C
5,860	98	Paved parking, HSG C
18,276	82	Weighted Average
12,416		67.94% Pervious Area
5,860		32.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.0330	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.26"
0.3	25	0.0330	1.27		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	7	0.0270	3.34		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.9	82	Total			

Summary for Link 4L: Charles River

Inflow Area = 1.891 ac, 41.05% Impervious, Inflow Depth > 6.84" for 100-Year event
Inflow = 14.39 cfs @ 12.08 hrs, Volume= 1.077 af
Primary = 14.39 cfs @ 12.08 hrs, Volume= 1.077 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs

N

CHARLES RIVER

CF 114'
0.024 FT/FT
12" RCP

SCF 17'
0.044 FT/FT
PAVE

SF 39'
0.206 FT/FT
SHORT GRASS

SCF 51'
0.020 FT/FT
PAVE

CB-7

CB-5

CF 14'
0.024 FT/FT
36" RCP

EX-CB-2

CB-1

CB-3

EX-CB-4

CB-6

DMH
RIM=8.98'

NASHUA STREET

125 NASHUA STREET

MBTA NORTH STATION

ZAKIM BRIDGE
(ABOVE)

CHARLES RIVER

EX-DMH-17

DMH-10

LB-11

LB-12

SF 22'
0.023 FT/FT
SHORT GRASS

CB-9

SCF 44'
0.115 FT/FT
SHORT GRASS

CB-14

SF 29'
0.070 FT/FT
PAVE

LB-13

EX-DMH-15

HEAD HOUSE

LEVERETT CIRCLE
CONNECTOR (ABOVE)

VENT BUILDING

0 40 100 160

SCALE: 1" = 40'

NO.	DATE	ISSUE / REVISION	MADE BY

DESIGNED BY:	W. MURPHY
DRAWN BY:	R. LEMIRE
CHECKED BY:	W. MURPHY
SCALE:	1"=40'-0"
JOB NO.:	MAX-2012032.00
SUBMITTAL DATE:	12/18/2017

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181 BALLARDVALE STREET, SUITE 202
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http://www.gpinet.com
Engineering | Design | Planning | Construction Management

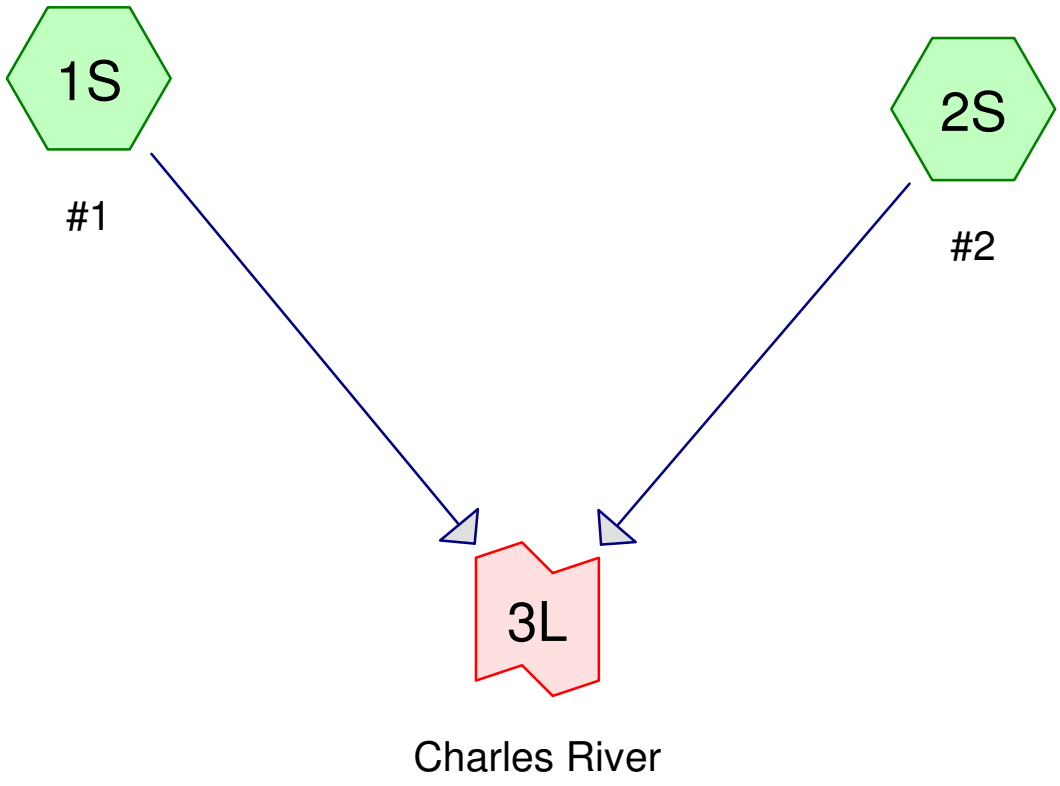
dcr Massachusetts
Commonwealth of Massachusetts
Department of Conservation and Recreation

South Bank Bridge Project
Contract No. P13-2843-C1A
Boston, Massachusetts

POST-DEVELOPMENT CONDITIONS

DWG NO. 2 OF 2

REV 0



Subcat Reach Pond Link

Routing Diagram for SBB Proposed
Prepared by Microsoft, Printed 1/19/2018

Time span=5.00-36.00 hrs, dt=0.05 hrs, 621 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: #1 Runoff Area=64,076 sf 59.64% Impervious Runoff Depth=2.05"
Flow Length=235' Tc=3.2 min CN=88 Runoff=3.81 cfs 0.251 af

Subcatchment 2S: #2 Runoff Area=18,276 sf 36.67% Impervious Runoff Depth=1.66"
Flow Length=95' Tc=2.9 min CN=83 Runoff=0.89 cfs 0.058 af

Link 3L: Charles River Inflow=4.70 cfs 0.309 af
Primary=4.70 cfs 0.309 af

Total Runoff Area = 1.891 ac Runoff Volume = 0.309 af Average Runoff Depth = 1.96"
45.46% Pervious = 0.859 ac 54.54% Impervious = 1.031 ac

Summary for Subcatchment 1S: #1

Runoff = 3.81 cfs @ 12.05 hrs, Volume= 0.251 af, Depth= 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.26"

Area (sf)	CN	Description
25,862	74	>75% Grass cover, Good, HSG C
38,214	98	Paved parking, HSG C
64,076	88	Weighted Average
25,862		40.36% Pervious Area
38,214		59.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	39	0.2060	0.36		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.26"
0.2	17	0.0440	1.47		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.9	51	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	72	0.0240	7.61	5.98	**Pipe Channel, RCP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
0.1	42	0.0240	7.61	5.98	**Pipe Channel, CMP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
0.0	14	0.0240	15.84	111.94	**Pipe Channel, RCP_Round 36"** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 Concrete pipe, finished
3.2	235	Total			

Summary for Subcatchment 2S: #2

Runoff = 0.89 cfs @ 12.05 hrs, Volume= 0.058 af, Depth= 1.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.26"

Area (sf)	CN	Description
11,574	74	>75% Grass cover, Good, HSG C
6,702	98	Paved parking, HSG C
18,276	83	Weighted Average
11,574		63.33% Pervious Area
6,702		36.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	44	0.1150	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.26"
0.1	29	0.0700	5.37		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	22	0.0230	1.06		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.9	95	Total			

Summary for Link 3L: Charles River

Inflow Area = 1.891 ac, 54.54% Impervious, Inflow Depth = 1.96" for 2-Year event
Inflow = 4.70 cfs @ 12.05 hrs, Volume= 0.309 af
Primary = 4.70 cfs @ 12.05 hrs, Volume= 0.309 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs

Time span=5.00-36.00 hrs, dt=0.05 hrs, 621 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: #1 Runoff Area=64,076 sf 59.64% Impervious Runoff Depth>4.81"
Flow Length=235' Tc=3.2 min CN=88 Runoff=8.62 cfs 0.589 af

Subcatchment 2S: #2 Runoff Area=18,276 sf 36.67% Impervious Runoff Depth=4.27"
Flow Length=95' Tc=2.9 min CN=83 Runoff=2.25 cfs 0.149 af

Link 3L: Charles River Inflow=10.87 cfs 0.738 af
Primary=10.87 cfs 0.738 af

Total Runoff Area = 1.891 ac Runoff Volume = 0.738 af Average Runoff Depth = 4.69"
45.46% Pervious = 0.859 ac 54.54% Impervious = 1.031 ac

Summary for Subcatchment 1S: #1

Runoff = 8.62 cfs @ 12.05 hrs, Volume= 0.589 af, Depth> 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (sf)	CN	Description
25,862	74	>75% Grass cover, Good, HSG C
38,214	98	Paved parking, HSG C
64,076	88	Weighted Average
25,862		40.36% Pervious Area
38,214		59.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	39	0.2060	0.36		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.26"
0.2	17	0.0440	1.47		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.9	51	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	72	0.0240	7.61	5.98	**Pipe Channel, RCP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
0.1	42	0.0240	7.61	5.98	**Pipe Channel, CMP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
0.0	14	0.0240	15.84	111.94	**Pipe Channel, RCP_Round 36"** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 Concrete pipe, finished
3.2	235	Total			

Summary for Subcatchment 2S: #2

Runoff = 2.25 cfs @ 12.05 hrs, Volume= 0.149 af, Depth= 4.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (sf)	CN	Description
11,574	74	>75% Grass cover, Good, HSG C
6,702	98	Paved parking, HSG C
18,276	83	Weighted Average
11,574		63.33% Pervious Area
6,702		36.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	44	0.1150	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.26"
0.1	29	0.0700	5.37		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	22	0.0230	1.06		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.9	95	Total			

Summary for Link 3L: Charles River

Inflow Area = 1.891 ac, 54.54% Impervious, Inflow Depth > 4.69" for 25-Year event
Inflow = 10.87 cfs @ 12.05 hrs, Volume= 0.738 af
Primary = 10.87 cfs @ 12.05 hrs, Volume= 0.738 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs

Time span=5.00-36.00 hrs, dt=0.05 hrs, 621 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: #1 Runoff Area=64,076 sf 59.64% Impervious Runoff Depth>7.35"
Flow Length=235' Tc=3.2 min CN=88 Runoff=12.91 cfs 0.901 af

Subcatchment 2S: #2 Runoff Area=18,276 sf 36.67% Impervious Runoff Depth>6.77"
Flow Length=95' Tc=2.9 min CN=83 Runoff=3.50 cfs 0.237 af

Link 3L: Charles River Inflow=16.41 cfs 1.138 af
Primary=16.41 cfs 1.138 af

Total Runoff Area = 1.891 ac Runoff Volume = 1.138 af Average Runoff Depth = 7.22"
45.46% Pervious = 0.859 ac 54.54% Impervious = 1.031 ac

Summary for Subcatchment 1S: #1

Runoff = 12.91 cfs @ 12.05 hrs, Volume= 0.901 af, Depth> 7.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.83"

Area (sf)	CN	Description
25,862	74	>75% Grass cover, Good, HSG C
38,214	98	Paved parking, HSG C
64,076	88	Weighted Average
25,862		40.36% Pervious Area
38,214		59.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	39	0.2060	0.36		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.26"
0.2	17	0.0440	1.47		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.9	51	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	72	0.0240	7.61	5.98	**Pipe Channel, RCP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
0.1	42	0.0240	7.61	5.98	**Pipe Channel, CMP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
0.0	14	0.0240	15.84	111.94	**Pipe Channel, RCP_Round 36"** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 Concrete pipe, finished
3.2	235	Total			

Summary for Subcatchment 2S: #2

Runoff = 3.50 cfs @ 12.05 hrs, Volume= 0.237 af, Depth> 6.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.83"

Area (sf)	CN	Description
11,574	74	>75% Grass cover, Good, HSG C
6,702	98	Paved parking, HSG C
18,276	83	Weighted Average
11,574		63.33% Pervious Area
6,702		36.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	44	0.1150	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.26"
0.1	29	0.0700	5.37		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	22	0.0230	1.06		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.9	95	Total			

Summary for Link 3L: Charles River

Inflow Area = 1.891 ac, 54.54% Impervious, Inflow Depth > 7.22" for 100-Year event
Inflow = 16.41 cfs @ 12.05 hrs, Volume= 1.138 af
Primary = 16.41 cfs @ 12.05 hrs, Volume= 1.138 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs

Recharge System Sizing Calculations

Station: 13+86 LT

Volume 3, Chapter 1 of the Massachusetts Stormwater Handbook

Soil type in Infiltration Layer	Sandy Clay Loam		
NRCS Hydrologic Soil Type	C		
Test Pit # =	N/A		
Impervious Area to Leaching Catch Basin		4820	SF
Volume of Storage Available in Leaching Basin and Stone		See Detail	
Depth of Structure from Invert (out at CB) to Bottom of Structure		3	FT
Internal Diameter of Structure		4	FT
External Diameter of Structure		5	FT
Diameter of Stone around Structure		9	FT
Depth of Stone Below Structure		1	FT
Porosity of Stone		0.4	
Number of Leaching Basins within Subcatchment Area		2	EA
Area Inside of Structure		12.57	SF
Area of Stone Below Structure		63.62	SF
Area of Stone deducting Structure		43.98	SF
Volume Inside Structure		37.70	CF
Volume of Stone Layer Below Structure	63.62 CF		
Volume of Stone Layer Around Structure	131.95 CF		
Volume of Anulus within Stone			
Below Structure		25.45	CF
Around Structure		52.78	CF
Total Volume Available to store runoff per structure =		115.92	CF
Total Volume available to store runoff =		231.85	CF

RECHARGE REQUIREMENTS

Required Recharge Volume

Rv=F*Impervious Area

F = Target Depth Factor

Rv= 0.25 Inch X 4820

Rv= 100.42 CF

Sizing Storage Volumes

Using the "Static" method:

The Required Recharge Volume =	100.42 CF
The Available Recharge Volume, assuming the stored runoff will exfiltate completely within 72 hrs =	
Leaching Basins =	231.85 CF
Total Storage Volume available to recharge =	231.85 CF

This method does have enough Available Storage Volume for the amount of Required Recharge Volume.

Therefore, the use of two leaching basins is sufficent to achieve the required recharge volume.

Recharge System Drawdown

Verify the Recharge System will Drawdown within 72 Hrs

TIMEdrawdown = Rv/(K* Bottom Area of Infiltration Structure * 2 Units)

55.7 Hours

The drawdown time is less than 72 hours, therefore this size system is acceptable.

WATER QUALITY REQUIREMENTS

Required Water Quality Volume

Vwq=(Dwq/12 inches/foot) * (A * 43560 SF/Acre)

Vwq = Required Water Quality Volume

Dwq = Water Quality Depth: 1" for discharges within a Zone II or Interim Wellhead Protection Area, to or near another critical area, runoff from LUHPPL, or exfiltration to soils with infiltration rate greater than 2.4 inches/hr or greater; 1/2" for discharges near or to other areas.

A = Impervious Area (In Acres)

Vwq = (0.5 inch/12 inches/foot)* 4820 SF =

200.83 CF

Therefore, the use of two leaching basins is sufficent to achieve the required water quality volume.

Recharge System Sizing Calculations

Station: 15+18 LT

Volume 3, Chapter 1 of the Massachusetts Stormwater Handbook

Soil type in Infiltration Layer	Sandy Clay Loam		
NRCS Hydrologic Soil Type	C		
Test Pit # =	N/A		
Impervious Area to Leaching Catch Basin		1720	SF
Volume of Storage Available in Leaching Basin and Stone		See Detail	
Depth of Structure from Invert (out at CB) to Bottom of Structure		3	FT
Internal Diameter of Structure		4	FT
External Diameter of Structure		5	FT
Diameter of Stone around Structure		9	FT
Depth of Stone Below Structure		1	FT
Porosity of Stone		0.4	
Number of Leaching Basins within Subcatchment Area		1	EA
Area Inside of Structure		12.57	SF
Area of Stone Below Structure		63.62	SF
Area of Stone deducting Structure		43.98	SF
Volume Inside Structure		37.70	CF
Volume of Stone Layer Below Structure	63.62 CF		
Volume of Stone Layer Around Structure	131.95 CF		
Volume of Anulus within Stone			
Below Structure		25.45	CF
Around Structure		52.78	CF
Total Volume Available to store runoff per structure =		115.92	CF
Total Volume available to store runoff =		115.92	CF

RECHARGE REQUIREMENTS

Required Recharge Volume

Rv=F*Impervious Area

F = Target Depth Factor

Rv= 0.25 Inch X 1720

Rv= 35.83 CF

Sizing Storage Volumes

Using the "Static" method:

The Required Recharge Volume =	35.83	CF
The Available Recharge Volume, assuming the stored runoff will exfiltate completely within 72 hrs =		
Leaching Basins =	115.92	CF
Total Storage Volume available to recharge =	115.92	CF

This method does have enough Available Storage Volume for the amount of Required Recharge Volume.

Therefore, the use of one leaching basin is sufficent to achieve the required recharge volume.

Recharge System Drawdown

Verify the Recharge System will Drawdown within 72 Hrs

TIMEdrawdown = Rv/(K* Bottom Area of Infiltration Structure * 1 Units)

39.8 Hours

The drawdown time is less than 72 hours, therefore this size system is acceptable.

WATER QUALITY REQUIREMENTS

Required Water Quality Volume

Vwq=(Dwq/12 inches/foot) * (A * 43560 SF/Acre)

Vwq = Required Water Quality Volume

Dwq = Water Quality Depth: 1" for discharges within a Zone II or Interim Wellhead Protection Area, to or near another critical area, runoff from LUHPPL, or exfiltration to soils with infiltration rate greater than 2.4 inches/hr or greater; 1/2" for discharges near or to other areas.

A = Impervious Area (In Acres)

Vwq = (0.5 inch/12 inches/foot)* 1720 SF =

71.67 CF

Therefore, the use of one leaching basin is sufficent to achieve the required water quality volume.

STORMWATER MANAGEMENT SYSTEM
Operation and Maintenance Plan

System Owner – Massachusetts Department of Conservation and Recreation

Responsible Party – Massachusetts Department of Conservation and Recreation

General Notes (from the Mass. Highway Stormwater Handbook)

1. Maintain records and document inspection and cleaning of catch basins (as well as any maintenance activities for other drainage structures) including: executed contracts, certificates of completion, contractor invoices, and other type of maintenance logs.
2. Sweep roadways on an annual basis after winter deicing applications as warranted, with an emphasis on high sand accumulation and locations adjacent to sensitive receiving waters.
3. Note problems and take appropriate corrective actions to maintain outlets and BMPs in good working condition.
4. Take appropriate control measures to avoid discharge of materials to receiving wetlands and water resources during cleaning and maintenance activities.
5. Install, inspect and maintain construction BMPs to ensure appropriate sediment control is provided throughout construction and until the site is stabilized.
6. The inspection and cleaning schedules for other BMPs is found in Section 5 of the Handbook.

BMPs

Deep Sump Catch Basins

Deep Sump Catch Basins are small retention systems designed to remove trash, debris, and coarse sediment from stormwater runoff and serve as temporary spill containment devices. Deep Sump Catch Basins have a regulatory pollutant removal efficiency rating of 25% of Total Suspended Solids (TSS).

Regular maintenance is essential if Deep Sump Catch Basins are to remain effective at removing pollutants. The basins should be inspected once a year and form a basis for a periodic cleaning schedule. Cleaning should be done after the end of the foliage and winter snow removal and deicing seasons or whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the basin. Frame and grates are inspected to remove litter and debris clogging inlet or curb inlet openings in areas known for flooding prior to large forecasted rainfall events.

Leaching Catch Basins

Leaching Catch Basins are pre-cast concrete structures with an open bottom that permits runoff to infiltrate into the ground. 80% TSS removal is credited to leaching catch basins provided they are offline and combined with pretreatment deep sump catch basins.

Leaching Catch Basins are recommended to be inspected annually or more frequently if warranted by their performance. Sediment should be removed at the annual inspection that is preferably done in the spring or when the basin is 50% filled.

Appendix C
Affidavit of Service, Notice to Abutters, Abutters List

AFFIDAVIT OF SERVICE

Under the Massachusetts Wetlands Protection Act

(To be submitted to the Massachusetts Department of Environmental Protection and the Conservation Commission when filing a Notice of Intent)

I, William J. Murphy Jr., hereby certify under the pains and penalties of perjury, that on or before February 7, 2018, I gave notification to abutters in compliance with the second paragraph of Massachusetts General Laws, Chapter 131, Section 40, and the DEP Guide to Abutter Notification, dated April 8, 1994, in connection with the following matter:

A Notice of Intent filed under the Massachusetts Wetland Protection Act by:

Greenman-Pedersen, Inc. with the City of Boston Conservation Commission on or before February 7, 2018 for property located at: Nashua Street Park and land between the Leonard P. Zakim Bunker Hill Memorial Bridge and the Leverett Circle Connector Bridge on the South Bank of the Charles River in Boston, Massachusetts.

The form of the notification and a list of the abutters to whom it was given and their addresses, are attached to the Affidavit of Service.

William J. Murphy
Name

2/2/18
Date

Property Owner Name: Commonwealth of Massachusetts, Department of Conservation and Recreation, Massachusetts Department of Transportation - Highway Division and Massachusetts Bay Transit Authority

NOTIFICATION TO ABUTTERS
Under the Massachusetts Wetlands Protection Act

In accordance with the second paragraph of Massachusetts General Law Chapter 131, Section 40, you are hereby notified of the following:

A. The name of the applicant is: **The Massachusetts Department of Conservation and Recreation**

B. The applicant has filed a Notice of Intent with the **Boston Conservation Commission** seeking permission to remove, fill, dredge or alter an area subject to protection under the Massachusetts Wetlands Protection Act (M.G.L. Chapter 131, Section 40).

C. The address of the lot where the activity is proposed is: **Nashua Street Park, the Charles River and parkland between the Leonard P. Zakim Bunker Hill Memorial Bridge and the Leverett Circle Connector Bridge on the South Bank of the Charles River in Boston, Massachusetts.**

D. The work proposed is: **Installation of a pedestrian bridge and modification of parkland on the south bank of the Charles River from Nashua Street Park to the Leonard P. Zakim Bunker Hill Memorial Bridge.**

E. Copies of the Notice of Intent may be examined at the Conservation Office in the City Hall at 1 City Hall Square, Room 709, Boston, Ma between the hours of 9:00 A.M. and 5:00 P.M. Monday through Friday.

For more information, call 617-635-3850.

F. Copies of the Notice of Intent and more information may be obtained from either (check one) the applicant ___, or the applicant's representative __X___, by calling this telephone number: (978) 570-2969 between the hours of 9:00 am and 4:30 pm on the following days of the week:
Monday through Friday.

G. Currently the hearing is scheduled for February 21 at 6 P.M. (subject to change). Information regarding the date, time, and place of the public hearing may be obtained from the Conservation Office by calling (617-635-3850) between the hours of 9:00 A.M. and 5:00 P.M. Monday through Friday. Please also check the Cities Public Notice web page at https://www.boston.gov/public-notices for more information

NOTE: Notice of public hearing, including its date, time, and place, will be published at least five (5) days in advance of the hearing in the Boston Hearld.

NOTE: Notice of the public meeting, including its date, time and place will be posted in City Hall not less than forty-eight (48) hours in advance.

NOTE: You may also contact the nearest Department of Environmental Protection Regional Office for more information about this application or the Wetlands Protection Act. To Contact DEP, call the Northeast Region at (978) 694-3200.

Abutter Mailing List Generator --- City of Boston Assessing Department

Enter/Select a Street Name:
CITY HALL
Find Addresses
Click an Address to find a Parcel:

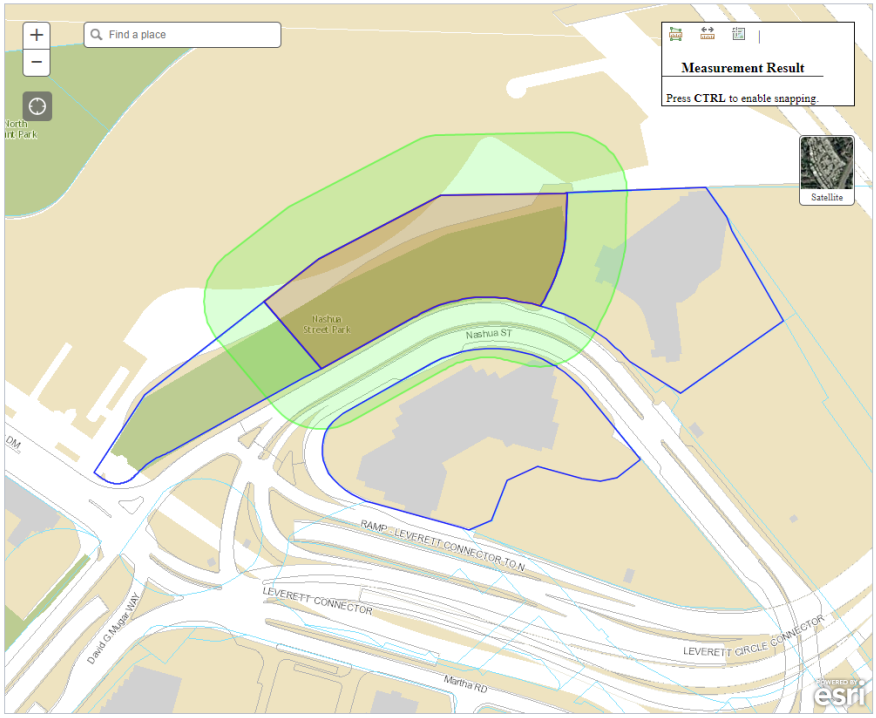
Enter a Parcel ID:
0302615000
Find a Parcel

When you can see Parcels:
Click Here to Select a Parcel

Buffer Parameters:
Distance: 100 Feet
Buffer and Select

Click here to download a CSV file (Open in Notepad, not in Excel) for Mailing list.
Click here for an instruction to convert a CSV file to Mailing Labels using MS Word.

Note: Use newer versions of browser to view this site such as IE 11+ or Chrome 47+ etc.



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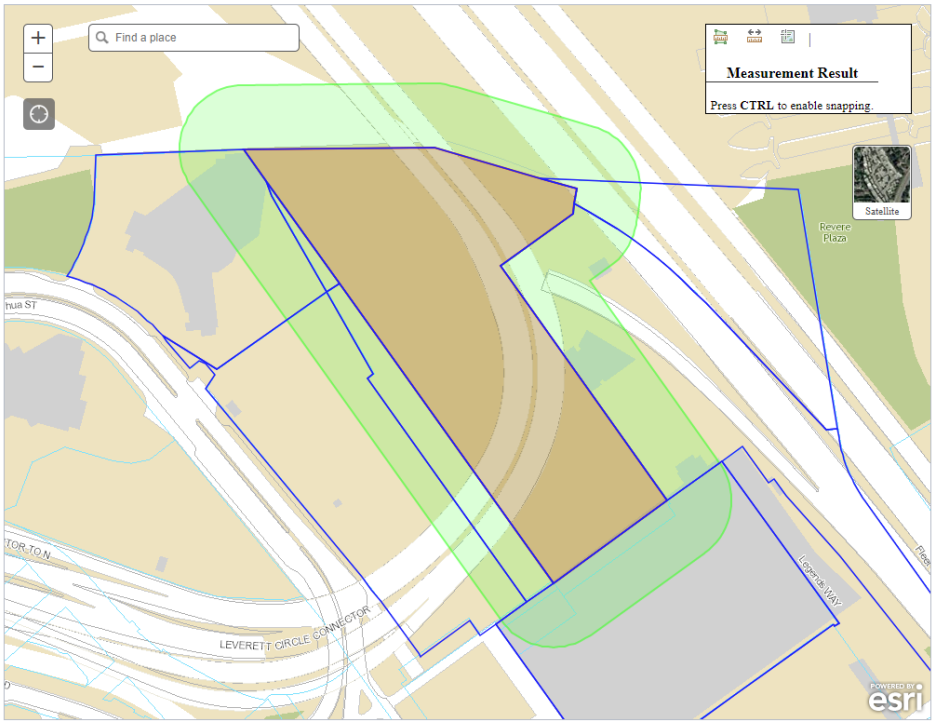

Abutter Mailing List Generator --- City of Boston Assessing Department

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CITY HALL

Find Addresses

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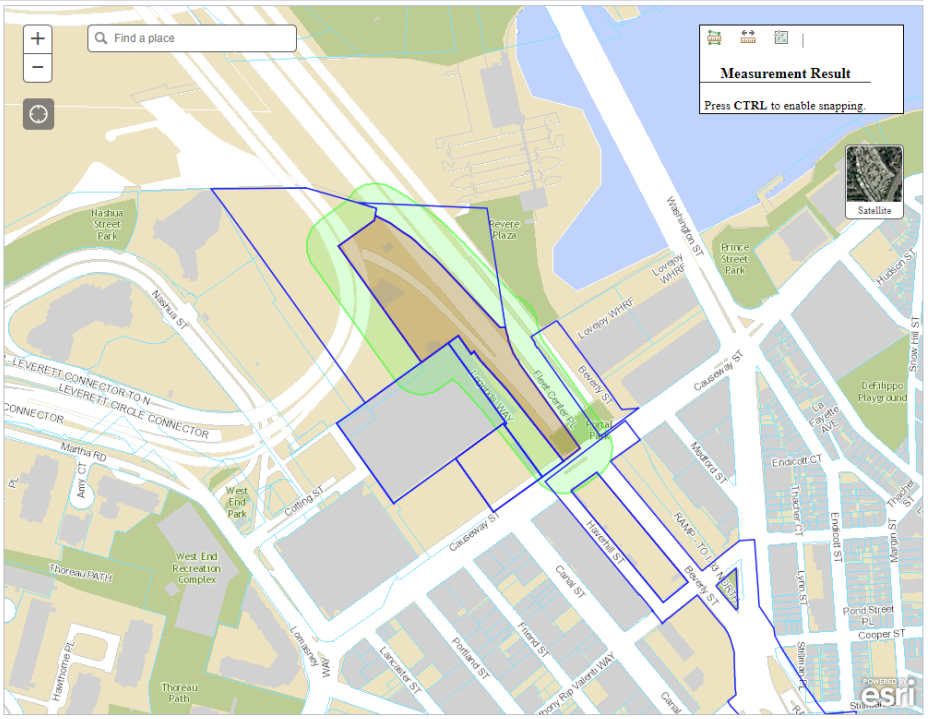

PID	OWNER	ADDRESSEE	MLG_ADDRESS	MLG_CITYSTATE	MLG_ZIPCODE	LOC_ADDRESS	LOC_CITY	LOC_ZIPCODE
301536000	IMP VICTOR LLC	LESSEE	C/O JOANNA STIMPSON - GID	125 HIGH ST (27TH FL)	BOSTON MA 2110	95 HAVERHILL ST	BOSTON	2114
301910000	COMM OF MASS MDC		BEVERLY	BOSTON MA	2114	BEVERLY ST	BOSTON	2114
301911000	COMM OF MASS		122 BEVERLY ST	BOSTON MA	2114	150 CAUSEWAY ST	BOSTON	2114
301911010	ONE-20 NASHUA STREET LLC	C/O BOSTON GARDEN DEV CORP	100 LEGENDS WY	BOSTON MA	2114	CAUSEWAY ST	BOSTON	2114
301911025	PODIUM OWNER LP	PODIUM DEVELOPER LLC	800 BOYLSTON ST	BOSTON MA	2199	80 CAUSEWAY ST	BOSTON	2114
301911035	BOSTON GARDEN DEVELOPMENT		100 LEGENDS WAY	BOSTON MA	2114	100 LEGENDS WY	BOSTON	2114
301913000	MASS BAY TRANS AUTH		ACCOLON WAY	BOSTON MA	2114	CAUSEWAY ST	BOSTON	2114
301918010	GARAGE EXPANSION OWNER LP	GARAGE EXPANSION DEVELOPER LLC	800 BOYLSTON ST	BOSTON MA	2199	80 CAUSEWAY ST	BOSTON	2114
301918025	PODIUM OWNER LP	PODIUM DEVELOPER LLC	800 BOYLSTON ST	BOSTON MA	2199	80 CAUSEWAY ST	BOSTON	2114
301918045	GARDEN IMPROVEMENTS OWNER	CHRISTOPHER MAHER-GARDEN IMPROV DEV	100 LEGENDS WAY	BOSTON MA	2114	80 CAUSEWAY ST	BOSTON	2114
301925000	GARDEN PARKING CORPORATION	GARDEN PARKING CORPORATION	100 LEGENDS WAY	BOSTON MA	2114	100 LEGENDS WY	BOSTON	2114
301925100	DELAWARE NORTH COMPANIES	DELAWARE NORTH CO INC BOSTON	100 LEGENDS WAY	BOSTON MA	2114	NASHUA ST	BOSTON	2114
301927500	THE GENERAL HOSPITAL CORP		55 FRUIT ST	BOSTON MA	2114	99 NASHUA ST	BOSTON	2114
301927510	MASS DEPT OF TRANSPORTATION		NASHUA ST	BOSTON MA	2114	NASHUA ST	BOSTON	2114
301927600	THE GENERAL HOSPITAL CORP		55 FRUIT ST	BOSTON MA	2114	125 NASHUA ST	BOSTON	2114
301927610	MASS DEPT OF TRANSPORTATION		NASHUA ST	BOSTON MA	2114	NASHUA ST	BOSTON	2114
301929000	COMMWLTH OF MASS		NASHUA	BOSTON MA	2114	NASHUA ST	BOSTON	2114
301931000	COMMONWLTH OF MASS		NASHUA	BOSTON MA	2114	NASHUA ST	BOSTON	2114
301934200	COMMONWEALTH OF MASS DCAM	C/O COMMONWEALTH OF MASS	NASHUA ST	BOSTON MA	2114	NASHUA ST	BOSTON	2114
303063001	COMMONWEALTH OF MASS	STATE TRANSP BLDG	10 PARK PLZ	BOSTON MA	2116	CAUSEWAY ST	BOSTON	2114
303430000	MASSACHUSETTS DEPARTMENT OF		KEELAND ST	BOSTON MA	2111	KNEELAND ST	BOSTON	2111

Appendix D
Copy of Payments

GPI

GREENMAN - PEDERSEN, INC.
Consulting Engineers, Architects & Planners
325 West Main Street, Babylon, NY 11702
Ph. 631/587-5060

Signature Bank
Everett, MA 02149
53-292/113

1712379

CHECK DATE

February 2, 2018

PAY One Thousand Five Hundred and 00/100 Dollars

AMOUNT 1,500.00

TO City of Boston
1 City Hall Square
Room 709
Boston, MA 02201

Security Check features included. Details on back.

⑈1712379⑈ ⑆011302920⑆ ⑈743240⑈

VOID AFTER 180 DAYS

MP
AUTHORIZED SIGNATURE

GPI

GREENMAN - PEDERSEN, INC.
Consulting Engineers, Architects & Planners
325 West Main Street, Babylon, NY 11702
Ph. 631/587-5060

Signature Bank
Everett, MA 02149
53-292/113

1712380

CHECK DATE

February 2, 2018

PAY Six Hundred Twelve and 50/100 Dollars

AMOUNT 612.50

TO Commonwealth of Massachusetts
Department of Environmental Protection
P.O. Box 4062
Boston, MA 02211

Security Check features included. Details on back.

⑈1712380⑈ ⑆011302920⑆ ⑈743240⑈

VOID AFTER 180 DAYS

MP
AUTHORIZED SIGNATURE