Deval L. Patrick, Governor
Timothy P. Murray, Lt. Governor
Richard A. Davey, Secretary & CEO
Frank DePaola, Administrator

massDOT
Massachusetts Department of Transportation
Highway Division

December 18, 2012

Karen Kirk Adams
Chief, Regulatory Division/Operations Directorate
ATTN: Dan Vasconcellos
Department of the Army
New England District, Corps of Engineers
696 Virginia Road
Concord, MA 01742

RE: NAE-2012-02157, Replacement of the Mitchell River Bridge
Bridge # C-07-001
Chatham, Massachusetts
MassDOT Project #603690

Dear Ms. Adams,

The Massachusetts Department of Transportation Highway Division respectfully submits this application for a Category 2 Massachusetts General Permit for the replacement of the drawbridge that carries Bridge Street over the Mitchell River in the town of Chatham, Massachusetts.

The proposed project will completely replace the existing Mitchell River drawbridge with a six-span bridge with a single-leaf bascule span, and concrete-filled driven steel pipe piles. The project will result in a total of 12,310 square feet (sf) of impacts to Waters of the United States; including 10,491 sf of temporary-direct and 1,819 sf of permanent-direct impacts. Impacts to salt marsh are not proposed. The use of cofferdams and turbidity curtains will reduce turbidity and noise impacts to fisheries resources. The Federal Highway Administration has completed the Section 106 consultation process, and attached to this application is a fully executed Section 106 MOA, and the Project Notification Forms submitted to the state and tribal historic preservation officers.

Thank you for the consideration of this Category 2 permit application. If you have any questions or require additional information, please contact Tim Dexter in the Wetlands and Water Resources Section, at (857) 368-8794 or timothy.dexter@state.ma.us.

Sincerely,

Susan McArthur

Susan McArthur
Wetlands Permitting Supervisor
Environmental Services
MassDOT Highway Division

Ten Park Plaza, Suite 4160, Boston, MA 02116
Tel: 617-973-7000, TDD: 617-973-7306
www.mass.gov/massdot

Application

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wetlands and Waterways

BRP WW 07, 08 Dredging

401 Water Quality Certification – Projects Proposing More Than 100 Cubic Yards Dredging or Disposal of Dredged Material

X253989
Transmittal Number #

A. Applicant Information

1. For which permit category are you applying?

☐ BRP WW 07 ☒ BRP WW 08

2. Applicant:

Massachusetts Department of Transportation, Highway Division
Name

10 Park Plaza
Street Address

Boston
City

MA
State

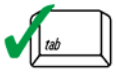
2116
Zip Code

Susan McArthur
Contact person

Telephone Number (home)

857-368-8807
Telephone Number (work)

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



3. Authorized Agent:

Massachusetts Department of Transportation, Highway Division
Name

10 Park Plaza
Street Address

Boston
City

MA
State

02116
Zip Code

Tim Dexter
Contact person

Telephone Number (home)

857-368-8794
Telephone Number (work)

B. Project Information

1. Project Location:

Bridge Street
Street Address

Chatham
City

Mitchell River
Nearest or Adjacent Waterbody

2. Project Name (if any):

Bridge Street over Mitchell River (Bridge # C-07-001) Bridge Replacement

B. Project Information (cont.)

3. Will the proposed project occur in any wetlands or waters designated as "Outstanding Resource Waters"?

   ☐ Yes ☒ No

   If yes, has public notice been published in the Environmental Monitor?

   ☐ Yes ☒ No

   To be published
   Date of Publication

4. Identify the loss, or alteration, in square feet of each type of resource area (see Application instructions for additional information.):

   a. Land under water: 12,310 (10,491 temporary; 1,819 permanent) square feet

   b. Other Resources: _____ square feet

5. Does this project require a license from the Federal Energy Regulatory Commission?

   ☐ Yes ☒ No If yes, see Application Instructions for additional information needed.

6. Is the project categorically subject to MEPA?

   ☐ Yes ☒ No

   If yes, has final action been taken?

   ☐ Yes ☐ No

   If yes, please include copy of MEPA certificate.

7. Is any of your proposed work exempt from the Massachusetts Wetlands Protection Act or taking place in a federal non-state wetland?

   ☒ Yes ☐ No If yes, see Application Instructions for additional information needed.

C. Description of Proposed Dredging Site

1. a. Describe in general the proposed project or activity, including the purpose and intended use of the project, and the duration of the work within any waterbody:

   The existing bridge will be demolished and replaced with a new structure in the same location, along the same alignment. The bridge will be closed during demolition and construction. See attached narrative for more detailed, bridge-specific descriptions.

C. Description of Proposed Dredging Site (cont.)

b. Date activity is to commence: Spring 2014

c. What is the expected frequency of maintenance dredging of this project? N/A

2. Attach plan(s) of the proposed project as follows:

☒ Include a copy of the appropriate portion from the USGS quadrangle map for this project site. Include the identification number and name of the USGS quad map.

Plan view.
The plan view of the proposed activity should show the following:

☒ Existing shorelines.
☒ North arrow.
☒ Mean high and low water lines if the proposed activity is located in tidal areas.
☒ Water depths around the project.
☐ Seaward distance from an existing permanent fixed structure or object.
☐ Distance between proposed activity and navigation channel, where applicable.
☐ Location of structures, if any, in navigable waters immediately adjacent to the proposed activity
☒ Ebb and flood in tidal waters and direction of flow in rivers.
☒ Graphic and numerical scale.
☐ Ordinary high water line for inland water.
☒ Principal dimensions of the structure or work and extent of encroachment beyond the applicable high water line.
☐ Harbor lines, if established and known.
☒ Location of any vegetated wetlands or wetland resource areas.
☐ Proximity to any designated Areas of Critical Environmental Concern.

Elevation and/or Section View.
The elevation and/or section view of the proposed project should show the following:

☒ Same water elevations as the plan view.
☒ Graph and numerical scale.
☒ Depth at waterward face of proposed work. Show dredging grade.
☒ Cross-section of excavation including approximate side slopes.

3. a. What are the length, width, depth and volume of the proposed project?

Length: 47-54 feet
Feet

Width: 4-21 feet
Feet

Depth: 2-4 feet
Feet

Volume: 543 CY
Cubic yards

C. Description of Proposed Dredging Site (cont.)

b. Is the proposed project considered:

i. a new project,

☒ Yes ☐ No

ii. maintenance of an existing project?

☐ Yes ☒ No

iii. when was the project last dredged?

Date

Permit/License Name and Number

c. Describe in complete detail the physical dredging operation including descriptions of the type of dredge equipment, i.e., hopper dredge, hydraulic dredge, etc., the type of transportation to be used from the dredge site to the disposal site, the method of release of the dredged material into the disposal site, and the name of the contractor if other than the applicant.
Excavation/dredging will be via mechanical means (excavator, auger or crane). Excavated material will be dewatered on site and then transported offsite by truck for disposal on land. No contractor has been selected at this time and the disposal site will be determined after contract is awarded.

d. Describe all measures designed to avoid and minimize adverse impacts of the project on aquatic life and the aquatic ecosystem. Where impacts cannot be avoided or minimized, what mitigation measures are proposed? (See Application Instructions.)
As recommended by MADMF, work-in-water activities will be contained to minimize impacts on spawning winter flounder, restriction of fish passage will be minimized to the best extent practicable, and bridge elements will not be placed in eel grass beds. Turbidity curtains and temporary control of water structures will be utilized to avoid sedimentation impacts. The majority of in water work will be conducted within control of water structures that have been dewatered to minimize impacts to aquatic environments.

4. Historical Parameters:

To the best of your knowledge, does the proposed project are have any past history of:

a. chemical or oil spills of discharge?	☐ Yes	☒ No
b. Upstream or on-site industrial or municipal discharge within 1,000 feet of the proposed project?	☐ Yes	☒ No
c. chronic pollutant loading from port or harbor use and/or other sources of pollutants? (eg. CSO or POTW discharges)	☐ Yes	☒ No

C. Description of Proposed Dredging Site (cont.)

If yes to any questions in Item C-4, provide as much historical information as you have, including dates, amounts, concentrations, etc. of such spills or discharge. Attach additional sheets if necessary.

D. Description of Material to be Dredged

1. Grain Size Analysis:

   See application for sampling and analysis requirements.

   Percentage of total by weight passing

BB-3: 96; BB-5: 99 No. 4 Sieve	BB-3: 44; BB-5: 68 No. 60 Sieve
BB-3: 90; BB-5: 97 No. 10 Sieve	See sampling report (No. 140 & No. 270 Sieve) No. 200 Sieve
BB-3: 64; BB-5: 86 No. 40 Sieve	

2. Chemical Analysis of Sediment:

   See application instructions for sampling and analysis requirements. List constituents in mg/kg (ppm) dry weight unless otherwise indicated.

BB-3: 21.6; BB-5: 11.1 arsenic	BB-3: <0.78; BB-5: <0.703 cadmium
BB-3: 4.95; BB-5: 11.2 chromium	BB-3: 4.42; BB-5: 8.82 copper
BB-3: 4.27; BB-5: 8.82 lead	BB-3: <0.0589; BB-5: <0.0582 mercury
BB-3: <6.24; BB-5: 10 nickel	BB-3: 12.8; BB-5: 24 zinc
See sampling report PCBs (polychlorinated biphenyls)	See sampling report PAHs (polynuclear aromatic hydrocarbons)
See sampling report TPH (total petroleum hydrocarbons)	See sampling report EPH (extractable petroleum hydrocarbons
See sampling report volatile solids (percent)	BB-3: 20.1; BB-5: 19.4 water (percent)

E. Description of the Disposal Site for Dredged Material

1. For ocean disposal sites:

   a. Location of proposed disposal site and its physical boundaries.

   b. Has the site been designated by the state of E.P.A. as a dredge disposal site?

   ☐ Yes ☐ No

   If no, give a description of the characteristics of the proposed disposal site and an explanation as to why no currently designated site is feasible for this project.

   c. Is the anticipated disposal site located within a designated ocean sanctuary as established by federal law or G.L.c. 132A, sec. 13?

   ☐ Yes ☐ No

   If yes, which sanctuary?

2. For disposal sites or dewatering sites on land (landward of mean high water), see instructions

   a. Location of proposed disposal and dewatering sites and physical boundaries.

   b. Indicate drainage characteristics of dewatering and disposal sites from the results of test pits, borings, and percolation tests as applicable.

   Water from the dewatering process will be routed through a sedimentation tank before being discharged back into the river.

   c. How long are the dewatering and disposal sites estimated to be in use from this project? From future projects?

   Dewatering and disposal will be performed during excavation portions of the project and intermittent pumping and disposal will occur throughout the period of work performed within cofferdams.

E. Description of the Disposal Site for Dredged Material (cont.)

d. Include plans for effluent control at the dewatering and disposal sites.

3. For proposed dewatering of dredged sediment on a barge, provide plans for adequate containment

F. Certification

Application is hereby made for Water Quality Certification concerning the activities described herein. I certify that I am familiar with the information contained in this application, and that to the best of my knowledge and belief such information is true, complete, and accurate. I further certify that I possess the authority to undertake the proposed activities.

12/17/12
Date

Susan McArthur
Signature of Applicant or Authorized Agent

The application must be signed by the applicant; however, it may be signed by a duly authorized agent (named in Item 2) if this form is accompanied by a statement by the applicant designating the agent and agreeing to furnish upon request, supplemental information in support of the application.

Narrative and Plans

NARRATIVE

Bridge Replacement, C-07-001
Bridge Street over Mitchell River
Chatham, Massachusetts

1. Existing Conditions

Bridge Number C-07-001 (437) carries Bridge Street over the Mitchell River in the town of Chatham. The bridge is located on Bridge Street, between Stage Harbor Road and the intersection of Main Street and Morris Island Road, approximately 1.5 miles (2.4 km) from the mouth of the river. The majority of boat traffic on the river is recreational, consisting of sailboats, pleasure craft, and canoes/kayaks. According to the harbormaster, approximately 90% of the bridge openings are associated with boats being transported to and from Pease Boat Works and Marine Railway, which builds, repairs, and restores boats upstream of the existing bridge.

The existing bridge has a horizontal clearance of approximately 19 feet (5.8 meters) and a vertical clearance of 7 feet, 2 inches (2.2 m) with the bridge closed. The superstructure of the bridge consists of a twelve span timber trestle structure with span eight a bascule type lift span. The bridge has a curb-to-curb width of 24'-0" (7.3 m) and carries one traffic lane in each direction. For spans two through seven and nine through eleven there are 6'-9" (2.1 m) wide sidewalks on both sides of the bridge and 14" x 8" timbers separating the sidewalk from the roadway on both sides. The total out-to-out width of the bridge within these spans is 37'-6" (11.4 m). For spans one, eight and twelve there are 3'-9" (1.1 m) wide sidewalks on both sides of the bridge and 14" x 8" timbers separating the sidewalk from the roadway on both sides. The total out-to-out width of the bridge within these spans is 31'-6" (9.6 m). The decking is composed of 4" timber decking with a 3" timber wearing surface. The overall length of the superstructure is 192' (58.5 m), with a draw span length of 23'-0" (7.0 m). The substructure consists of concrete abutments with timber piles, and timber pier caps founded on timber piles.

The bascule span is raised using lift hoists that are located in the sidewalks on the east end of the span. An electrical control cabinet is located on the northwest side of the bridge. The bridge is equipped with manually operated wood frame safety gates and traffic signals on both approaches. An existing submarine cable spans the length of the drawspan to connect the operating equipment for the bridge, which will be removed as part of the project.

Based on the October 5, 2010 MassDOT Structures Inspection Field Report (prepared by MassDOT) the condition of the critical bridge elements are as follows:

Deck:	5
Superstructure:	6
Substructure:	4

Bridge Street is classified as an Urban Collector and runs between Stage Harbor Road and Main Street running over the Mitchell River. Bridge Street is not part of the National Highway Inventory. The area itself is considered residential to the east of the bridge and recreational/business to the west of the bridge. There is a marina on the southerly side of Bridge Street just west of the bridge location with a town boat ramp directly across the street on the north side of Bridge Street.

The existing horizontal alignment is essentially straight with an 8,315 foot (2,534.4 m) radius curve ending just before the abutment at station 9+48.00. The existing roadway carries one lane of traffic in each direction with a constant 24'-0" (7.3 m) curb-to-curb width at both approaches within 100' (30.48 m) of the bridge limits. On street parking is available in front of the Marina

and along the northerly side of Bridge Street on both sides of the bridge. Boats are sometimes stored in close proximity to the roadway at the marina. The existing sidewalks are situated between the curb and retaining wall and vary in width from 3 to 4 feet (0.9 to 1.2 m). Horizontally, the sidewalks were constructed between the stop signals/stop gates and the abutments and are approximately 100 feet (30.48 m) long on each side of the bridge. There are no sidewalks along Bridge Street beyond the structure.

The Mitchell River, in the vicinity of the project site is a tidal estuary that flows to the south. A portion of Bridge Street near the Mitchell River crossing was built as a causeway. The shores of the causeway are lined with riprap. Tidal flats and salt marsh characterize the intertidal zones. The existing channel is approximately 193' (58.8) wide at the top of the riprap slope. The channel is navigable with specified course under the lift span. The square channel opening below the bascule is approximately 19'-4" (5.9 m) face-to-face of the existing fender system. The existing bascule span does not provide a full 19'-4" (5.9 m) of horizontal clearance when in the open position as the bascule span cannot be lifted to a full vertical position. The elevation of the channel bottom varies from -2.4± ft at mean low tide and +1.6± ft at mean high tide (NAVD 88).

Waters of the United States were delineated, flagged, and located via a topographic survey; and the following resource boundaries are shown on the plans: salt marsh, isolated vegetated wetland, High Tide Line, Mean High Water, and Mean Low Water. On the east side of the bridge, salt marsh extends up from the bank of the river before transitioning to upland forest. An isolated vegetated wetland is located in the southeast quadrant of the bridge. The west side of the bridge is heavily developed in the southwest quadrant, leaving no jurisdictional wetlands in the vicinity of the bridge; however a section of salt marsh was delineated in the northwest quadrant between the abutment and the boat ramp.

The Massachusetts Division of Marine Fisheries (MADMF) has identified the waters of Stage Harbor and surrounding embayment's as winter flounder (*Pseudopleuronectes americanus*) spawning habitat. The Massachusetts Natural Heritage and Endangered Species Program (NHESP) has indicated that the following state-listed rare species have been found in the vicinity of the site: roseate tern (*Sterna dougallii*), common tern (*Sterna hirundo*), arctic tern (*Sterna paradisaea*), and least tern (*Sternula antillarum*). The National Marine Fisheries Service (NMFS) identified the Mitchell River as habitat for Atlantic sturgeon (*Acipenser oxyrinchus*).

2. Proposed Conditions

This proposed project consists of a 195 foot (59.4 m) long, six-span bridge with a single-leaf bascule span over a 25 foot (7.6 m) clear horizontal navigation channel. The approach superstructure would include a timber wearing surface with the planks oriented diagonally to the roadway centerline. The timber wearing surface is attached to a timber structural deck. The timber structural deck is supported on glue-laminated (Glulam) lumber stringers. Crash-tested timber traffic railings, meeting AASHTO and NCHRP 350 requirements, separate the roadway from the sidewalk. The timber bridge railing may incorporate components from the existing wood railing.

The proposed substructure over the waterway consists of pile bents with concrete-filled, driven steel pipe piles, and reinforced concrete caps. The substructure at the ends of the bridge consists of pile-supported concrete abutments. The abutments include integral concrete wing walls (retaining walls) that extend along the approach roadway at the back of sidewalk to retain the roadway embankment. The embankments adjacent to the abutments and retaining walls along the waterway have riprap slope protection.

The proposed bascule span channel will provide 25 feet (7.6 m) of horizontal width between fenders, 7'-2" (2.2 m) of vertical clearance above mean high water when the bascule leaf is in the

lowered position. In accordance with a requirement of the U.S. Coast Guard, the replacement structure will offer unlimited vertical clearance with the bascule leaf fully raised. The pivot for the bascule leaf is located on the west side of the navigation channel. The bascule leaf is approximately 33 feet (10.1 m) from pivot to tip, and rotates to completely clear the fender with the bascule leaf fully raised. In order to reduce the loads on the operating machinery, the bascule leaf is balanced by a 12.6 foot (3.8 m) long counterweight consisting of a steel counterweight box filled with concrete and steel ballast. The drive machinery consists of two independent drive trains each directly coupled to the outboard end of the trunnion shafts. A means to manually operate the bridge is integrated into the drive train in the event of a complete loss of power to the motors. As the channel is unlikely to be dredged in the future, a new submarine cable is proposed to be installed 5 feet (1.52 m) below the bottom of channel, which is 1' deeper than U.S. Army Corps of Engineers (USACOE) requirements. The cable will be jet plowed into the sediment between the bascule pier and rest pier.

The bascule leaf superstructure consists of a timber wearing surface with the planks oriented diagonally to the roadway centerline. The timber wearing surface at the bascule span is supported on and attached to steel open grid flooring panels. The proposed bascule leaf is supported on a concrete bascule pier and a concrete rest pier. The bascule pier and rest pier are supported on concrete-filled driven steel pipe piles. The exterior faces of the bascule pier would include stone facing using materials and details consistent with the local landscape. The fender system on each side of the navigation channel consists of a combination of horizontal and vertical timber members attached to the face of the concrete bascule pier and the rest pier.

3. Construction Sequence

Construction of the bridge is expected to begin in spring 2014 and last approximately 24-28 months. A full roadway traffic detour will be in place during construction, with the new bridge being constructed in one stage. The detour length is approximately 3 miles and would route traffic onto Stage Harbor Road then Main Street, and back to Bridge Street. Demolition of the existing bridge is anticipated to take approximately 3 months.

In general, the construction sequence will be as follows:

i. Install erosion and sedimentation controls and debris containment devices under existing bridge and along embankments.
ii. Demolish existing superstructure and substructure (excluding abutments), remove submarine cable, and completely remove or cut-off existing timber piles 2-feet below existing mudline (all piles in new navigational channel will be removed completely).
iii. Place turbidity curtains around the location of the new bascule pier and rest pier (to be removed directly after installation of sheet pile cofferdams).
iv. Install steel sheet pile cofferdams for use in construction of bascule pier, abutments, and rest pier footing.
v. Excavate waterway bottom surface material inside bascule pier and rest pier cofferdams to required depth.
vi. Store and dewater excavated material on a barge, filter water before discharge to waterway, and dispose excavated material off-site in approved and permitted disposal site.
vii. Drive steel pipe piles for new foundations and fill with concrete.
viii. Place seal concrete within cofferdams.
ix. Dewater cofferdam and construct bascule pier and rest pier footing and walls in the dry (cofferdam can be removed as soon as concrete construction is complete).
x. Place turbidity curtains around work area and drive fender piles and install fender wales and supports (turbidity barriers will be removed after pile driving complete).
xi. Erect bascule leaf steel framing, install counterweight ballast, install operating equipment (electrical and mechanical), and construct bascule span timber deck and railings.

xii. Place turbidity curtains around work area and install submarine cable from bascule pier to rest pier to a minimum depth of 5-feet below the lower of the authorized dredge depth or existing waterway bottom (turbidity barriers will be removed after cable installation).
xiii. Make bascule span operable and test functionality and safety.
xiv. Place turbidity barriers around work zone and drive steel pipe piles for intermediate pile bents and fill with concrete (turbidity barriers will be removed after pile driving complete).
xv. Construct intermediate pile bent caps.
xvi. Place upland erosion and sedimentation controls and turbidity curtains around work area and install steel sheet pile cofferdams for use in construction of abutment footings and walls in the dry (turbidity curtains will be removed directly after installation of sheet pile cofferdams).
xvii. Excavate existing riprap and demolish existing abutments.
xviii. Excavate inside abutment cofferdams to required depth.
xix. Store and dewater excavated material from abutments, filter water before discharge to waterway, and dispose material off-site in approved and permitted disposal site.
xx. Drive steel pipe piles for new foundations and fill with concrete.
xxi. Place seal concrete within abutment cofferdams.
xxii. Construct new abutment footings and walls and drainage structures.
xxiii. Backfill and compact embankments behind abutments with new clean, granular backfill material.
xxiv. Construct approach roadways on newly constructed embankments including grading and roadway base material.
xxv. Install new abutment riprap slope protection.
xxvi. Begin site restoration for temporary salt marsh impact.
xxvii. Erect timber approach span superstructure beams, deck and railings.
xxviii. Complete final paving, barriers, and signage.
xxix. Complete site restoration of salt marsh and any other disturbed areas.
xxx. Remove erosion and sedimentation control devices upon establishment of vegetation.

* Turbidity curtains may be installed or moved as needed, in areas shown on the plans, in order to ensure turbidity is contained at all in-water work areas and to minimize the waterway width that is blocked, in accordance with: MADMF letter dated 9/10/09; MADMF email dated 7/3/12; and NMFS email dated 11/27/12.

4. Wetland Impacts

The project involves activities in federal and state wetland resource areas that will require a USACOE Section 404 Category II MA General Permit and a 401 Minor Dredge Water Quality Certification. The project will impact 12,310 sf of Land Under Water (LUW)/Ocean, of which 10,491 sf is temporary and 1,819 sf is permanent. A total of approximately 543 cubic yards of material will be dredged at the site (within resource areas) to provide scour protection for the abutments and to construct the bascule pier and rest. The permanent impact to LUW/Ocean is due to the removal of the existing pier piles, replacing the existing riprap in front of the abutments, installation of new pier piles, and construction of a new bascule pier and rest pier. The temporary impact is due mainly to the use of turbidity barriers during the removal of existing piles and installation of new pier piles (the limits of the turbidity barrier were utilized to calculate the temporary impact).

LUW/Ocean (impact in square feet)

Location	Reason	Temporary	Permanent	Total
West Abutment	Riprap/Restoration	1,887	126	2,013
East Abutment	Riprap/Restoration	1,727	188	1,915
Piers	New Substructure	6,877	1,505	8,382
			Total	12,310

The project does not propose direct impacts to salt marsh, however, the limits of work are adjacent to a portion of salt marsh in the northwest quadrant of the project. In this location, steel sheeting is proposed immediately behind the limits of an existing fringe salt marsh. The area associated with the steel sheeting installation is currently degraded by pieces of asphalt that have been discarded at the toe of slope. Upon removal of the steel sheeting, this degraded area will be enhanced through the planting of salt marsh, and should consequently increase the size of salt marsh at the site. In the event that existing salt marsh is temporarily impacted during the installation or removal of the steel sheeting, the salt marsh enhancement area will extend into the areas that were impacted, and consequently any unanticipated impacts to salt marsh will be mitigated at the same time the proposed salt marsh enhancement area is planted (see Section 5 below).

5. Wetland Enhancement

A salt marsh enhancement area is proposed for in the northwest quadrant of the bridge, adjacent to an existing salt marsh area. The project design was able to avoid all permanent and temporary impacts to salt marsh, however, the project limit does directly abut an area of salt marsh. The current design calls for the contractor to drive steel sheeting on the outside edge of the existing salt marsh area to minimize impacts to wetlands and to provide a dry work zone during construction. After the steel sheeting has been removed, the contractor will place suitable material in the area previously occupied by the sheeting, and plant two staggered rows of smooth cordgrass (*Spartina alterniflora*) with 2-inch peat pots spaced at 12 inches on center.

To prepare the site, the sheet piles will be removed during low tide, to avoid sedimentation impacts in the waterway. If necessary, the contractor will remove 12-inches of material and replace with clean sand fill covered with a coir mat suitable for planting smooth cordgrass. Once the site has been planted, a goose fence will be installed and the site will be monitored by a certified wetland scientist. See the following attached items for more information: ITEM 755.2 Wetland Enhancement Areas; and ITEM 755.7 Wetland Specialist.

6. Sedimentation Control

Prior to construction, compost filter tubes will be placed along the perimeter of the work area as shown on the construction plans. A turbidity curtain will be placed around the existing piers during pile removal and during installation of new piles in the waterway. The turbidity curtain will be phased during water work as shown on the plans, to avoid blocking large portions of the river to fish passage. Control of water structures (i.e. steel pile cofferdams) will be installed in order to build the bascule pier, the rest pier, and the abutments. The control of water structure at the abutments will also facilitate the excavation and replacement of riprap in dry conditions. Once installed, the control of water structures will serve to control sedimentation in the waterway during construction.

7. Dewatering

It is anticipated that a control of water structure will be used in order to construct the bascule pier, the rest pier, and the abutments, as well as replace the existing riprap “in the dry.” The control of

water structure will be comprised of steel sheeting, as there is no other practicable alternative. Water from the dewatering process will be routed through a sedimentation tank before being discharged back into the river. It will be the responsibility of the contractor to determine the means and methods for the dewatering techniques.

Steel sheeting being used for dewatering activities will be phased during the project to accommodate MADMF and NMFS recommendations. The MADMF provided three recommendations for the project: prohibit work-in-water activities between January 15 and May 31 if silt producing activities cannot be contained, restrict blocking of more than 25% of the river at any one time, and avoid placing bridge elements in nearby eelgrass beds. Follow up coordination with DMF on July 3, 2012 changes the recommendation of blocking no more than 25% of the river at any one time, to constructing the piers one by one and minimizing the restriction of passage to the best extent practicable.

Steel sheet pile cofferdams within the waterway will be installed behind turbidity curtains, and used to create a dry environment for the demolition of the existing abutments and for construction of the new bascule pier, rest pier and abutments. Turbidity barriers will be placed around the steel sheet piling during installation and once the steel sheet piling has been installed, the turbidity barriers may be removed, as the sheet piling will adequately contain sediments produced by construction activities performed within the cofferdams. There are some sections of steel sheeting that will be installed within the intertidal zone in order to construct retaining walls associated with the roadway approach. These steel sheets shall be installed during low tide to avoid the displacement of sediment into the water column. All cofferdams will be dewatered in order to permit demolition and construction operations in the dry. Water that is removed from the cofferdams during dewatering operations will be collected and filtered to remove sediments before discharge into the waterway.

8. Storm Water Management

The existing drainage system at the bridge consists of two catch basins on the east side of the bridge with a drainage outlet in the northeast quadrant. The proposed design will replace these catch basins on the east side of the bridge with deep sump catch basins and replacing the existing outlet with a concrete pipe and concrete headwall. On the west side of the bridge, where there are no drainage structures at the bridge approach, two new deep sump catch basins are proposed with a concrete pipe and headwall draining in the northwest quadrant of the bridge. The new drainage system is an upgrade over the existing system, where there is no current sediment discharge control.

9. Fisheries and Wildlife/Natural Heritage Endangered Species/Vernal Pools

The U.S. Fish and Wildlife Service (USFWS) stated (letter dated 10/21/09) that the federally endangered roseate tern (*Sterna dougallii*) is known to occur in proximity to the project area. However, due to the limited size of the project and the abundance of feeding areas available to terns in the vicinity, the agency determined that the project is not likely to adversely affect the roseate tern.

The NHESP of the Massachusetts Department of Fisheries and Wildlife stated (letter dated 4/22/10) that the project site is located in Priority Habitat as indicated in the Massachusetts Natural Heritage Atlas (13th edition). Specifically, this project is within the habitat of Common Tern (*Sterna hirundo*), Artic Tern (*Sterna paradisaea*), and Least Tern (*Sterna antillarum*), which are state-listed as Species of Special Concern and Roaseate Tern (*Sterna dougallii*), which is state-listed as Endangered pursuant to the Massachusetts Endangered Species Act. The bridge is partially within mapped foraging habitat of these species, but will not negatively affect them. The NHESP finds that this project, as currently proposed, will not constitute a prohibited "take"

because it appears that construction activities at this site will not be detrimental to foraging or reproductive success.

The NMFS identified (letter dated 7/27/12) the presence of the federally listed Atlantic sturgeon (*Acipenser oxyrinchus*) in the vicinity of the project area. MassDOT is currently in consultation with NMFS regarding this listed species. A recent analysis has determined that the proposed project may affect, but is not likely to adversely affect Atlantic sturgeon. The Section 7 determination of no affect to Atlantic sturgeon has been submitted to NMFS concurrently with this application.

10. Alternative Analysis

Four alternatives were evaluated in addition to the No-Build alternative.

- Alternative A – No-Build Alternative

  The no-build alternative would entail leaving the existing bridge in place, including all superstructure, substructure, and scour protection elements. Under the No-Build Alternative, maintenance of the bridge would continue until it could no longer safely support live load traffic or until the bascule span could no longer function. At that time, the bridge would either be dismantled or permanently closed with the bascule span in the full open position to allow the unconstrained flow of boat traffic through the channel. No longer able to cross the Mitchell River Bridge, vehicular traffic would be detoured onto Stage Harbor Road and then to Main Street, a distance of approximately 3 miles. Given the traffic count numbers and the detour would be along routes of similar classification, it is anticipated that the detour route would have the capacity to handle the added traffic volumes. Pedestrian and bike traffic would also be required to use the detour route. Permanent closure of the bridge would limit access to recreational users of the bridge and areas adjacent to the bridge due to concerns over the safety of the structure.

- Alternative B – Bridge Rehabilitation

  The existing bridge structure has been rebuilt and rehabilitated many times over the operation of the bridge. Most recently, the superstructure of the bridge was replaced in 1980. The environmental setting in which the bridge is located (i.e. tidal river near the ocean, with exposure to offshore storm events and storm surges), in combination with the materials used in the original bridge construction (i.e. timber piles and timber deck), has led to accelerated deterioration of the bridge elements. The cost to rehabilitate the existing structure over time far outweighs the cost of a full bridge replacement.

- Alternative C – Bridge Replacement with High Level Structure

  Replacing the bridge with a non-movable structure would require designing a high level structure, in order to maintain the navigational channel of the river. A high level structure would satisfy the requirements of maintaining the navigational channel; however it would introduce impacts to businesses and residences along Bridge Street, as the profile of the approach roadways would need to be raised in order to accommodate the structure. Additionally, impacts to wetlands resource areas would increase.

- Alternative D – Bridge Replacement with Bascule Span (Preferred Alternative)

  The preferred alternative is the full bridge replacement with a new single leaf bascule span bridge as described in the project description. This alternative has been designed

to improve roadway function and safety, as well as improve the necessary horizontal and vertical clearances through the navigational channel. In addition, the preferred alternative strikes the appropriate balance between maintenance and reliability issues and context sensitive design.

- Alternative E – Build on a New Location
  Building a bridge on a new location was not considered to be a feasible or prudent. This alternative would require construction of a new bridge and approach roadways on new location either to the north or south of their current location, while maintaining roadway access between Stage Harbor Road and Main Street in Chatham. The project area is an ecologically sensitive location, having wetlands (including salt marsh), shellfish growing areas, anadromous fish species habitat, FEMA floodplain, publicly owned parcels, residences, and the Stage Harbor Marina all within close proximity of the bridge. The bridge is located at the narrowest point of the Mitchell River. A replacement structure on a new location would require a longer span, resulting in substantially greater disruption of the previously mentioned natural and social environmental resources and greatly increased construction cost.

11. Dredging

Impacts to LUW/Ocean that necessitate the removal and disposal of sediment are considered dredging impacts. Proposed dredging is for construction of the bascule pier, the rest pier, and placement of riprap to provide scour protection to the abutments. Dredging will conclude at the completion of the project and no maintenance dredging is proposed as part of the project. The location and volumes are summarized below and in the table located in the attached plans. A total of 543 CY of material will be dredged below the high tide line. All dredging impacts are associated with the removal and replacement of riprap along the newly constructed abutments and wingwalls. The dredged materials will be disposed of at an upland and off-site disposal site, identified by the contractor after the contract is awarded.

12. Specifications to be included into the contract

- ☑ Demo
- ☑ Wetland/Salt Marsh Enhancement
- ☑ Wetland Specialist
- ☐ Mussel Survey/Transplant Protocol
- ☐ Vegetation Survey/Transplant Protocol

ITEM 755.2 WETLAND ENHANCEMENT AREAS – TIDAL SY

Work under these items shall conform to the relevant provisions of Sections 120 and the following:

The work under this Item includes the furnishing of all labor, transportation, equipment, materials and plants required for construction, protection, and maintenance of the Tidal Wetland Enhancement Area as compensation for potential proposed impacts to existing tidal wetlands that may occur due to location of steel sheeting. Tasks include erosion controls, goose fence installation, planting (including substrate), maintenance and removals as shown on the Plans and as required by the Engineer.

DESCRIPTION OF WORK
To ensure that no loss of wetland function results from the proposed project, the Tidal Wetland Enhancement Area characterized by Salt Marsh shall be constructed in the area shown on the Plans. Tidal Wetland Enhancement Area shall hereafter be referred to as Enhancement Area. The following minimum area requirements shall be met for the Enhancement Area location shown on the Plans.

Enhancement Area:
Salt Marsh enhancement area = 76 sf.
Located in the northwest quadrant of the project area. The area is immediately adjacent to the western approach to the bridge, between stations 8+70 and 9+30, between the proposed edge of riprap and the existing edge of salt marsh.
Salt Marsh mitigation area = to be detemined by Wetland Specialist
Located in the approx same location as the enhancement area. If the existing salt marsh is impacted due to project activities (e.g. installation or removal of sheet pile cofferdams), those impacts will be mitigated for in-kind, through the work under this Item.

The Enhancement Area shall be constructed to meet the requirements of the permits and in accordance with the U.S. Army Corps of Engineers - New England District Compensatory Mitigation Guidance.

The Contractor shall retain a qualified Wetland Specialist as per Item 755.7 WETLAND SPECIALIST to coordinate and oversee work under this item. The Wetland Specialist shall report directly to the Resident Engineer and work independently of the wetland contractor.

The Contractor shall be responsible for protection and preservation of natural areas adjacent to the wetland enhancement area both within and outside of the project limits for the duration of the contract period. Access to the Enhancement Area shall be clearly defined in order to minimize damage to existing vegetation and soils. Although all replication and restoration locations can be accessed from adjacent upland areas, the Contractor shall use duck boards or mats, as necessary, to minimize impacts from foot paths or construction equipment. All labor and materials required for protection and preservation of the site shall be incidental to this item. Damage to soils or

vegetation due to trampling, vehicles, storing of materials, debris, or negligence shall be repaired to the satisfaction of the Engineer and at the Contractor's expense.

To protect new herbaceous plantings from grazing by geese, Goose Fence shall be installed according to the Plans in order to enclose tidal wetland planting areas and prevent geese from flying, swimming or walking into the area. All costs associated with installation, maintenance and removals of Goose Fence are incidental to this item.

RELATED ITEMS:
The following tasks related to work within the Enhancement Area shall be paid for under these separate items.

ITEM 755.7 WETLAND SPECIALIST

SUBMITTALS
Contractor shall submit the following for approval by the Engineer in consult with the MassDOT Landscape Architect at least sixty (60) days prior to installation. The Contractor shall make all submittals to the Engineer in a timely and complete manner.

Sand: Contractor shall submit for approval all sources of clean sand prior to ordering. Soil tests shall be provided to the Engineer for approval at least thirty (30) days prior to delivery. Off-site sources shall be identified and available for inspection by the Wetland Specialist prior to transport of sand to the site to verify that sand brought in from off-site is likely to be free of invasive plant species including all viable plant parts.

Plants: Source of plant material, confirmation of availability, and certification of provenance from the nursery supplier. Species substitutions must be approved in writing by the MassDOT Landscape Design Section prior to ordering and at least sixty (60) days prior to installation.

Photographic Documentation: Prior to any disturbance, clear and legible digital photographs with date and time stamps shall be taken of the existing site conditions including existing wetlands to be impacted, all proposed wetland mitigation sites and reference/model wetland areas, typically an adjacent undisturbed wetland. These shall be submitted to the Engineer on CD or DVD format.

<u>Samples:</u>

Cut sheets for erosion controls and goose fence materials.
1 foot square sample of silt fence
1 foot long sample of compost filter tube sock material
1 foot square sample of UV stabilized polypropylene netting
1 foot long sample of bird repellent ribbon
Sample(s) of planting substrate(s) tested and accepted, if needed.

MATERIALS
All materials are incidental to this item unless specified otherwise.

<u>Erosion Controls:</u>
Silt Fence:

Silt Fence shall conform to the requirements of Section 697 -- 'Sedimentation Fence" -- of the Standard Specifications amended as follows. Width of Geotextile fabric and length of stakes shall be sufficient to meet the installation requirements within the inter-tidal zone.

Soils:
Imported soils for planting shall be coarse sand conforming to the requirements of M1.04.0 Type 'a' Sand Borrow per Division III of the Standard Specifications. Compost or organic soil amendments shall not be used in tidal wetland areas. No soil or soil amendment shall be brought on site without prior approval of the material source and test results approved by the Engineer.

Existing clean sandy soil or existing peat mat in situ that is free of unacceptable materials and meets the target elevations shall be considered suitable for planting in salt marsh areas.

Soil within the top 1.0 ft of the proposed Enhancement Area surfaces shall be spot checked for unacceptable material. Unacceptable materials include hazardous materials or contamination, rubble, debris, large rocks, invasive plant material or other foreign matter. Unacceptable materials shall be removed from the site prior to final grading and/or planting.

Usable sand without organic matter may be stripped and stockpiled for re-use in salt marsh replication areas. Excavated soils shall be stockpiled outside resource areas and stored at least 100 feet from the edge of the wetland. Precautions shall be taken as necessary to prevent erosion of the stockpiled material. In the event there is excess borrow, it shall be disposed of without additional compensation.

Plant Material:
The Contractor shall provide plant materials in the quantities, species and sizes shown on the Plans.

All plant material shall conform to the current issue of American Standard for Nursery Stock (ASNS), ANSI Z-60.1, latest edition published by American Association of Nurserymen (AAN), with: American Standard for Nursery Stock (ASNS), ANSI Z60.1-2004, or latest edition, published by American Nursery and Landscape Association (ANLA), (formerly American Association of Nurserymen). Other subsequent references to AAN should likewise be revised to ANLA.

All plant material shall be species native to the region. As per current recommendations by the NOAA Restoration Center and the EPA Ecoregion Assessment, in order to maintain genetic diversity, only native species of seed and plants from the EPA Level III Ecoregion of the project area shall be used for ecosystem restoration. The EPA Level III Ecoregions of Massachusetts are Ecoregion 84 Atlantic Coastal Pine Barrens which encompasses Barnstable, Dukes, Nantucket and Plymouth Counties. Ecoregion 59 Northeastern Coastal Zone encompasses the remainder of Massachusetts. The current EPA map, Ecoregions of the Continental United States, is available through the following link: ftp://ftp.epa.gov/wed/ecoregions/us/Eco_Level_III_US.pdf
The nursery source shall certify that the provenance, or origin, of the seed from which the plants were produced is from the applicable EPA Level III Ecoregion.

Transplants and plant material collected from the wild is prohibited unless approved in writing by the MassDOT Landscape Architect and Wetland Specialist. The Wetland Specialist and MassDOT Landscape Architect will determine whether useable plant material can be harvested

from the existing salt marsh areas that will be impacted as a result of the construction. Plant materials shall be selected from certified nurseries that have been inspected by state and/or federal agencies. Nursery inspection certificates shall be furnished to the Engineer upon request.

All plant material used shall be nursery grown and healthy, sound and free of disease, insect pests, eggs or larvae, discolorations, leaf wilting or curling and weeds. Container grown stock shall have been grown in a container long enough for the root system to have developed sufficiently to hold its soil after removal from the container. Roots shall visibly extend to the inside face of the growing container, but shall not be root-bound or girdling. Plants grown in peat pots shall be well-rooted through the pot with 4-6 stems per pot and stems at least 6 inches in height.

Plant material intended for tidal wetlands shall be acclimated to the salinity of the adjacent water body. Many nurseries require the customer to inform them of the target salinity. Salinity acclimation shall be done incrementally at the nursery to bring the plants up to a tolerance of the site salinity. Plants shall be thriving in the nursery at the target salinity level for a minimum of two weeks prior to delivery.

All plants shall be delivered to the site as live, actively growing or just breaking dormancy, and arrive to the project site ready for planting. The Engineer and/or Wetland Specialist may reject plants damaged in handling or transport. Plant material shall be installed as soon as possible after it has been delivered to the site.

Soil and root mass shall be watered and moist upon delivery to the job site. Plants with dry soil and roots shall not be acceptable. All plant materials temporarily stored at the site prior to planting shall be stored out of direct exposure to sun and wind, shall be maintained by careful watering and shall be protected from damage due to construction activities and adverse weather. Plants stored improperly may be rejected and shall be replaced by the Contractor at no additional cost to MassDOT.

No plants shall be installed until the Wetland Specialist approves the condition of the plant material and the process of installation.

Requests for substitutions shall be submitted in writing to the Engineer for review by the MassDOT Landscape Architect at least ninety (90) days prior to planting. The Contractor shall submit a list of nurseries that were contacted and unable to supply the species as shown on the Plans. All proposed substitutes shall be in conformance with the requirements herein and suitable for the site conditions.

Controlled-release Fertilizer:

Fertilizer shall only be used for planting container or plug grown plants and not for seeding. Polymer-coated slow-release fertilizer derived from ammonium nitrate, ammonium phosphate, potassium sulfate and calcium phosphate. Duration of time release shall be an 8-9 month period at an average media temperature of 70 degrees Fahrenheit (21 degrees Celsius).

Guaranteed Analysis 13-13-13

Total Nitrogen (N)	13.00%
7.5% Ammoniacal Nitrogen	
5.5% Nitrate Nitrogen	

Available Phosphate (P205)	13.00%
Soluble Potash (K20)	13.00%

Application rate:

Container Size	Amount in bottom of each planting hole
Herbaceous plants in plugs or peat pots	0.64 ounces (18 grams) (Approximately = one heaping Tablespoon)

Goose Fence:

Netting:	UV-stabilized polypropylene netting, such as typical of deer netting, to be approved by MassDOT Landscape Architect
Structure:	square or quadrangular
Mesh size:	1-inch (max.) in either longitudinal or transversal direction
Color:	black
Tensile strength:	308 lbs. (min.)
Elongation:	20 % (max.)
Fasteners:	minimum 10-inch long UV-stabilized nylon cable ties
Posts:	2” x 2” untreated hardwood stakes. Metal stakes are not an acceptable substitute.
Overhead lines:	#18 white, braided nylon twine; 20# white polished hemp twine; or approved equal.
Bird repellent ribbon:	¾ - 2 inch wide holographic iridescent diffraction foil ribbon. Available from the following manufacturers or approved equal. ¾ inch wide: Holographic Bird Scare Tape from Dalen 2 inch wide: Tanglefoot Repeller Ribbon from Contech 2 inch wide: Irri-tape from Bird-X

Water:

Plant material shall be saturated with fresh water before delivery, upon delivery to the site and twice daily up to time of installation. The Contractor shall provide water and all equipment required at no extra cost. Water shall be suitable for irrigation and free from ingredients harmful to plants and wildlife. According to DEP requirements, water from the water body shall not be utilized. It is the Contractor's responsibility to correct injury or damage due to the lack of water, too much water or use of contaminated water.

METHODS

Site Preparation:

Prior to an initial site meeting, the Contractor shall stake out the Enhancement Area boundaries and set grade stakes in the field. Prior to start of work, the Contractor shall walk the site with the Engineer, Wetland Specialist, and MassDOT Landscape Architect for an initial site meeting. The purpose of the meeting is to verify limits of work, locations and installation of Phase 1 erosion controls, proposed construction methods, and grade stake elevations.

Erosion and Sediment Control:

The Contractor shall plan and execute operations in a manner minimizing the amount of excavated and exposed fill or other foreign materials that could be washed or otherwise carried into the Enhancement Area and nearby wetland resource areas. Erosion controls shall be in place prior to any construction activities.

The Engineer and Wetland Specialist shall inspect and approve erosion and sediment control measures prior to excavation work. The Contractor shall remove sediment deposits as necessary to maintain the filters in working condition. The Contractor shall maintain erosion controls in a functional condition at all times, including inspections after each rainfall and at least daily during prolonged rainfall and shall immediately correct all deficiencies.

Phase 1 Erosion Controls for Tidal Wetlands:
Silt fence shall serve as temporary erosion control during site preparation, excavation, grading and planting operations. Floating turbidity curtains shall not be acceptable for use above the mean low water line. Silt fence shall also act as a limit of work barrier for all heavy equipment. It is the Contractor's responsibility to ensure that adequate erosion control measures are in place and maintained to prevent suspended sediment and siltation from entering adjacent waters and wetlands.

It is expected that silt fence may not be necessary for the enhancement area. Based on consultation with the Wetland Scientist, if it is determined that the existing plantable area has suitable substrate, planting can be performed directly in existing suitable substrate. Disturbance and sedimentation will be minimal. If substrate is found to be unsuitable, a silt fence will be place at the edge of the enhancement area for excavation and replacement with suitable fill.

Silt fence shall be installed along the border of the existing salt march. The silt fence shall begin and end in the surrounding upland and shall be placed so that no excavated material or disturbed soil can enter adjacent wetlands or waters. Silt fencing shall be trenched into soil and secured to prevent sediment transport out of the work area. The top of siltation barrier shall extend above the highest tide elevations predicted for the period of work in order to contain suspended sediment within the work area during high tides and storm events. If necessary, silt fence shall be reinforced with wire or plastic mesh to withstand the forces of flooding and ebbing tides.

Immediately following acceptance of wetland planting, the silt fence shall be removed to allow unimpeded tidal flow across the site. Trenches and disturbed soil shall be restored to a smooth and level surface relative to surrounding areas. Exiting vegetation disturbed by erosion control installation and removals shall be replanted as directed by the Engineer and Wetland Specialist.

Excavation and Grading:

Final grades in the salt marsh replication areas shall conform to target elevations as shown on the Plans and as approved by the Wetland Specialist. These areas shall be staked and grades set for approval prior to excavation, and checked for accuracy following fill. The total area of Wetland Enhancement required by all permits shall not be reduced. Minimal excavation may be needed to provide suitable substrate for planting.

The Contractor shall confirm a minimum depth of one (1) foot of suitable planting substrate for the salt marsh enhancement area as defined in the materials section. If unacceptable material is found, it shall be removed from the soil. Soil that is beyond usable quality as determined by the Engineer and Wetland Specialist shall be disposed of off-site.

If suitable soils are not present at the required depth within the target elevations, the enhancement area shall be excavated to a depth of one (1) foot below proposed target elevations

and backfilled with clean, coarse sand. Special hydric soils or organic amendments are not required for tidal wetland areas.

Sequence and execution of work shall ensure minimal compaction and no heavy equipment moving over replacement soils. If heavy equipment is required to travel over existing wetland soils, wood mats shall be placed to minimize impacts. Upon acceptance of final grades, no heavy equipment or equipment shall travel across the enhancement area or adjacent wetland resource areas.
The Contractor shall identify existing areas of established invasive plants within the Enhancement Area and notify the Engineer and MassDOT Landscape Architect of the condition. Soil containing invasive plant material shall be excavated and disposed of off-site at an approved facility.

All cut trees, stumps, brush, wrack or vegetation not specified to remain shall be removed from the Enhancement Area unless directed otherwise by the Engineer and Wetland Specialist. Materials shall not to be stockpiled in the resource areas or buffer zone while awaiting disposal.

The finished grade shall be at an elevation that will provide a hydrologic connection between the replacement area and adjacent wetlands or water source. Plantings are specified between elevations 1.0’ to 2.6’.

After grading, Contractor shall allow a Settling Period of one full tide cycle, approximately two weeks, for substrates to settle before acceptance of final grades. Prior to planting, the Engineer and Wetland Specialist shall confirm that the target elevations have been achieved and provide approval of final grades to the Contractor. If settling or shifting occurs during the settling period, correct final grades before planting and removal of silt fence from salt marsh replication areas.

<u>Enahncement Area Planting:</u>
Planting shall be overseen by the Wetland Specialist. Plants shall be installed while planting surface is in the dry and according to the Plans. If planting includes more than one inter-tidal zone planting area, the Wetland Specialist shall flag out limits of inter-tidal zones prior to planting.

Plants shall be installed within the range of target elevations within the inter-tidal zone and at the spacing shown on the Plans. Discrepancies shall be resolved by the Engineer in consultation with the Wetland Specialist and MassDOT Landscape Design Section.

Plant material shall be installed as soon as possible after delivery. Plants stored onsite prior to planting shall be maintained in acceptable condition as described in materials section. Plants showing signs of stress or compromised health may be rejected by the Engineer or Wetland Specialist with replacement at the Contractor’s expense.

Firmly back fill hole by hand with the planting substrate to prevent dislodging from tidal action. There is potential for air pockets especially when planting in an existing peat substrate; care shall be taken not to leave air pockets in the planting hole. Stepping on the planting hole to back fill may cause stems to break and is not an acceptable practice.

Mulch shall not be used for plantings within the inter-tidal zone below the Mean High High Water (spring high tide) line.

Plants installed within the inter-tidal zone, or range of normal tidal flooding, shall not require additional watering after installation.

Herbaceous Plants:
Two-inch diameter *Spartina* plugs (with minimum of two culms/stems per plug) are specified to be planted 12-inches on center. Installation of herbaceous plants shall occur within the planting window of April 15 to June 30. Planting outside of these dates shall require written approval from the Engineer in coordination with the Wetland Specialist and MassDOT Landscape Design Section. Holes for planting shall be approximately 3" diameter and at a depth where roots are covered (typically 6-8 inches deep).

Goose Fence:
Goose fence shall be installed as perimeter protection for salt marsh mitigation areas prior to planting and according to the Plans. The Contractor shall ensure that the goose fence is maintained and wetland plantings are not grazed or disturbed by geese throughout the duration of the Establishment and Planting Guarantee Period. Any plants damaged or lost due to inadequate protection shall be replaced at the Contractor's expense.

Goose Fence shall consist of UV-stabilized polypropylene netting secured to stakes in order to enclose the tidal wetland planting area and prevent geese from flying, swimming or walking into the area. Wetland planting areas shall be divided by Goose Fence into sections no greater than 48 feet by 48 feet. The top of netting shall be at or above Mean High High Water (spring high tide) elevation to prevent geese from swimming into planting areas. A network of overhead lines shall be installed to prevent geese from flying into planting areas. Bird repellent ribbon shall be attached to the overhead lines and top edge of netting to warn birds of the obstructions.

The Contractor shall remove and properly dispose of all Goose Fence materials at the end of the second growing season after plants enter dormancy or as directed by the Resident Engineer.

Mitigation Performance Standards:
The Contractor shall fulfill the following minimum Mitigation Performance Standards for the Enhancement Area within a Planting Guarantee Period of two (2) full growing seasons. Monitoring shall be performed by the Wetland Specialist according to Item 755.7 WETLAND SPECIALIST.

1. The target elevations for the Enhancement Area and planting types have been met and maintained. A minimum of 90% of the wetland enhancement area must meet desired hydrology. Areas that are too high or too low should be identified along with suggested corrective measures.
2. Establish at least 80 percent uniform cover of the intended herbaceous wetland plant community.
3. All slopes, soils, substrates, and constructed features within and adjacent to the enhancement site(s) are stable.

Plant species listed as invasive by Massachusetts Invasive Plant Advisory Group (MIPAG) and the USACE – New England District shall be identified as such in the monitoring reports and corrective measures taken to control them within the limits of the Enhancement Area for the duration of the Planting Guarantee Period.

If at the end of the Planting Guarantee Period, the Mitigation Performance Standards have not been met according to the monitoring report, the Contractor shall provide corrective measures and install replacement plant material to achieve the required establishment. All costs associated with achieving the Mitigation Performance Standards through the Planting Guarantee Period shall be incidental to this item.

As-Built Drawings:
Following acceptance of the planting by MassDOT, as-built drawings of the Wetland Enhancement Area shall be surveyed and prepared as per the USACE - New England District's Compensatory Mitigation Guidance. As-built drawings shall be prepared at a clearly legible scale including 1-ft. contours and polygons outlining the wetland enhancement area. The as-built drawings shall serve to confirm that area requirements have been met and as the base map for mitigation monitoring. The as-built drawings shall be provided in printed paper format (full size 30" x 42" sheets) as well as Portable Document Format (e.g., Adobe PDF) and AutoCAD files on compact disk. As-built drawings shall be completed within 30 days of acceptance of initial wetland mitigation planting.

Monitoring and Maintenance:
Monitoring shall be performed by the Wetland Specialist in order to ensure compliance with the Mitigation Performance Standards. Monitoring methods and report content shall conform to the New England District Compensatory Mitigation Guidance, US ACOE, New England District (July 20, 2010). The monitoring schedule shall be as per Item 755.7 WETLAND SPECIALIST. Work performed by the Wetland Specialist shall be according to and paid for under Item 755.7 WETLAND SPECIALIST.

Based on monitoring results and as directed by the Engineer in consult with the MassDOT Landscape Design Section, the Contractor shall make corrective measures to achieve compliance with the Mitigation Performance Standards. All plants not showing satisfactory evidence of establishment during the Planting Guarantee Period shall be replaced within the appropriate planting window. Unsatisfactory plants shall be removed and replaced along with dead and missing plants.

Maintenance of the Enhancement Area shall include replacement of dead or missing plant material, maintaining goose fencing in functioning condition, removal of debris within and around the perimeter of Enhancement Area, correcting unintended ponding, erosion and gullies. Goose Fence shall be maintained in tidal Mitigation Areas for at least two full growing seasons. If tidal wetland plants are replaced, goose fence shall be maintained or be re-installed to protect seedlings from foraging for two full growing seasons. All maintenance shall be incidental to this item.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Within 10 days of the award of the contract, the Contractor shall submit, in duplicate, for approval by the Engineer, a schedule of unit prices and amounts for the major components of the Enhancenet Area as listed on the following table. The cost of labor and materials for any item not listed but required to complete the work under this item shall be considered incidental to the item and no further compensation will be allowed.

Item Component	Quantity	Unit
	Salt Marsh Replication/Restoration	
Goose Fence	120	FT
Coarse Sand Fill (ITEM 154)	3	CY
Spartina alterniflora (Smooth Cordgrass) 2-inch plugs	120	EA

Work for Item 755.2 WETLAND MITIGATION AREAS – TIDAL shall be measured and paid at the contract bid price per square yard, which price shall include full compensation for work herein.

Such payment shall be considered full compensation for all labor, tools, equipment, materials, travel and incidentals necessary to complete the work as described herein and in a manner satisfactory to the Engineer.

PAYMENT SCHEDULE
75 percent paid upon acceptance of initial planting.
25 percent paid at end of Planting guarantee period.

ITEM 755.7 **WETLAND SPECIALIST** **HOUR**

The Contractor shall retain the services of a Coastal Ecologist, Wetland Scientist, Wetland Ecologist, Restoration Ecologist, or other professional with similar qualifications hereafter referred to as the Wetland Specialist. The Wetland Specialist shall possess the knowledge and expertise to coordinate and oversee all work associated with wetland replication as defined herein, as shown on the Plans and as in Items 755.2 WETLAND ENHANCEMENT AREAS-TIDAL.

The Wetland Specialist shall serve as an expert advisor to the Engineer and report directly to the Resident Engineer.

QUALIFICATIONS

The Wetland Specialist shall have a minimum of five (5) years' experience in successful construction and monitoring of wetland mitigation areas that is similar to the project. The Wetland Specialist shall be thoroughly versed in the Commonwealth of Massachusetts Wetlands Protection Act (MGL C.131, s.40); U.S. Army Corps of Engineers New England District Compensatory Mitigation Guidance; and all other relevant regulations of the Massachusetts Department of Environmental Protection and the U.S. Army Corps of Engineers - New England District.

SUBMITTALS

Within sixty (60) days following the Notice to Proceed, the Contractor shall furnish proof of qualifications for the Wetland Specialist to the Engineer for approval in consult with the MassDOT Landscape Architect..

Proof of qualifications shall include, but not be limited to, the following items:

a. Narrative describing company, its expertise, technical qualifications and experience with wetland construction.
b. Resumes of individuals who will perform the work, if different from company description.
c. At least three (3) references from prior work of a similar nature that was completed in last five (5) years by the individuals who will perform the work. Provide contact information for each reference including address, phone number and email.
d. Provide a summary of each of reference project including nature of the work, project size, dates and period of construction and monitoring, methodologies used, and summary of success or not in terms of meeting performance objectives.
e. Provide a minimum of one before and one after photo for each reference project.
f. Provide a minimum of one complete set of monitoring reports for a similar project including a Final Assessment Report as per the U.S. Army Corps of Engineers New England District Compensatory Mitigation Guidance.

ITEM 755.7 (continued)

SCOPE OF WORK

The Wetland Specialist shall be responsible for oversight and monitoring of work associated with Items 755.2 WETLAND ENHANCEMENT AREAS- TIDAL including, but not limited to, the following tasks:

- Review environmental permits relevant to wetland replication and ensure compliance through the duration of the contract.
- Evaluate site and conditions prior to construction. Identify and inform the Engineer of unique site conditions that could require adjustments to the schedule, design or construction methods. For example, wildlife nesting, illegal dumping or presence of invasive plant species.
- Review suitability of material submittals prior to submission to the Engineer with copies to MassDOT Landscape Architect.
- Participate in site meetings as outlined in Items 755.2 WETLAND ENHANCEMENT AREAS- TIDAL.
- Review erosion controls (within the Mitigation Areas only), monitor construction impacts to adjacent areas and regulated wetland resources.
- Provide updates at project milestones according to Items 755.2 WETLAND ENHANCEMENT AREAS- TIDAL.
- Perform digital photo documentation through the duration of the contract and submit a photo archive on compact disk upon completion.
- Perform site observations at least two times during the growing season in late spring/early summer and again in late summer/early fall.
- Submit annual monitoring reports in the format provided in the US Army Corps of Engineers - New England District: Compensatory Mitigation Guidance.
- Make written recommendations on maintenance and corrective measures following each site observation in order to achieve the Mitigation Performance Standards.

The Wetland Specialist shall be responsible for oversight and approval of, including but not limited to, the following activities in coordination with the Contractor and Engineer.

- Location and boundaries of wetland enhancement area, limits of clearing and limits of work in the enhancement area.
- Installation and removal of erosion controls
- Target elevations and grade stakes prior to excavation
- Final grades prior to planting and/or seeding
- Flagging wetland plant locations prior to installation
- Planting installation and/or seeding procedures.
- Removal of goose fence

ITEM 755.7 (continued)

Monitoring reports shall be submitted no later than November 1 of each monitoring period. For each project update and monitoring report, submit one (1) printed copy and a digital copy in Portable Document Format (e.g., Adobe PDF) to the Engineer for distribution to the MassDOT Landscape Architect, MassDOT Environmental Services, U.S. Army Corps of Engineers, National Marine Fisheries Service (Habitat Conservation) and the US Environmental Protection Agency. All reports shall be marked with the applicable permit numbers and identifying information as required in the permits.

Monitoring:
Monitoring will be performed for the wetland replication areas in order to ensure satisfactory plant establishment and compliance with the Mitigation Performance Standards as defined in Items 755.2 WETLAND ENHANCEMENT AREAS- TIDAL.

Plant species listed as invasive by Massachusetts Invasive Plant Advisory Group (MIPAG) and the USACE – New England District shall be identified as such in the monitoring reports and corrective measures taken to control them within the limits of the wetland mitigation areas for the duration of the contract. The definition of invasive plant species referred to herein shall be as defined by Massachusetts Invasive Plant Advisory Group (MIPAG) and classified as Invasive, Likely Invasive or Potentially Invasive according to their current classification lists. MIPAG link: http://www.massnrc.org/MIPAG/
Invasive plant species shall also include those listed by the USACE New England District.

As per the monitoring schedule, the Wetland Specialist shall complete and submit a monitoring report detailing the relative success of the replication areas and make recommendations for maintenance and/or corrective measures. According to the USACE permit conditions, a growing season starts no later than May 31. Reports shall include data sheets. Data summaries shall be cumulative in each successive report.

ITEM 755.7 (continued)

Monitoring report requirements shall be as outlined in the USACE New England District Compensatory Mitigation Guidance and include the following.

- Identification of all plant species present
- Quantity installed and total mortality of each target plant species
- Percent cover for each plant species and overall percent cover for replication area
- Description of health and vigor of installed target species as well as volunteer plant species within the replication areas
- Changes in site conditions including topography, such as erosion, gullies, shifting or accretion of sediment, and hydrology, such as ponding, damming, breaches or other observed changes in water levels
- Salinity of tidal water flooding the wetland replication areas
- Condition of perimeter controls (such as goose fence) and erosion controls
- Evidence of pests, disease and invasive plant species
- If invasive plant species are identified in replication areas, measure and map approximate area of establishment for each species
- Photo documentation with date and time stamped photos
- Visual observations of fauna using or in the vicinity of the site at the time of monitoring
- Any other information required by permits, Massachusetts DEP and U.S. Army Corps of Engineers regulations and requirements.

Monitoring Report & Schedule:

1. End of First Growing Season

At the end of the first full growing season before plants enter dormancy, typically in September, inspect to document the monitoring parameters defined above.

2. End of Second Growing Season

At the end of the second growing season before plants enter dormancy, typically in September, inspect to document the monitoring parameters defined above.

Monitoring Report Appendices:

Appendix A: Soil profile description shall be provided from within Salt Marsh.
Appendix B: A vegetative species list of colonizing species in each plant community type. The volunteer species list shall include those that cover at least 5% of their vegetative layer.
Appendix C: Representative photos taken from the same locations for each monitoring event. Photos shall be dated and clearly labeled with the direction from which the photo was taken.

ITEM 755.7 (continued)

Maintenance Requirements:
Wetland enhancement shall show satisfactory establishment as defined according the Mitigation Performance Standards in 755.2 WETLAND ENHANCEMENT AREAS- TIDAL. The Contractor shall be responsible for maintenance and replacement according to those items. Corrective measures requiring earth movement or changes in hydrology shall not be implemented without written approval from the Corps to MassDOT.

Maintenance of wetland mitigation areas shall include replacement of dead or missing plant material, maintaining goose fence in effective and satisfactory condition, maintaining compost filter tubes in functioning condition, removal of debris within and around perimeter of mitigation area, correcting erosion or gullies.

Based on monitoring results, plants that have not shown satisfactory evidence of establishment shall be replaced and corrective measures taken. Dead or missing plants shall be replaced within the next appropriate planting window.

Goose Fence shall be maintained in tidal wetland mitigation areas for two full growing seasons. If tidal wetland plants are replaced, goose fence shall be maintained or be re-installed to protect seedlings from foraging for two full growing seasons.

If at the end of the second growing season and upon acceptance of the monitoring report, the Mitigation Performance Standards have not been met and the Contractor is required to perform corrective measures, the Wetland Specialist shall be compensated for work ordered.

The permits require a total of five-years monitoring of mitigation areas. MassDOT shall be responsible for fulfilling the permitting requirements beyond the end of the second growing season. The post-construction Final Wetland Assessment monitoring report to be submitted to the applicable regulatory agencies at the end of the fifth growing season is not included in the scope of this item.

ITEM 755.7 (continued)

Method of Measurment

The work described under this item shall be measured per HOUR. The basis for measurement is as follows:

1. Permit Review\ Site Assessment\Construction Oversight - 40 HRS
2. 1st year Spring and Fall field observation\Spring Update\Monitoring Report - 32 Hours
3. 2nd year Spring and Fall field observations\Spring Update\ Monitoring Report – 20 hours

Basis of Payment

The work described under this item shall be measured and paid at the contract unit price per HOUR, which price shall include labor, tools, equipment, materials, travel and incidentals necessary to complete the work as described herein and in a manner satisfactory to the Engineer.

MITCHELL RIVER

MEAN LOW WATER ELEV = -2.4

MEAN HIGH WATER ELEV = 1.6

HIGH TIDE LINE ELEV = 2.2 EST.

TIDAL FLAT

SALT MARSH

BRIDGE STREET

9+00 10+00 11+00 12+00 13+00 14+00 15+00

MAP 14A LOT 93
N/F
MARGARET & TIMOTHY BYRNE, TRUSTEES OF RESIDUARY TRUST
45 BRIDGE
BK 1030 PAGE 38
DOC: 544392
Ctf.# 125676

MAP 14A LOT 11
N/F
J. R. FENNELL REALTY TRUST
90 BRIDGE ST
BK 1049 PG 93
Doc. #564375 Ctf. #128013
P.L.C. 24180-A

MAP 15B LOT 1B
N/F
MITCHELL RIVER NOMINEE TRUST
157 BRIDGE ST
BK 998 PG 54

MAP 15A LOT 1
N/F
TOWN OF CHATHAM
BRIDGE ST
NO DEEDS FOUND

MAP 15A LOT 6A
N/F
CHATHAM CONSERVATION FOUNDATION INC
BRIDGE ST
BK 1495 PG 733

ISOLATED VEGETATED WETLANDS

flood

ebb

SM1 SM2 SM3 SM4 SM5 SM25 SM26 SM27 SM28 SM29 SM30 SM31

IVW1 IVW2 IVW3

APPROX.

LEGEND

- HIGH TIDE LINE
- MEAN HIGH WATER +1.6
- SALT MARSH
- MEAN LOW WATER −2.4

20 0 20 40
SCALE IN FEET

NOTE:

1. ELEVATION DATUM IS NAVD88

MASSDOT – HIGHWAY DIVISION
BOSTON MASSACHUSETTS

FACILITY: BRIDGE STREET
CHATHAM, MASSACHUSETTS

PROJECT NO.:

TITLE: WETLAND PLAN

CONSULTANT: URS Corporation
260 Franklin Street
Suite # 300
Boston, MA 02110

DESIGNED BY: HJH	DRAWN BY: HJH	CHKD. BY: CMC
SCALE: AS NOTED	APPROVED: TFR	DATE: 12/18/2012

SHEET NO.: 1

SALT MARSH (TYP.)
PROP HEADWALL
PROP 5.0' SIDEWALK
MEAN LOW WATER ELEV = -2.4
PROP STEEL BACKED TIMBER GAURDRAIL WITH GRAN CURB (TYP)
PROP LOAM & SEED
COMPOST FILTER TUBES (TYP)
BEGINNING OF PROJECT LIMIT OF WORK
STA. 8+03.61
N: 2708436.1665
E: 1076376.8826
PROP GRAN CURB (TYP.)
APPROX. ℄
PROP RIP RAP M2.02.2 (TYP.)
TIDAL FLAT
SALT MARSH
TURBIDITY BARRIER (TYP)
PROP BASCULE PIER
PROP SUBMARINE CABLE
REMOVE EXIST CONDUIT
PROP REST PIER
MITCHELL RIVER
MEAN HIGH WATER ELEV = 1.6
HIGH TIDE LINE ELEV = 2.2 EST.
MEAN LOW WATER ELEV = -2.4
SALT MARSH TURBIDITY BARRIER (TYP)
TIDAL FLAT
SALT MARSH (TYP.)
PROP HEADWALL
STEEL SHEETING (REMOVE AFTER CONSTRUCTION)
PROP RIP RAP M2.02.2 (TYP.)
COMPOST FILTER TUBES (TYP)
PROP STEEL BACKED TIMBER GAURDRAIL WITH GRAN CURB (TYP)
PERM RELOCATED PATH
PROP GRAN CURB (TYP.)
PROP PVM'T MILLINGS (TYP)
PROP LOAM & SEED
PROP GATE & SIGNALS
PROP FULL DEPTH PVM'T
PROP MICROMILLING & DRIVEWAY PVM'T OVERLAY
END OF LIMIT STA. N: 270 E: 1076
PROP HMA BERM TYPE "A"
PROP SAWCUT
PROP MICROMILLING & PVM'T OVERLAY
PROP PVM'T MILLINGS (TYP)
COMPOST FILTER TUBES (TYP)
PROP LOAM & SEED
TEMP RELOCATED PATH
PROP GRAN CURB (TYP.)
PROP CB
TURBIDITY BARRIER (TYP)
PROPOSED CONCRETE FILLED 16" STEEL PIPE PILES (TYP)
STEEL SHEETING (REMOVE AFTER CONSTRUCTION)
PROP STEEL BACKED TIMBER GAURDRAIL WITH GRAN CURB (TYP)
HIGH TIDE LINE ELEV = 2.2 EST.
MEAN HIGH WATER ELEV = 1.6
MEAN LOW WATER ELEV = -2.4
PROP GATE & SIGNALS
PROP GRAN CURB (TYP.)
PROP 5.0' SIDEWALK
PROP CB
ISOLATED VEGETATED WETLANDS
SALT MARSH
TIDAL FLAT
flood
ebb
BOS
TOS
PT
PC
+60.00
+00.43
N72°13'08.49"E
440.41
MAP 14A LOT 11 N/F J. R. FERRELL REALTY TRUST 90 BRIDGE ST BK 1049 PG 93 Doc. #564375 Ctf. #128013 P.L.C. 24180-A
MAP 15B LOT 1B N/F MITCHELL RIVER NOMINEE TRUST 157 BRIDGE ST BK 998 PG 54
TOWN OF CHATHAM BRIDGE ST NO DEEDS FOUND
CHATHAM CONSERVATION FOUNDATION INC BRIDGE ST BK 1495 PG 733
BRIDGE ST BK 1030 PAGE 30 DOC. 544392
GARAGE
EXIST. BUILD.
TOP OF FOUND. EL=9.01
FISH STORAGE
WOODEN PIER
BIT. CONC. APRON
RAIL ROAD TIES
GABLE GUARD RAIL W/TRIANGU
EDGE OF WATER
EDGE OF BANK
IVW1
IVW2
IVW3
IVW4
SM1
SM2
SM3
SM4
SM5
SM25
SM26
SM27
SM29
SM30
SM31

LEGEND

- HIGH TIDE LINE
- MEAN HIGH WATER +1.6
- SALT MARSH
- MEAN LOW WATER −2.4

20 0 20 40
SCALE IN FEET

NOTE:

1. ELEVATION DATUM IS NAVD88

MASSDOT – HIGHWAY DIVISION
BOSTON MASSACHUSETTS

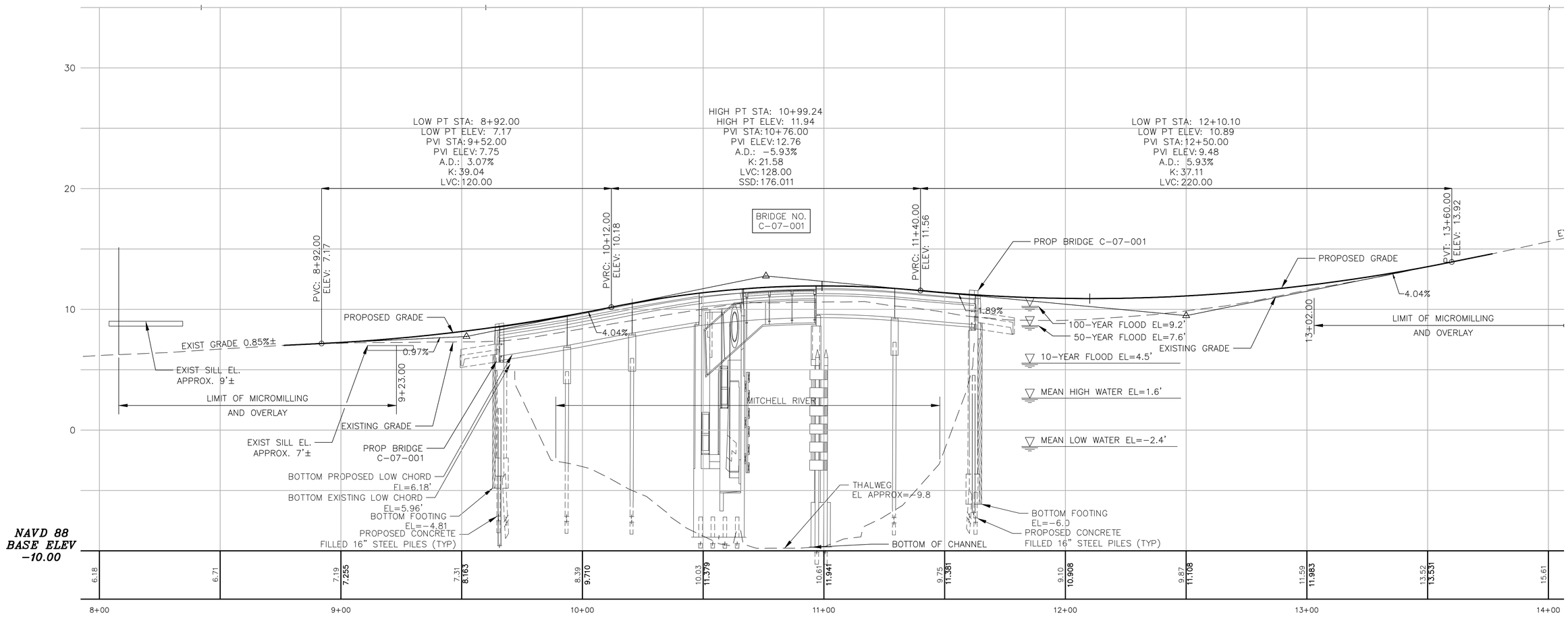
FACILITY: BRIDGE STREET CHATHAM, MASSACHUSETTS

PROJECT NO.:

TITLE: GENERAL PLAN

CONSULTANT: URS Corporation, 260 Franklin Street, Suite # 300, Boston, MA 02110

DESIGNED BY: HJH	DRAWN BY: HJH	CHKD. BY: CMC	
SCALE: AS NOTED	APPROVED: TFR	DATE: 12/18/2012	SHEET NO.: 2



HORIZONTAL
20 0 20 40
4 0 4 8
VERTICAL
SCALE IN FEET

MASSDOT – HIGHWAY DIVISION
BOSTON MASSACHUSETTS

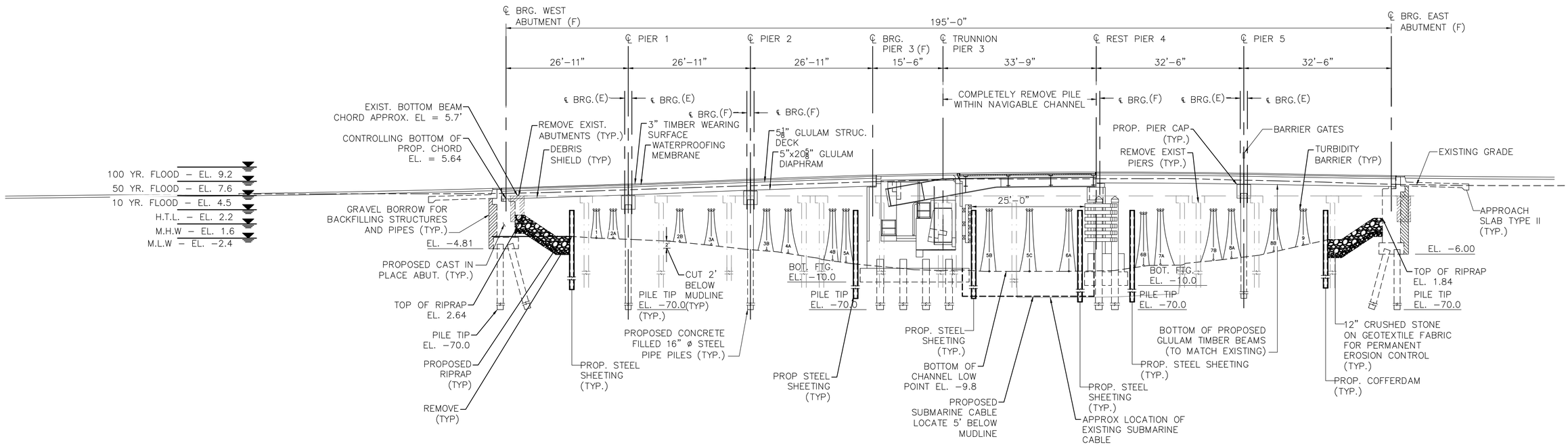
FACILITY: BRIDGE STREET
CHATHAM, MASSACHUSETTS

PROJECT NO.:

TITLE: PROFILE

CONSULTANT: URS Corporation
260 Franklin Street
Suite # 300
Boston, MA 02110

DESIGNED BY: HJH	DRAWN BY: HJH	CHKD. BY: CMC	
SCALE: AS NOTED	APPROVED: TFR	DATE: 12/18/2012	SHEET NO.: 3



N.T.S

MASSDOT – HIGHWAY DIVISION
BOSTON MASSACHUSETTS

FACILITY: BRIDGE STREET
CHATHAM, MASSACHUSETTS

PROJECT NO.:

TITLE: LONGITUDINAL SECTION

CONSULTANT: URS Corporation
260 Franklin Street
Suite # 300
Boston, MA 02110

DESIGNED BY: HJH	DRAWN BY: HJH	CHKD. BY: CMC	
SCALE: AS NOTED	APPROVED: TFR	DATE: 12/18/2012	SHEET NO.: 4

MITCHELL RIVER

MEAN LOW WATER ELEV = -2.4

APPROX. ℄

TIDAL FLAT

BEGINNING OF PROJECT LIMIT OF WORK
STA. 8+03.61
N: 2708436.1665
E: 1076376.8848

SM5 SM4 SM3 SM2 SM1

SALT MARSH

SEE DETAIL A

8 9 10 11 12 13

+60.00 PT

N72°13' 08.49"E 140.41'

TURBIDITY BARRIER (TYP)

STEEL SHEETING (TYP)

COMPOST FILTER TUBES (TYP)

HIGH TIDE LINE ELEV = 2.2 EST.

MEAN HIGH WATER ELEV = 1.6

MEAN LOW WATER ELEV = -2.4

SM31 SM30 SM29 SM28 SM27 SM26 SM25

SALT MARSH

TIDAL FLAT

E:1076750

N:2708270

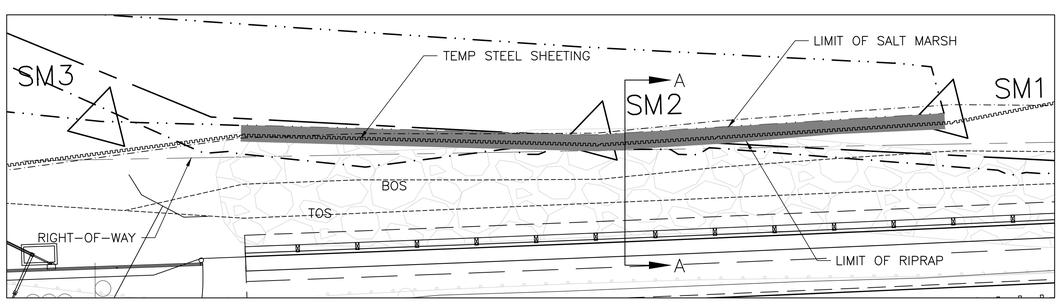
+00.43 PC

IVW3 IVW2 IVW1

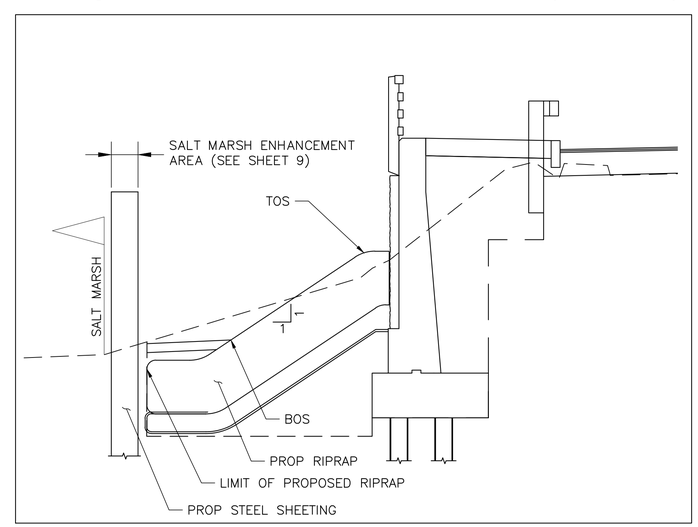
ISOLATED VEGETATED WETLANDS

flood ebb

20 0 20 40
SCALE IN FEET



DETAIL A
NTS



SECTION A–A
NTS

LEGEND

- HIGH TIDE LINE
- MEAN HIGH WATER +1.6
- SALT MARSH
- MEAN LOW WATER −2.4
- SALT MARSH ENHANCEMENT AREA

NOTE:

1. ELEVATION DATUM IS NAVD88

MASSDOT – HIGHWAY DIVISION
BOSTON MASSACHUSETTS

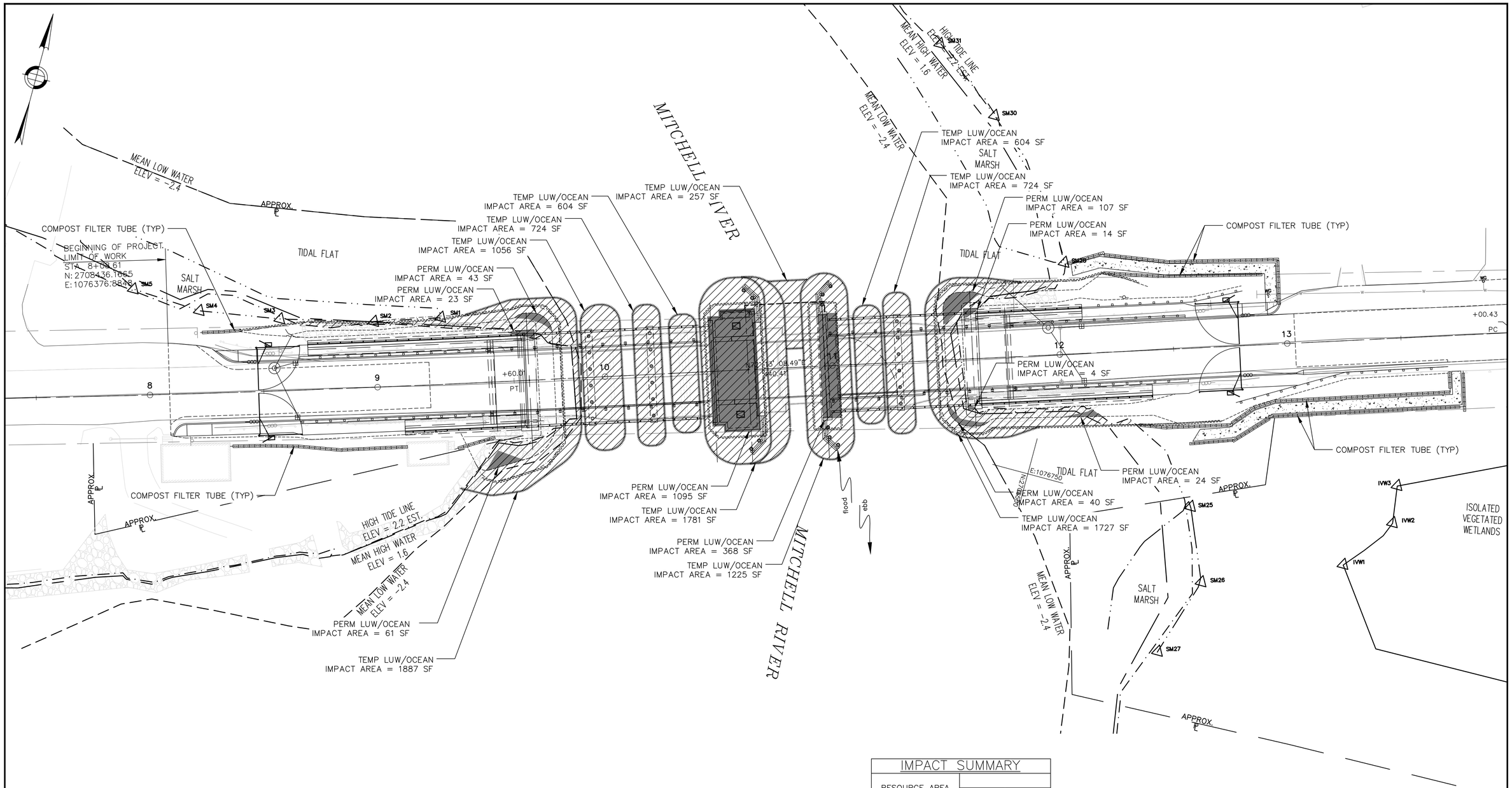
FACILITY: BRIDGE STREET
CHATHAM, MASSACHUSETTS

PROJECT NO.:

TITLE: WATER CONTROL & RETAINING WALL PLAN

CONSULTANT: URS Corporation
260 Franklin Street
Suite # 300
Boston, MA 02110

DESIGNED BY: HJH	DRAWN BY: HJH	CHKD. BY: CMC	
SCALE: AS NOTED	APPROVED: TFR	DATE: 12/18/2012	SHEET NO.: 5



LEGEND

- HIGH TIDE LINE
- MEAN HIGH WATER +1.6
- SALT MARSH
- MEAN LOW WATER −2.4
- LUW/OCEAN TEMPORARY IMPACT
- LUW/OCEAN PERMANENT IMPACT

NOTE:

1. ELEVATION DATUM IS NAVD88

20 0 20 40
SCALE IN FEET

IMPACT SUMMARY

RESOURCE AREA	SUBTOTAL	TOTAL
TEMP LUW/OCEAN*	10587	10491
PERM LUW/OCEAN**	1778	1819
TOTALS	12365	12310

* TEMP REDUCED BY 96 S.F. TO ACCOUNT FOR EXISTING PILES, 121 @ 0.79'

** PERM INCREASED BY 41 S.F. TO ACCOUNT FOR NEW PILES, 31 @ 1.33'

DREDGING IMPACTS

RESOURCE AREA	S.F.	C.Y.
LUW/OCEAN	3668	543

MASSDOT – HIGHWAY DIVISION
BOSTON MASSACHUSETTS

FACILITY: BRIDGE STREET
CHATHAM, MASSACHUSETTS

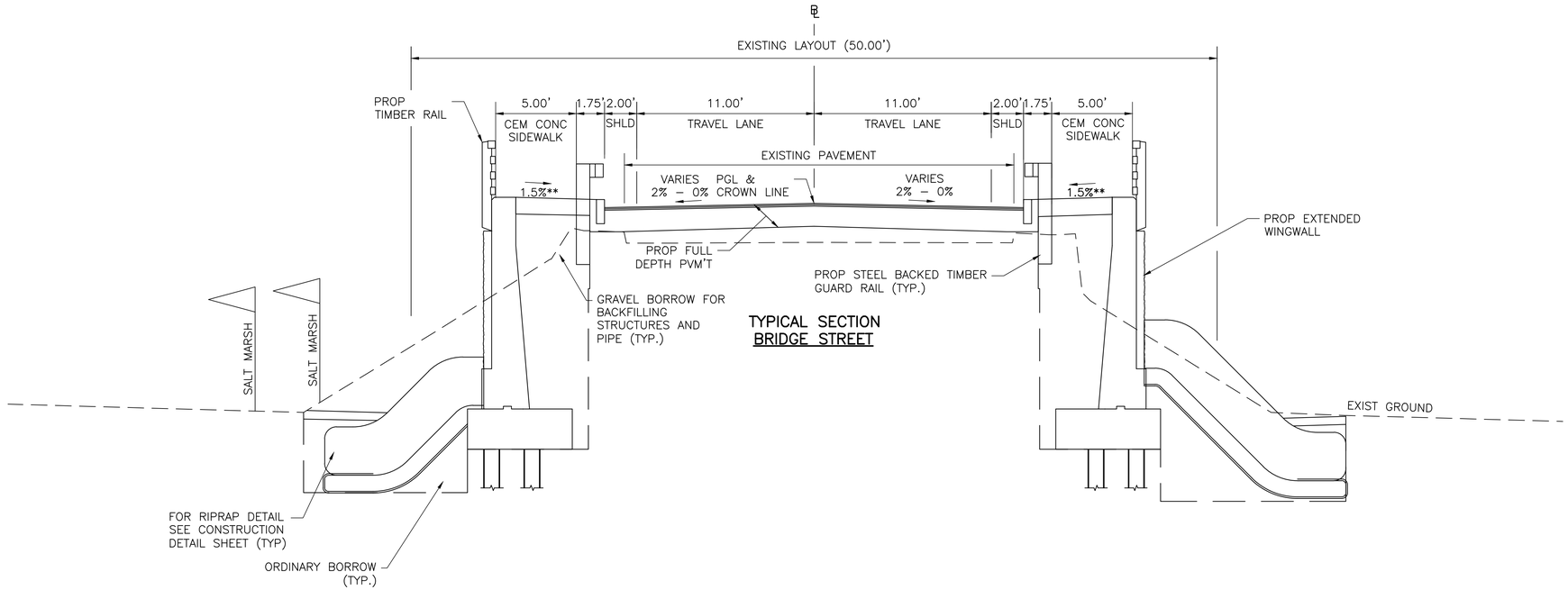
PROJECT NO.:

TITLE: WETLAND IMPACT PLAN

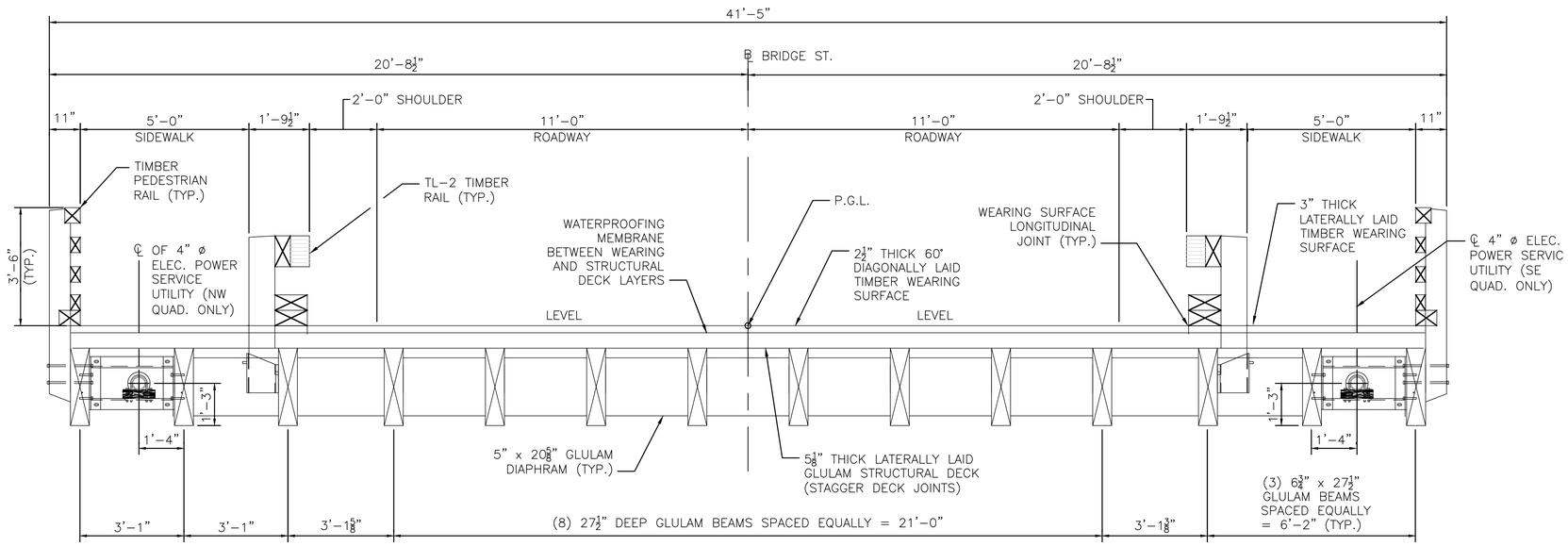
CONSULTANT: URS Corporation
260 Franklin Street
Suite # 300
Boston, MA 02110

DESIGNED BY: HJH | DRAWN BY: HJH | CHKD. BY: CMC

SCALE: AS NOTED | APPROVED: TFR | DATE: 12/18/2012 | SHEET NO.: 6



TYPICAL SECTION
BRIDGE STREET



MASSDOT – HIGHWAY DIVISION
BOSTON MASSACHUSETTS

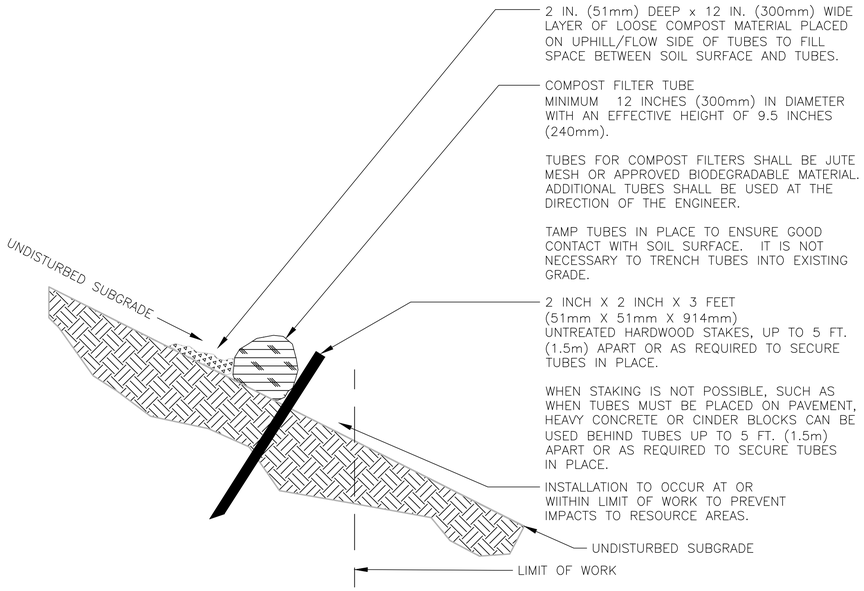
FACILITY: BRIDGE STREET
CHATHAM, MASSACHUSETTS

PROJECT NO.:

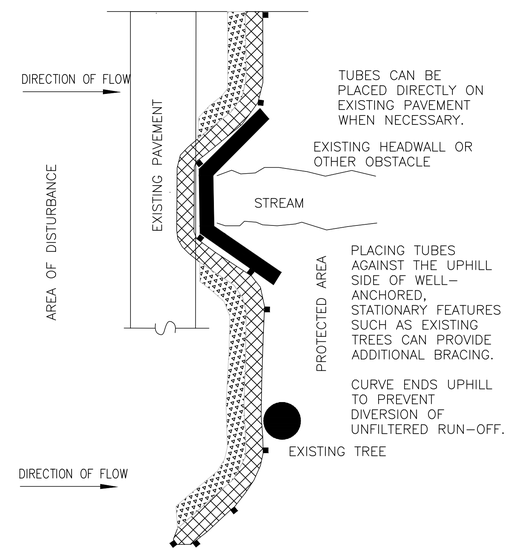
TITLE: TYPICAL CROSS SECTIONS

CONSULTANT: URS
URS Corporation
260 Franklin Street
Suite # 300
Boston, MA 02110

DESIGNED BY: HJH	DRAWN BY: HJH	CHKD. BY: CMC	
SCALE: AS NOTED	APPROVED: TFR	DATE: 12/18/2012	SHEET NO.: 7



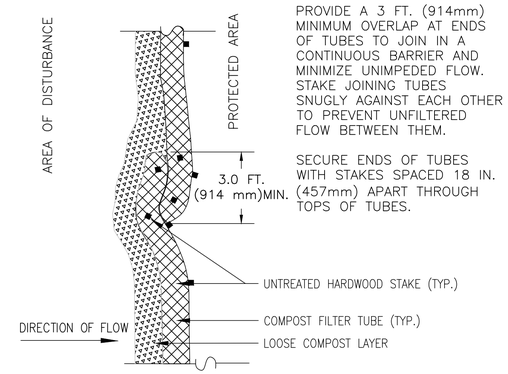
SECTION VIEW



PLAN VIEW

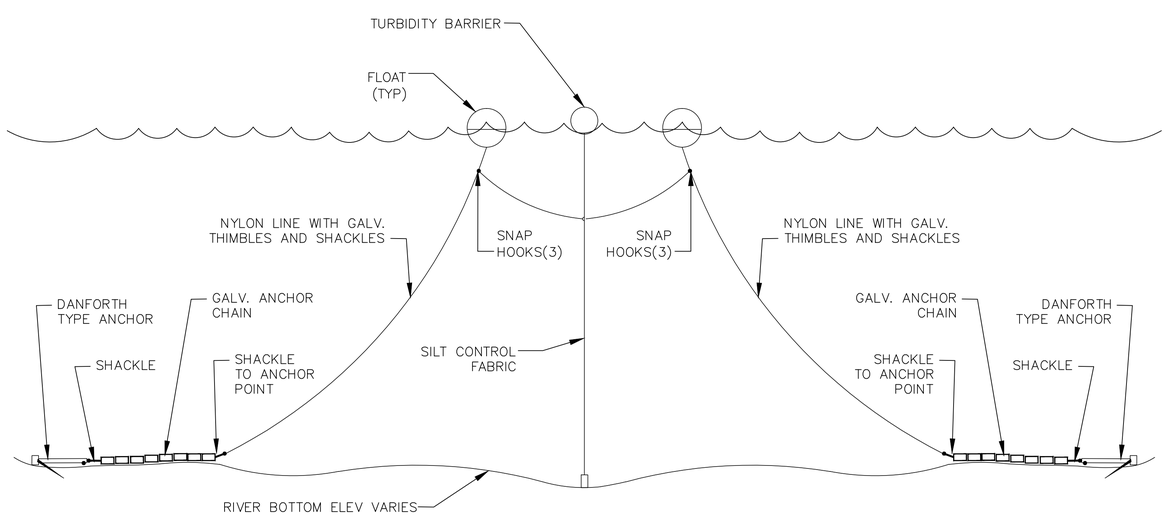
GENERAL NOTES:

1. PROVIDE A MINIMUM TUBE DIAMETER OF 12 INCHES (300mm) FOR SLOPES UP TO 50 FEET (15.24m) IN LENGTH WITH A SLOPE RATIO OF 3H:1V OR STEEPER. LONGER SLOPES OF 3H:1V MAY REQUIRE LARGER TUBE DIAMETER OR ADDITIONAL COURSING OF FILTER TUBES TO CREATE A FILTER BERM. REFER TO MANUFACTURER'S RECOMMENDATIONS FOR SITUATIONS WITH LONGER OR STEEPER SLOPES.
2. INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO SHEET OR CONCENTRATED FLOW.
3. DO NOT INSTALL IN PERENNIAL, EPHEMERAL OR INTERMITTENT STREAMS.
4. CONFIGURE TUBES AROUND EXISTING SITE FEATURES TO MINIMIZE SITE DISTURBANCE AND MAXIMIZE CAPTURE AREA OF STORMWATER RUN-OFF.



PLAN VIEW – JOIN DETAIL

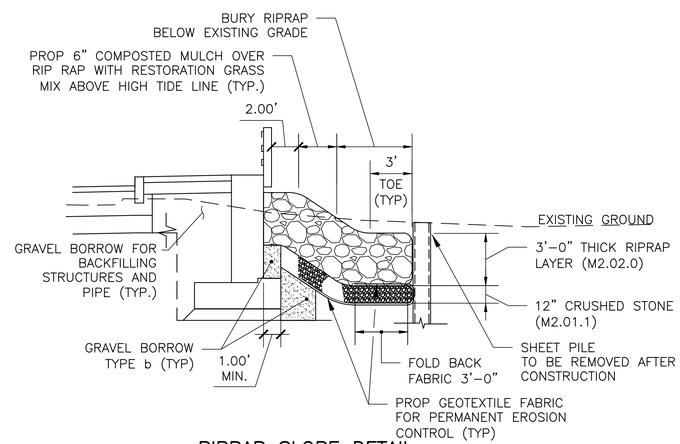
SINGLE COMPOST FILTER TUBE DETAIL



NOTE: BOTTOM OF TURBIDITY BARRIER SHALL EXTEND TO RIVER BOTTOM DURING EXCAVATION AND FILLING OPERATIONS.

ANCHOR

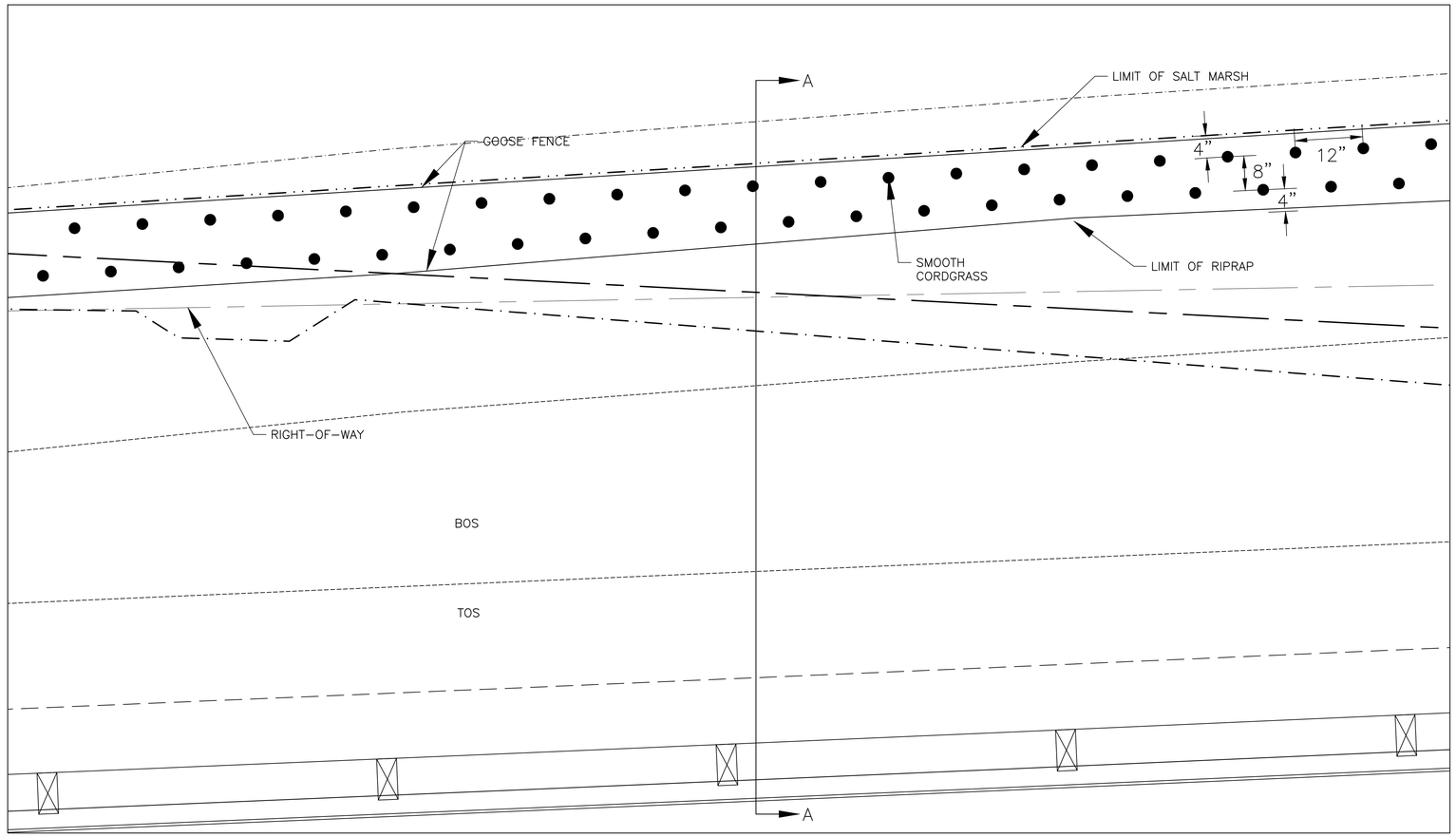
NTS



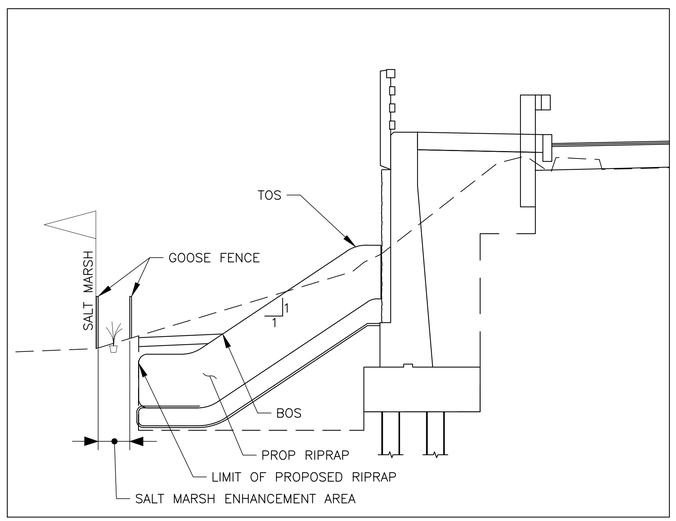
RIPRAP SLOPE DETAIL

NTS

MASSDOT – HIGHWAY DIVISION BOSTON MASSACHUSETTS	
FACILITY: BRIDGE STREET CHATHAM, MASSACHUSETTS	
PROJECT NO.:	
TITLE: TYPICAL DETAILS	
CONSULTANT: URS Corporation 260 Franklin Street Suite # 300 Boston, MA 02110	
DESIGNED BY: HJH	DRAWN BY: HJH / CHKD. BY: CMC
SCALE: AS NOTED / APPROVED: TFR	DATE: 12/18/2012 / SHEET NO.: 8



DETAIL A
NTS



SECTION A–A
NTS

LEGEND

- HIGH TIDE LINE
- MEAN HIGH WATER +1.6
- SALT MARSH
- MEAN LOW WATER –2.4

NOTE:

1. ELEVATION DATUM IS NAVD88

MASSDOT – HIGHWAY DIVISION
BOSTON MASSACHUSETTS

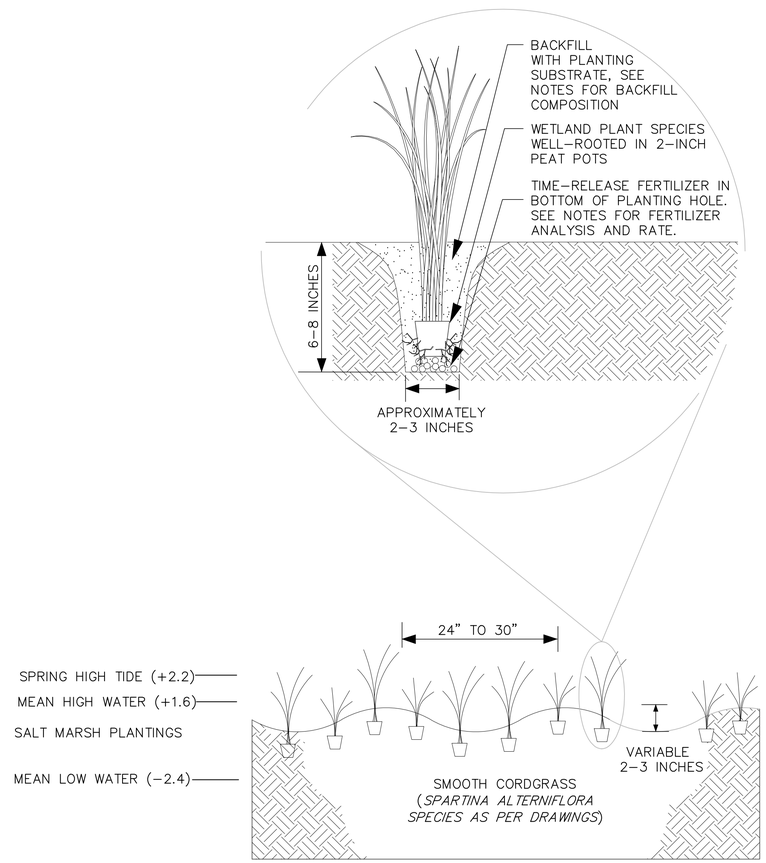
FACILITY: BRIDGE STREET
CHATHAM, MASSACHUSETTS

PROJECT NO.:

TITLE: WETLAND ENHANCEMENT PLAN

CONSULTANT: URS Corporation
260 Franklin Street
Suite # 300
Boston, MA 02110

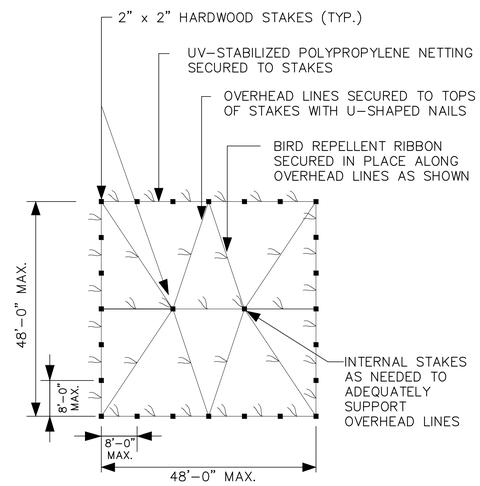
DESIGNED BY: HJH	DRAWN BY: HJH	CHKD. BY: CMC	
SCALE: AS NOTED	APPROVED: TFR	DATE: 12/18/2012	SHEET NO.: 9



TRANSVERSE VIEW

SALT MARSH PLANTING
NOT TO SCALE

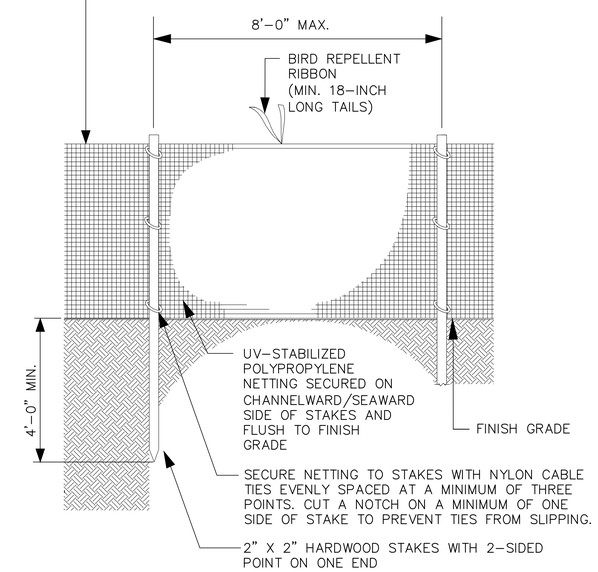
NOTE: GROUNDCOVER THROUGHOUT SALT MARSH ENHANCEMENT AREA SHALL BE PLANTED WITH SMOOTH CORDGRASS WITH 2" PEAT POTS PLANTED 12" ON CENTER.



PLAN VIEW

NOTE: ACTUAL SIZE AND SHAPE OF CELLS WILL BE DETERMINED BY CONFIGURATION OF PLANTING AREA. FENCE SHALL ENCLOSE ALL WETLAND PLANTINGS AND INCLUDE A 2-FOOT (MIN.) MARGIN AROUND PERIMETER OF ALL NEW PLANTS.

FOR LARGE SITES WHERE THERE IS NO PERIMETER ACCESS TO INDIVIDUAL CELLS FOR MONITORING, PROVIDE 3-FOOT WIDE, UNPLANTED ACCESS AISLES BETWEEN EVERY OTHER CELL AND PARALLEL IN ONE DIRECTION. FOR VERY LARGE SITES OF MANY ACRES, PROVIDE AISLES THAT CAN ACCOMMODATE AN ALL-TERRAIN VEHICLE SUITABLE FOR USE IN MARSH CONDITIONS.



GOOSE FENCING
NOT TO SCALE

MASSDOT – HIGHWAY DIVISION
BOSTON MASSACHUSETTS

FACILITY: BRIDGE STREET
CHATHAM, MASSACHUSETTS

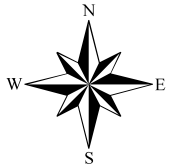
PROJECT NO.:

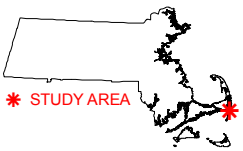
TITLE: WETLAND ENHANCEMENT DETAILS

CONSULTANT: URS
URS Corporation
260 Franklin Street
Suite # 300
Boston, MA 02110

DESIGNED BY: HJH	DRAWN BY: HJH	CHKD. BY: CMC	
SCALE: AS NOTED	APPROVED: TFR	DATE: 12/18/2012	SHEET NO.: 10

Maps and Photos





0 1,400 2,800 4,200 5,600 Feet

Source: MassGIS

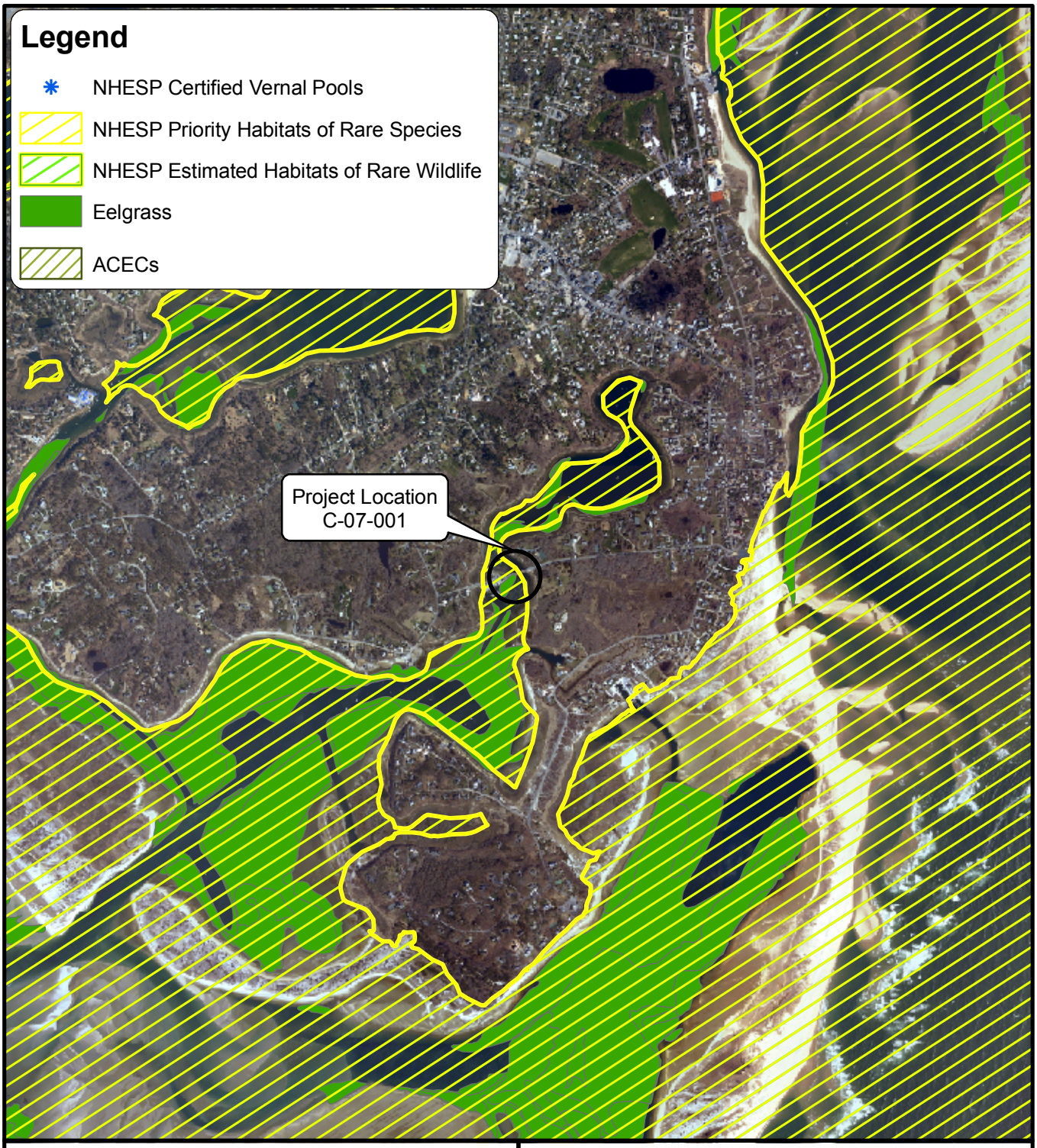
FIGURE 1
SITE LOCATION MAP

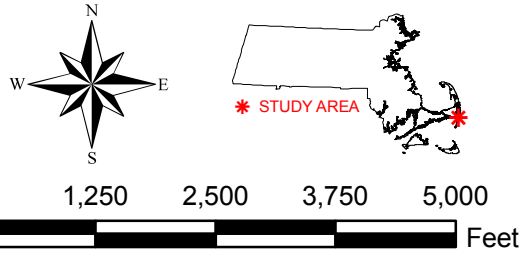
BRIDGE ST BRIDGE C-07-001
CHATHAM, MA

URS
260 FRANKLIN STREET, SUITE 300
BOSTON, MASSACHUSETTS
(617) 542-4244

Project No. 10160737 | **JULY 2009**

J:\National Park Service\Georges Island\CADD\GIS\Georges Island SiteMap.mxd





Source: MassGIS

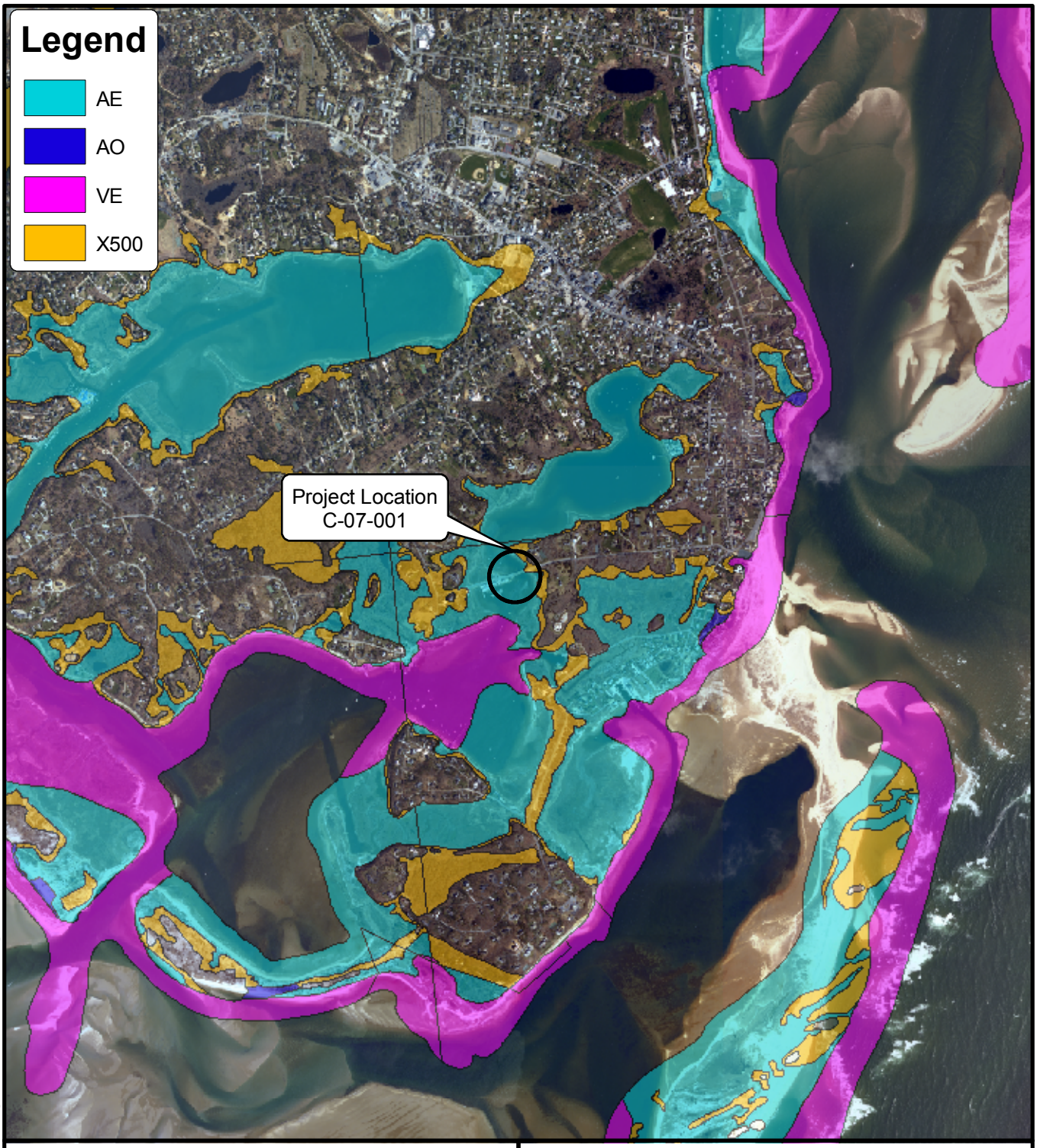
FIGURE 2
HABITAT MAP

BRIDGE ST BRIDGE C-07-001
CHATHAM, MA

URS
260 FRANKLIN STREET, SUITE 300
BOSTON, MASSACHUSETTS
(617) 542-4244

Project No. 10160737 | **JULY 2009**

File: J:\MassHighway\2009 SEDRSCM 5\Assignment #1 - Chatham Bridge\500 CADD - GIS - Graphics\520 GIS\Bridge St Habitat Map.mxd



Source: MassGIS

FIGURE 3
FEMA MAP

BRIDGE ST BRIDGE C-07-001
CHATHAM, MA

URS
260 FRANKLIN STREET, SUITE 300
BOSTON, MASSACHUSETTS
(617) 542-4244

Project No. 10160737 | **JULY 2009**

File: J:\MassHighway\2009 SEDRSCM 5\Assignment #1 - Chatham Bridge\500 CADD - GIS - Graphics\520 GIS\Bridge St FEMA Map.mxd

Photo No. 1	**Date 7/9/09**
Direction Photo Taken: **East**	
Description: Southeast quadrant of the bridge showing existing riprap and shoreline	

Photo No. 2	**Date 7/9/09**
Direction Photo Taken: **West**	
Description: Southeast quadrant of the bridge showing existing riprap and shoreline	

Photo No. 3	Date 7/9/09
Direction Photo Taken: **South**	
Description: Northeast quadrant of the bridge showing existing riprap and abutment	

Photo No. 4	Date 7/9/09
Direction Photo Taken: **North**	
Description: Northeast quadrant of the bridge showing wetlands and shoreline	

Photo No. 5	Date 7/9/09
Direction Photo Taken: **North**	
Description: Southwest quadrant of the bridge showing existing riprap, and abutment	

Photo No. 6	Date 7/9/09
Direction Photo Taken: **West**	
Description: Northwest quadrant of the bridge showing existing riprap and boat launch in the distance	

Wetland Resource Area Analysis Report

May 6, 2011

E-Mail
(Original via Regular Mail)

Mr. Paul Bergquist, P.E.
URS Corporation
260 Franklin Street, Suite 300
Boston, MA 02110-3197

Re: Wetland Resource Area Analysis Report
Mitchell River Bridge
Chatham, Massachusetts

[LEC File #: URS\09-207.02]

Dear Mr. Bergquist:

As requested, LEC Environmental Consultants, Inc., (LEC) has prepared the following Wetland Resource Area Analysis Report detailing the results of our wetland boundary determination associated with the Mitchell River Bridge located on Bridge Street in Chatham, Massachusetts. LEC has provided these services in the context of the proposed bridge replacement project to be performed by the Massachusetts Highway Department (MHD) under the auspices of the Accelerated Bridge Program (ABP). Specifically, the objective of this evaluation was to delineate the boundary of Bordering Vegetated Wetlands (BVW), Isolated Vegetated Wetland (IVW) and/or Salt Marsh associated with the Mitchell River in areas located within 100 feet of the Mitchell River Bridge in accordance with the Massachusetts Department of Environmental Protection's (DEP) *401 Water Quality Certification Regulations* (314 CMR 9.00) and Section 404 of the *Clean Water Act* (33 USC 1251, *et seq.*) administered by the DEP and the Army Corps of Engineers (ACOE).

LEC delineated the boundary of an IVW and Salt Marsh boundaries on November 3, 2009 in accordance with the methods and guidance outlined within the *Army Corp of Engineers Wetlands Delineation Manual* (1987), the DEP handbook *Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act* (March 1995), and *Field Indicators for Identifying Hydric Soils in New England* (April 2004). ACOE New England District Wetland Delineation Data Sheets are attached to the report. The report also references the attached aerial photograph of the bridge and surrounding area, and the attached *Wetland Plan*, dated July 28, 2010, by URS Corporation.

The boundary of Salt Marsh was demarcated using orange flagging labeled SM 1-13, 14-22, 25-28, 29-44 and 45-51. The boundary of the IVW was demarcated using orange flagging tape labeled IVW 1-5. No BVW was observed within the area evaluated and/or within 100 feet of the Mitchell River Bridge

The original wetland delineation was completed on November 3, 2009, and was reviewed by LEC on January 11, 2011. During the review, we observed that ongoing shoreline erosion on the southeast side of the bridge has eliminated the fringing Salt Marsh area previously delineated with flags SM 23-25. Consequently, wetland flags SM 23 and 24 were removed and the Salt Marsh boundary now begins with wetland flag SM 25, as depicted on the *Wetland Plan*. In addition, the location of Salt Marsh flags SM 1 through SM 5 was adjusted slightly to more accurately identify the landward extent of Salt Marsh and to exclude rip-rap from the delineation.

General Site Description

The Mitchell River Bridge is located on Bridge Street within the southeastern portion of Chatham. The bridge crosses the Mitchell River, a tidal waterbody flowing from Nantucket Sound and Stage Harbor to Mill Pond (see attached aerial photograph). Within 100 feet of the bridge, the edges of the river are occupied primarily by Salt Marsh transitioning to forested upland, with the exception of a small IVW located southeast of the bridge and rip-rap slopes associated with a marina located to the southwest. The bridge itself is primarily a timber structure constructed on numerous wooden piles and functions as an active drawbridge allowing boat passage.

The areas located adjacent to the northeast and southeast of the bridge are similar in that they contain a narrow Salt Marsh abruptly transitioning into forested upland and/or scrub shrub upland habitat. Single family residences exist a few hundred feet from the Salt Marsh in these areas. Northwest of the bridge, the landscape is dominated by a broad Salt Marsh area extending westerly for approximately 500 feet. A paved boat ramp and town landing/dirt parking area also exist adjacent to the bridge in this area. An active commercial marina exists southwest of the bridge. This area is defined by marina buildings and a boat yard stabilized and surrounded by rip rap slopes along the edge of the water. A series of fixed docks, piers and floats extend southerly from the marina. Numerous moorings exist to the north and south of the bridge.

The Stage Harbor embayment, including Mitchell River, is known to provide suitable habitat and established populations for commercially-harvested quahog (*Mercenaria mercenaria*), various mussels (Family MYTILIDAE), soft-shelled clams (*Mya arenaria*), eastern oyster (*Crassostrea virginica*) and bay scallop (*Argopecten irradians*). The area is listed as an "approved" shellfish growing by the Massachusetts Division of Marine Fisheries. Winter flounder (*Pleuronectes americanus*), a commercially important finfish, is also known to utilize the Stage Harbor area.

According to the DEP Eelgrass Mapping Project, the eelgrass (*Zostera maritima*) was documented immediately adjacent to the south of the bridge in 1995; however mapping in 2001 did not identify eelgrass in the immediate vicinity of the bridge.

The upland areas located upgradient of the Salt Marsh and IVW include dense entanglements of grape (*Vitis* spp.) vines, Asiatic bittersweet (*Celastrus orbiculata*), and poison ivy (*Toxicodendron radicans*). The shrub layer is often dominated by tartarian honeysuckle (*Lonicera tatarica*), with scattered individuals and clusters of beach plum (*Prunus maritima*), bayberry (*Myrica pennsylvanica*), salt spray rose (*Rosa rugosa*) and staghorn sumac (*Rhus typhina*). Scattered mature trees include eastern red cedar (*Juniperus virginiana*), black cherry (*Prunus serotina*), cottonwood (*Populus* spp.) and pitch pine (*Pinus rigida*).

According to the Soil Survey of Barnstable County (1983), soils east of the bridge are mapped as Belgrade Silt Loam. Land to the west of the bridge is mapped as Carver Coarse Sand. The soil evaluations conducted during the wetland delineation confirmed the general accuracy of the soil survey mapping; however the broad Salt Marsh located west of the bridge is not depicted on the soil survey. Also, it is likely that fill material was imported to the area to accommodate the original construction of the bridge, the marina and the town landing.

Natural Heritage and Endangered Species Program Designation

According to the Chatham Quad of the 13th edition of the *Massachusetts Natural Heritage Atlas* (effective October 1, 2008) published by the Massachusetts Natural Heritage and Endangered Species Program (NHESP), the Mitchell River is located within Estimated Habitat of Rare Wildlife or Priority Habitat of Rare Species.

Floodplain Designation

According to the July 20, 1998 Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM, Community Panel No. 250004 0009 E), areas to the north of the Mitchell River bridge are located within Zone A8 (El. 9) and areas to the south are located within Zone A9 (El.10). Zone A indicates *areas subject to inundation by the 1-percent-annual chance flood event determined by detailed methods. Base Flood Elevations (BFEs) are shown* (on the FEMA Map).

Wetland Resource Areas

LEC delineated the boundary of Bordering Vegetated Wetland and Salt Marsh associated with the Mitchell River. A description of these Wetland Resource Areas is provided below. Also, please refer to the attached photographs of the wetlands taken from the bridge.

The 401 WQC Regulations at 314 CMR 9.02 define Waters of the United States within the Commonwealth as: *Navigable or interstate waters and their tributaries, adjacent wetlands, and other waters or wetlands within the borders of the Commonwealth where the use, degradation, or destruction could affect interstate or foreign commerce as determined by the Corps of Engineers. Bordering and isolated vegetated wetlands and land under water are waters of the United States within the Commonwealth when they meet the federal jurisdictional requirements defined at 33 CFR 328 through 329.*

The 401 WQC Regulations adopt and reference the Salt Marsh definitions provided in the *Massachusetts Wetlands Protection Act* (M.G.L., c. 131, s. 40) and *Regulations* (310 CMR 10.00), as cited below.

Salt Marsh

According to 310 CMR 10.32 (2), *Salt Marsh means a coastal wetland that extends landward and up to the highest high tide line, that is, the highest spring tide of the year, and is characterized by plants that are well adapted to, or prefer living in, saline soils. Dominant plants within salt marshes are salt meadow cordgrass (Spartina patens), and/or salt marsh cordgrass (Spartina alterniflora). A salt marsh may contain tidal creeks, ditches and pools.*

Salt Marsh exists in a relatively narrow band along the eastern shoreline of the Mitchell River in the vicinity of the Mitchell River Bridge. To the northwest, a broad, ditched Salt Marsh extends along the edge of the Town Landing and Bridge Street. Vegetation is dominated by salt meadow cordgrass (*Spartina patens*) and salt marsh cordgrass (*Spartina alterniflora*) with scattered individuals and interspersions of marsh elder (*Iva frutescens*), glasswort (*Salicornia* spp.), seaside goldenrod (*Solidago sempervirens*), halberd-leaved orach (*Atriplex patula* var. *hastata*), coast blite (*Chenopodium rubrum*), sea-blite (*Suaeda maritima*) and common reed (*Phragmites* spp.).

Isolated Vegetated Wetlands

IVW's may be protected federally under *The Clean Water Act* (33 U.S.C. 1344, s. 404) and the *401 Water Quality Certification Regulations* (314 CMR 9.00). Although IVW's are not defined specifically therein, they may be considered *adjacent wetlands* and thus fall under the more broadly defined term *Waters of the United States. Waters of the United States includes navigable waters and all their tributaries, adjacent wetlands and other waters or wetlands…*

LEC

The *401 Water Quality Certification Regulations* define Isolated Vegetated Wetlands *as vegetated areas subject to jurisdiction under 33 U.S.C. et seq. that are not bordering vegetated wetlands subject to jurisdiction under the Massachusetts Wetlands Protection Act and Regulations.*

The physical characteristics IVW's are not defined; however the following definition should suffice for the purposes of this report. The IVW boundary was based *on the presence of saturated and/or inundated soils supporting a predominance of wetland vegetation and evidence of wetland hydrology.*

The IVW is located southwest of the Mitchell River Bridge within a densely vegetated thicket approximately 100 feet upgradient from the Mitchell River. Its circular shape and position in the landscape suggest that it may have been a farm pond in the past. Vegetation within the interior is dominated by a few mature willow (*Salix* spp.) trees, and mats of sensitive fern (*Onoclea sensibilis*). The willows root system has produced numerous clone saplings which create a moderately dense understory within the IVW. Pockets of standing water up to 4 inches in depth were observed within the wetland.

Land Under Water

Land Under Water is defined in the *401 Water Quality Certification Regulations* as *the land or surface area defined in 310 CMR 10.25(2).* According to 310 CMR 10.25(2), Land Under Water (Ocean) *means land extending from the mean low water line seaward to the boundary of the municipality's jurisdiction and includes land under estuaries.*

As defined above, Land Under Water extends seaward from the Mean Low Water Line of -2.4 feet NAVD.

Summary

LEC conducted site evaluations on November 3, 2009 and January 11, 2011 to delineate Salt Marsh and an IVW associated with the Mitchell River and Mitchell River Bridge. The wetland delineation was conducted in accordance with the requirements outlined in the Massachusetts Department of Environmental Protection's (DEP) *401 Water Quality Certification Regulations* (314 CMR 9.00) and Section 404 of the *Clean Water Act* (33 USC 1251, *et seq.*) administered by the Army Corps of Engineers (ACOE), for the purposes of a bridge replacement project proposed by the Massachusetts Highway Department under the ABP. Any bridge replacement work proposed within these jurisdictional resource areas will requiring filing for the appropriate 401 Water Quality Certification and 404 Individual Permit administered by the Massachusetts DEP and ACOE.

Thank you for the opportunity to provide these services. Should you have any questions or require additional information, do not hesitate to contact me in our Plymouth Office at 508-746-9491 or at mmanganello@lecenvironmental.com.

Sincerely,

LEC Environmental Consultants, Inc.

Mark Manganello, Manager
Wetland Scientist

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Mitchell River Bridge City/County: Chatham, MA Sampling Date: 11/13/09

Applicant/Owner: Mass DOT State: MA Sampling Point: 1

Investigator(s): Mark Manganello Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Coastal Plain/hillslope Local relief (concave, convex, none): Concave

Slope (%): 8-15 Lat: 41.66983 Long: 69.96004 Datum: _____

Soil Map Unit Name: Carver Coarse Sand NWI classification: Palustrine Wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ____	Is the Sampled Area within a Wetland?	Yes ✓ No ____
Hydric Soil Present?	Yes ✓ No ____		
Wetland Hydrology Present?	Yes ✓ No ____	If yes, optional Wetland Site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ✓ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✓ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): .5
Water Table Present?	Yes ✓	No ____	Depth (inches): +/- 8"
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): +/- 8"

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Data gathered within isolated wetland that appears to be an old farm pond. wetland is dominated by willow & sensitive fern, but lacks significant vegetative diversity. Perimeter is overgrown with non-native shrubs & vines.

VEGETATION – Use scientific names of plants.

Sampling Point: 1

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. willow (Salix spp.)	20	Yes	FacW
2.			
3.			
4.			
5.			
6.			
7.			
	_____ = Total Cover		

Sapling/Shrub Stratum (Plot size: _____)			
1. (Absent)			
2.			
3.			
4.			
5.			
6.			
7.			
	_____ = Total Cover		

Herb Stratum (Plot size: _____)			
1. Sensitive Fern (Onoclea sensibilis)	5	yes	FacW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	_____ = Total Cover		

Woody Vine Stratum (Plot size: _____)			
1. (Absent)			
2.			
3.			
4.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ Rapid Test for Hydrophytic Vegetation

✓ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8"	7.5YR 3/1						Silty Loam	Ap/Oa Horizon - some muck
8-20"	2.5Y 2/1						mucky	Sapric organic material

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ✓ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ✓ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ✓ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Mitchell River Bridge City/County: Chatham, MA Sampling Date: 11/13/09

Applicant/Owner: Mass DOT State: MA Sampling Point: 2

Investigator(s): Mark Mazzarella Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Coastal Plain/hillslope Local relief (concave, convex, none): concave

Slope (%): 8-15 Lat: 41.66983 Long: 69.96004 Datum: _____

Soil Map Unit Name: Carver Coarse Sand NWI classification: Palustrine Wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	**If yes, optional Wetland Site ID:** _____

Remarks: (Explain alternative procedures here or in a separate report.)

Sampling Point is within upland area adjacent to delineated isolated wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- __ Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Sparsely Vegetated Concave Surface (B8)
- __ Water-Stained Leaves (B9)
- __ Aquatic Fauna (B13)
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- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres on Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Tilled Soils (C6)
- __ Thin Muck Surface (C7)
- __ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- __ Surface Soil Cracks (B6)
- __ Drainage Patterns (B10)
- __ Moss Trim Lines (B16)
- __ Dry-Season Water Table (C2)
- __ Crayfish Burrows (C8)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Stunted or Stressed Plants (D1)
- __ Geomorphic Position (D2)
- __ Shallow Aquitard (D3)
- __ Microtopographic Relief (D4)
- __ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: 2

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Eastern Red Cedar (Juniperus virginiana)	10%	Y	FacU
2. Black Cherry (Prunus serotina)	10%	Y	FacU
3.			
4.			
5.			
6.			
7.			
	_____ = Total Cover		

Sapling/Shrub Stratum (Plot size: _____)			
1. Privet (Ligustrum vulgare)	80%	Y	FacU
2. Tartarian Honeysuckle (Lonicera tatarica)	20%	Y	FacU
3.			
4.			
5.			
6.			
7.			
	_____ = Total Cover		

Herb Stratum (Plot size: _____)			
1. (Absent)			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	_____ = Total Cover		

Woody Vine Stratum (Plot size: _____)			
1. Porcelainberry (Ampelopsis brevipedunculata)	5%	Y	NI
2.			
3.			
4.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ✓ Rapid Test for Hydrophytic Vegetation
- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
.5-0"								Fibric Organic & Surface
0-16"	10YR 3/1						FSL	Ap Horizon
16"-24"	7.5YR 3/2		5YR 5/1	10			SL	redox @ 23"
24"-30"	7.5YR 4/4		10YR 5/2	5				redox @ 26"

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

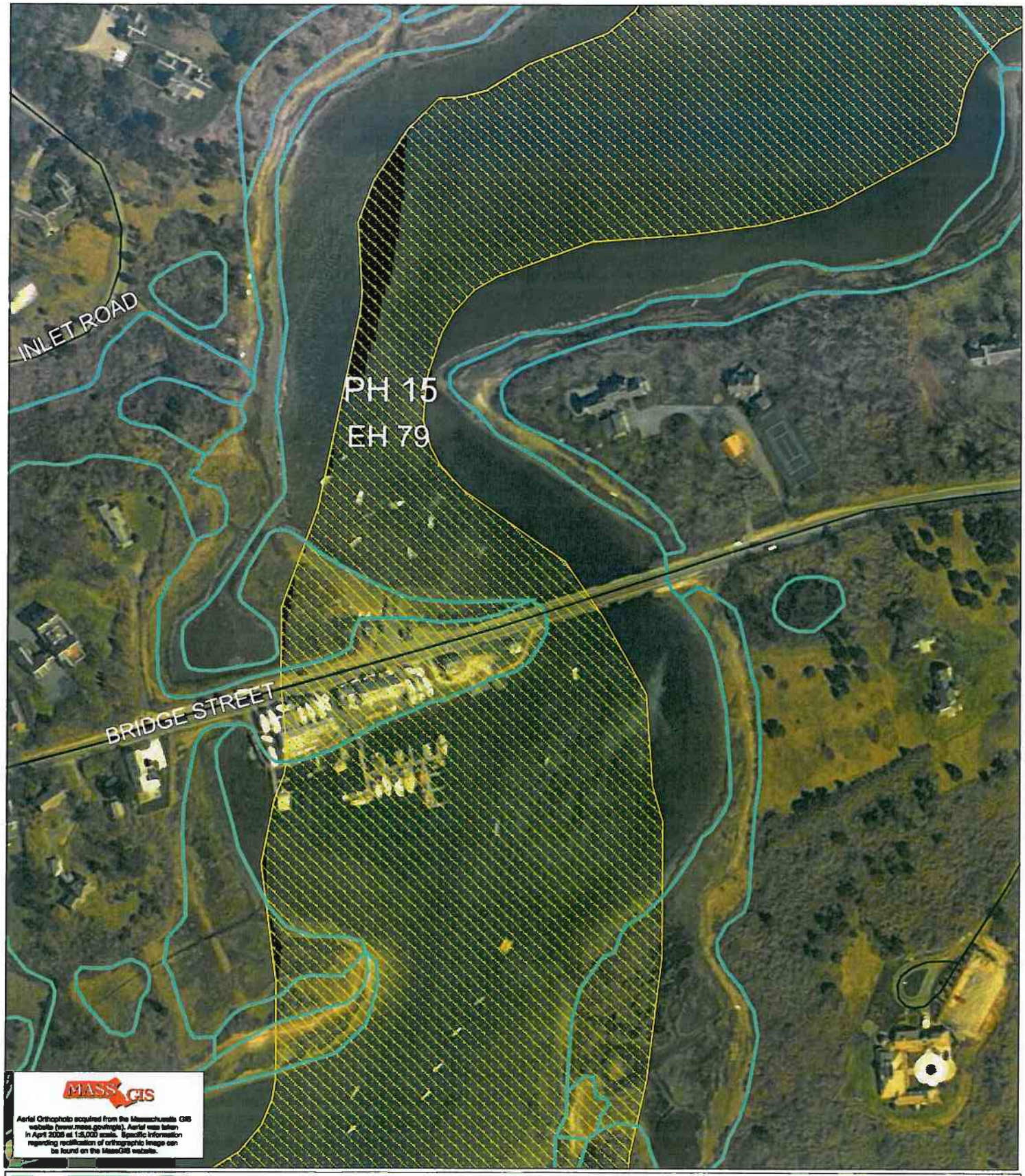
Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

Evidence of redox/seasonal high groundwater too deep to support hydrophytic plant community.



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www.lecenvironmental.com

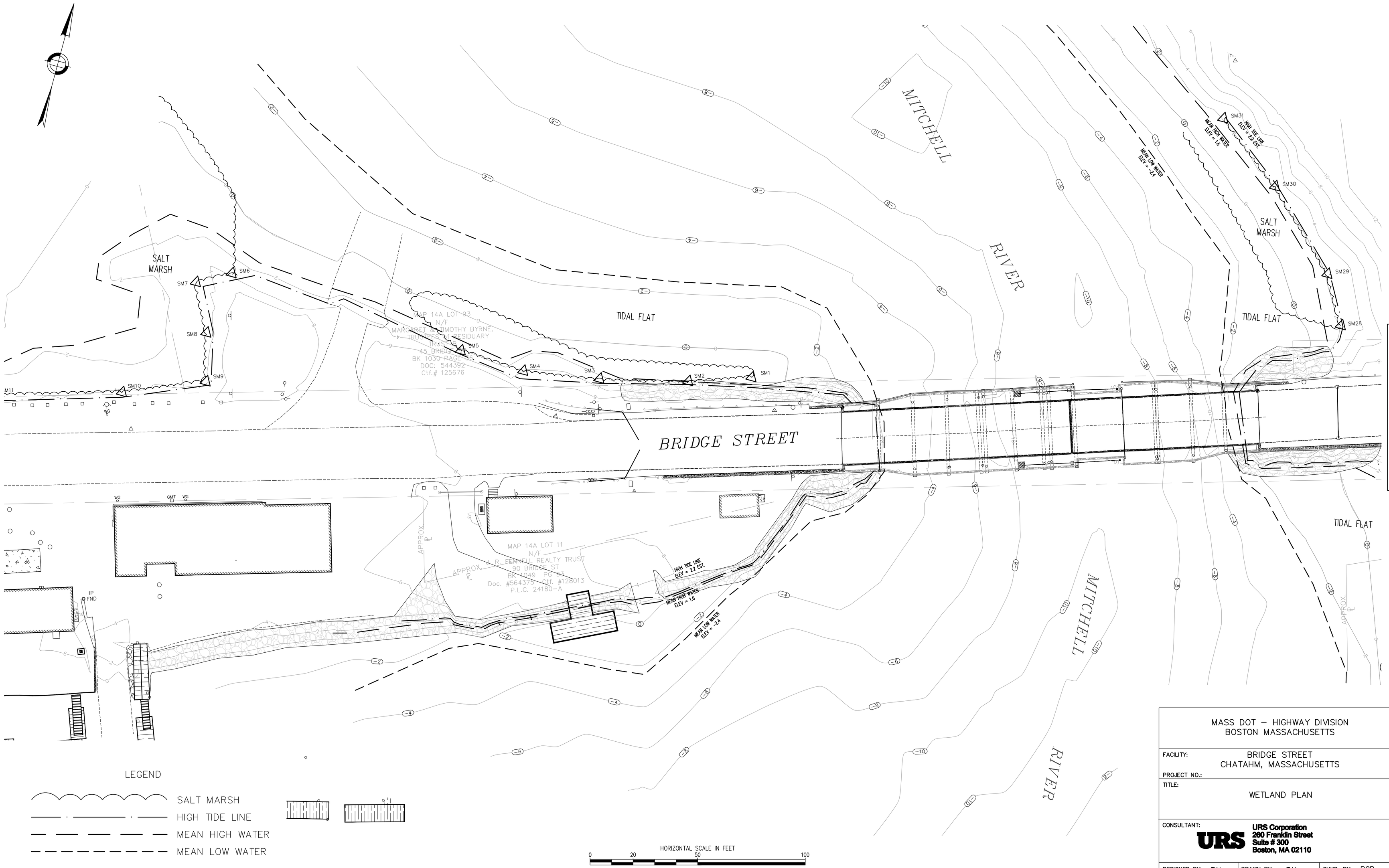
Bridge Street over Mitchell River
Chatham, MA

Approximate Scale: 1" = 200'

10/5/09

Legend

- Eotroads_arc.shp
- Wetchange_poly.shp
- Wetlandsdep_poly.shp
- Pvpx1.shp
- Prihab_poly.shp
- Esthab_poly.shp
- Cvp_pt.shp



MASS DOT – HIGHWAY DIVISION
BOSTON MASSACHUSETTS

FACILITY: BRIDGE STREET
CHATAHM, MASSACHUSETTS

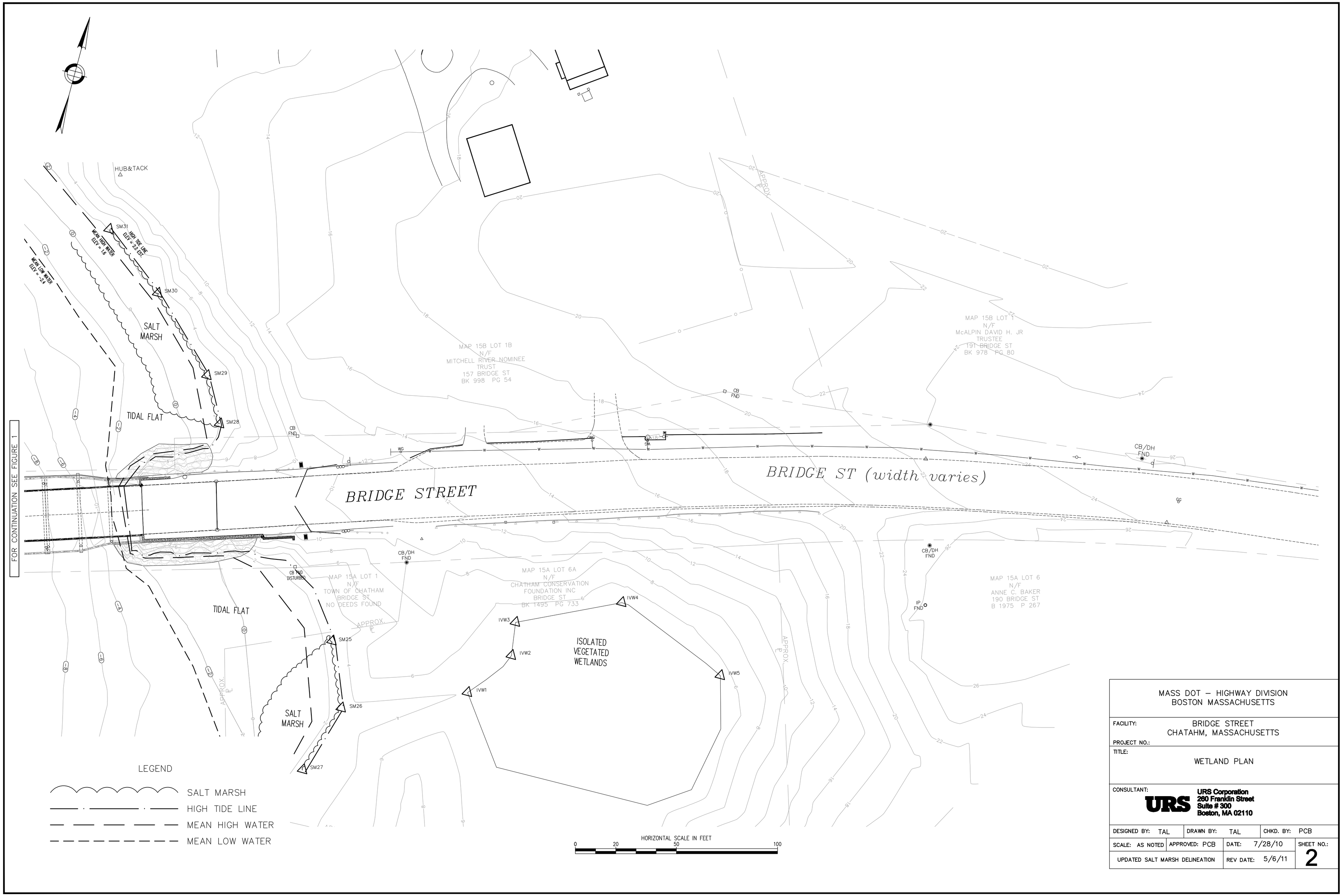
PROJECT NO.:

TITLE: WETLAND PLAN

CONSULTANT: URS
URS Corporation
260 Franklin Street
Suite # 300
Boston, MA 02110

DESIGNED BY: TAL	DRAWN BY: TAL	CHKD. BY: PCB	
SCALE: AS NOTED	APPROVED: PCB	DATE: 7/28/10	SHEET NO.: 1
UPDATED SALT MARSH DELINEATION		REV DATE: 5/6/11	

PLOTTED: 5/6/2011 1:28 PM BY: HADER, JAMANDI
DRAWING: P:\CO85-SEDMA\SB\HIGHWAY\32009 SEDRECM BASSIGN IR - CHATHAM BRIDGE\000 CADD - GIS - GRAPHICS\01 CADD\CIVIL\C_SURVEY\SHEET\3 BASE PLAN.DWG (4 BASE PLAN) 5/6/2011 1:28 PM BY: HADER, JAMANDI



FOR CONTINUATION SEE FIGURE 1

MASS DOT – HIGHWAY DIVISION
BOSTON MASSACHUSETTS

FACILITY: BRIDGE STREET
CHATAHM, MASSACHUSETTS

PROJECT NO.:

TITLE: WETLAND PLAN

CONSULTANT: URS Corporation
260 Franklin Street
Suite # 300
Boston, MA 02110

DESIGNED BY: TAL	DRAWN BY: TAL	CHKD. BY: PCB	
SCALE: AS NOTED	APPROVED: PCB	DATE: 7/28/10	SHEET NO.: 2
UPDATED SALT MARSH DELINEATION		REV DATE: 5/6/11	

PLOTTED: 5/6/2011 3:28 PM BY: HADER, HANANDI
DRAWING: PLOS8S-SEDIMASBRIGWAY2008 SEDPROM BASSION #1 - CHATTAM BRIDGE\800 CADD - GIS - GRAPHICS\810 CADD\CIVIL\C_SURVEY\SHEET10 BASE PLAN.DWG [B BASE PLAN] 5/6/2011 1:23:06 PM BY: HADER, HANANDI

Sediment Sampling Summary

July 29, 2010

Sediment Sampling Summary Memorandum for WQC Application – Bridge No. C-07-001 Mitchell River Bridge (MHD Project Number 603690)

URS Corporation is in the process of designing a replacement bridge, on behalf of Massachusetts Department of Transportation (MassDOT), Highway Division, to replace the structurally deficient Mitchell River Bridge in the Town of Chatham Massachusetts.

To assess the current sediment quality, URS collected two sediment samples from 0-4' below the existing channel bottom in the areas of the proposed dredging. The samples were obtained by drilling through the existing bridge deck and collected using a 3 inch diameter 2 foot long oversized split spoon sampler. At both sampling locations (BB-3 & BB-5) the split spoon was advanced from 0-2' below the channel bottom. A second sample was collected from 2-4' below channel bottom. The two samples were composited together into one 0-4' sample prior to being transferred into one 8oz glass jar, one 4oz plastic jar and two 40ml preserved vials. Once both samples were collected, they were placed in a cooler with ice ready to be couriered to the laboratory for analysis. A Chain of Custody Record form was completed and included with the samples prior to transfer to the courier for delivery to the laboratory.

Each of the two samples collected were analyzed by AMRO Analytical Laboratories in Merrimack NH, for chemical constituents per the WW-07 application form and 314 CMR 9.07(2). These analyses included: Extractable Petroleum Hydrocarbons (EPH), total metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zi), Polychlorinated Biphenyls (PCBs), Polynculear Aromatic Hydrocarbons (PAHs), Total Organic Carbon (TOC), volatile solids, and moisture content. The analyses were performed pursuant to DEP's Compendium of Analytical Methods. Pursuant to 314 CMR 9.07(9), results from the analyses was compared to Massachusetts Contingency Plan (MCP, 310 CMR 40.0360) Reportable Concentrations (RCS-1) and to MassDEP Policy for Reuse and Disposal of Contaminated Soils at Massachusetts Landfills (COMM-97-001). As shown on Table 1, Methylene Chloride was detected at the concentrations RCS-1 standard of 0.1 parts per million (ppm); however, this is a common laboratory contaminant and the absence of other Volatile Organic Compounds (VOCs) affirms the source. Low concentrations of PAHs were detected in both samples and may be attributed to roadway run-off or creosote coatings of the nearby timber piles. PCBs were not detected during analysis. Metal concentrations at both locations including Arsenic, Chromium, Copper, Lead & Zinc were reported above detection limits. Nickel was also reported above detection limits for BB-5. At location BB-3, Arsenic slightly exceeded the RCS-1 standard of 20 ppm. The source of the Arsenic is unknown, but could be related to old pressure treated lumber in the existing bridge.

Each of the composite samples was also analyzed for grain size distribution (i.e. sieve analysis) by Briggs Engineering & Testing from Rockland Massachusetts. These results are also shown on Table 1. The sieve analyses indicate the sediments largely consist of sand with varying amounts of silt or clay.

Included with this Sediment Sampling Summary Memorandum are the following attachments:

- Mitchell River Bridge Sediment Sampling Results Table 1
- Sediment Sampling Plan (Showing sample Locations)

URS Corporation
260 Franklin Street, Suite 300
Boston, MA 02110
Tel: 617.542.4244
Fax: 617.542.3301

- AMRO Laboratories Chain of Custody Record and Data Report
- Briggs Engineering Sieve Analysis Results

Sediment Sampling Results
Mitchell River Bridge
Chatham MA.

Test Parameter	Sample ID Sample Date	Sample		Standards		
		BB-3 (0-4') 4/2/2010 mg/kg	BB-5 (0-4') 4/1/2010 mg/kg	MCP RCS-1 Standard mg/kg	Sediment Reuse mg/kg Lined	Sediment Reuse mg/kg Unlined
VOC 8260	Acetone	<0.23	<0.25	6	10	4
	Teriary Amyl Methyl Ether	<0.046	<0.044	NE	NE	NE
	Benzene	<0.023	<0.022	2	10	4
	Bromobenzene	<0.023	<0.022	100	10	4
	Bromochloromethane	<0.023	<0.022	NE	NE	NE
	Bromodichloromethane	<0.023	<0.022	0.1	10	4
	Bromoform	<0.046	<0.044	0.1	10	4
	Bromomethane	<0.046	<0.044	0.5	10	4
	sec-Butylbenzene	<0.023	<0.022	NE	NE	NE
	n-Butylbenzene	<0.023	<0.022	NE	NE	NE
	tert-Butylbenzene	<0.023	<0.022	100	10	4
	Carbon disulfide	<0.046	<0.044	100	10	4
	Carbon tetrachloride	<0.023	<0.022	5	10	4
	Chlorobenzene	<0.023	<0.022	1	10	4
	Dibromochloromethane	<0.023	<0.022	0.005	10	4
	Chloroethane	<0.046	<0.044	100	10	4
	Chloroform	<0.023	<0.022	0.3	10	4
	Chloromethane	<0.046	<0.044	100	10	4
	2-Chlorotoluene	<0.023	<0.022	NE	NE	NE
	4-Chlorotoluene	<0.023	<0.022	NE	NE	NE
	1,2-Dibromo-3-chloropropane	<0.12	<0.11	10	10	4
	1,2-Dibromomethane	<0.023	<0.022	0.1	10	4
	Dibromomethane	<0.023	<0.022	500	10	4
	1,3-Dichlorobenzene	<0.023	<0.022	1	10	4
	1,2-Dichlorobenzene	<0.023	<0.022	9	10	4
	1,4-Dichlorobenzene	<0.023	<0.022	0.7	10	4
	Dichlorodifluromethane	<0.046	<0.044	1000	10	4
	1,1-Dichloroethane	<0.023	<0.022	0.4	10	4
	1,2-Dichlorethane	<0.023	<0.022	0.1	10	4
	1,1-Dichloroethene	<0.023	<0.022	3	10	4
	cis-1,2-Dichoroethene	<0.023	<0.022	NE	NE	NE
	trans-1,2-Dichloroethene	<0.023	<0.022	1	10	4
	1,2-Dichloropropane	<0.023	<0.022	0.1	10	4
	1,3-Dichlroropropane	<0.023	<0.022	0.01	10	4
	2,2-Dichloropropane	<0.023	<0.022	NE	NE	NE
	1,1-Dichloropropene	<0.023	<0.022	NE	NE	NE
	cis-1,3-Dichoropropene	<0.023	<0.022	0.01	10	4
	trans-1,3-Dichloropropene	<0.023	<0.022	0.01	10	4
	Diethyl ether	<0.23	<0.22	100	10	4
	Diisopropyl ether	<0.046	<0.044	100	10	4
	1,4-Dioxane	<1.2	<1.1	0.2	10	4
	Ethyl Tertiary Butyl Ether	<0.046	<0.044	NE	NE	NE
	Ethylbenzene	<0.023	<0.022	40	10	4
	Hexachlorobutadiene	<0.046	<0.044	6	10	4
	2-Hexanone	<0.23	<0.22	100	10	4
	Isopropylbenzene	<0.023	<0.022	1000	10	4
	4-Isopropyltoluene	<0.023	<0.022	NE	NE	NE

Sediment Sampling Results
Mitchell River Bridge
Chatham MA.

Test Parameter	Sample ID Sample Date	Sample		Standards		
		BB-3 (0-4') 4/2/2010 mg/kg	BB-5 (0-4') 4/1/2010 mg/kg	MCP RCS-1 Standard mg/kg	Sediment Reuse mg/kg Lined	Sediment Reuse mg/kg Unlined
	2-Butanone	<0.23	<0.22	4	10	4
	4-Methyl-2-pentanone	-0.230	<0.22	0.4	10	4
	Methyl tert-butyl ether	<0.023	<0.022	0.1	10	4
	Methylene chloride	**0.100**	<0.044	0.1	10	4
	Naphthalene	<0.046	<0.081	4	10	4
	n-Propylbenzene	<0.023	<0.022	NE	NE	NE
	Styrene	<0.023	<0.022	3	10	4
	1,1,1,2-Tetrachloroethane	<0.023	<0.022	0.1	10	4
	1,1,2,2-Tetrachloroethane	<0.023	<0.022	0.005	10	4
	Tetrachloroethene	<0.023	<0.022	0.005	10	4
	Tetrahydrofuran	<0.23	<0.22	500	10	4
	Toluene	<0.023	<0.022	30	10	4
	1,2,4-Trichlorobenzene	<0.023	<0.022	2	10	4
	1,2,3-Trichlorobenzene	<0.023	<0.022	NE	NE	NE
	1,1,1-Trichloroethane	<0.023	<0.022	30	NE	NE
	1,1,2-Trichloroethane	<0.023	<0.022	0.1	NE	NE
	Trichloroethene	<0.023	<0.022	0.3	NE	NE
	Trichlorofluromethane	<0.046	<0.044	1000	NE	NE
	1,2,3-Trichloropropane	<0.023	<0.022	100	NE	NE
	1,2,4-Trimethylbenzene	<0.023	<0.022	1000	10	4
	1,3,5-Trimethylbenzene	<0.023	<0.022	10	10	4
	Vinyl chloride	<0.023	<0.022	3	10	4
	o-Xylene	<0.023	<0.022	NE	NE	NE
	m,p-Xylene	<0.023	<0.022	NE	NE	NE
EPH	C9-C18 Aliphatic Hydrocarbons	<12	<12	1000	5000	2500
	C19-C36 Aliphatic Hydrocarbons	<12	<12	3000	5000	2500
	C11-C22 Aromatic Hydrocarbons	<12	<12	1000	5000	2500
	Naphthalene	**0.058**	**0.016**	4	5000	2500
	2-Metylnaphthalene	**0.019**	<0.012	0.7	5000	2500
	Acenaphthylene	**0.044**	<0.012	1	5000	2500
	Acenaphthene	**0.140**	**0.044**	4	5000	2500
	Fluorene	**0.100**	**0.017**	1000	5000	2500
	Phenanthrene	**0.770**	**0.034**	10	5000	2500
	Anthracene	**0.047**	**0.100**	1000	5000	2500
	Fluoranthene	**0.610**	**1.700**	1000	5000	2500
	Pyrene	**0.700**	**1.100**	1000	5000	2500
	Benz(a)anthracene	**0.120**	**0.440**	7	5000	2500
	Chrysene	**0.420**	**0.630**	70	5000	2500
	Benz(b)fluoranthene	**0.200**	**0.200**	2	5000	2500
	Benz(k)fluoranthene	**0.150**	**0.170**	7	5000	2500
	Benzo(a)pyrene	**0.180**	**0.190**	2	5000	2500
	Dibenz(a,h)anthracene	**0.030**	**0.020**	0.7	5000	2500
	Indeno(1,2,3-cd)pyrene	**0.091**	**0.100**	7	5000	2500
	Benzo(g,h,i)perylene	**0.150**	**0.100**	1000	5000	2500

Sediment Sampling Results
Mitchell River Bridge
Chatham MA.

Test Parameter	Sample ID Sample Date	Sample		Standards		
		BB-3 (0-4') 4/2/2010 mg/kg	BB-5 (0-4') 4/1/2010 mg/kg	MCP RCS-1 Standard mg/kg	Sediment Reuse mg/kg Lined	Sediment Reuse mg/kg Unlined
PCBs 8082	Aroclor 1016	<0.03	<0.031	2	<2	<2
	Aroclor 1221	<0.03	<0.031	2	<2	<2
	Aroclor 1232	<0.03	<0.031	2	<2	<2
	Aroclor 1242	<0.03	<0.031	2	<2	<2
	Aroclor 1248	<0.03	<0.031	2	<2	<2
	Aroclor 1254	<0.03	<0.031	2	<2	<2
	Aroclor 1260	<0.03	<0.031	2	<2	<2
	Aroclor 1262	<0.03	<0.031	2	<2	<2
	Aroclor 1268	<0.03	<0.031	2	<2	<2
TOC		2600	1200	NE	NE	NE
Percent Solid		84	83			
Percent Moisture		20.1	19.4	NE	NE	NE
ICP Metals	Arsenic	**21.6**	**11.1**	20	40	40
	Cadmium	<0.78	<0.703	2	80	30
	Chromium	**4.95**	**11.2**	30	1000	1000
	Copper	**4.42**	**8.82**	1000	NE	NE
	Lead	**4.27**	**6.52**	300	2000	1000
	Nickel	<6.24	**10**	20	NE	NE
	Zinc	**12.8**	**24**	2500	NE	NE
	Mercury	<0.0589	<0.0582	20	10	10

< = Non-detect (detection limits shown)
[Bold] = Concentrations reported above detection limit
[Bold-Yellow] = Exceeds MCP RCS-1 Standard
NE = None Established

Sediment Sampling Results
Mitchell River Bridge
Chatham MA.

Grain Size	Particle Size Analysis (Sieve Size)		Results
	Standard	Alternate	% Pass
BB-3	100mm	4"	100
	90mm	3.5"	100
	75mm	3"	100
	63mm	2.5"	100
	50mm	2"	100
	37.5mm	1.5"	100
	25mm	1"	100
	19mm	3/4"	99
	12.5mm	1/2"	98
	9.5mm	3/8"	98
	4.75mm	#4	96
	2.00mm	#10	90
	0.850mm	#20	80
	0.425mm	#40	64
	0.250mm	#60	44
	0.106mm	#140	12
	0.053mm	#270	7
BB-5	100mm	4"	100
	90mm	3.5"	100
	75mm	3"	100
	63mm	2.5"	100
	50mm	2"	100
	37.5mm	1.5"	100
	25mm	1"	100
	19mm	3/4"	99
	12.5mm	1/2"	99
	9.5mm	3/8"	99
	4.75mm	#4	99
	2.00mm	#10	97
	0.850mm	#20	94
	0.425mm	#40	86
	0.250mm	#60	68
	0.106mm	#140	35
	0.053mm	#270	23

AMRO Environmental Laboratories Corporation
111 Herrick Street
Merrimack, NH 03054

CHAIN-OF-CUSTODY RECORD

59899

Office: (603) 424-2022
Fax: (603) 429-8496
web: www.amrolabs.com

Project No.:	Project Name:	Project State:	Project Manager:	Samplers (Signature):	AMRO Project No.:
10160738	CHATHAM BRIDGE	MA.	IRWAN HALIM	[signature]	1004004

P.O.#:

Results Needed by: 14 day TAT from sampling date

QUOTE #:

Seal Intact? Yes No N/A

REQUESTED ANALYSES

Sample ID.:	Date/Time Sampled	Matrix	Total # of Cont. & Size	Comp.	Grab	Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)	PCB Method 8082	EPH 1.1 w/PAH Targets	VOC Method 8260	Moisture Content	*TOC (Subcontd)	Remarks
BB-5 (0-4')	4-1-10/0930	S	4	✓		✓	✓	✓	✓	✓		* Note: Both 0-4' Composite samples collected from 0-2' & 2-4' below mudline.
BB-3 (0-4')	4-2-10/0810	S	4	✓		✓	✓	✓	✓	✓		

Preservative: Cl-HCl, MeOH, N-HN03, S-H2SO4, Na-NaOH, O- Other

Send Results To: URS CORPORATION
ATTN. Aleksandar Marinkovic
260 Franklin Street Suite 300
Boston, MA 02110

PRIORITY TURNAROUND TIME AUTHORIZATION
Before submitting samples for expedited TAT, you must *have a coded AUTHORIZATION NUMBER*
AUTHORIZATION No.: BY:

METALS 8 RCRA ☐ 13 PP ☐ 23 TAL ☐ 14 MCP ☐
Method: 6010 ☐ 200.7 ☐ Other Metals:
Dissolved Metals Field Filtered? YES ☐ NO ☐

PHONE #: FAX #: 617 542-3301
E-mail: aleksandar_marinkovic@urscorp.com

MCP Presumptive Certainty Required? YES ✓ NO ☐

MCP Methods Needed: YES ✓ NO ☐

Required Reporting Limits: S-1 ☐ GW-1 ☐ S-2 ☐ GW-2 ☐ S-3 ☐ GW-3 ☐ Other:

Relinquished By:	Date/Time	Received By
[signature]	4-5-10/0430	[signature]
[signature]	4/5/10 12:15	[signature]

AMRO report package level needed:

EDD required:

Please print clearly, legibly and completely. Samples can not be logged in and the turnaround time clock will not start until any ambiguities are resolved.

Samples arriving after 12:00 noon will be tracked and billed as received on the following day.

AMRO policy requires notification in writing to the laboratory in cases where the samples were collected from highly contaminated sites.

KNOWN SITE CONTAMINATION: NONE

White: Lab Copy Yellow: Client Copy

SHEET 1 OF 1

AMROCOC2004, Rev.3 08/18/04

8 own

AMRO Environmental Laboratories Corporation
111 Herrick Street
Merrimack, NH 03054

CHAIN-OF-CUSTODY RECORD

Office: (603) 424-2022
Fax: (603) 429-8496
web: www.amrolabs.com

Project No.:	Project Name:	Project State:	Project Manager:	Samplers (Signature):	AMRO Project No.:
101607	CHATHAM BRIDGE	MA		MG	1004004

P.O.#:	Results Needed by:
	STD

QUOTE #:	Seal Intact? Yes No N/A

REQUESTED ANALYSES: TOTAL ORGANIC CARBON

Sample ID.:	Date/Time Sampled	Matrix	Total # of Cont. & Size	Comp.	Grab	TOTAL ORGANIC CARBON	Remarks
BB-5 (0-4')	4-1-10 9:30	S	1	✓		✓	89596
* BB-3 (0-4')	4-2-10 08:10	S	1	✓		✓	89597

Preservative: Cl-HCl, MeOH, N-HN03, S-H2SO4, Na-NaOH, O- Other

Send Results To: NANCY STEWART
AMRO ENVIRONMENTAL
111 HERRICK ST
MERRIMACK - NH - 03054

PRIORITY TURNAROUND TIME AUTHORIZATION
Before submitting samples for expedited TAT, you must *have a coded AUTHORIZATION NUMBER*
AUTHORIZATION No.: BY:

METALS 8 RCRA ☐ 13 PP ☐ 23 TAL ☐ 14 MCP ☐
Method: 6010 ☐ 200.7 ☐ Other Metals:
Dissolved Metals Field Filtered? YES ☐ NO ☐

PHONE #: FAX #:
E-mail:

MCP Presumptive Certainty Required? YES ☐ NO ☐

MCP Methods Needed: YES ☐ NO ☐

Required Reporting Limits: S-1 ☐ GW-1 ☐ S-2 ☐ GW-2 ☐ S-3 ☐ GW-3 ☐

Relinquished By:	Date/Time	Received By
[signature]	4-5-10 17:00	[signature]
fedex	4-6-10 10:38	[signature]

AMRO report package level needed: L2

EDD required:

Other:

Please print clearly, legibly and completely. Samples can not be logged in and the turnaround time clock will not start until any ambiguities are resolved.

Samples arriving after 12:00 noon will be tracked and billed as received on the following day.

AMRO policy requires notification in writing to the laboratory in cases where the samples were collected from highly contaminated sites.

KNOWN SITE CONTAMINATION:

White: Lab Copy Yellow: Client Copy

SHEET OF

AMROCOC2004, Rev.3 08/18/04

*-bar recid broken Transferred at lab

March 09, 2010

Massachusetts Department of Environmental Protection
Attention: Ken Chin
1 Winter Street
Boston, MA 02108

Re: Dredge Sediment Sampling Plan for WQC Application – Bridge No. C-07-001 Bridge Street over Mitchell River, Chatham MA (MHD Project Number 603690)

Dear Mr. Chin:

URS Corporation is in the process of designing a replacement bridge, on behalf of Massachusetts Department of Transportation (MassDOT) - Highway Division, to replace the Bridge Street bridge over Mitchell River in the Town of Chatham. The existing timber bridge is being replaced because it is structurally deficient.

The existing bridge consists of timber piles and decking and concrete abutments. The overall length of the superstructure is 192 feet and 37 feet in width, with a bascule draw span length of 23 feet. The bridge will be replaced in its entirety with a five span structure, total overall length of 195 feet. The curb-to-curb roadway width of the bridge will be 24 feet, and there will be 5.75 feet of sidewalk on both sides. The new abutments, semi integral with the superstructure and supported on concrete piles, will be in the same approximate location as the existing abutments. The piers will consist of concrete caps on concrete piles. The existing timber piles in the river will be cut-off to approximately two feet below the bottom of the channel and temporary sheeting may be placed to control water and reduce the excavation footprint during construction. The finished river bottom after construction will maintain the same approximate grade as that of the existing river bottom.

The design anticipates the dredging of bottom sediments to a maximum depth of approximately 4 feet in the area of the bascule span for the installation of the new bascule foundation pile cap. The piles in the fixed span locations will be driven and no dredging is anticipated. The volume of dredged sediments in the bascule span area is anticipated to be approximately 200 cubic yards. URS is preparing an Application for 401 Water Quality Certificate (Form BRP WW-07) for the dredging aspects of the project. To verify the current sediment quality, URS proposes to collect 2 current sediment samples from depths of 0-4 feet below the existing channel bottom in the areas of the proposed dredging. The samples will be collected in March in conjunction with geotechnical borings. Attached is a plan showing the sampling locations. Samples are anticipated to be collected at 2-foot intervals with a stainless steel split spoon sampler. Samples from each of the two borings within the channel (BB#3 and BB#5) will be composited individually, such that a composite sediment sample from BB#3 and a composite sediment sample from BB#5 will be obtained. Each of these two samples will subsequently be analyzed by AMRO Analytical Laboratories for chemical constituents per the WW-07 application form. These analyses include: Extractable Petroleum Hydrocarbons (EPH), total metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zi), Polychlorinated Biphenyls (PCBs), Polynculear Aromatic Hydrocarbons (PAHs), volatile solids, and water content. The analyses will be performed pursuant to DEP's Compendium of Analytical Methods. Results from the analyses will be compared to DEP's disposal facility acceptance criteria (COMM-97). The composite samples will also be analyzed for grain size distribution (i.e. sieve analysis) by Geotesting Express.

URS Corporation
260 Franklin Street, Suite 300
Boston, MA 02110
Tel: 617.542.4244
Fax: 617.542.3301

If you have any questions about this request, or require additional information, please contact me at 857-383-3822.

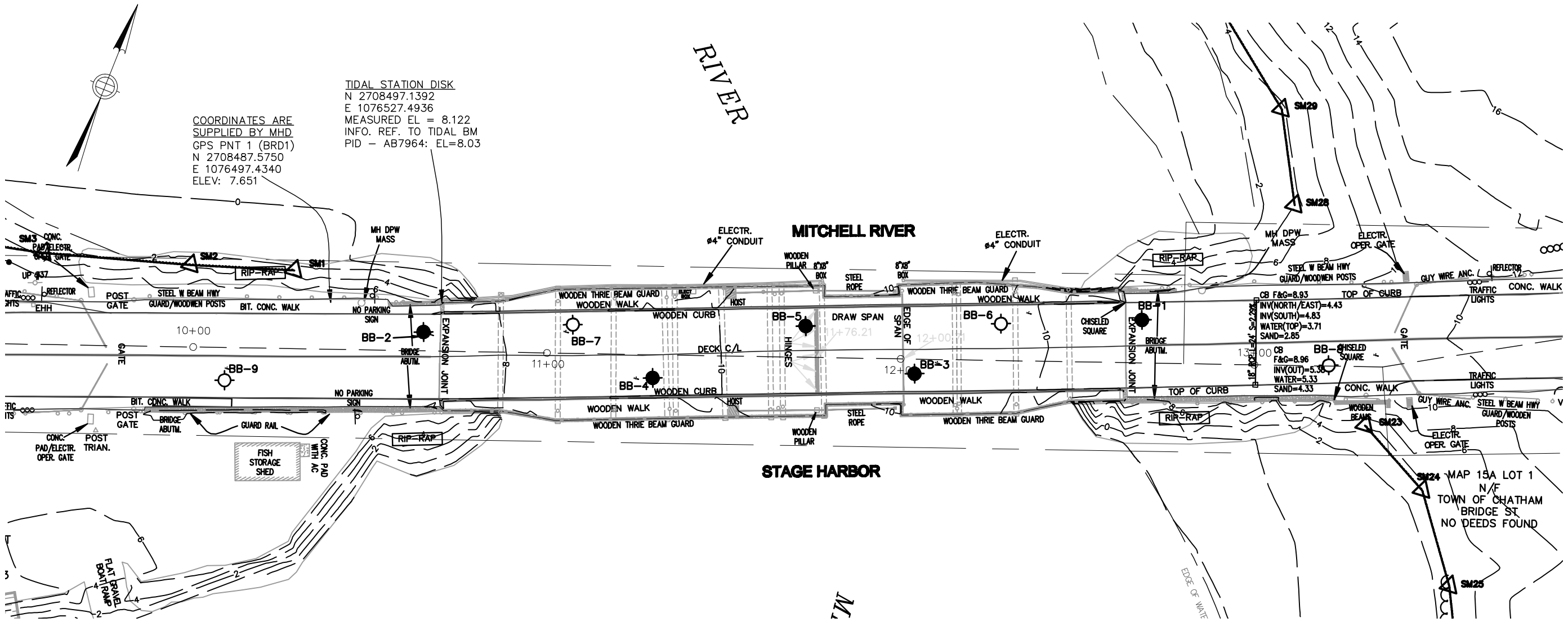
Sincerely,
URS Corporation

Brian Vaillancourt
Manager – Planning & Permitting Group

CC: Erin Remillard, MassDOT

Attachments: Boring Plans

J:\MassHighway\2009 SEDRSCM 5\Assignment #1 - Chatham Bridge\400 Work Products & Reports - Active & Draft (No PDF)\460 Permiting (application, back-up materials)\WQC\WQC Sampling Plan - Chatham.doc



BORING PLAN

SCALE: 1" = 30'–0"

BORING LOCATIONS (FEET)						
BORING	NORTHING	EASTING	STATION	OFFSET	SURFACE	H.B.E.
BB–1	2,708,551	1,076,718	12+68.0	12.16 LT	9.3	–90.7
BB–2	2,708,488	1,076,525	10+65.0	5.33 LT	7.4	–92.6
BB–3	2,708,518	1,076,661	12+4.0	4.10 RT	10.7	–39.3
BB–4	2,708,495	1,076,590	11+30.0	6.56 RT	9.3	–40.7
BB–5	2,708,522	1,076,627	11+73.0	8.85 LT	10.5	–39.5
BB–6	2,708,526	1,076,686	12+30.0	3.34 RT	10.2	–39.80
BB–7	2,708,486	1,076,562	11+0.0	7.58 RT	8.3	–41.7
BB–8	2,708,554	1,076,772	13+21.0	0.22 LT	9.3	–40.70
BB–9	2,708,459	1,076,475	10+9.0	9.26 RT	7.2	–42.75

PROJECT FILE NO. 603690

massDOT Highway

BORING PLAN FOR PROPOSED BRIDGE
IN

CHATHAM

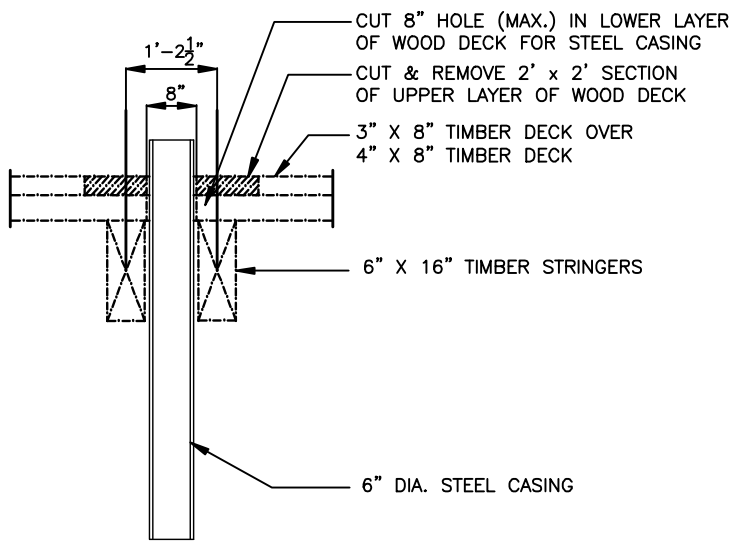
BRIDGE STREET
OVER MITCHELL RIVER

THE COMMONWEALTH OF MASSACHUSETTS
HIGHWAY DEPARTMENT

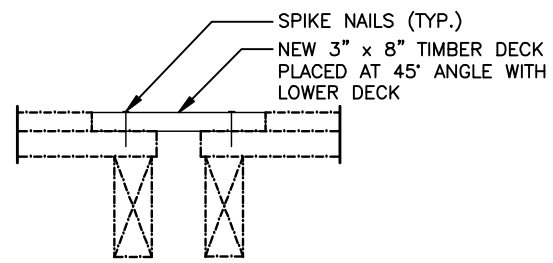
FEBRUARY 2010

SHEET 1 OF 2 BRIDGE NO. C–07–001(437)

PLOTTED: 03/09/10 1:22PM BY:ALEKSANDAR_MARINKOVI
DRAWING: J:\MASSHIGHWAY\2009 SEDRSCM 5\ASSIGNMENT #1 – CHATHAM BRIDGE\500 CADD – GIS – GRAPHICS\510 CADD\STRUC\MISC\CHATHAM BORING PLAN.DWG



SUGGESTED SETUP FOR DRILLING THROUGH BRIDGE DECK
N.T.S.



DECK REPAIR DETAIL
N.T.S.

NOTES:

1. LOCATION OF CONTROL DRIVE SAMPLE BORINGS ARE SHOWN THUS: ●
   LOCATION OF COMPLIMENTARY DRIVE SAMPLE BORINGS ARE SHOWN THUS: ○
2. COMPLIMENTARY BORINGS ARE ONLY TO BE TAKEN DEPENDING ON THE RESULTS OF CONTROL BORINGS UNLESS DIRECTED BY THE ENGINEER.
3. BORINGS SHALL BE PERFORMED IN THE SEQUENTIAL NUMBERING ORDER. BORING BB–1 SHALL BE TAKEN FIRST, BORING BB–2 TAKEN SECOND, ETC. BORING BB–9 SHALL BE TAKEN LAST.
4. SEE THE BORING LOCATIONS TABLE FOR THE SPECIFIED HIGHEST BOTTOM ELEVATION (H.B.E.) OF EACH BORING.
5. ALL BORINGS SHALL HAVE SAMPLES TAKEN EVERY 5 FT.. BORING BB–2 SHALL HAVE SAMPLES TAKEN EVERY 5 FT. FOR THE FIRST 50 FT. AND AT 10 FT. INTERVALS THEREAFTER FORTHE REMAINING OF THE BORING.
6. BORINGS BB–1 TO BB–5 SHALL EXTEND TO THE SPECIFIED HIGHEST BOTTOM ELEVATION OR TO REFUSAL BELOW THE H.B.E., WHICHEVER IS DEEPER. BORINGS BB–6 TO BB–9 SHALL EXTEND TO THE H.B.E. AND THEN BE TERMINATED.
7. SHOULD BEDROCK BE ENCOUNTERED AT OR ABOVE THE SPECIFIED HIGHEST BOTTOM ELEVATION, THE BORING SHALL BE CONTINUED AS A ROCK CORE BORING FOR A DEPTH OF 10' THEN TERMINATED.
8. BENCHMARK: TIDAL STATION DISK (TIDAL BM PID AB7964)
9. BORINGS ARE LOCATED FROM THE BASELINE OF BRIDGE STREET.
10. ADDITIONAL BORINGS MAY BE REQUESTED BY THE ENGINEER IF NECESSARY.
11. BORINGS ARE LOCATED APPROXIMATELY 5 FT OFF OF THE EXISTING CURBLINE.
12. BB–3 AND BB–5 SHALL TAKE 4 FT SEDIMENT SAMPLES AT RIVER BED. THE SAMPLE SHALL BE TAKEN WITH AN OVERSIZE SPOON.

PLOTTED: 03/09/10 1:23PM BY:ALEKSANDAR_MARINKOVI
DRAWING: J:\MASSHIGHWAY\2009 SEDRSCM 5\ASSIGNMENT #1 – CHATHAM BRIDGE\500 CADD – GIS – GRAPHICS\510 CADD\STRUC\MISC\CHATHAM BORING PLAN.DWG

Agency Correspondence

Commonwealth of Massachusetts

Division of Marine Fisheries

251 Causeway Street, Suite 400
Boston, Massachusetts 02114
(617)626-1520
Fax (617)626-1509

Paul J. Diodati
Director

Deval Patrick
Governor

Ian A. Bowles
Secretary

Mary B. Griffin
Commissioner

September 10, 2009

Mr. Carl Chamberlin, Environmental Planner
URS Corporation
260 Franklin Street, Suite 300
Boston, MA 02110

Dear Mr. Chamberlin:

In response to your inquiry, *MarineFisheries* is concerned that the proposal work on the Mitchell River Bridge could have an adverse impact on winter flounder spawning. The waters of Stage Harbor and surrounding embayments have been identified as winter flounder (*Pseudopleuronectes americanus*) spawning habitat. Winter flounder enter the area and spawn from January through May, laying clumps of eggs directly on the substrate. These demersal eggs hatch approximately fifteen to twenty days later. The Atlantic States Marine Fisheries Commission (ASMFC) has designated winter flounder spawning habitat as "Habitat Areas of Particular Concern" (HAPC). A recent stock assessment has determined that Southern New England/Mid Atlantic winter flounder populations are at only 9% of the recommended recovery level and are considered nearly depleted. Because of the dramatic decline in the winter flounder stock, every effort should be made to protect winter flounder and their spawning habitat between the dates of January 15 and May 31.

MarineFisheries offers the following comments for your consideration:

- Relatively small amounts of silt will cover and destroy demersal winter flounder eggs. Silt in the water column can clogs the gills and suffocate larval flounder. Therefore, *MarineFisheries* recommends that all silt producing activities be contained to minimize impacts on spawning winter flounder. If the silt can not be contained, *MarineFisheries* recommends that impacts to spawning flounder should be avoided by prohibiting all silt producing activities between January 15 and May 31;
- No more than 25% of the area under the bridge should be blocked at any given time. Blocking more than 25% of the river with coffer dams or bottom anchored turbidity curtains could impede winter flounder passage between Stage Harbor and Mill Pond.
- The western portion of the Mitchell River Bridge is within mapped eelgrass (*Zostera marina*) beds. Eelgrass beds provide one of the most productive marine habitats for numerous marine species and are designated "special aquatic sites" under the Federal Clean Water Act 404(b)

(1) guidelines. The placement of new abutments, piles or any other structures should not be allowed in eelgrass beds.

Questions regarding this review may be directed to Eileen Feeney in our New Bedford office at (508) 910-6305.

Sincerely,

Paul J. Diodati
Director

cc: Chatham Conservation Commission
Christian Petitpas, DMF
Terry O'Neil, DMF

From: Feeney, Eileen (FWE)
To: Burnham, Erin (DOT)
Cc: Petitpas, Christian (FWE)
Subject: RE: Chatham - Recommendation Question
Date: Tuesday, July 03, 2012 11:52:31 AM

Hi Erin,
Thank you for sending the Draft plans for the Mitchell River bridge work proposed by MassDOT in Chatham. Your concern is 31.4% (at MLW) of the waterway will be blocked at any one time to perform work on the remaining piles after the permanent bascule span and rest pier have been completed. Our recommendation was not to block more than 25% of the area under the bridge at any given time which could impede winter flounder passage between Stage Harbor and Mill Pond. The Elevation View (sheet 4 of 7, June 2012) depicts that the thalweg, the deepest portion of the channel, is between the bridge pier and to the right of the rest pier. Since this area of construction is expected not to encompass more than 25% of the river, the winter flounder should have room to pass under the bridge to get to Mill Pond to spawn. While the other piers are being constructed one by one, try to minimize the restriction of passage to the best extent practicable.
Thank you.
Eileen

| Eileen M. Feeney | Fisheries Habitat Specialist | Division of Marine Fisheries | 1213 Purchase St. - 3rd floor | New Bedford, MA 02740 | telephone: 508.990.2860 x 117 |
fax: 508.990.0449 | email: Eileen.Feeney@state.ma.us

From: Burnham, Erin (DOT) [mailto:erin.remillard@dot.state.ma.us]
Sent: Monday, July 02, 2012 11:16 AM
To: Feeney, Eileen (FWE)
Subject: Chatham - Recommendation Question

Hi Eileen,

As we discussed on the phone, I am attaching the original letter from DMF for Chatham (Bridge Street over the Mitchell River), a few of the draft plan sheets, and a couple photos to show the existing bridge and the rendering of the proposed bridge. The existing bridge is a twelve span bascule style with a counterweight open and dipping into the water. The proposed bascule bridge will have six spans and the counterweight will be housed in a closed counterweight box. One of the current recommendations from your office is as follows:

- No more than 25% of the area under the bridge should be blocked at any given time. Blocking more than 25% of the river with coffer dams or bottom anchored turbidity curtains could impede winter flounder passage between Stage Harbor and Mill Pond.

While the bascule and rest pier are being installed, they are expected to encompass 23.7% of the river at Mean Low Water (22.0% at Mean High Water). Once the cofferdam is removed, this will create a permanent structure in the waterway that will encompass a little less than 23% of the river. The remaining pile bent installations can be phased to occur one at a time (i.e. turbidity barrier installed, pile bent installed, turbidity barrier removed, then repeat for the remaining pile bents). However, it is estimated that, including the permanent bascule span and rest pier, the total percent of the waterway being blocked while a pile bent is being installed may be around 31.4% MLW (29.2% MHW). This will be higher than your recommended 25% area. Would it be possible to allow for a larger area of the waterway to be blocked at one time so that construction may occur?

Feel free to call or email with any questions.

Thanks,
Erin

Erin Burnham
Environmental Analyst
MassDOT, Highway Division
10 Park Plaza, Room 4260
Boston, MA 02116
(617) 973-7727

From: Susan Tuxbury - NOAA Federal [mailto:susan.tuxbury@noaa.gov]
Sent: Tuesday, November 27, 2012 10:24 AM
To: Damaris.Santiago@dot.gov
Cc: erin.burnham@state.ma.us; eileen.feeney@massmail.state.ma.us; Madden, Diane (DOT); Bastoni, Michael (DOT); Dexter, Timothy (DOT)
Subject: Mitchell River Bridge Replacement

Dear Mr. Santiago,

NMFS has reviewed the Environmental Assessment (EA) and Essential Fish Habitat (EFH) Assessment for the Mitchell River Bridge replacement project in Chatham, MA. The EA evaluated two alternatives for replacing the existing structurally deficient bridge. We would like to offer the following comments and recommendations to minimize project impacts to EFH in the project area.

We would first like to clarify that EFH for winter flounder is designated for Stage Harbor and surrounding waters, including the project site in the Mitchell River. The EFH Mapper Tool has limitations for pinpointing a specific site, particularly with some coastal embayments. Please see the data quality tab on the EFH Mapper help page which identifies limitation in the data, including spatial resolution and inland extent. The EFH Mapper tool should be used as a general reference, while the individual source documents should be used to determine spatial extent of EFH for a particular species.

NMFS concurs with the mitigative measures proposed in the EA and recommended by MA Division of Marine Fisheries to protect winter flounder sensitive life stages. As such, NMFS recommends all in- water silt producing activities be contained with the use of turbidity barriers. Any silt-producing activities that cannot be contained should be avoided between January 15th through May 31st of any year to minimize impacts to winter flounder spawning and development.

Should you have any further questions regarding these comments or this project, please contact me at 978-281-9176 or susan.tuxbury@noaa.gov. Thank you.

Sincerely,

Sue Tuxbury

Fishery Biologist

Habitat Conservation Division

NOAA Fisheries

55 Great Republic Drive

Gloucester, MA 01930

978-281-9176 (phone)

978-281-9301 (fax)

susan.tuxbury@noaa.gov

Commonwealth of Massachusetts

Division of Fisheries & Wildlife

MassWildlife

Wayne F. MacCallum, *Director*

April 22, 2010

Erin Remillard
Environmental Services Division
Massachusetts Department of Transportation
10 Park Plaza
Boston, MA 02116

RE: Project Location: Bridge Street over Mitchell River, Chatham
Project Description: Bridge Replacement
NHESP Tracking No. 09-27090

Dear Mr. Bennett,

Thank you for submitting project plans and narrative for review pursuant to the MA Endangered Species Act Regulations (MESA)(321 CMR 10.18). Your filing describes the full replacement of the Bridge Street Bridge over the Mitchell River in Chatham.

Based on a review of the information that was provided and the information that is currently contained in our database, the NHESP has determined that this project, as currently proposed, **occurs within Priority Habitat** as indicated in the *Massachusetts Natural Heritage Atlas* (13th Edition; 2008). **Specifically, this project is within the habitat of Common Tern** (*Sterna hirundo*), **Arctic Tern** (*Sterna paradisaea*), and **Least Tern** (*Sterna antillarum*), which are state-listed as Species of Special Concern and **Roseate Tern** (*Sterna dougallii*), which is state-listed as Endangered, respectively, pursuant to the MESA. The bridge is partially within the mapped foraging habitat of these species but will not negatively affect them.

The NHESP finds that this project, as currently proposed, will not constitute a prohibited "take" of Common or Roseate Tern pursuant to 321 CMR 10.18(2)(a), because it appears that construction activities at this site will not be detrimental to foraging or reproductive success. However, any additional work beyond that shown on the site plans and within Priority Habitat may require a filing with the NHESP.

Please do not hesitate to contact Michael T. Jones, Ph.D., Endangered Species Review Biologist, at (508) 389-6386 (michael.t.jones@state.ma.us), with any questions or comments you may have.

Sincerely,

Thomas W. French, Ph.D.
Assistant Director

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087
http://www.fws.gov/northeast/newenglandfieldoffice

October 21, 2009

Carl Chamberlin
URS Corporation
260 Franklin Street, Suite 300
Boston, MA 02110

Dear Mr. Chamberlin:

This responds to your recent correspondence, dated September 18, 2009, regarding the proposed replacement of the Bridge Street Bridge over the Mitchell River in the Town of Chatham, Massachusetts. The project involves the replacement of the existing 194 foot by 37 foot timber framed structure with a similar-sized structure in the same general location.

As indicated in your letter, the federally-endangered roseate tern (*Sterna dougallii*) is known to occur in proximity to the project area. Although we have no records of observations in the vicinity of the project, roseate terns are expected to feed in the area. However, due to the limited size of the project and the abundance of feeding areas available to terns in the vicinity, the project is not likely to adversely affect the roseate tern. No other federally-listed or proposed, threatened or endangered species or critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service are known to occur in the project area. Preparation of a Biological Assessment or further consultation with us under Section 7 of the Endangered Species Act is not required.

This concludes our review of listed species and critical habitat in the project location and environs referenced above. No further Endangered Species Act coordination of this type is necessary for a period of one year from the date of this letter, unless additional information on listed or proposed species becomes available.

Thank you for your coordination. Please contact Anthony Tur at 603-223-2541, extension 24, if we can be of further assistance.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office

From: Anthony_Tur@fws.gov
Sent: Wednesday, June 27, 2012 8:31 AM
To: Burnham, Erin (DOT)
Cc: Jeannine_Dube@fws.gov
Subject: Re: Chatham, MA Coordination
Attachments: USFWS comments 10-21-2009.pdf; USGS Map.pdf

Erin,

Our position regarding this project has not changed and our prvious letter, dated October 21, 2009, remains valid.

Thank you for coordinating.
Tony

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(")(")

Anthony Tur
Endangered Species Biologist
U.S. Fish and Wildlife Service
New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301

Phone (603) 223-2541 x.24
Anthony_Tur@fws.gov

http://www.fws.gov/newengland/

"Burnham, Erin (DOT)" <erin.burnham@state.ma.us>

06/14/2012 11:34 AM

To "'Anthony_Tur@fws.gov'" <Anthony_Tur@fws.gov>
cc
Subject Chatham, MA Coordination

Anthony,

I am emailing regarding an upcoming project that the Massachusetts Department of Transportation has in Chatham, Massachusetts. A letter regarding the project was received from your office dated October 21, 2009. However, this letter stated that no further coordination would be necessary for a period of one year. The project has had a number of delays and has recently picked up a little more momentum so I am emailing you for your determination on whether the information contained in the letter is still accurate or if, now, there might be more coordination necessary. Below is a project description. Attached you will find a copy of the original letter and a locus map of the project area.

Project Description

The Mitchell River Bridge is an electrically powered, cable-lift, simple trunnion, single-leaf timber bascule drawbridge with eleven timber stringer approach spans supported on timber pile bents. Replacement of the bridge is necessary to address both structural deficiencies and functionally

obsolete features of the current bridge. The preferred alternative for replacement is a 6-span, 195-foot long timber superstructure, including a single-leaf bascule span over a 25-foot clear horizontal navigation channel, supported on a concrete and steel substructure. In-water features would include 4 typical piers (sets of concrete filled steel pipe piles) and one bascule pier. The fender system on each side of the navigation channel will consist of a combination of horizontal and vertical timber members attached to the face of the concrete bascule pier and rest bent.

The Mitchell River, a 1.1-mile long tidal waterway, links Mill Pond to the Stage Harbor embayment system along Chatham's southwest coastline. The river has a mean tide range of approximately 3.9 feet and a mean spring tide range of approximately 4.5 feet. The State Harbor System consists of six embayments: Stage Harbor, Oyster Pond River, Oyster Pond, Mitchell River, Mill Pond, and Little Mill Pond. The Stage Harbor embayment supports both salt marsh and eelgrass communities. The mean depth of the Mitchell River is approximately 5.25 feet. Mean salinity is 30 parts per thousand (ppt). The tide within Stage Harbor is semidiurnal and at the Mitchell River Bridge the amplitude ranges from between 2.2 and 6.0 feet (neap and spring, respectively).

Prior to construction, a combination of hay bales, silt fences, and other soil erosion and sedimentation control devices will be placed along the perimeter of the upland work areas to control erosion and sedimentation. Turbidity barriers will be placed around the existing pile bents during pile removal and around new pile bents during installation of new piles to contain sediments produced during construction activities. Steel sheet pile cofferdams will be used to create a dry environment for the demolition of the existing abutments and for construction of the new bascule pier and abutments. Turbidity barriers will be placed around the steel sheet piling during installation and, once the steel sheet piling has been installed, the turbidity barriers may be removed, as sheet piling will adequately contain sediments produced by construction activities performed within the cofferdams. The cofferdams will be dewatered in order to permit demolition and construction operations in the dry. Water that is removed from the cofferdams during dewatering operations will be collected and filtered to remove sediments before discharge into the waterway.

Please let me know if there is any additional information you might need.

Thank you,
Erin Burnham

Erin Burnham
Environmental Analyst
MassDOT, Highway Division
10 Park Plaza, Room 4260
Boston, MA 02116
(617) 973-7727

U.S. Department of Homeland Security
United States Coast Guard

Commander
First Coast Guard District

Battery Park Bldg.
1 South Street
New York, NY 10004-1466
Staff Symbol: (dpb)
Phone: (212) 668-7165
Fax: (212) 668-7967

16591/0.02H/Mitchell R/MA
February 12, 2010

Mr. William R. Egan, P.E.
Project Manager
URS Corporation
260 Franklin Street
Boston, MA 02110

RE: Bridge Street Bridge

Dear Mr. Egan:

We are pleased to learn that the referenced bridge will soon be replaced. I apologize for this tardy response but we thought that this had been sent earlier.

As you may be aware, there have been numerous structural and operational issues involving this bridge over the past several years. A design flaw in the original construction of the bridge prevented it from fully opening for the passage of vessel traffic resulting in several mishaps wherein vessels sustained damage to their rigging due to hitting the tip of the draw span. In its present condition the draw span cannot fully open to provide unobstructed vertical clearance for the full width of the bridge between the fender faces. The Coast Guard, therefore, will seek to promote the optimum navigational opening for any proposed replacement structure.

Bridge navigational lighting has been an issue raised by local mariners also so provision for navigational lighting should be included in your design plans along with clearance gauges and protective bridge fenders.

We are available to meet with you, Massachusetts Department of Transportation and the Town of Chatham (bridge owner) to discuss early permit coordination and bridge design issues. Please provide us with any up to date design plans and summary of local meetings held.

Your assistance and cooperation in addressing these drawbridge issues is vital. If you have any questions, please contact John McDonald at 617 223-8364 or me at 212 668-7021.

Sincerely,

Gary Klassof
Bridge Program Manager
First Coast Guard District
By direction of the District Commander

Copy: Commander, Sector Southeastern New England

Section 106 MOA and Consultation

DEVAL L. PATRICK, GOVERNOR
TIMOTHY P. MURRAY, LT. GOVERNOR
JEFFREY B. MULLAN, SECRETARY & CEO
LUISA PAIEWONSKY, ADMINISTRATOR

Moving Massachusetts Forward. massDOT Highway

November 2, 2011

RE: Chatham, Replacement of the Mitchell River Bridge (C-07-001)
MassDOT Project #603690
Section 106 Review: Project Notification Form

Ms. Bettina Washington
Tribal Historic Preservation Officer
Wampanoag Tribe of Gay Head (Aquinnah)
20 Black Brook Road
Aquinnah, MA 02535

Dear Ms. Washington:

Enclosed please find a Project Notification Form (PNF) for the above noted project in Chatham. This project will be supported in part with funds from the Federal Aid Highway Program. Furthermore, work in water will require a U.S. Army Corps of Engineers' permit, the jurisdiction of which will cover the entire project area. This project, therefore, is a federal undertaking that requires review under Section 106 of the National Historic Preservation Act of 1966, as amended.

MassDOT is submitting the enclosed project information to the Tribal Historic Preservation Officer to meet the Section 106 consultation requirements of both the Federal Highway Administration and the U. S. Army Corps of Engineers. Please submit any written comments or concerns regarding historic or archaeological properties that may be affected by this project to Thomas Broderick, P.E., Chief Engineer, Massachusetts Department of Transportation, 10 Park Plaza, Boston, MA 02116-3973, Attn: Jeffrey Shrimpton.

Please feel free to contact me at 617-973-7497 if you have any questions regarding this project.

Sincerely,

Jeffrey Shrimpton
Cultural Resources Specialist
Environmental Services

encs: PNF
Site plan and elevation
Locus
Scope
Aerial Photo
NR eligibility letter
c.c.: K. Adams, ACOE

DEVAL L. PATRICK, GOVERNOR
TIMOTHY P. MURRAY, LT. GOVERNOR
JEFFREY B. MULLAN, SECRETARY & CEO
LUISA PAIEWONSKY, ADMINISTRATOR

Moving Massachusetts Forward.
massDOT Highway

November 2, 2011

RE: Chatham, Replacement of the Mitchell River Bridge (C-07-001)
MassDOT Project #603690
Section 106 Review: Project Notification Form

Mr. George Green, Jr.
Tribal Historic Preservation Officer
Mashpee Tribe
P.O. Box 1048
Mashpee, MA 02649

Dear Mr. Green:

Enclosed please find a Project Notification Form (PNF) for the above noted project in Chatham. This project will be supported in part with funds from the Federal Aid Highway Program. Furthermore, work in water will require a U.S. Army Corps of Engineers' permit, the jurisdiction of which will cover the entire project area. This project, therefore, is a federal undertaking that requires review under Section 106 of the National Historic Preservation Act of 1966, as amended.

MassDOT is submitting the enclosed project information to the Tribal Historic Preservation Officer to meet the Section 106 consultation requirements of both the Federal Highway Administration and the U. S. Army Corps of Engineers. Please submit any written comments or concerns regarding historic or archaeological properties that may be affected by this project to Thomas Broderick, P.E., Chief Engineer, Massachusetts Department of Transportation, 10 Park Plaza, Boston, MA 02116-3973, Attn: Jeffrey Shrimpton.

Please feel free to contact me at 617-973-7497 if you have any questions regarding this project.

Sincerely,

Jeffrey Shrimpton
Cultural Resources Specialist
Environmental Services

encs: PNF
Site plan and elevation
Locus
Scope
Aerial Photo
NR eligibility letter
c.c.: K. Adams, ACOE

APPENDIX A
MASSACHUSETTS HISTORICAL COMMISSION
220 MORRISSEY BOULEVARD
BOSTON, MASS. 02125
617-727-8470, FAX: 617-727-5128

PROJECT NOTIFICATION FORM

Project Name:	Replacement of Bridge C-07-001 (MassDOT # 603690)
Location /Address:	Bridge Street over Mitchell River
City/Town:	Chatham
Project Proponent	
Name:	Massachusetts Department of Transportation
Address:	10 Park Plaza
City/Town/Zip/Telephon	Boston, MA 02116 / T: 617-973-7497

Agency license or funding for the project (list all licenses, permits, approvals, grants or other entitlements being sought from state and federal agencies).

Agency Name	Type of License or funding (specify)
Army Corps of Engineers	General permit, Section 404 of the Clean Water Act
Federal Highway Admin.	Federal Aid
MassDOT	State Funding, Accelerated Bridge Program

Project Description (narrative):

This project proposes to remove the existing Mitchell River Bridge (C-07-001) and replace it with a new bridge on the same alignment. The proposed new bridge combines a timber superstructure on each of five approach spans with a steel-framed, single-leaf bascule draw span, with all superstructure elements supported on a steel-and-concrete substructure. The principal structural members of the approach span superstructures will be glue-laminated (glulam) timber beams; the principal structural members of the proposed new draw span will be steel girders and steel floor beams. The decking on all six spans, including the draw span, will be timber planks. Other timber elements of the superstructure will include the sidewalk decks, at-curb crash barriers, and bridge railings. All connections on the superstructure shall be made with steel fasteners. The substructure will be comprised of two reinforced concrete abutments, one reinforced-concrete hollow bascule pier, and five concrete-filled steel pipe piers with reinforced-concrete pier caps. The outer elevations of the bascule pier and the abutment wingwalls will be clad with stone.

Approach work will include reconstruction of the existing paved roadway for 100' at either end of the bridge. The existing 2 ½ foot wide asphalt sidewalks along the approach roadways will be widened to 5'. Existing steel beam guardrails along the approaches will be removed and replaced.

Does the project include demolition? If so, specify nature of demolition and describe the building(s) which are proposed for demolition.

Yes. The existing Mitchell River Bridge is an electrically powered, cable-lift, simple-trunnion, single-leaf timber bascule drawbridge with eleven timber stringer approach spans supported on timber pile bents. The entire existing bridge superstructure, including that of the bascule and all eleven approach spans, was constructed of new timber elements in 1980. This 1980 superstructure was erected on a reconstructed substructure that combines reused timber piles from a previous bridge on this crossing intermixed with new (1980) timber piles, all new timber pier caps, all new wooden cross-bracing, and two new reinforced concrete abutments. The earlier bridge from which the reused timber piles were retained was a timber drawbridge that had been constructed in 1925 and then widened and modernized in 1949. This 1925/49 structure was itself a complete replacement of a much longer timber drawbridge reportedly erected

APPENDIX A (continued)

in either 1858 or 1871. That mid-19th century bridge is presumed to have been the original bridge on this crossing. No part of that original bridge is known to exist today.

The Keeper of the National Register of Historic Places has determined that the existing Mitchell River Bridge has "exceptional significance" and is eligible for listing in the National Register as "one of a continuous line of wooden drawbridges that have spanned this crossing for over 150 years" and as "the last remaining single-leaf wooden drawbridge in Massachusetts (and perhaps the United States), despite its less-than-50 years age." The Keeper's DOE notification letter to FHWA, dated October 31, 2010, is enclosed with this submittal..

Does the project include rehabilitation of any existing buildings? If so, specify nature of rehabilitation and describe the building(s) which are proposed for rehabilitation

No.

Does the project include new construction? If so, describe (attach plans and elevations if necessary).

Yes. A new bridge will be constructed on the same alignment to carry Bridge Street over the Mitchell River.

To the best of your knowledge, are any historic or archaeological properties known to exist within the project's area of potential impact? If so, specify.

Besides the Mitchell River Bridge itself, no National Register-listed or –eligible districts or properties are located in the immediate vicinity of the project area.

MassDOT's Archaeological Resources Supervisor, John Rempelakis, has reviewed this project for its potential to impact significant archaeological resources. A review of the MHC pre-contact archaeological base maps revealed no recorded sites in the immediate vicinity of the project area. The closest recorded pre-contact sites — 19-BN-267 and -268 — are located east of the Mitchell River roughly 0.25 to 0.5 mile from the project are. A review of the MHC historic archaeological base maps revealed one recorded historic site — CHA.HA.1 — located approximately 500' southeast of the project area. Project impacts will be confined to the existing bridge and the existing paved roadway approaches. Little or no archaeological potential can be ascribed to the project area based on the nature of the proposed work; the effects of past roadway, causeway, and bridge construction; roadside development (i.e. boat landing, building construction); and the presence of unfavorable environmental conditions (i.e. embankment).

What is the total acreage of the project area?

Woodland		acres	Productive Resources:		
Wetland		acres	Agriculture		acres
Floodplain		acres	Forestry		acres
Open Space		acres	Mining/Extraction		acres
Developed	1	acres	Total Project Acreage	1	acres

What is the acreage of the proposed new construction? 1 acres

What is the present land use of the project area?

Bridge and roadway ROW.

Please attach a copy of the section of the USGS quadrangle map which clearly marks the project location.

APPENDIX A (continued)

This Project Notification Form has been submitted to the MHC in compliance with 950 CMR 71.00.

Signature of person submitting this form: Jeffrey Shrimpton **Date:** 11/2/2011

Name: Jeffrey Shrimpton

Address: 10 Park Plaza

City/Town/Zip: Boston, MA 02116

Telephone: 617-973-7497

REGULATORY AUTHORITY

950 CMR 71.00: M.G.L. c. 9, §§ 26-27C as amended by St. 1988, c. 254.

Application Package

a. Applicant

Massachusetts Department of Transportation – Highway Division
10 Park Plaza
Boston MA, 02116
Contact: Steven Soma, Project Manager
Tel: (617) 973-8176

b. Consultant

URS Corporation
260 Franklin Street, Suite 300
Boston, MA 02110
Contact: Bill Egan, Project Manager
Tel: (857) 383-3849

c. Project Description

Bridge Number C-07-001 (437) carries Bridge Street over the Mitchell River in the town of Chatham, Massachusetts (Barnstable County). The bridge is approximately 1.5 miles from the mouth of the river, and there are no other structures crossing the waterway. The purpose of the project is to replace a structurally deficient bridge with a new bridge along a similar horizontal and vertical alignment. The project is an Accelerated Bridge Program (ABP) reconstruction that involves the replacement of an existing structure in the same location with a similar capacity.

The proposed project will replace the entire exiting bridge (both superstructure and substructure) with a five span structure, total overall length of 195 feet. The curb-to-curb roadway width of the bridge will be 24 feet, and there will be 5.75 feet of sidewalk on both sides. The new abutments, semi integral with the superstructure and supported on concrete piles, will be in the same approximate location as the existing abutments. The piers will consist of concrete caps on concrete piles. All power and communication systems, and bridge signal equipment, including traffic signal interconnect equipment, will be replaced or upgraded.

The bridge profile is expected to remain approximately the same, although it may be raised to maintain a minimum vertical clearance under the structure. The current as-built clear opening has been determined to be unacceptable, as the bridge does not open up entirely when in the open position. The new bascule span will provide at least 19.33 feet of horizontal clearance, which is equivalent to the existing designed clearance, when the bridge is in the open position. Additionally, a suitable fender system will be provided along both sides of the channel.

d. Legislative Authority

In accordance with the Chapter 233, Section 13 of the Acts of 2008, which created the Accelerated Bridge Program, this bridge is exempt from review under the Massachusetts Environmental Policy Act Regulations (301 CMR 11.00), the Massachusetts Wetlands Protection Act Regulations (310 CMR 10.00), and the Chapter 91 Waterways Regulations (310 CMR 9.00).

e. International Bridges

Not applicable.

f. Proposed Horizontal and Vertical Clearances

The Mitchell River is a navigable waterway and the proposed structure will need to maintain the navigable channel of the river. The existing horizontal clearance is approximately 19 feet, and the

Bridge Street over the Mitchell River, C-07-001

Chatham, Massachusetts

Moving Massachusetts Forward. massDOT Highway

0 0.04 0.08 0.16 0.24 0.32 Miles

1 inch = 0.4 Miles

MEMORANDUM OF AGREEMENT
AMONG
THE FEDERAL HIGHWAY ADMINISTRATION,
THE MASSACHUSETTS STATE HISTORIC PRESERVATION OFFICER, AND
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION
REGARDING THE REPLACEMENT OF THE
MITCHELL RIVER BRIDGE (C-07-001)
IN CHATHAM, MASSACHUSETTS

WHEREAS, the Federal Highway Administration (FHWA), in consultation with the Massachusetts State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation, pursuant to 36 CFR Part 800, regulations implementing Section 106 of the National Historic Preservation Act of 1966, as amended [16 U.S.C. Part 470(f)], has determined that the proposed demolition of the Mitchell River Bridge (in order to construct a new bridge on the same alignment) will have an adverse effect on that National Register-eligible structure; and

WHEREAS, FHWA, through the Massachusetts Department of Transportation (MassDOT), has defined the undertaking's area of potential effect as comprising the Mitchell River Bridge (C-07-001), which carries Bridge Street over the Mitchell River in Chatham, Massachusetts; the properties abutting the immediate approach roadways along Bridge Street; and areas along the banks of the Mitchell River that are in view of the bridge; and

WHEREAS, the Mitchell River Bridge is an electrically powered, cable-lift, simple-trunnion, single-leaf timber bascule drawbridge with eleven timber stringer approach spans supported on timber pile bents; and

WHEREAS, the bridge's existing timber superstructure, including the single bascule draw span and all eleven approach spans, was entirely constructed of new timber elements in 1980 on a substructure that reused many of the timber piles from the previous bridge (built 1925, widened 1949) on this crossing, intermixed with many new timber piles, all new wooden pier caps, all new pile bent cross-bracing, and all new reinforced concrete abutments — all built in 1980; and

WHEREAS, the Keeper of the National Register of Historic Places (National Register) has stated, in a Determination of Eligibility (DOE) notification dated October 1, 2010, that the existing Mitchell River Bridge is eligible for listing in the National Register "for its association with local transportation history" and "as a rare surviving example of a structure embodying the distinctive characteristics of a once-common method of construction," and has noted further that the bridge is "of exceptional significance" as "the last remaining single-leaf wooden drawbridge in Massachusetts (and perhaps the United States);" and

WHEREAS, the Mitchell River Bridge is not located in any historic district that is either listed in or has been determined eligible for listing in the National Register; and

WHEREAS, MassDOT has determined that the Mitchell River Bridge is structurally deficient, functionally obsolete, and cannot prudently be rehabilitated to serve current transportation needs for an acceptable design-life; and

WHEREAS, the Town of Chatham owns and maintains the Mitchell River Bridge; and

WHEREAS, FHWA has undertaken an extensive Section 106 consultation process with numerous local, statewide, and national parties, including meetings in Chatham on January 25 and May 17, 2011, and a teleconference on January 4, 2012; and

WHEREAS, MassDOT has participated in the Section 106 consultation process and has been invited to sign this Memorandum of Agreement (MOA) as an invited signatory; and

WHEREAS, as a result of that consultation process, MassDOT has significantly revised its initially proposed, 3-span, fully modern concrete-and-steel bridge design, and has developed instead a more context-sensitive design that incorporates a substantial number of structural timber elements (plus other, non-structural wooden features) into the superstructure of the proposed replacement bridge (as further described in Stipulation 1 below); and

WHEREAS, MassDOT has determined that concrete-filled steel pipe pile piers and a steel-framed bascule leaf are the most prudent alternatives for this undertaking based on extensive research into the engineering performance of structural materials used in marine environments; and

WHEREAS, the Town of Chatham Board of Selectmen has participated in the Section 106 consultation process and has been invited to sign this Memorandum of Agreement (MOA) as an invited signatory; and

WHEREAS, other parties have participated in the Section 106 consultation process and have been invited to sign this MOA as concurring parties, including the Chatham Historical Commission, the Friends of the Mitchell River Wooden Drawbridge, Pease Boat Works & Marine Railway, Preservation Massachusetts, the National Trust for Historic Preservation, the Historic Bridge Foundation, the Indiana Historic Spans Taskforce, James L. Cooper, PhD, and George Myers; and

WHEREAS, FHWA and MassDOT have notified the Wampanoag Tribe of Gay Head/Aquinnah, the Mashpee Wampanoag Indian Tribal Council, and the Massachusetts Board of Underwater Archaeological Resources about the proposed project and have invited their comments; and

WHEREAS, in accordance with 36 CFR § 800.6(a)(1), FHWA has notified the Advisory Council on Historic Preservation (Council) of its adverse effect determination with specified documentation and the Council has chosen to participate in the consultation pursuant to 36 CFR § 800.6(a)(1)(iii); and

NOW, THEREFORE, FHWA, the SHPO, and the Council agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the adverse effect of the proposed undertaking on historic properties.

STIPULATIONS

FHWA shall ensure that the following provisions are carried out:

I. DESIGN OF NEW REPLACEMENT BRIDGE

FHWA shall ensure that MassDOT designs and constructs a context-sensitive new bridge to replace the existing National Register-eligible Mitchell River Bridge. The proposed new bridge shall be comprised of a single-leaf bascule draw span and five approach spans. The principal structural members of the proposed new draw span shall be steel girders and steel floor beams and the principal structural members of the five approach spans shall be glue-laminated (glulam) timber beams. The decking, sidewalks, bridge railings, and at-curb barriers on all six spans shall be constructed of timber. All connections on the superstructure shall be made with steel fasteners. The substructure of the proposed new bridge shall be comprised of two reinforced concrete abutments, one reinforced concrete bascule pier, and five concrete-filled steel pipe pile piers. The outer elevations of the bascule pier and the wingwalls of the abutments shall be clad with stone. FHWA has provided conceptual drawings and architectural renderings of this design, known as Alternative 3, to all parties that have been involved in the Section 106 consultations for this project. Those drawings and renderings were included as enclosures with FHWA's Section 106 Adverse Effect submittal dated November 9, 2011.

II. FURTHER CONSULTATION TO DEFINE AESTHETIC DETAILS

A. FHWA and MassDOT shall convene at least one additional meeting in Chatham of the Section 106 consulting parties to discuss the sketch plans (25% design phase) and aesthetic details of the proposed new replacement bridge as described in Stipulation I. The sketch plans will show the dimensions and profile of the new bridge but may not show its structural or aesthetic details. FHWA and MassDOT, however, will ensure that more refined computer-generated renderings of the aesthetic details of the proposed bridge are made available to the Section 106 consulting parties and the public prior to the meeting. FHWA will provide hard copies (11" x 17") or electronic versions of the sketch plans and architectural renderings to each Section 106 consulting party (as each party may prefer) at least fourteen days prior to the meeting in Chatham. Written comments regarding the sketch plans or renderings may be submitted to FHWA (Pamela S. Stephenson, Division Administrator, Federal Highway Administration, 55 Broadway, 10th Floor, Cambridge, MA 02142) by the Section 106 consulting parties or the public. FHWA and MassDOT shall review and consider all comments received within fourteen days following the meeting, before proceeding to final design.

B. FHWA shall invite all Section106 consulting parties to the meeting in Chatham to consult on further refinement of the sketch plans and aesthetic details of the proposed new bridge, regardless of whether or not any of those parties has chosen to sign this MOA.

C. MassDOT will continue to study the prudence of utilizing timber pier caps on concrete-filled steel pipe pile piers, and will discuss the results of that study with the Section 106 consulting parties.

D. Aesthetic details of the proposed new bridge to be discussed at the public meeting in Chatham shall include, but shall not necessarily be limited to, the following:

1. The design of the stone cladding to be used on the outer elevations of the bascule pier and the wingwalls of the abutments.
2. Whether the existing timber railings along the outer edges of the present bridge's sidewalks shall be salvaged and reinstalled on the proposed new bridge or shall new timber railings be designed and constructed for installation on the new bridge.
3. The paint color to be used on the steel pipe pile piers and the steel beams of the bascule span.

E. The Section 106 consulting parties meeting described in this stipulation shall be held in addition to the project's design public hearing and the NEPA Environmental Assessment public hearing.

III. ARCHIVAL DOCUMENTATION

A. FHWA shall ensure that MassDOT prepares archival-quality photographic documentation of the existing bridge in the form of 8" x 10" black and white prints made from 35 mm black and white negatives. Photographs shall depict aerial views of the existing bridge and its surroundings, as well as views of the bridge's elevations, bascule span and operating system, deck, abutments, and timber pile bents, and context views showing the bridge in relation to its setting. All photographs shall be identified on the back in pencil, with no affixed labels, unmounted but sleeved in archival-quality, unbuffered envelopes, the contents of each envelope identified and numbered in pencil on the envelope. The negatives shall be sleeved in appropriate archival-quality negative holders, which shall be suitably labeled. All photographs shall be keyed by number to a site plan printed on archival-quality paper. A list of photographic views printed on archival-quality paper also shall be included.

B. All photographic documentation described in Subsection A shall be completed prior to the commencement of any construction associated with the proposed bridge replacement project.

C. MassDOT shall include photocopies of selected pages from the original 1980 construction plans for the Mitchell River Bridge, including a site plan, elevations, and details. Photocopies shall be printed on archival-quality 11"x17" paper, which shall be folded in half for storage.

D. MassDOT shall include photocopies of any other existing paper documentation, copied on archival-quality paper, which FHWA, MassDOT, and any of the Section 106 consulting parties shall mutually agree to include.

E. MassDOT shall submit one original set of photographic documentation (with negatives) to the Chatham Historical Commission for transmittal to an appropriate local repository. All paper documentation described in Subsections A, C, and D shall be enclosed in an archival-quality file folder and included with the photographic documentation. All documentation, including photographs, shall be enclosed in an archival-quality box.

F. MassDOT shall include a compact disc containing all photographic and paper documentation with the archival documentation. FHWA shall provide copies of that compact disc to all Section 106 consulting parties.

IV. FUTURE NATIONAL REGISTER DETERMINATION OF ELIGIBILITY

Once the construction of the new Mitchell River Bridge is completed, FHWA and MassDOT shall assist the efforts of any Section 106 consulting party to this undertaking to pursue a formal National Register DOE for the new bridge. That assistance will include, but not be limited to, the timely provision of documentation, upon the request of the preparer of the DOE, such as the final project plans for the new bridge, photographs, and any information that was included in the original DOE package sent to the Keeper on August 31, 2010.

V. POST-REVIEW DISCOVERIES

If FHWA or MassDOT determines that the undertaking will affect a previously unidentified property that may be eligible for listing in the National Register of Historic Places, or will affect a known historic property in an unanticipated manner, FHWA and MassDOT shall make reasonable efforts to avoid, minimize or mitigate any adverse effects to such properties and determine actions that they can take to resolve any adverse effects following the procedures in 36 CFR 800.13(b). In the event that a post-review discovery involves a property or properties that may have traditional cultural and religious significance to federally recognized Indian tribes, FHWA, in coordination with MassDOT, shall consult with the appropriate Indian tribe(s) in accordance with the requirements of 36 CFR 800.13(b) and established procedures for Section 106 tribal consultation for Massachusetts. If pre-contact cultural resources are discovered or unanticipated effects on pre-contact period resources are found, FHWA, in coordination with MassDOT, will consult with the appropriate federally recognized Indian tribes in accordance with established procedures for Section 106 tribal consultation for Massachusetts.

VI. DURATION

This MOA will be null and void if its terms are not carried out within five years from the date of its execution. Prior to such time, FHWA may consult with the other signatories to reconsider the terms of the MOA and amend it in accordance with 36 CFR 800.6(c)(7).

VII. DISPUTE RESOLUTION

Should any party to this agreement, or any party consulted under this agreement, object in writing to any actions proposed or the manner in which the terms of this MOA are implemented, FHWA shall consult with such party to resolve the objection. If FHWA determines that such objection cannot be resolved, FHWA will:

A. Forward all documentation relevant to the dispute, including FHWA's proposed resolution, to the Council. The Council shall provide FHWA with its advice on the resolution of the objection within thirty days of receiving adequate documentation. Prior to reaching a final decision on the dispute, FHWA shall prepare a written response that takes into account any timely advice or comments regarding the dispute

from the Council, signatories and concurring parties, and provide them with a copy of this written response. FHWA will then proceed according to its final decision.

B. If the Council does not provide its advice regarding the dispute within the thirty day time period, FHWA may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, FHWA shall prepare a written response that takes into account any timely comments regarding the dispute from the signatories and concurring parties to the MOA, and provide them and the Council with a copy of such written response.

C. FHWA's responsibility to carry out all other actions subject to the terms of this MOA that are not the subject of the dispute remain unchanged.

VIII. TERMINATION

If any signatory to this MOA determines that its terms will not or cannot be carried out, that party shall immediately consult with the other parties to attempt to develop an amendment per 36 CFR 800.6(c)(7). If within thirty (30) days (or another time period agreed to by all signatories) an amendment cannot be reached, any signatory may terminate the MOA upon written notification to the other signatories.

Once the MOA is terminated, FHWA must either (a) execute an MOA pursuant to 36 CFR 800.6 or (b) request, take into account, and respond to the comments of the Council under 36 CFR 800.7. FHWA shall notify the signatories as to the course of action it will pursue.

Execution of this MOA by FHWA, the SHPO, and the Council and implementation of its terms evidence that FHWA has taken into account the effects of this undertaking on historic properties and afforded the Council an opportunity to comment.

MEMORANDUM OF AGREEMENT
AMONG
THE FEDERAL HIGHWAY ADMINISTRATION,
THE MASSACHUSETTS STATE HISTORIC PRESERVATION OFFICER, AND
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION
REGARDING THE REPLACEMENT OF THE
MITCHELL RIVER BRIDGE (C-07-001) IN CHATHAM, MASSACHUSETTS

SIGNATORIES

FEDERAL HIGHWAY ADMINISTRATION, MASSACHUSETTS DIVISION

By: Pamela S. Stephenson Date: 3/8/12
Pamela S. Stephenson, Division Administrator

MASSACHUSETTS STATE HISTORIC PRESERVATION OFFICER

By: Brona Simon Date: 4/17/12
Brona Simon, State Historic Preservation Officer

ADVISORY COUNCIL ON HISTORIC PRESERVATION

By: John M. Fowler Date: 5/14/12
John M. Fowler, Executive Director

INVITED SIGNATORIES

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION

By: F. DePaola Date: 3/7/12
Frank DePaola, Administrator, Highway Division

TOWN OF CHATHAM

By: Florence Seldin Date: 3/14/12
Florence Seldin, Chairperson, Board of Selectmen

CONCURRING PARTY

CHATHAM HISTORICAL COMMISSION

By:_____ Date: _____
Robert D. Oliver, Chairman

CONCURRING PARTY

FRIENDS OF THE MITCHELL RIVER WOODEN DRAWBRIDGE

By:_____ Date: _____
Norman Pacun

MEMORANDUM OF AGREEMENT
AMONG
THE FEDERAL HIGHWAY ADMINISTRATION,
THE MASSACHUSETTS STATE HISTORIC PRESERVATION OFFICER, AND
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION
REGARDING THE REPLACEMENT OF THE
MITCHELL RIVER BRIDGE (C-07-001) IN CHATHAM, MASSACHUSETTS

CONCURRING PARTY

PEASE BOAT WORKS & MARINE RAILWAY

By: _____ Date: 3/14/12
Michael Pease, President

CONCURRING PARTY

PRESERVATION MASSACHUSETTS

By:_____ Date: _____
James W. Igoe, President

CONCURRING PARTY

NATIONAL TRUST FOR HISTORIC PRESERVATION

By:_____ Date: _____
Elizabeth Merritt, Deputy General Council

CONCURRING PARTY

HISTORIC BRIDGE FOUNDATION

By:_____ Date: _____
Kitty Henderson, Executive Director

CONCURRING PARTY

INDIANA HISTORIC SPANS TASKFORCE

By:_____ Date: _____
Paul Brandenburg, Chairman

CONCURRING PARTY

JAMES L. COOPER, PHD

By:_____ Date: _____
James L. Cooper, PhD

MEMORANDUM OF AGREEMENT
AMONG
THE FEDERAL HIGHWAY ADMINISTRATION,
THE MASSACHUSETTS STATE HISTORIC PRESERVATION OFFICER, AND
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION
REGARDING THE REPLACEMENT OF THE
MITCHELL RIVER BRIDGE (C-07-001) IN CHATHAM, MASSACHUSETTS

CONCURRING PARTY

GEORGE MYERS

By: George D Myers
George Myers

Date: 3/15/2012

From: Mastone, Victor (ENV) [mailto:victor.mastone@MassMail.State.MA.US]
Sent: Wednesday, January 11, 2012 8:49 AM
To: Shrimpton, Jeffrey (DOT)
Cc: Burnham, Erin (DOT); Rempelakis, John (DOT); Bastoni, Michael (DOT); McArthur, Susan (DOT)
Subject: Mitchell River Bridge (C-07-001), Chatham

Dear Jeffrey,

The staff of the Massachusetts Board of Underwater Archaeological Resources has reviewed the materials provided by MassDOT for the Mitchell River Bridge Replacement Project (Bridge C-07-001) in Chatham. We offer the following comments.

The Board has conducted a preliminary review of its files and secondary literature sources to identify known and potential submerged cultural resources in the proposed project area. No record of any underwater archaeological resources was found. Based on the results of this review, prior disturbance by earlier bridge construction, and the limited nature of bottom lands disturbance by the proposed project, the Board expects that this project is unlikely to impact submerged cultural resources.

However, should heretofore-unknown submerged cultural resources be encountered during the course of the project, the Board expects that the project's sponsor will take steps to limit adverse affects and notify the Board and the Massachusetts Historical Commission, as well as other appropriate agencies, immediately in accordance with the Board's Policy Guidance for the Discovery of Unanticipated Archaeological Resources (updated 9/28/06).

The Board appreciates the opportunity to provide these comments as part of the review process. Should you have any questions regarding this letter, please do not hesitate to contact me.

Sincerely,

Vic

Victor T. Mastone
Director and Chief Archaeologist

Board of Underwater Archaeological Resources
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TOWN OF CHATHAM

OFFICE OF THE SELECTMEN
TOWN MANAGER
549 Main Street, Chatham, Massachusetts, 02633
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Mr. Joseph A Pavao, Jr., P.E.
MassDOT – Highway Division
Accelerated Bridge Program
10 Park Plaza, Room 6500
Boston, MA 02116

May 31, 2011

Re: Mitchell River Bridge

Mr. Pavao,

I am writing on behalf of the Chatham Board of Selection to let you know that the Board met on Tuesday, May 24, to discuss the seven alternative schemes MassDOT described at the May 17 Section 106 meeting for the reconstruction of the Mitchell River Bridge and to vote the Board's preference among these alternatives. Based on the evidence presented so far by MassDOT and consulting parties, the Board voted four to one on May 31, 2011 to support Alternative #3 (Timber Superstructure on Concrete-Steel Substructure, Steel Bascule Leaf on Concrete Pier) as embodying the most prudent balance of aesthetic, functional, and financial benefits for the Town of Chatham.

The Board hopes its decision will help move the Section 106 process towards the Memorandum of Agreement which will be the basis for further development of the bridge design. By making this decision, however, the Board in no way intends to create the impression that all its concerns about the bridge's ultimate design and appearance are satisfied. In particular, if Alternative #3 does indeed turn out to be the way forward, the Board requests that MassDOT provide timely information and an opportunity to comment on the total proposed width of the bridge, the coatings considered for protecting concrete-filled steel piles from superficial deterioration (rusting), and whether other concrete-encasing pile materials not subject to superficial deterioration are structurally feasible and cost-beneficial (e.g. fiber-reinforced plastic).

Very Truly Yours,

Florence Seldin

Florence Seldin, Chair
Chatham Board of Selectmen