



**US Army Corps
of Engineers**®
New England District

696 Virginia Road
Concord, MA 01742-2751

PUBLIC NOTICE

Date: May 5, 2009

Comment Period Ends: June 5, 2009

File Number: 2008-3745

In Reply Refer To: Paul Sneeringer or Karen Adams

Or by e-mail: Paul.J.Sneeringer @usace.army.mil

The District Engineer has received a permit application from the applicant below to **conduct work in waters of the United States** as described below.

APPLICANT **Massachusetts Highway Department, 10 Park Plaza, Boston, MA 02116**

ACTIVITY The work proposed includes the placement of fill material in wetlands and/or waterways necessary for the replacement, reconstruction, rehabilitation, and maintenance of bridges. A detailed description and standards are attached.

WATERWAY AND LOCATION OF THE PROPOSED WORK

This work is proposed in waterbodies throughout the Commonwealth of Massachusetts.

AUTHORITY

Permits are required pursuant to:

Section 10 of the Rivers and Harbors Act of 1899

Section 404 of the Clean Water Act

Section 103 of the Marine Protection, Research and Sanctuaries Act).

The decision whether to issue a permit will be based on an evaluation of the probable impact of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit which may reasonably accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered, including the cumulative effects thereof; among those are: conservation, economics, aesthetics, general environmental concerns, wetlands, cultural value, fish and wildlife values, flood hazards, flood plain value, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food production and, in general, the needs and welfare of the people.

The Corps of Engineers is soliciting comments from the public; Federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National

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Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

Where the activity involves the discharge of dredged or fill material into waters of the United States or the transportation of dredged material for the purpose of disposing it in ocean waters, the evaluation of the impact of the activity in the public interest will also include application of the guidelines promulgated by the Administrator, U.S Environmental Protection Agency, under authority of Section 404(b) of the Clean Water Act, and/or Section 103 of the Marine Protection Research and Sanctuaries Act of 1972 as amended.

ESSENTIAL FISH HABITAT

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires all federal agencies to consult with the National Marine Fisheries Service on all actions, or proposed actions, permitted, funded, or undertaken by the agency, that may adversely affect Essential Fish Habitat (EFH).

This project will impact small areas of Essential Fish Habitat (EFH) at each project location. Work will be located in a variety of habitat types. Marine habitats are near shore to offshore environments where the salinity is 25‰ or greater. Estuarine areas are near shore habitats that receive freshwater input from the land or rivers, lowering the salinity of the water. Salinity in estuarine habitats is typically 0.5‰ to 25‰. Riverine Tidal is the area upstream in rivers above the estuarine areas to the head of tide where water levels still rise and fall with the tides but salinity is very low or the water is free of any salt content (0.0‰ to 0.5‰). Riverine Inland are those portions of rivers upstream of the head of tide and where salinity is 0.0‰ and water levels are not tidally influenced. Loss of habitat may adversely affect the following species at various life stages depending upon the specific location:

Marine/Estuarine Species

Atlantic salmon (*Salmo salar*)
Atlantic cod (*Gadus morhua*)
Haddock (*Melanogrammus aeglefinus*)
pollock (*Pollachius virens*)
Whiting (*Merluccius bilinearis*)
Offshore hake (*Merluccius albidus*)
Red hake (*Urophycis chuss*)
White hake (*Urophycis tenuis*)
Redfish (*Sebastes fasciatus*)
Witch flounder (*Glyptocephalus cynoglossus*)
Winter flounder (*Pleuronectes americanus*)
Yellowtail flounder (*Pleuronectes ferruginea*)
Windowpane flounder (*Scophthalmus aquosus*)
American plaice (*Hippoglossoides platessoides*)
Ocean pout (*Macrozoarces americanus*)
Atlantic halibut (*Hippoglossus hippoglossus*)
Atlantic sea scallop (*Placopecten magellanicus*)
Atlantic sea herring (*Clupea harengus*)
Monkfish (*Lophius americanus*)
Bluefish (*Pomatomus saltatrix*)

Long finned squid (*Loligo pealei*)
Short finned squid (*Illex illecebrosus*)
Atlantic butterfish (*Peprilus triacanthus*)
Atlantic mackerel (*Scomber scombrus*)
Summer flounder (*Paralichthys dentatus*)
Scup (*Stenotomus chrysops*)
Black sea bass (*Centropristus striata*)
Surf clam (*Spisula solidissima*)
Ocean quahog (*Artica islandica*)
Spiny dogfish (*Squalus acanthias*)
Tilefish (*Lopholatilus chamaeleonticeps*)
King mackerel (*Scomberomorus cavalla*)
Spanish mackerel (*Scomberomorus maculatus*)
Cobia (*Rachycentron canadum*)

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Anadromous Species

Atlantic salmon (*Salmo salar*)
Alewife (*Alosa pseudoharengus*)
Blueback herring (*Alosa aestivalis*)
American shad (*Alosa sapidissima*)
Rainbow smelt (*Osmerus mordax*)
White perch (*Morone americana*)
Brown trout (sea run) (*Salmo trutta*)

Coho salmon (*Oncorhynchus kisutch*)
Lamprey (*Petromyzon marinus*)
Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*)
Gizzard shad (*Dorosoma cepedianum*)
Hickory shad (*Alosa mediocris*)
Tomcod (*Microgadus tomcod*)
Striped bass (*Morone saxatilis*)

However, the District Engineer has made a preliminary determination that with the inclusion of special conditions, the site-specific adverse effect will not be substantial. Further consultation with the National Marine Fisheries Service regarding EFH conservation recommendations is being conducted and will be concluded prior to the final decision.

Based on his initial review, the District Engineer has determined that the proposed work may impact properties listed in, or eligible for listing in, the National Register of Historic Places. Additional review and consultation to fulfil requirements under Section 106 of the National Historic Preservation Act of 1966, as amended, will be ongoing as part of the permit review process.

The States of Connecticut, Maine, Massachusetts, New Hampshire and Rhode Island have approved **Coastal Zone Management Programs**. Where applicable the applicant states that any proposed activity will comply with and will be conducted in a manner that is consistent with the approved Coastal Zone Management Program. By this Public Notice, we are requesting the State concurrence or objection to the applicant's consistency statement.

The following authorizations have been applied for, or have been, or will be obtained:

- () Permit, License or Assent from State.
- () Permit from Local Wetland Agency or Conservation Commission.
- (X) Water Quality Certification in accordance with Section 401 of the Clean Water Act.

In order to properly evaluate the proposal, we are seeking public comment. Anyone wishing to comment is encouraged to do so. **Comments should be submitted in writing by the above date.** If you have any questions, please contact Paul Sneeringer at (978) 318-8491, (800) 343-4789 or (800) 362-4367, if calling from within Massachusetts.

Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider the application. Requests for a public hearing shall specifically state the reasons for holding a public hearing. The Corps holds public hearings for the purpose of obtaining public comments when that is the best means for understanding a wide variety of concerns from a diverse segment of the public.

The initial determinations made herein will be reviewed in light of facts submitted in response to this notice.

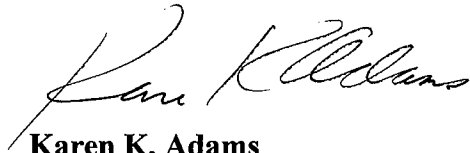
All comments will be considered a matter of public record. Copies of letters of objection will be forwarded to the applicant who will normally be requested to contact objectors directly in an effort to

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reach an understanding.

For more information on the New England District Corps of Engineers programs, visit our website at <http://www.nae.usace.army.mil>.

THIS NOTICE IS NOT AN AUTHORIZATION TO DO ANY WORK.



Karen K. Adams
Chief, Permits and Enforcement Branch
Regulatory Division

If you would prefer not to continue receiving Public Notices, please contact Ms. Tina Chaisson at (978) 318-8058 or e-mail her at bettina.m.chaisson@usace.army.mil. You may also check here () and return this portion of the Public Notice to: Bettina Chaisson, Regulatory Division, U.S. Army Corps of Engineers, 696 Virginia Road, Concord, MA 01742-2751.

NAME: _____
ADDRESS: _____

Massachusetts Highway Department – Statewide Bridge Program

The Massachusetts Highway Department's (MassHighway) has a Statewide Bridge Program for the replacement, reconstruction, rehabilitation, and maintenance of bridges owned by MassHighway or municipalities of the Commonwealth. This program is funded by the Governor's office and the Massachusetts Legislature through the Transportation Bond Bill, the Accelerated Bridge Bond Bill, and federal transportation funds administered by the Federal Highway Administration (FHWA).

The primary objective of MassHighway's Statewide Bridge program is to reduce the number of structurally deficient and/or functionally obsolete¹ bridges in the Commonwealth in a cost-effective manner that minimizes right-of-way and environmental impacts.

As defined by the Transportation Bond Bill, a bridge project involves the "repair, reconstruction, replacement, or demolition of existing state highway bridge or other bridges, including the immediate roadway approaches necessary to connect these bridges to the existing adjacent highway system, in which the design is substantially the functional equivalent of, and in similar alignment to, the structure to be reconstructed or replaced." Further, these projects are not subject to the Commonwealth's Wetland Protection Act (WPA), the Massachusetts Environmental Policy Act (MEPA), or MA Chapter 91 regulations.

Project Purpose

This permit application concerns work being completed under MassHighway's Statewide Bridge program. Massachusetts' bridges are a critical component of the Commonwealth's infrastructure and the continued maintenance of bridges is vital to preserving highway safety standards and the economic vitality of the Commonwealth. However, as one of the oldest settled areas in the United States, Massachusetts has some of the oldest infrastructure, especially the bridges. Over 61 percent of Massachusetts bridges were constructed prior to 1960 and 42 percent of the bridges are between 40 and 60 years old. As a result of their age and the destructive effects of New England's harsh winters, many bridges have reached the end of their useful lives and require significant rehabilitation or replacement.

The need to improve the condition of bridges in Massachusetts is urgent. There are 511 structurally-deficient bridges in Massachusetts. Additionally, 483 of these bridges have been weight-restricted because their deteriorated condition has reduced their load carrying capacity. Most urgently, 53 of the most severely deteriorated bridges have been closed to all traffic.

¹ A structurally-deficient bridge is one for which the bridge deck, superstructure or substructure have been given a bridge condition rating of 4 or less (on a scale of 1-10) by MassHighway's Statewide Bridge Inspection Team. A functionally obsolete bridge is one whose deck geometry is insufficient (typically too narrow) for the volume and/or type of vehicles, pedestrians, and bicyclists using the bridge.

MassHighway has made significant progress in rehabilitating or reconstructing structurally-deficient bridges, including 51 structurally-deficient bridges reconstructed in 2007.

Unfortunately the number of structurally-deficient bridges actually increased during this period because other bridges were rated as structurally-deficient at a faster rate than MassHighway was able to reconstruct them. Specifically, for every structurally-deficient bridge that MassHighway reconstructs, 1.1 other bridges become structurally-deficient.

To address this urgent need, Governor Deval Patrick signed legislation in August 2008 authorizing the \$3 billion Accelerated Bridge Bond Bill. This eight-year plan was established for the repair and replacement of 250 to 300 of the Commonwealth's most neglected and structurally-deficient bridges. These funds, coupled with the passage of the \$3.5 billion Massachusetts Transportation Bond Bill and funds directed to Massachusetts through the 2009 American Recovery and Reinvestment Act, will allow MassHighway to address hundreds of bridges in most urgent need of repair across the Commonwealth. This work will enhance public safety, while creating thousands of engineering and construction jobs, and will result in the savings of an estimated \$1.5 billion in avoided inflation and deferred maintenance costs.

The Accelerated Bridge Program is a top priority of Governor Patrick, Secretary of Transportation James Aloisi and MassHighway Commissioner, Luisa Paiewonsky.

In reviewing bridge projects and developing appropriate and protective conditions in the proposed permit, MassHighway and the Army Corps are drawing upon on more than 15 years of experience working with the USACE Programmatic General Permit (PGP) for Massachusetts.

A permit developed exclusively for MassHighway bridges will contain conditions that allow it to be integrated seamlessly into the bridge construction process while maintaining the highest level of environmental protection. Similar to the MA PGP, this permit will provide a blueprint for engineers when designing a project to minimize environmental impacts thus avoiding unnecessary permitting and allowing bridge repair projects to proceed quickly.

This permit will require standard permit conditions that stipulate rigorous performance standards during construction. These standards, along with the eligibility requirements are attached.

Projects not eligible will be reviewed through the existing USACE Massachusetts PGP or Standard (Individual) Permit process. All bridge projects will continue to be reviewed pursuant to the Section 401 Water Quality Certification program, administered by the Massachusetts Department of Environmental Protection (MA DEP), which is the counterpart of the USACE Section 404 permit process. These bridge projects will adhere to the General Conditions (as amended) found in the MA DEP Water Quality Certification Standard Form (WQC-SF) for MassHighway Bridge Replacement and Rehabilitation Projects (see Attachment 1).

Bridge projects within Massachusetts Priority Habitat of Rare Species or Estimated Habitat of Rare Wildlife, as determined by mapping compiled by the Massachusetts Division of Fisheries

and Wildlife Natural Heritage and Endangered Species Program (MNHESP), are eligible provided that the project has been reviewed and received “clearance” from the MNHESP.

The U.S. Coast Guard has jurisdiction over bridge projects that cross Navigable Waterways. For those Waters of limited size such that they are used exclusively by watercraft 21 feet or less in length, the Federal Highway Administration (FHWA) can become the lead agency for bridge projects, pursuant to the Surface Transportation and uniform Relocation and Assistance Act of 1987 (i.e., when a STURAA exemption is issued by FHWA).

General Guidelines

The work proposed is defined as the replacement, reconstruction, rehabilitation, and maintenance of bridges resulting in the temporary or permanent fill to wetlands and/or waterways.

Bridge projects, particularly those over water, often involve minor amounts of temporary and permanent fill in bordering wetlands and/or waterways. The fill is typically required for the rehabilitation or reconstruction of bridge abutments and piers and for the placement of riprap around those structures to provide long-term erosion control.

Specifically, this work may require construction activities within waters crossed by the structure. Reconstruction measures may include excavation and filling, repair of an abutment face, removal and reconstruction of an abutment, repair or removal and reconstruction of a pier, scour protection, deck replacement, bank stabilization, or other activities that will require construction equipment and activities to occur within streams, rivers, lakes, bays, or harbors. In addition, equipment such as barges and boats and temporary features such as staging areas, fill pads or access roads may be placed within the water body or waterway in support of the repair activities. Specific elements of each project will be different, so the actual activities at each site cannot be identified in detail but can be discussed in general terms.

There are two overall types of activities that will be undertaken; those actions that can be conducted in the water, such as pile driving or pile removal, and work that must be conducted “in the dry.” In-water work will generally be minor in nature and will not include activities that have the potential to generate a significant amount of turbidity in the water column. Activities such as concrete repairs, concrete forming and pouring, excavation and filling, and placement of precast structures may require the installation of a cofferdam to hold back water and create a dry work area. The general standards for construction activities that may be undertaken during a bridge project are described in the attached “Standards and Conditions for the Programmatic Permit for Bridges”.

Wetland Resource Impacts Associated for Bridge Projects

The following provides a general description of the impact to wetland resources typically associated with bridge replacement projects.

Permanent Wetland Impact

Minor permanent fill to bordering wetlands and/or waterways in bridge projects is often the unavoidable result of important safety improvements, *e.g.*, constructing a wider bridge deck, approach roadways, and sidewalks to more safely accommodate vehicles, pedestrians, and bicyclists.

Excavation and filling for a structural base and construction of a new abutment or pier may be required within wetlands, waterways, or water bodies. Construction of a new abutment or pier also requires forming and pouring concrete for footings and a new structure below ordinary or mean high water. These activities reconstruct an existing structure or place a new permanent structure or fill within the resource area. Any structure that is constructed within the resource area will be designed to minimize impacts and protect and prolong the useful life of the structure.

Permanent impact to waterways below the ordinary high water can also occur when bridge piers are reconstructed and realigned to parallel the stream flow (an improvement to the aquatic environment).

Wetland Mitigation

Bridge repair and reconstruction, in particular abutment and approach roadway work may result in a permanent loss of wetland habitat. Any permanent impact to vegetative wetlands must be mitigated by replacement in kind and at a 1:1 ratio. Generally, a nearby upland area adjacent to existing wetlands will be excavated, graded, and planted to replace the lost wetland habitat. All construction work areas will be restored and stabilized to prevent erosion to the adjacent wetland resources.

Temporary Wetland Impact

Temporary impact to bordering wetlands and/or waterways (waters of the United States) often occurs as a result of necessary construction methodologies and controls related to staged construction and use of cofferdams.

Temporary impacts to vegetated wetlands from wall construction, grading, or access needed to complete the bridge repairs will be restored to preconstruction conditions. Removal of any temporary fill, regrading to restore preconstruction contours, and replanting with native wetland species will be conducted to ensure no long term loss of habitat.

Staged Construction

MassHighway often uses staged construction during bridge rehabilitation or reconstruction. Staged construction involves reconstructing only a portion of a bridge while the remainder is open to traffic. Staged construction methods are used to safely and efficiently reconstruct bridges through the use of access trestles, in-stream crane pads, utility bridges, and temporary roadway bridges. While closing a bridge during construction may reduce overall project-related impacts to wetland resources, staged construction must be employed when a bridge serves as a critical link within an arterial or collector roadway system. Furthermore, closing a bridge may require that thousands of vehicles be rerouted through residential neighborhoods, which is neither practical nor desirable. While these methods may result in minor increases in the overall project's temporary impact on wetland resources, they represent a reasonable balance between protecting environmental resources and maintaining mobility along important regional roadways.

Turbidity

Construction activities may cause a rise of in turbidity in the water column. Turbidity may be increased from equipment and laborers working within the water, installation or removal of equipment such as cofferdams, or placement of riprap. This will be somewhat dependent on the substrate at the project area. A rocky, sandy, or gravelly substrate will contain a smaller fraction of fine sediments and will not cause much turbidity when disturbed. However, disturbance of muddy or clay substrate typical in lower riverine or estuarine environments has a higher potential of causing resuspension and turbidity. The substrate type will be taken into consideration in the project design to ensure that the construction activities do not cause excessive turbidity in the vicinity of the project.

Noise

Noise from equipment operations, digging, pile driving, material movement and laborers may disrupt fish movement and activities. During equipment operations, the increased noise at the work site may cause shy fish species to leave the vicinity of the project or cause migrating fish to delay their passage until the noise ceases. Noise from construction will be a temporary impact, occurring only periodically during work activities and will also not be present on non-working days or after daily work activities cease. Although noise may be a temporary disruption to fish activities or movement, it will not stop migrations or permanently eliminate habitat.

Considerations for a Bridge's Hydraulic Opening

The Corps of Engineers, FHWA and MassHighway are required by law to comply with Executive Order #11988, *Floodplain Management*. To ensure compliance, MassHighway performs a hydraulic analysis for each bridge project in order to assess and reduce the long- and short-term adverse impacts associated with the occupancy and modification of floodplains. FHWA reviews and approves these hydraulic analyses. Additionally, to be eligible for federal

funding, MassHighway must also adhere to the Federal-aid Policy Guide – Floodplain Management (23 CFR 650).

MassHighway's bridge projects typically maintain the same hydraulic opening as the existing bridge to avoid altering the hydraulic characteristics of the stream in the area of a bridge which may cause upstream or downstream flooding. Bridges and culverts do not typically function independently but are part of a system of hydraulic controls in a particular watershed. Altering (typically increasing) the hydraulic opening of an individual bridge can have dramatically and unexpected effects on the characteristics of a stream system both upstream and downstream of the bridge. These changes can result in more frequent and/or more severe flooding of properties adjacent to the stream, new or increased areas of streambank erosion, or other ecological damage.

There are occasionally certain circumstances, in particular when areas neighboring a bridge site experience frequent flooding, in which MassHighway will evaluate the possibility of increasing the hydraulic opening of a bridge, *i.e.*, raise the low chord elevation or widen the horizontal opening of the bridge.

However, if the low chord of a proposed bridge will intersect the 10-year flood elevation, then it will not be eligible for authorization under this permit.

Standards and Conditions for the Programmatic Permit for Bridges

Project Eligibility

Certain projects, depending on federal requirements or the environmental sensitivity of the area, will not be eligible for authorization under this permit. These projects include:

- Bridges crossing a designated Wild and Scenic River;
- Projects involving work on Corps properties and Corps-controlled flood easements such as the Charles River Natural Valley Storage Area;
- Proposed bridges whose low chord will intersect the 10-year flood elevation;
- Bridges that have been identified by the Massachusetts Office of Coastal Zone Management as potentially causing restrictions to tidal flows.
- Projects which may affect any federally listed endangered species or their habitat.
- Any project located in an historic district or where there are historic properties present unless impacts have been addressed pursuant to the Programmatic Agreement (PA) between Federal Highway Administration and the State Historic Preservation Officer or any subsequent Corps of Engineers PA to satisfy the requirements of Section 106 of the National Historic Preservation Act.

These projects will be processed through the existing Massachusetts Programmatic General Permit or Standard (Individual) Permit process. All bridge projects will continue to be reviewed pursuant to the Section 401 Water Quality Certification program, administered by the Massachusetts Department of Environmental Protection (MA DEP), which is the counterpart of the USACE Section 404 permit process. These bridge projects will adhere to the General Conditions (as amended) found in the Attachment 1 MA DEP Water Quality Certification Standard Form (WQC-SF) for MassHighway Bridge Replacement and Rehabilitation Projects.

Bridge projects within Massachusetts Priority Habitat of Rare Species or Estimated Habitat of Rare Wildlife, as determined by mapping compiled by the Massachusetts Division of Fisheries and Wildlife Natural Heritage and Endangered Species Program (MNHESP), are eligible provided that the project has been reviewed and received “clearance” from the MNHESP.

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However, if the low chord of a proposed bridge will intersect the 10-year flood elevation, then it will not be eligible under this authorization.

Water Control Measures for Bridge Projects

Repair work on bridge abutments and piers typically must be done “in the dry.” The work area must be suitably contained to minimize impacts to waterways. This is accomplished by creating a dry work area through the use of an appropriate type of water control measures, as described in Table 1 and as depicted on the accompanying Figures 1-8. By isolating the work area, these water control methods control pollution during construction operations, thereby protecting the interests of the Section 404 regulations. The sequence of construction for establishing a dry work area for the rehabilitation or replacement of a bridge abutment or pier involves the following three main steps:

1. Install a cofferdam or other approved water control method around the bridge abutment or pier, establishing the work area. The most common cofferdam methods include:
 - a. Sandbag Cofferdam (Figure 1);
 - b. Jersey Barrier Cofferdam (Figure 2);
 - c. Steel Sheeting Cofferdam (Figure 3);
 - d. Coated Fabric and Steel Frame Cofferdam, *e.g.*, Portadam (Figure 4); and
 - e. Flume Pipe (Figure 5)

Depending on the characteristics of the project work site, or the preferences of the contractor, other water control methods may be used.

2. Dewater (pump out) the work area to an established upland sedimentation basin, or other approved sediment removal device, and perform the required bridge work under dry conditions. Any required long-term scour protection, *e.g.*, placement of riprap around an abutment or pier (Figure 2), will occur prior to cofferdam removal. Two dewatering/sediment control methods include:
 - a. Hay/Straw Bale Barrier enclosure (Figure 6); and
 - b. Filter Bag (Figure 7)
3. Remove cofferdam or other approved water control method. During cofferdam removal, if sufficient water depth exists, a turbidity curtain/boom (Figure 8) will be placed outside the cofferdam and used to minimize sedimentation entering the stream flow during cofferdam removal. Cofferdam removal is performed downstream-to-upstream in a manner that minimizes introduction of sediment to the waterway.

Table 1 – Water Control Measures

Water Control Measure	Conditions for Use
Flume/Diversion Pipe (Where entire water column must be isolated and protected)	Will need some form of dam to direct flows through the pipe. Flume pipe must be installed level with stream bed to prevent blocking fish movement. Stream bed must be stabilized at outlet.
Cofferdam Options (Where entire or partial channel must be isolated and de-watered) <ul style="list-style-type: none"> • Sand bags with polyethylene plastic sheeting • Sheet pile (steel, wood or vinyl) • Coated fabric and steel frame, <i>e.g.</i>, Portadam • Water tube • Sectional concrete barrier (<i>e.g.</i>, Jersey Barrier) with polyethylene plastic sheeting and sand bags at joints and to secure plastic sheeting, 	To the greatest extent practicable, all in-stream work, <i>i.e.</i> , installation and removal of cofferdams, should be conducted during low flow periods throughout the year. Times of year when stream flow is high due to extended rain and/or melt events should be avoided. Must stabilize work area prior to cofferdam removal compatible with streambed characteristics (crushed stone, biodegradable erosion control matting). Remove cofferdam downstream to upstream.

Unacceptable water control measures:

- Turbidity curtains across flow
- Earthen embankments
- Diversion channels
- Bypass pumping

Construction Timing

Timing of the construction activities may have an impact on resources and EFH habitat. To the extent possible, in-water construction will be timed to avoid high flow conditions and sensitive fish migration or breeding periods. If cofferdams are used, once installed, work may proceed without consideration of flow conditions, fish migration or breeding concerns since the work area will be isolated from the waterway or water body. Removal of any in-water features will also be timed to the extent possible to avoid high flow or biologically active time periods. However, removal of equipment or cofferdams may proceed at any time, provided adequate safeguards are used to avoid excessive impact to the waterway or water body. Removal of in-stream construction features in a timely manner will reduce the duration of any temporary impacts and allow the project area to recover more quickly.

Construction Sequence

Temporary and permanent impacts from bridge projects can be minimized by construction sequencing. Construction activities will be sequenced to avoid work within the entire waterway or along the entire crossing at the same time. Multiple-span bridges will be repaired while keeping one or more spans fully open to allow unimpeded flow and movement of fish. As construction progresses, work will move to other spans or piers and flow will be restored to the completed portions of the bridge. In this way, flow and migration pathways will be maintained throughout the construction period.

Another feature of construction sequencing will be to avoid in-water work to the extent possible during high flow conditions. Construction activities on approach roadways, the bridge deck or other non-wetland areas will be scheduled to the extent possible during high flows or sensitive migratory and breeding periods.

Construction Techniques

Construction techniques and water control measures that can be used to minimize impacts to waters and EFH habitat were identified in the *General Description of Projects* section of this narrative. These measures include use of cofferdams to isolate the work areas, flume pipes, dewatering measures to remove turbidity from water before run back, and equipment and cofferdam removal techniques to minimize filling or generation of turbidity. Turbidity curtains or booms may also be used to help contain any fugitive turbidity. Care must be used in the deployment of curtains as curtains should not be deployed across flowing water.

Wetland Replacement and Restoration

Bridge repair and reconstruction, in particular abutment and approach roadway work, may result in a permanent loss of wetland habitat and flood storage. Any permanent impact to vegetative wetlands must be mitigated by replacement in kind at a 1:1 ratio. Any project that includes a permanent impact to vegetated wetland habitat will include measures to replace the lost wetland area. Generally, a nearby upland area adjacent to existing wetlands will be excavated, graded, and planted to replace the lost functions. Temporary impacts to vegetated wetlands from wall construction, grading, or necessary access will be restored to preconstruction conditions. Removal of any temporary fill, regrading to restore preconstruction contours, and replanting with native wetland species will be conducted to ensure no long term loss of habitat. All construction work areas will be restored and stabilized to prevent erosion to the adjacent wetland resources.

Attachment 1
DEP Water Quality Certificate Standard Form (WQC-SF)
General Conditions

General Conditions:

1. There is no less damaging practicable alternative available and capable of being done after taking into consideration costs, existing technology, and logistics in light of overall project purposes.
2. The project authorized by this permit shall result in the loss of less than 5,000 square feet of vegetated wetlands or waters. Project dredging shall involve less than 100 cubic yards.
3. The project shall not result in the permanent impoundment of waters in a waterway or vegetated wetland
4. All vegetated wetlands which are impacted shall be replaced and/or restored at a 1:1 ratio.
5. No activity is authorized under this permit which affects greater than 1,000 sf of wetland resources within an Area of Critical Environmental Concern, an Outstanding Resource Water (ORW) or a barrier beach. No activity is authorized under this WQC-SF permit which results in salt marsh impacts. Projects with mapped habitat for rare species are eligible for a WQC-Standard Form, as long as the project has been reviewed and has received clearance from the MA DFW.
6. Temporary fill in waters and wetlands authorized by this permit (e.g. access roads) shall be properly stabilized, as per project plans, during use to prevent erosion. Temporary fill in wetlands shall be placed on geotextile fabric laid on existing wetlands grade. Temporary fills shall be disposed of at an upland site, suitably contained to prevent erosion and transport to a waterway or wetland. Temporary fill areas shall be restored to their original contours and seeded with native herbaceous vegetation.
7. Where work in wetlands and waterways is unavoidable particularly due to bridge abutment replacement and stabilization, turbidity shall be controlled as described on the attached plans. Temporary cofferdams constructed of steel sheeting, jersey barriers, sandbags or other suitable material shall be utilized to create a dry environment within the waterway for construction to occur. If cofferdams are proposed for use, documentation shall be provided which demonstrates the suitability of the proposed cofferdams design for the particular site conditions (e.g. stream bed, surficial geology, and hydrology) of the stream crossing. Sediment laden water will be pumped to an enclosure comprised of filter fabric, haybales or a combination of both which shall be used to filter the water prior to its return to the water course. Sedimentation enclosures shall be located in upland areas and shall be properly sized in order to provide adequate filtration of sediments so as not to impair the water quality of the receiving waters.
8. Construction equipment shall be kept out of wetlands and waterways except as described in this application

9. To prevent erosion and sedimentation from disturbed areas from entering the wetlands and waterways, the following erosion and sedimentation control measures will be taken:
- a. Construction shall be scheduled so that areas shall be denuded or disturbed for only the duration necessary for the specific phase of construction. Siltation devices shall be used during all phases of construction to reduce flow velocity and intercept the sediment before it leaves the construction area. Siltation devices shall also be installed at the bottoms of disturbed embankments, at temporary slope drain outlets, as filter cores for check dams, around storm drain inlets and in front of the silt fences as applicable to the individual project site.
 - b. Siltation devices shall be installed before the commencement of any site work. These devices shall be inspected regularly and entrapped silt shall be removed and disposed of in an upland location greater than 100 ft. from wetland resource areas where feasible. Haybales and silt fences shall be maintained or replaced when clogged with sediment or deteriorated.
 - c. During all phases of construction, all disturbed or exposed areas shall be stabilized immediately after the grading operation is completed. In order to stabilize exposed areas, temporary or permanent vegetation or similar erosion control material shall be applied. Some combination of the following measures shall be utilized to provide sufficient sediment/erosion controls for all exposed areas:
 - i. fertilization to application amounts as recommended by the manufacturer;
 - ii. mulch or binder (including straw, bituminous, and/or jute mesh);
 - iii. topsoil, loam or plantable soil (4-inch minimum thickness);
 - iv. sod at critical locations (embankment grade break, ditch bottoms, and other susceptible areas); and
 - v. other special vegetative applications as necessaryTemporary stabilization is practical when the final grading operation cannot be immediately completed and the area will be exposed for a considerable length of time (e.g. more than one month). Haybales and silt fence will be removed upon completion of project work, and entrapped silt shall be removed and disposed of in an upland location greater than 100 ft from wetland resource areas where feasible.
10. Waterway Crossings:
- a. All temporary and permanent crossings of waterbodies shall be culverted, bridged, or otherwise designed to withstand and to prevent the restriction of high flows, and so as not to obstruct the movement of aquatic life indigenous to the waterbody.
 - b. Open trench excavation is not allowed in flowing waters. Check if project complies with this condition.
 - c. Bridge, culverts, or cofferdams shall be used for equipment access across streams (note: areas of fill and/or cofferdams must be included in total waterway/wetlands impacts to determine applicability of this general permit).

- d. The period of work in waterways shall be determined by DMF/DFW in order to protect existing species and to ensure protection during annual spawning periods. MHD has consulted with DMF/DFW in order to confirm species and spawning period and obtain recommendations as to the optimal timing for conducting the work.
11. DEP shall be permitted to make periodic inspections at any time deemed necessary in order to ensure that work is being performed in accordance with the terms and conditions of this permit. DEP may require construction engineering drawings for completed work which will be so indicated on the Water Quality Certificate
12. If DEP makes a determination regarding the eligibility of a project under this permit, and subsequently discovers that it has relied on false, incomplete or inaccurate information provided by the permittee, the permit shall not be valid.
13. If the permittee anticipates it will fail to complete the activity authorized under this permit within the permit term, the permittee shall request an extension from the Department. The request for an extension shall be made to DEP at least 30 days prior to the expiration of this Certification. If an extension is not granted, work will cease and the area shall be stabilized to prevent adverse impacts.
14. This permit does not apply to any existing or proposed activity in DEP jurisdiction associated with on-going DEP enforcement action (e.g. hazardous waste sites), until such time as the enforcement action is resolved or the DEP determines that the activity may proceed independently without compromising enforcement action.

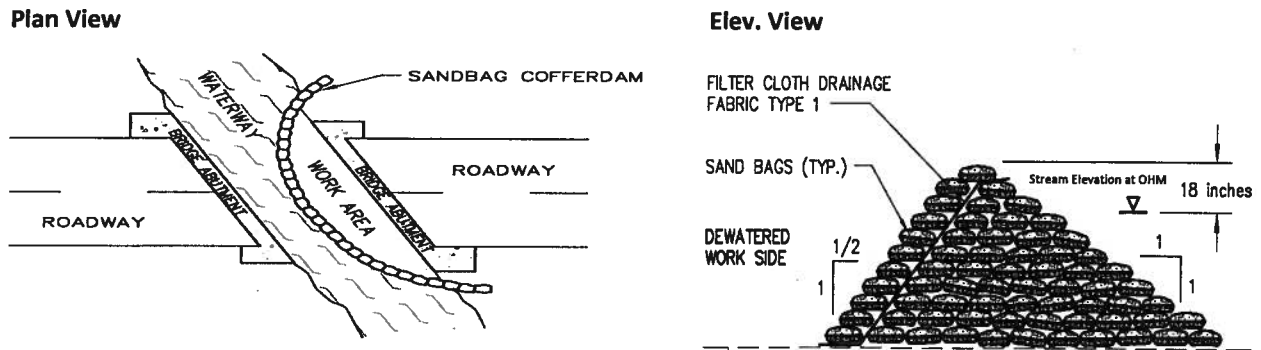
The DEP may insert additional special conditions, as needed.

Attachment 2

Typical Cross Section of Water Control Measures for Bridge Projects

Figure 1

Sandbag Cofferdam



Purpose

Sandbags can be manually stacked to form a temporary impervious cofferdam when encapsulated with an impervious poly-fabric liner. The sandbags can be filter bags filled with sand. This type of sandbag cofferdam can be used to impound or divert a waterway and is easily removed.

Conditions Where Applicable

- Used when the waterway has a low flow rate.
- Used when the height of the sandbag cofferdam is less than 5 feet (stream height at ordinary high water is less than 3 feet - 6 inches).
- Used when heavy equipment is unavailable, unnecessary, or undesirable.

Conditions Where NOT Applicable

- Concrete is not allowed in sand mixture.

Construction

Step 1- Remove large rocks and branches from the area where the sand bags will be placed.

Step 2 - Lay out the poly-fabric liner with the center of the liner located over the center of the sandbag cofferdam.

Step 3- Place the sandbags to necessary height. The width of the cofferdam should be suitable to support the height of the cofferdam. Each row should be offset so the joints are staggered. The sandbags should be packed tightly together.

Step 4- Wrap the sandbag cofferdam in the poly-fabric liner and secure with a final layer of sandbags.

Removal Methodology

Sandbag cofferdam should be removed from the downstream end to the upstream end to prevent unnecessary sediment from entering the waterway.

Maintenance

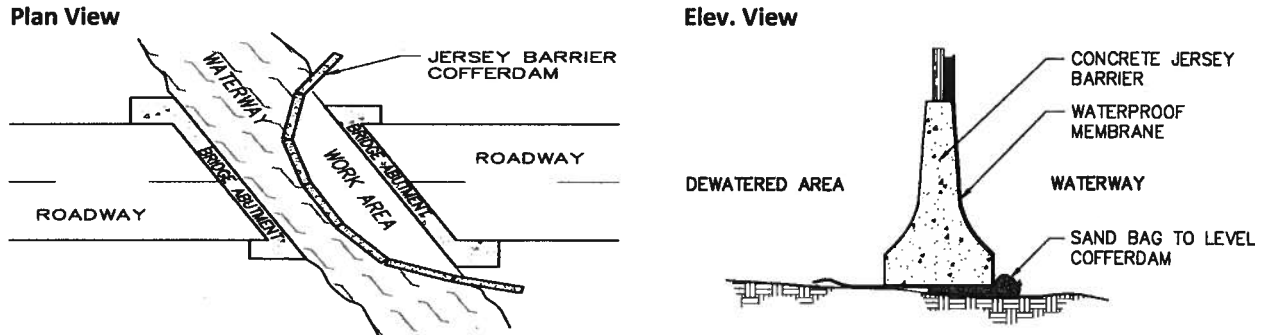
Inspect the sandbags daily for water leaks and signs of instability and implement repair procedures accordingly.

Typical Problems

- Improperly placed sandbags cause leaks.
- Height of sandbag cofferdam is insufficient.

Figure 2

Jersey Barrier Cofferdam



Purpose

A Jersey Barrier Cofferdam should be used for dewatering of shallow waterways with coarse substrates. Dewatering consists of placing barriers in only a portion of the waterway and allowing the main flow of the waterway to go around the cofferdam.

Conditions Where Applicable

The waterway being dewatered is less than 2 feet deep.

Construction

Step 1- The area that will act as the base of the cofferdam should be leveled with sand bags to prevent seepage.

Step 2- The barriers should be set up as closely packed as possible.

Step 3- A continuous or overlapping waterproof membrane should line the cofferdam on the in stream side and should continue under the cofferdam and extend beyond the dewatered side to prevent silt-laden water from seeping into the waterway.

Removal Methodology

Jersey barrier cofferdam should be removed from the downstream end to the upstream end to prevent unnecessary sediment from entering the waterway.

Maintenance

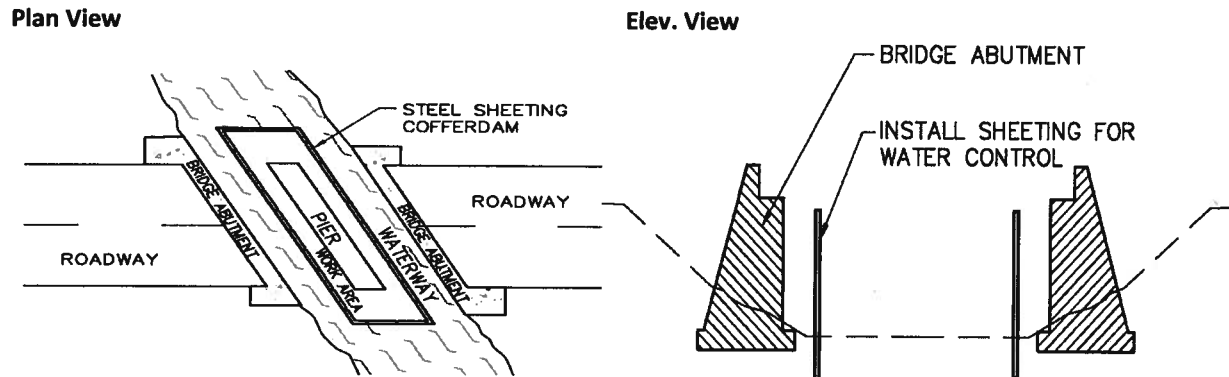
Inspect jersey barriers daily for water leaks and signs of instability and implement repair procedures accordingly.

Typical Problems

- Jersey barriers are not placed level or the height is insufficient
- Improperly placed jersey barriers cause water leaks

Figure 3

Steel Sheeting Cofferdam



Purpose

Steel sheeting cofferdams can be used with bypass pumps to keep a work area moderately dry during construction. Steel sheets are driven into the ground and then interlocked to create a wall or barrier.

Conditions Where Applicable

- Where minimum channel disturbance is required.
- Where channel substrate is sufficiently free of stones or bedrock to allow the sheeting to be driven sufficiently deep into the channel.

Conditions Where NOT Applicable

Small waterway with little or no flow.
Where the access to drive steel sheets requires more disturbance to jurisdictional areas than other cofferdam types.
Locations where rocks and other obstructions prevent steel sheets from being driven into the ground.

Construction

Step 1 - Be sure sheet is free of dirt, greaser and other potential contaminants before installation.

Step 2 - Install by placing and driving sheets with a backhoe, excavator, hammer or other suitable equipment.

Step 3 - Ensure the sheets penetrate to a sufficient depth in order to bear the load of water being diverted.

Step 4 - Overlap or interlock sheets in a manner that prevents any water from seeping into the work area as well as preventing sediment from the work area seeping into the waterway

Removal Methodology

Steel sheeting cofferdam should be removed from the downstream end to the upstream end to prevent unnecessary sediment from entering the waterway.

Maintenance

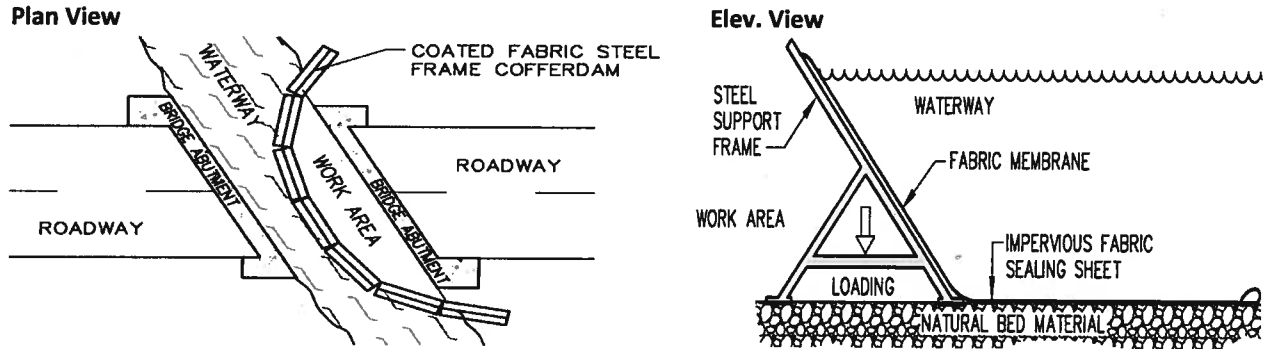
Inspect steel sheets daily for water leaks and signs of instability and implement repair procedures accordingly

Typical Problems

- Improperly installed sheets cause leaks.
- Sheets not driven deep enough to withstand pressure of water.

Figure 4

Coated Fabric Steel Frame Cofferdam



Purpose

A coated fabric steel frame cofferdam is used to form a temporary dry work area within a waterway. A coated fabric steel frame cofferdam can be used in streams with a higher flow rate conditions than a sandbag cofferdam.

Conditions Where Applicable

- The water is no more than 12 feet deep.
- For shallow water, the flow is up to 2 fps.
- For deep water, the flow is up to 1 fps.

Construction

This kind of cofferdam must be installed by a properly trained crew.

Removal Methodology

Coated fabric steel frame cofferdam should be removed from the downstream end to the upstream end to prevent unnecessary sediment from entering the waterway.

Maintenance

Inspect cofferdam daily for water leaks or erosion and implement repair procedures accordingly.

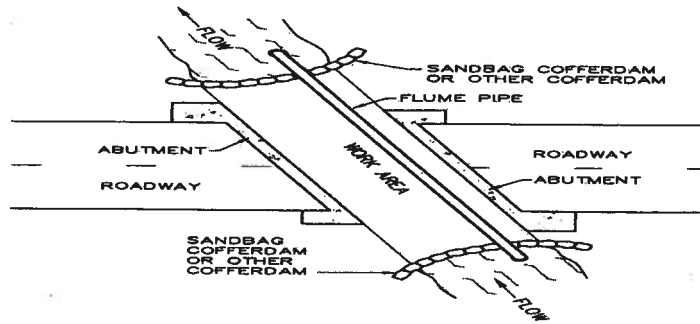
Typical Problems

There is a potential for water leaks if the sections of the cofferdam are not placed close enough together.

Figure 5

Flume Pipe

Plan View



Purpose

A flume pipe is a temporary pipe installed to divert the flow of the waterway around the work area (but within the stream channel) without the use of pumping operations.

Conditions Where Applicable

- Where adequate slope and space exist between the upstream and downstream ends of the flume pipe.
- Headwall installations and some pipe/ culvert replacements where adequate space is unavailable.

Conditions Where NOT Applicable

- When the pipe would adversely impact the aquatic habitat migration.

Construction

Step 1- Install sediment controls

Step 2- Install flume pipe adjacent to work area. Provide a positive drainage slope from the upstream to the downstream side.

Step 3- Connect the downstream flume pipe into the downstream waterway. Place outlet of flume pipe to minimize erosion at the discharge site or provide temporary energy dissipation measures.

Step 4- Connect the upstream flume pipe into the upstream waterway.

Step 5- Construct a cofferdam at the upstream side of the waterway to divert the waterway into the flume pipe.

Step 6- Construct a cofferdam at the downstream side of the flume pipe to isolate work area.

Step 7- Upon completion of construction, remove the cofferdams.

Removal Methodology

Remove the downstream cofferdam allowing the work area to become flooded. Then remove the flume pipe and then the upstream cofferdam.

Maintenance

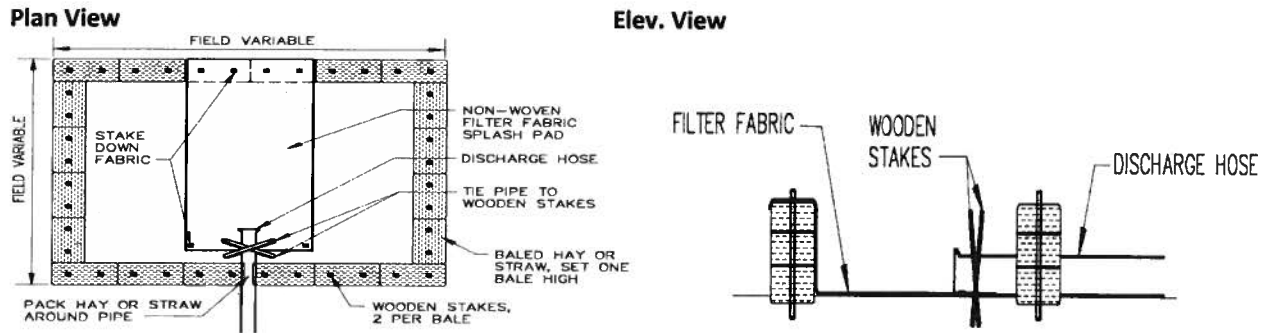
- Inspect cofferdams and flume pipes daily for damage or leakage.
- Remove accumulated sediment and debris from cofferdams and pipes.
- Inspect outlet for erosion.

Typical Problems

- Improper amount of slope that impedes diverted flow.
- Diverted flow bypasses the flume pipe and causes erosion as surface flow.

Figure 6

Hay/Straw Bale Dewatering Basin



Purpose

Hay/straw bale dewatering basins are used at sites where dewatering of the work area is required to perform work. The effluent is pumped into the dewatering basin to allow the heavier particles to settle out prior to being discharged.

Conditions Where Applicable

- Where there is enough room in the work area to form the basin.
- Where water will be pumped from the work area.

Conditions Where NOT Applicable

Not allowed to be constructed in jurisdictional wetlands.

Construction

- Step 1-** The area that will act as the base of the basin should be leveled with sand bags to prevent seepage.
- Step 2-** The barriers should be set up as closely packed as possible.
- Step 3-** A continuous or overlapping non-woven geotextile fabric should line the base of the basin.

Removal Methodology

Remove and dispose of sediment and haybales properly, outside of jurisdiction wetlands.

Maintenance

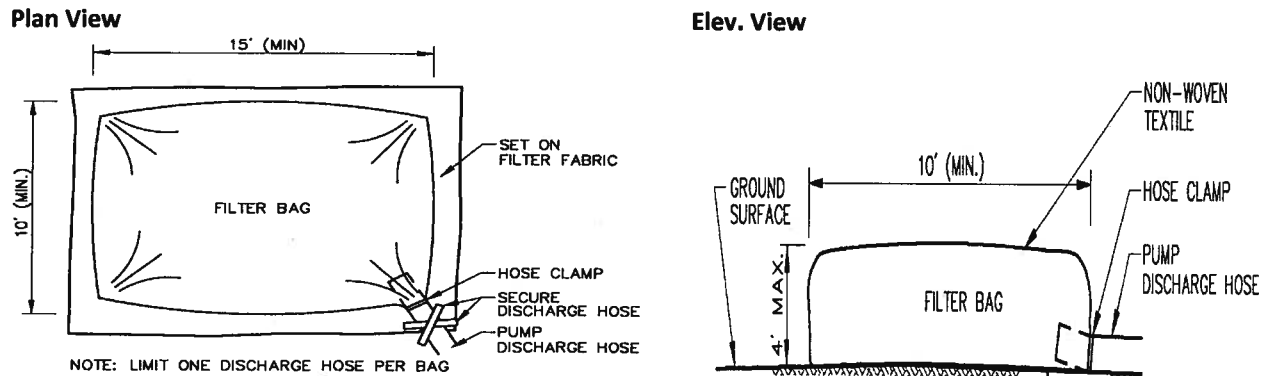
- Inspect basin daily after each significant rainfall.
- Basin should be cleaned out when approximately one half full.
- Clean and replace hay/straw bales when needed.

Typical Problems

- Inadequate basin capacities
- Accumulated sediment not removed when needed.
- Basins built in sandy soils may cause sloughing of slopes.

Figure 7

Filter Bag



Purpose

Filter bags are used at sites where the construction site limitations do not allow for the construction of a dewatering basin. The effluent from the work area is pumped into a prefabricated silt bag. Water slowly filters out of the bag in a dispersed manner and the sediment is captured in the bag. Sediment control stone is used as a foundation for the bag.

Conditions Where Applicable

- When the effluent can be pumped out of the work area at a rate of 1500 gallons per minute or less.
- When the work area and dewatering volume is small.
- When there is not enough available upland area to construct a dewatering basin.
- When the construction activities will not require an extended period of time.

Conditions Where NOT Applicable

- Construction sites that will require large amounts of dewatering.

Construction

- The silt bag should be at least 10' by 15'. The bag should be made from a nonwoven fabric and have sewn-in sleeve for receiving pump discharge.
- The bag seams should be sewn with a double needle machine using a high strength thread. The seams should have a wide width strength of at least 60 lb./in. (using test method ASTM D-4884).
- The silt bag should be placed on top of at least 6 inches of sediment control stone in an area that will drain away from the work area.

Removal Methodology

Remove inlet hose and dispose of entire silt bag.

Maintenance

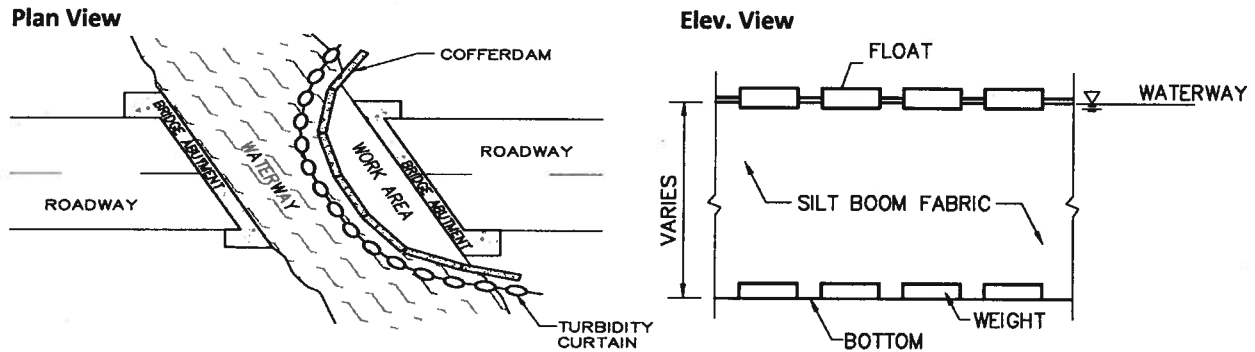
- Inspect inlet pipe and bag for damage and blockage.
- Replace the bag when $\frac{3}{4}$ full of sediment.

Typical Problems

- Discharge too large for bag.
- Continued use when bag is full.
- Inlet pipe disconnected from bag.

Figure 8

Turbidity Curtain



Purpose

Turbidity curtains are used as an in-stream sediment control filtration device to isolate a cofferdam work area from the normal flow of the waterway.

Conditions Where Applicable

- When performing work in a stream in a small localized area.
- Where stream height at ordinary high water is between 4 and 8 feet.
- When the repair or construction activities will not require an extended period of time to complete.

Conditions Where NOT Applicable

- Across flowing streams. Turbidity curtains are not designed as prefabricated dams.
- Where water depth is below 4 feet.

Construction

- The curtain should be made of tightly woven nylon, plastic or other non-deteriorating material.
- A flotation material with over 29 lbs./ft (43 kg/m) buoyancy should support the curtain material. A 5/16 inch (7.8 mm) galvanized chain should act as ballast for the floating curtain. Dual 5/16 inch (7.8mm) galvanized wire ropes with a

heavy vinyl coating should be used as the load lines.

Removal Methodology

Remove silt curtain from the upstream side first, being careful not to release sediment into the waterway while the silt curtain is removed.

Maintenance

- Inspect the curtain, flotation and ballast to ensure the work area is securely partitioned from the stream flow.
- Remove accumulated debris.

Typical Problems

- Does not permanently remove sediment.
- Improper anchoring of curtain on channel bottom.
- Tidal flows requiring frequent repositioning.