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Sevenson Environmental Services, Inc.

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US ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
Total Environmental Restoration Contract
USACE Contract Number: DACW33-03-D-0006
Task Order No. 0007

FINAL 2011 FISH MIGRATION IMPACT PLAN, NEW BEDFORD HARBOR REMEDIAL ACTION

New Bedford Harbor Superfund Site
New Bedford, MA

May 2011

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ACRONYMS AND ABBREVIATIONS

Jacobs	Jacobs Engineering Group
MADMF	Massachusetts Division of Marine Fisheries
NAE	U.S. Army Corps of Engineers – New England District
POC	point of contact
SES	Sevenson Environmental Services

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1.0 INTRODUCTION

The purpose of this document is to detail the measures that the Jacobs Engineering Group (Jacobs) and Sevenson Environmental Services (SES) team in coordination with the U.S. Army Corps of Engineers – New England District (NAE) will undertake during the 2011 dredge season to avoid impacting the annual fish migration in the Upper New Bedford Harbor.

2.0 2011 DREDGING ACTIVITIES

In 2011, dredging activities will be conducted in up to seven areas of the Upper New Bedford Harbor. The 2011 dredge areas and associated pipelines are shown on Figure 1. Six of the dredge areas are to be dredged hydraulically; one area (Dredge Area Q) will be dredged mechanically. The hydraulic dredging activities will alternate between a high tide dredge area (either Dredge Area G, Dredge Area N, Dredge Area O, or western Dredge Area K) and a low tide dredge area (either Dredge Area L, eastern Dredge Area K, or Dredge Area P). Mechanical dredging activities will only occur in Dredge Area Q, located at the eastern end of Sawyer Street. The following section provides a brief description of the dredging methods and means that the Jacobs/SES team have used since 2004 to remove polychlorinated biphenyl (PCB)-contaminated sediments from the New Bedford Harbor Superfund Site. The descriptions focus on activities that might pose negative impacts to resident and migratory fish in the Acushnet River.

2.1 DESCRIPTION OF DEBRIS REMOVAL ACTIVITIES

As in previous years' dredging actions, debris removal will occur ahead of dredging operations to remove scrap, trash, boulders, and clumps of vegetation that have the potential to impair dredging production or damage the equipment by becoming entangled or lodged in the dredge equipment. In dredge areas requiring debris removal, the activity will be carried out mechanically using an excavator, equipped with an ADD-A-STICK® extension and a rake attachment with a hydraulic thumb. The rake and thumb squeeze out sediment and maintain larger debris in the rake. This rake and thumb system has been utilized with success since 2005. The excavator is supported on a 40-foot by

40-foot barge constructed of modular flexi floats; the barge is equipped with spuds. In addition to the excavator platform, a 20-foot by 40-foot scow will be staged at the debris removal sites for collection and transport of debris to Area C.

Progressing methodically, the barge mounted excavator will probe for and clear debris by retaining debris between the fingers of the rake and thumb. The excavator will then place the recovered debris into the adjacent debris scow. Once a scow is loaded with debris it is pushed back to the Area C dock with a work boat for unloading and eventual disposal of collected material.

Debris removal activities will be conducted in undredged areas prior to dredging. In previously dredged areas debris removal will only be conducted on an as needed basis if debris is encountered. It is not anticipated that debris removal activities will occur in the mechanical Dredge Area Q; if large debris is encountered during the excavation, however, it may be necessary. Section 3.0 will discuss specific activities planned for each dredge area and the potential impacts to fish and fish migration.

2.2 DESCRIPTION OF DREDGING METHODS

2.2.1 Hydraulic Dredging Methods

Hydraulic dredge areas are set-up prior to dredging with a perimeter of sheet piles. All hydraulic dredging is conducted within the sheets using a cabling system where the dredge pulls itself back and forth within the dredge area. The direction of dredge travel is decided based on bathymetry, shoreline geography, pipeline routing, and wind exposure. Sheet piles will be spaced at 50-foot intervals on the faces of the dredge area perpendicular to dredge travel, and at 100-foot intervals on the faces parallel to dredging. The sheet piles will be used to anchor the dredge traverse cable system, spanning a maximum of 625 feet. The piles will form anchors which will support a $^{5}/_{8}$-inch steel cable around the perimeter of the dredge area. This perimeter cable is utilized as an anchoring point for the dredge traverse cable. The elevation of the cable is nominally at the water line during high tide and flagged for visibility. A photograph illustrating the

sheet pile and cable configuration is shown as Figure 2. The sheet piles are also used as attachment points for the perimeter oil boom deployed prior to any debris removal or dredging activities.

In 2011, three "Mudcat" MC 2000 sediment dredges will be deployed. A photograph of a "Mudcat" MC 2000 dredge is presented as Figure 3. One dredge will be deployed in Dredge Area G and will be used predominately during periods of high tide when there is sufficient water to allow adequate flotation of the dredge. A second dredge will be deployed in Dredge Area K and will be used when tides do not allow dredging in Area G. The third dredge will be assigned to Dredge Area L which consists of deeper water and allows sufficient water depth during all tidal cycles for dredging, this dredge will be relied upon to maintain production if dredging is not possible in the northern dredge areas due to mechanical or logistical issues. As Dredge Area G is completed sheets will be relocated to form Area N. Dredge Area N will be the high tide dredge area once Area G is completed. It is not anticipated that dredging or debris removal will occur in the planned Dredge Areas O and P due to time constraints, the plans, however, have been prepared as a contingency for use if unforeseen conditions prevent dredging in other areas.

The dredged sediment slurry, which consists of harbor water and sediment, is transported from the dredges through floating pipelines, and through one or two booster pumps to the Area C desanding plant. A photograph of one of the booster pump stations is shown as Figure 4. The first booster pump will be located south of Hadley Street on the shoreline of the Titleist facility. Sediment dredged from Dredge Area G, Dredge Area J, Dredge Area N, Dredge Area O, and Dredge Area K will be routed through the Hadley Street booster pump to transport the sediment slurry from these dredge areas down to a subsequent booster pump. The second booster pump, which will be co-located with the ferric sulfate injection station, will be located approximately 3,500 feet south on the Manomet Street property. Dredge Areas L and P will utilize only the Manomet Street booster pump station. These two booster pump stations, which will be located along the western shoreline of the harbor, are shown on Figure 1.

The floating pipeline from the dredge consists of multiple sections of 10-inch high density polyethylene (HDPE) pipe with attached flotation and flexible hose connections. The combination of rigid floating sections and hose connections results in an articulated pipeline that follows the dredge. This articulated set-up allows for back and forth movement of the dredge within the dredge areas while maintaining relatively stationary rigid floating slurry pipelines from the dredge areas to the booster pump stations. The dredge and the associated articulated floating pipeline that trails behind the dredge are illustrated as Figure 5.

2.2.2 Mechanical Dredging Methods

Dredge Area Q, located at the eastern end of Sawyer Street is being dredged to accommodate a future City of New Bedford boathouse and dock. Dredge Area Q is 50 feet wide by approximately 200 feet long and consists entirely of intertidal sediments. The planned dredge cut depth in Dredge Area Q is 2 feet. Sediment removal in Dredge Area Q will be performed utilizing a barge-mounted excavator, scows, and work boats as well as a shore-based component utilizing an excavator and dump truck. The barge will be 40 feet by 40 feet and the scows will be 20 feet by 40 feet. The barge, equipped with spuds, will be positioned with workboats and spudded to hold a constant position during dredging. The excavator operator will methodically dredge a 2-foot depth of material from Dredge Area Q and place the material into a scow. The excavator will be equipped with a conventional bucket for dredging. Care will be taken to minimize the amount of free water transferred with the material to the scow. Once the excavator has removed all targeted material within reach of the barge position, the spuds will be lifted and workboats will reposition the barge and scow for further dredging. The shore based excavator will excavate will also methodically dredge a 2-foot depth of material from Dredge Area Q but will place the material in a dump truck. Once a scow has been loaded with material, it will be pushed with workboats from Dredge Area Q to the Area C dock where it will be secured for unloading. The dredge and reposition sequence will continue until Dredge Area Q has been completed.

2.3 TIMELINE OF THE 2010 DREDGING ACTIVITIES AND FISH MIGRATION

It is anticipated that the 2011 dredging activities will occur from June through October. The goal of the 2011 dredge season is to dredge as much of the shallow northern areas of the Upper Harbor as possible. To do this the Jacobs/SES team will coordinate work with the tides that are experienced in the Upper New Bedford Harbor. Hydraulic dredging will alternate between the following two groups of dredge areas presented on Figure 1:

- Dredge Area G, Dredge Area N, Dredge Area O, and western Dredge Area K, which are primarily comprised of mudflats and intertidal sediments, will be dredged during periods of high tide; and
- Eastern Dredge Area K, Dredge Area P, and Dredge Area L, which are comprised mostly of subtidal sediments, will be dredged during periods of low tide when insufficient water is present to allow the dredge to operate in shallower dredge areas.

Dredging activities will be coordinated to minimize any potentially negative impacts to migratory fish. The water quality monitoring program established for this project will be implemented during all dredging and excavation activities to ensure that turbidity levels do not exceed the established criteria. Water quality monitoring and fisheries observations conducted during debris removal and dredging activities are intended to document effects of activities as well as minimize the potential for negative impacts.

The annual fish migration on the Acushnet River takes place in the following two stages:

- The "**In-Migration**" of Alewife and Blueback Herring up the Acushnet River towards the up-river spawning grounds occurs approximately from March 1st through June 15th; and
- The "**Out-Migration**" of the Alewife and Blueback Herring down the Acushnet River towards the ocean occurs approximately from September 15th through November 1st.

In the early portion of the 2011 dredge season (through the middle of June), the In-Migration of fish will be occurring. The fish will migrate from the ocean upstream (north) through the dredge areas to the Acushnet River. During the later portion of the

2011 dredging season (September through the end of October) the Out-Migration of fish will occur. The fish will migrate downstream (south) through the dredge areas towards the ocean.

Section 3.0 outlines the potential impacts to the fish (resident and migratory) in each dredge area and the steps that the Jacobs/SES team will take to lessen these potentially negative impacts.

3.0 POTENTIAL IMPACTS TO FISH MIGRATION AND MITIGATION MEASURES BY DREDGE AREA

Two potential impacts to the upstream and downstream fish migration during the 2011 season have been identified. The primary concern will be the potential for the floating dredge pipelines obstructing the fish migration during periods of low tide. In prior coordination with the Massachusetts Division of Marine Fisheries (MADMF), it was determined that a minimum of 6 inches of clearance between the bottom of the pipeline and the harbor bottom must be maintained for fish passage. This approach was successfully used in prior years' dredging in these same areas. The second concern will be the potential impact of elevated turbidities from dredging and debris removal activities on the fish migration. The potential impacts and the planned mitigation measures are discussed by dredge area in the following sections; debris removal in all areas is discussed in Section 3.8. In addition to the mitigation measures taken by the Jacobs team to prevent negative impacts to fish and wildlife, Woods Hole Group will periodically conduct fish, wildlife, and water quality monitoring throughout the 2011 dredge season. Woods Hole Group will report any potentially negative effects caused by dredge related activities directly to NAE.

3.1 DREDGE AREAS L AND P

Dredge Areas L and P are the southernmost dredge areas. These two dredge areas are adjacent to each other and span from the western shore to the eastern shore. Dredge Area L has been partially dredged previously. It is anticipated that dredging will be conducted in a north/south direction in both Dredge Areas L and P. When the dredge is

on the eastern side of either dredge area, the pipeline completely crosses the river; see Figure 1.

3.1.1 Potential Impacts

There is concern that the fish traveling north during the In-Migration may follow the dredge pipeline running from the Manomet Street booster pump station to the dredge when it is located in northeastern corner of Dredge Area L. The fish may get "herded" by the pipeline to the eastern shoreline where they may get trapped in the shallows between the dredge pipeline and the eastern shoreline on an out-going tide.

There are similar concerns that the fish traveling south on the outgoing tide during the Out-Migration may get trapped in the shallows between the dredge and the eastern shoreline.

In both cases of Out- and In-Migration, there is concern that as the water level drops during the outgoing tide fish may become either trapped or highly stressed. The trapping of the fish on the exposed mudflats may result in a fish kill.

In addition to the pipeline, the turbidity created by the dredging and debris removal activities also represents a potential hazard to fish in Dredge Areas L and P.

3.1.2 Mitigation Measures

To minimize the potential for negative impacts to any resident or migratory fish, as low tide approaches dredging operations will be moved away from the shoreline to allow adequate depth/clearance for the fish to pass either around the dredge or underneath the pipeline. In addition, to ensure adequate depth/clearance is available, dredging operations will not be conducted directly adjacent to the eastern shoreline during periods of low tide.

To minimize the potential for negative impacts to resident or migratory fish from elevated turbidities, the Woods Hole Group water quality team will make periodic

observations within and in the immediate vicinity of the dredge area watching for signs of stressed or dead fish. In addition, periodic water quality data (dissolved oxygen and turbidity) will be evaluated around the dredge areas to identify any project related impacts that could affect the fishery as a whole. Verbal reports will be provided daily during a monitoring event to the onsite NAE point of contact (POC). The Jacobs field crew will make daily inspections of active dredge areas; observations of stressed or dead fish will be recorded and reported to the on-site NAE POC. Corrective action will be taken as directed by the on-site NAE POC in the event of an undesirable condition. The frequency and intensity of Woods Hole Group's water quality monitoring efforts is determined by NAE.

3.2 DREDGE AREA K

Dredge Area K is located just south east of the former Aerovox facility. Area K consists of mudflats along the western shoreline, the rest of Area K is subtidal. Portions of Area K have been dredged previously. When the dredge is in the southeastern corner, the pipeline completely crosses the river, however the depth of the water in this area allows unobstructed passage beneath the pipeline at all tides; see Figure 1.

3.2.1 Potential Impacts

The north westernmost portion of Dredge Area K was mechanically dredged in 2008. An average of 4 feet of sediment was removed. The increase in river depth created by the 2008 dredge activity greatly reduces the potential restriction posed by the dredge pipeline in this dredge area.

There are concerns if the dredge is located in the southeastern section of Dredge Area K during the In-Migration. The in-migrating fish could be herded by the pipeline to the western shoreline where the pipeline comes on shore at the Hadley Street Booster Pump station. However, as a result of the 2008 excavation activities conducted along the western Aerovox Shoreline, there will be an average of 4 feet of water depth beneath the pipeline in this area. Therefore, the in-migrating fish cannot be trapped beneath the

pipeline that travels from the Hadley Street Booster Pump station to the dredge. The center and east side have been dredged previously removing an average of 2 feet of sediment; this increased depth ensures the minimum 6-inch clearance beneath the pipeline can easily be maintained.

There is concern that the fish traveling south on an outgoing tide or during the Out-Migration may follow the dredge pipeline from the Hadley Street booster pump to the dredge when it is located in the southeastern section of Dredge Area K. The potential exists for the out-migrating fish to be "herded" by the pipeline and travel along the eastern shoreline where they may get trapped in the shallow mudflats of Dredge Area O, adjacent to the eastern shoreline. There is also concern that as the water level drops during the outgoing tide the fish either may become trapped or become highly stressed. The trapping of the fish on the exposed mudflats may result in a fish kill.

In addition to pipeline concerns, the elevated turbidities created by the dredging and debris removal activities also represent a potential hazard to fish in Dredge Area K (resident and migratory).

3.2.2 Mitigation Measures

To minimize the potential for negative impacts to any resident or migratory fish, dredging operations conducted along the eastern shoreline during an ebbing tide will require moving the dredge and pipeline away from the shoreline to allow adequate depth/clearance for the fish to pass either around the dredge or underneath the pipeline. If the pipeline is not found to be maintaining adequate clearance for fish passage, the dredge will be moved to a deeper water location and dredging will resume in the deeper Dredge Area L until the tidal conditions are more favorable.

The Woods Hole Group water quality team will make periodic observations within and in the immediate vicinity of the dredge area watching for signs of stressed or dead fish to minimize the potential for negative impacts to resident or migratory fish from elevated turbidities. In addition, periodic water quality data (dissolved oxygen and turbidity) will

be evaluated around the dredge areas to identify any project related impacts that could affect the fishery as a whole. Verbal reports will be provided daily during a monitoring event to the onsite NAE POC. The Jacobs field crew will make daily inspections of active dredge areas; observations of stressed or dead fish will be recorded and reported to the on-site NAE POC. Corrective action will be taken as directed by the on-site NAE POC in the event of an undesirable condition. The frequency and intensity of Woods Hole Group's water quality monitoring efforts is determined by NAE.

3.3 DREDGE AREA O

Dredge Area O is located in a small cove east of Area K. All of Dredge Area O consists of shallow mudflats. Dredging is anticipated to be conducted in an east/west direction.

3.3.1 Potential Impacts

Due to the orientation of Dredge Area O and depth of water where the pipelines make landfall along the western shoreline there is little concern that fish traveling north would be trapped or herded by the pipeline during the In-Migration. There is concern, however, that fish traveling south during the Out-Migration may be herded and trapped on the Area O mudflats during an outgoing tide. Resident fish may become trapped on the mudflats during an outgoing tide. If the fish were trapped on the Area O mudflats it is possible that the fish could become highly stressed and a fish kill may result.

3.3.2 Mitigation Measures

To minimize the potential for negative fish impacts in Dredge Area O dredging activities will cease in the area during periods of low tide. The dredge and pipeline will be backed out of Area O and staged along the Area K boundary during low tide and periods of inactivity, this measure should provide a free fish passage through Area O and prevent trapping fish on the mudflats. Although the pipeline will completely cross the river during active dredging the depth of Dredge Area K is sufficient to allow passage beneath the pipeline at all tides.

To minimize the potential for negative impacts to resident or migratory fish from elevated turbidities, the Woods Hole Group water quality team will make periodic observations within and in the immediate vicinity of the dredge area watching for signs of stressed or dead fish. In addition, periodic water quality data (dissolved oxygen and turbidity) will be evaluated around the dredge areas to identify any project related impacts that could affect the fishery as a whole. Verbal reports will be provided daily during a monitoring event to the onsite NAE POC. The Jacobs field crew will make daily inspections of active dredge areas; observations of stressed or dead fish will be recorded and reported to the on-site NAE POC. Corrective action will be taken as directed by the on-site NAE POC in the event of an undesirable condition. The frequency and intensity of Woods Hole Group's water quality monitoring efforts is determined by NAE.

3.4 DREDGE AREA N

Dredge Area N consists of a small sheltered cove in the northeast portion of the Upper Harbor. Much of Area N consists of shallow mudflats. Due to the shape of the cove dredging will be conducted in an east/west direction for much of the area but will have to be reconfigured to run northwest/southeast to maximize coverage.

3.4.1 Potential Impacts

The sheltered nature of this cove lends itself to the possibility that resident fish may become trapped and stressed or killed during an outgoing tide. During the Out-Migration period the possibility exists that the pipeline from Area N to the Hadley Street booster pump station may herd or trap migratory fish on an outgoing tide. The possibility for herding in Dredge Area N during the Out-Migration may be exacerbated if other activity in the adjacent Dredge Area G restricts the channel running along the west side of the dredge area.

3.4.2 Mitigation Measures

To minimize the potential for negative effects to resident and migratory fish, the dredge in Dredge Area N will be backed out of the cove to the Area G boundary at low tide or when not in use. Activities which have the chance to restrict the channel in Dredge Area G will be curtailed during an outgoing tide, and the equipment will be moved out of the channel area, this action will lessen the likelihood that the pipeline could cause herding toward the Area N mudflats. The pipeline will be positioned so as to maintain the required 6-inches of clearance for fish passage in the channel area.

To minimize the potential for negative impacts to resident or migratory fish from elevated turbidities, the Woods Hole Group water quality team will make periodic observations within and in the immediate vicinity of the dredge area watching for signs of stressed or dead fish. In addition, periodic water quality data (dissolved oxygen and turbidity) will be evaluated around the dredge areas to identify any project related impacts that could affect the fishery as a whole. Verbal reports will be provided daily during a monitoring event to the onsite NAE POC. The Jacobs field crew will make daily inspections of active dredge areas; observations of stressed or dead fish will be recorded and reported to the on-site NAE POC. Corrective action will be taken as directed by the on-site NAE POC in the event of an undesirable condition. The frequency and intensity of Woods Hole Group's water quality monitoring efforts is determined by NAE.

3.5 DREDGE AREA G

Dredge Area G is the northernmost hydraulic dredge area, this dredge area is composed of mudflat areas with the main channel running generally north-south up the west side. Much of Area G has been previously dredged. It is anticipated that dredging will be conducted in an east/west direction.

3.5.1 Potential Impacts

The narrow channel on the western side of Dredge Area G could be blocked by the dredge pipeline during low tide, thereby preventing fish from migrating north (In-Migration) or south (Out-Migration) and potentially result in a fish kill and/or stressing of the fish.

3.5.2 Mitigation Measures

To minimize the potential for negative impacts to any resident or migratory fish, as low tide approaches, dredge operations will be kept away from the western shoreline to reduce the potential for fish to become trapped during low tide conditions. A minimum of 6 inches of clearance between the bottom of the pipeline and the harbor bottom will be maintained for fish passage if the pipeline crosses the channel. The preferred option will be to back the dredge up to the center of Area G and move the pipeline out of the channel during the low tide period.

To minimize the potential for negative impacts to resident or migratory fish from elevated turbidities, the Woods Hole Group water quality team will make periodic observations within and in the immediate vicinity of the dredge area watching for signs of stressed or dead fish. In addition, periodic water quality data (dissolved oxygen and turbidity) will be evaluated around the dredge areas to identify any project related impacts that could affect the fishery as a whole. Verbal reports will be provided daily during a monitoring event to the onsite NAE POC. The Jacobs field crew will make daily inspections of active dredge areas; observations of stressed or dead fish will be recorded and reported to the on-site NAE POC. Corrective action will be taken as directed by the on-site NAE POC in the event of an undesirable condition. The frequency and intensity of Woods Hole Group's water quality monitoring efforts is determined by NAE.

3.6 DREDGE AREA Q

Dredge Area Q is the only area targeted for mechanical dredging during the 2011 season. Dredge Area Q, located at the eastern end of Sawyer Street, is being dredged to accommodate a future City of New Bedford boathouse and dock. Dredge Area Q is 50 feet wide by approximately 200 feet long and consists entirely of intertidal sediments. The planned dredge cut depth in Dredge Area Q is 2 feet.

3.6.1 Potential Impact

Dredge Area Q, in one of the wider portions of the upper harbor lies well away from the deeper channel running approximately north – south for the length of the upper harbor. Operations in Area Q focusing on the shoreline and intertidal sediments will not have the possibility of blocking the channel. Turbidity generated during excavations does have the possibility of affecting water quality and may stress resident or migratory fish.

3.6.2 Mitigation Measures

To minimize the potential for negative impacts to any resident or migratory fish, as low tide approaches, dredge operations will shift from barge-based to land-based. This change should decrease the amount of sediment suspended as a result of the barge movement during operations. Conducting the shore based work at low tide will also allow the excavation to be conducted when the sediment is not covered by water, reducing any negative impacts to resident or migratory fish. Scow movement will be conducted by navigating through a previously dredged area on the eastern boundary of Area Q into the channel, this course will allow the scows to maneuver in relatively deep water at all tide cycles. Maneuvering the scows in deeper water reduces blockage concerns and reduces the chance of causing elevated turbidities due to prop wash.

To minimize the potential for negative impacts to resident or migratory fish from elevated turbidities, the Woods Hole Group water quality team will make periodic observations within and in the immediate vicinity of the dredge area watching for signs of stressed or dead fish. In addition, periodic water quality data (dissolved oxygen and

turbidity) will be evaluated around the dredge areas to identify any project related impacts that could affect the fishery as a whole. Verbal reports will be provided daily during a monitoring event to the onsite NAE POC. The Jacobs field crew will make daily inspections of active dredge areas; observations of stressed or dead fish will be recorded and reported to the on-site NAE POC. Corrective action will be taken as directed by the on-site NAE POC in the event of an undesirable condition. The frequency and intensity of Woods Hole Group's water quality monitoring efforts is determined by NAE.

3.7 POTENTIAL IMPACTS OF DEBRIS REMOVAL ACTIVITIES

3.7.1 Potential Impacts

During the 2005 dredge season, turbidity levels above the project action levels were detected when debris removal activities were conducted in mudflat areas at or near low tide conditions. There is concern that high turbidity areas could act as a barrier to the migrating fish.

3.7.2 Mitigation Measures

As a result of these observed 2005 turbidity levels, debris removal activities have been curtailed during periods of low tide in mudflat dredge areas. In deeper water dredge areas debris removal activities will continue through all tide cycles if turbidity levels are found to remain within project specific criteria.

Additional actions to reduce turbidity or its effects during debris removal include slower more deliberate debris removal actions by the excavator operator, and moving scows or the barges at periods of higher water. To minimize the potential for negative impacts to resident or migratory fish from elevated turbidities, the Woods Hole Group water quality team will make periodic observations within and in the immediate vicinity of the dredge area watching for signs of stressed or dead fish. In addition, periodic water quality data (dissolved oxygen and turbidity) will be evaluated around the dredge areas to identify any project related impacts that could affect the fishery as a whole. Verbal reports will be

provided daily during a monitoring event to the onsite NAE POC. The Jacobs field crew will make daily inspections of active dredge areas; observations of stressed or dead fish will be recorded and reported to the on-site NAE POC. Corrective action will be taken as directed by the on-site NAE POC in the event of an undesirable condition. The frequency and intensity of Woods Hole Group's water quality monitoring efforts is determined by NAE.

3.8 COMMUNICATION OF POTENTIALLY NEGATIVE FISH IMPACTS

In the unlikely event of a fish kill or if it is suspected that the fish are being negatively impacted in some manner, the following notifications will be made in the order presented below:

1. **Initial Notification of Fish Kill or Negative Fish Impact:** If such an observation is made by either Woods Hole Group or the Jacobs field team they will contact Mr. Paul L'Heureux, the on-site NAE Project Engineer at 978-318-5462 extension 212, or his cell at 508-294-9859. The Woods Hole Group is the field team responsible for water quality monitoring and fish and wildlife observations during dredging and debris removal activities throughout the dredging period. On those days that Woods Hole Group is not conducting field operations, the Jacobs field team will be responsible for notifying Mr. L'Heureux.

   If the dredging subcontractor, SES, observes any dead fish or negative fish impact, they will contact Mr. Mark Gouveia (Jacobs Site Manager) at his office at 508-996-5462 extension 212, or his cell phone at 508-802-2197. Mr. Gouveia, will in turn, contact Mr. L'Heureux.

2. **Second Level of Notification:** Mr. L'Heureux will contact Mr. Todd Randall, Marine Ecologist, NAE Environmental POC at the New England District office, Concord, Massachusetts, at 978-318-8518 (office) or 978257-0724 (cell). Mr. Randall will assess the situation and will notify Mr. Brad Chase at the MADMF at 508-990--2860 extension 118 or Dr. Kathryn Ford at the MADMF at 508-990-2860 extension 145 to discuss the event and determine what corrective actions should be taken, if any.

4.0 SUMMARY

The Jacobs/SES team in coordination with the NAE will schedule or coordinate activities to reduce any potential negative impacts to migratory or resident fish by taking the following steps:

- Curtail debris removal activities in mudflat areas during periods of low tide.
- Position dredge and pipeline in Area G when not in use so as to not block the channel.
- Back the dredge in Area N out to the Area G/N boundary when not in use.
- Back the Dredge in Area O out to the Area K/O boundary when not in use.
- Avoid dredging along the shorelines during periods of low tide in all dredge areas.
- Avoid moving debris removal barge or scows during periods of low water.
- Maintain a minimum clearance of 6 inches below the pipeline to prevent fish herding or stranding.
- Both the Woods Hole Group and the Jacobs/SES team will exhibit extra vigilance during those periods of unfavorable seasonal environmental conditions (i.e., low dissolved oxygen during the warm summer months).

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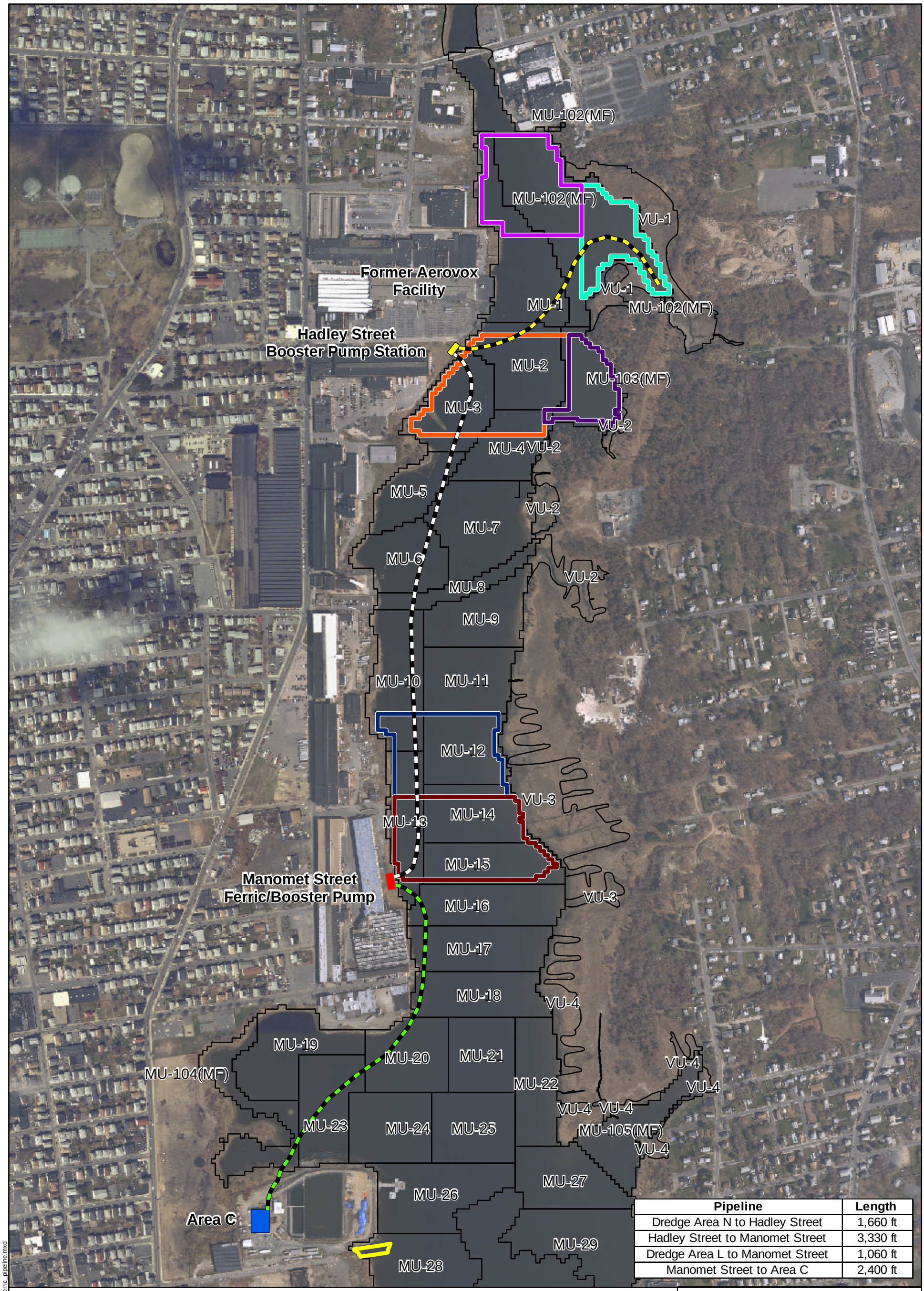
FIGURES



Pipeline	Length
Dredge Area N to Hadley Street	1,660 ft
Hadley Street to Manomet Street	3,330 ft
Dredge Area L to Manomet Street	1,060 ft
Manomet Street to Area C	2,400 ft

Legend

- Line from Hadley Street Booster Pump to Manomet Street Booster Pump
- Line from Dredge Area N to Hadley Street Booster Pump
- Line from Dredge Area L to Manomet Street Booster Pump
- Line to Desanding
- 2011 Dredge Area G
- 2011 Dredge Area N
- 2011 Dredge Area K
- 2011 Dredge Area O
- 2011 Dredge Area L
- 2011 Dredge Area P
- 2011 Dredge Area Q
- Management Units

N

0 275 550

Feet

1:6,600

JACOBS™

Booster Pump Locations,
Ferric Sulfate Injection Location,
Dredge Pipeline Routes

New Bedford Harbor Superfund Site

NAME: croberts DATE: 04/25/2011

Figure 1

Y:\NBH\Projects\35BG0801\20110425\ArcGIS\Fig3-9_pumps_ferric_pipeline.mxd

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Dredge Sheet Pile Network

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

4/16/09cr Fig2_SES_sheet_pile.cdr

Figure 2

Y:\NBH\Projects\35BG0702\20090416\Graphics\Fig2_SES_sheet_pile.cdr

JACOBS™

Mudcat MC 2000 Dredge

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

4/16/09cr Fig3_mudcat.cdr

Figure 3

Y:\NBH\Projects\35BG0702\20090416\Graphics\Fig3_mudcat.cdr

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Booster Pump Set-Up

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

4/16/09cr Fig4_booster_pump.cdr | Figure 4

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Dredge and Pipeline Configuration

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

4/16/09cr Fig5_pipeline_config.cdr | Figure 5

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