FISH DETERMENT SYSTEM
FIELD INSPECTION and SURVEY REPORT:
WEEK OF 1/15/2013-1/22/2013

In Accordance With The:

FISH DETERMENT PLAN

New Bedford Marine Commerce Terminal,
New Bedford South Terminal, New Bedford, MA

Prepared on behalf of:

Massachusetts Clean Energy Center
as Part of Regulatory Compliance

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OPERATIONS REPORT:

REGULATORY COMPLIANCE ACTIVITIES

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Fish Deterrent System
Field Inspection and Survey Report
Week: 01-15-13 through 01-22-13
New Bedford Marine Commerce Terminal (NBMCT)

This Field Inspection and Survey Report was prepared as part of the implementation of the "Fish Deterrent Plan", which is part of "Water Quality Performance Standards" for the NBMCT (South Terminal Project) referenced in the USEPA "EPA Final Determination for the South Terminal Project" (November, 2012).

1. Introduction:

The Water Quality Standards included in the USEPA Final Determination for the South Terminal Project includes a "Fish Deterrent Plan" (FDP) that describes fish deterrent activities and fish barrier systems that the project proponent (the Commonwealth of Massachusetts) agreed to install and operate (in certain portions of the Harbor) in order to reduce the potential impact to fish (i.e. a "Fish Deterrent System," or FDS). The FDP indicates that fish deterrent activities shall be conducted during the period from January 15 through June 15 of any year if there is to be construction related to the New Bedford Marine Commerce Terminal (NBMCT) during that period in those areas. The purpose of the FDS is "to reduce the impact to fish by excluding them from a proposed area"; in this case the work areas associated with the construction of CAD Cell #3 and the area around the proposed South Terminal bulkhead extension and berthing channel at the NBMCT. The deployment and operation of the Fish Deterrent System (FDS) is to take place between January 15 and June 15 of any year within areas shallower than –5 meters MLLW if any work that could disrupt spawning or other activities associated with certain fish species is undertaken. The FDP also calls for regular weekly inspections of the system and an assessment as to the presence or absence of fish within the FDS work areas, coupled with actions that should be taken to remove fish from the FDS work areas if they are encountered (using a "Fish Startle System").

This Field Inspection Report represents the first Report associated with the installation, inspections, and maintenance of the "Fish Deterrent System" that has been deployed in New Bedford Harbor to meet the 2013 Water Quality Performance Standards in the EPA Final Determination for this Project. As this is the first Report for the Fish Deterrent Plan activities, it includes information regarding:

- The deployment of the Fish Deterrent System;
- Description of the first inspection of the FDS work areas;
- Fish Startle Activities undertaken; and
- Maintenance activities that have been undertaken to maintain and improve the FDS system after initial installation.

Future weekly reports will concentrate on the results of the weekly inspections and fish surveys, fish removal activities undertaken (if any), and any maintenance activities conducted (if any).

2. Deployment of the FDS System:

As noted above, the FDS System has been deployed at both the CAD Cell #3 Project Area and the South Terminal Project Area. The following sections represent a narrative describing the FDS equipment installed and the methods used to install the systems.

Installation:

The following equipment and personnel were utilized for the initial system installation:

Barge "Topcat" (Lindberg Marine): Work Barge with mounted Crane (10ton/70' boom)
2 Work Skiffs (Lindberg Marine): 18-foot steel, outboard.
Construction Barge with Crane (Diligent Marine Services): Work Barge 18'x48' with mounted Crane (9ton/70' boom).
Work Skiff (Diligent Marine Services): 18-foot Steel, Outboard.
Support Vessel: Apex "Xepa", 19-foot Ocean Scout research vessel.
Support Vessel: Apex "Xepa IV", 22-foot moon-pool-equipped pontoon platform vessel.
Personnel: G. Lindberg, J. Lindberg II, S. Mitchell, K. Mindle, R. Viera, D. Houghton (Lindberg Marine); J. Belanger, D. Fitzgerald (Diligent Marine); S. Gomes, 2 Helpers (Pioneer Mooring Services); G. Dolan, J. Ray, J. Frishman, J. Borkland, C. Stillman (Apex).

2.1 CAD Cell #3 Area Deployment:

Deployment of the FDS at the CAD Cell #3 Area began on January 10th 2013 with the deployment of marker and alignment buoys (from Apex's 19' Bristol Ocean Scout) to provide a baseline for the deployment of the modified silt barrier and the fish weir. The same day, Linberg Marine Construction of Fairhaven, Massachusetts received the first delivery of the specialized silt curtain and boom from the manufacturer, Brockton Spilldam of Brockton Massachusetts.

On January 11, 2013 Linberg Marine Construction mobilized a self propelled barge and two work skiffs from their dock in Fairhaven, and began deployment of the modified silt curtain. Deployment proceeded in a stepwise fashion beginning at the southwest corner of the CAD Cell #3 area and proceeding to the north. Two 250 pound mushroom anchors were set approximately 50 feet south of the corner, and attached to the first section of modified silt barrier with approximately 50 feet of mooring tackle. The barge was maneuvered along the line of marker buoys which marked the western edge of the deployment area, and the barrier was placed in the water and drawn taught between the barge and the mushroom anchors. Each subsequent 100 foot length of modified silt barrier was attached to the previous, and drawn tight along the alignment by the self propelled barge while the work skiffs deployed 22 pound danforth anchors with 100 feet of tackle to maintain the alignment between the corner anchors. 600 linear feet of modified silt barrier were deployed on January 11 in this manner.

On January 12, 2013 the deployment of the modified silt barrier continued at CAD Cell #3 in the same manner as the previous day along the northern limit of the fish exclusion area and continued along the east and southern sides. A total of 1900 linear feet of modified silt barrier was deployed on January 12th in this manner. The fish weir deployment also began on January

12 at the southwest corner of the CAD Cell #3 area and followed the alignment of the modified silt barrier which had been positioned the previous day. The fish weir was deployed by Apex staff with the assistance of Diligent Marine Services. A 460 pound steel mooring plate was placed to the south and west of the corner of the previously deployed modified silt barrier and was used as the start point and the primary corner anchor for the weir. The weir was fed over the bow of the deployment barge, as the barge was towed by its stern to the north following the alignment of the modified silt barrier. Marker buoys were attached to the top of the weir approximately every 100' to provide visual evidence of the alignment of the weir at the surface. At each corner a 460 pound steel mooring plate was placed and the deployment continued until the entire fish exclusion area and modified silt barrier were encompassed. A total of 2600 linear feet of fish weir was deployed on January 12, 2013.

See Attachment A for Designs of FDS System Components.
See Attachment B for Map showing FDS System Deployment Areas.
See Attachment C for Photos of FDS System Deployment.

2.2 South Terminal Area Deployment:

Deployment of the FDS at the South Terminal Area began on January 10th 2013 with the deployment of marker and alignment buoys from (Apex's 19' Bristol Ocean Scout) to provide a baseline for the deployment of the modified silt barrier and the fish weir.

On January 11, 2013, Apex mobilized with Diligent Marine Services to deploy the Bubble Curtain at the northern end of the South Terminal fish exclusion area. The bubble curtain was deployed over the bow of Diligent Marine's barge, beginning at the South Terminal bulkhead extending to the east and ending at the proposed terminus of the modified silt barrier. The bubble curtain consists of a series of bubble generation lines, and air supply lines which are all ballasted with galvanized cable to ensure continuous negative buoyancy. The 200 feet of bubble curtain lines were wound onto a deployment spool, and suspended above the deck of the barge. The western end was connected to the bulkhead fendering with a steel cable, and the barge was moved eastward to the planned end of the modified silt barrier, while the bubble curtain lines were fed over the bow of the barge. Divers equipped with drysuits then inspected the installation to ensure proper alignment of the supply and generation lines, and to remove any pinches or kinks. 200 feet of bubble curtain were deployed on the 11th of January.

On January 13, 2013 Linberg Marine Construction mobilized a self propelled barge and two work skiffs from their dock in Fairhaven, and began deployment of the modified silt curtain. Deployment proceeded in a stepwise fashion beginning at the southern end of the modified silt barrier area and proceeding to the north. Two 250 pound mushroom anchors were set approximately 50 feet north of the southern terminus of the silt barrier, and attached to the northern end of the first section of modified silt barrier with approximately 50 feet of mooring tackle. This first section was anchored at the midpoint with a 22 pound danforth anchor, and the southern end was placed above the high tide line on the US Army Corps of Engineer's Hurricane Barrier. Each subsequent 100 foot length of modified silt barrier was attached to the previous, and drawn tight along the alignment by the self propelled barge while the work skiffs deployed

22 pound danforth anchors with 100 feet of tackle to maintain the alignment along the length of the system. 1400 linear feet of modified silt barrier were deployed on January 13 in this manner.

The fish weir deployment also began on January 13 at the southeastern end of the South Terminal fish exclusion area and followed the alignment of the modified silt barrier which had been positioned earlier in the day. The fish weir was deployed by Apex staff with the assistance of Diligent Marine Services. A 460 pound steel mooring plate was placed to the east of the previously deployed modified silt barrier, and at the base of the rip rap slope of the hurricane barrier, and was used as the start point and the primary corner anchor for the weir. The southern end of the weir was carried by hand above the high tide line and secured to the rip rap slope of the hurricane barrier. During the remainder of deployment, the weir was fed over the bow of the deployment barge, as the barge was towed by its stern to the north following the alignment of the modified silt barrier. Marker buoys were attached to the top of the weir approximately every 100' to provide visual evidence of the alignment of the weir at the surface. At the northern corner a 460 pound steel mooring plate was placed and the deployment continued to the west until the entire fish exclusion area, the modified silt barrier, and the bubble curtain were encompassed. A total of 1700 linear feet of fish weir was deployed on January 13, 2013.

See Attachment A for Designs of FDS System Components.
See Attachment B for Map showing FDS System Deployment Areas.
See Attachment C for Photos of FDS System Deployment.

3. Fish Presence/Absence Assessment:

As noted in the Fish Deterrent Plan, a weekly assessment as to the presence (or absence) of fish within the FDS work areas is required. In particular, emphasis is placed on the presence (or absence) of (but not necessarily limited to) flat fish, particularly:
Winter flounder (*Psuedopleuronectes americanus*);
Windowpane flounder (*Scopthalmus aquosus*);
and finfish, particularly:
Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*);
Scup (*Stenotomus chrysops*); and
Black sea bass (*Centropristus striata*).

Other fish species have been identified as present in New Bedford Harbor (*Essential Fish Habitat Assessment Addendum, New Bedford Harbor Marine Commerce Terminal, 2012, Land Use Ecological Services, Inc.),* and the fish assessment activities described herein include reporting on the full range of fish species (ie, reporting on all fish encountered) for completeness.

3.1 Fish Assessment Activities:

Initial Fish Assessment activities began on January 15, 2013, approximately 24-hours after the completion of the installation of the Fish Deterrent System (FDS). To the extent possible, Fish Assessment activities were undertaken during daylight hours to aid underwater visibility. The following sections describe the Fish Assessment activities undertaken.

Vessel 1: Fathom Research 25-foot research vessel, diver equipped.
Vessel 2: Apex "Xepa IV", 25-foot moon-pool-equipped pontoon platform vessel.
Personnel: R. Dahlberg, E. Grenert, W. McIntyre, J. Potts (Fathom), G. Dolan, J. Ray, J. Frishman (Apex).
Weather: Mild temperatures ranging from 36-42 degrees F throughout the day. Cloudy. Winds approximately 5-10 knots from the N.
Seas moderately calm (inside hurricane barrier).
Water visibility: 5 to 10 feet.

3.1.1 South Terminal Area Assessment Methods:

Because of the timing of the completion of the installation of the FDS system, the inspections of the South Terminal Area Assessment survey had to be completed on the ebbing tide. An initial reconnaissance of the survey area with the research vessel indicated that, with the falling tide conditions and limited hours of daylight per day (which precluded waiting for more advantageous tidal conditions), the standard lineal survey grid with camera and sonar fish finder would not be possible given the water depths present at the time. At the time of the survey, the water depths in the southern portion of the FDS exclusion area (near the Gifford Street Boat Ramp and the Hurricane Barrier), were too shallow to allow for the prescribed survey lane lengths. A field decision was made to modify the survey approach such that surface supplied-air-diver surveys were conducted using a pendulum search pattern over the accessible portion of the search area.

The diver search pattern of the accessible portion of the survey area was completed by locating the research vessel in the middle of a search grid square, the size of which (approximately 150 feet) was determined by the length of the umbilical air hose used by the divers. The decision was made to use surface-supplied-air because that method of diving allows a diver in a dry suit (required because of the water temperature) more freedom of motion to scan the water column than other diving methods. Use of surface-supplied-air allowed the divers to navigate in shallower water than would have been possible if a boat survey were conducted or if diving using other dive methods had been conducted. The vessel was positioned within the center of a pendulum search circle, and a pair of divers searched a circular pattern around the vessel in ever increasing arcs with the spacing between successive arcs being approximately 25-feet. Visibility ranged from approximately 5-10 feet throughout the survey. The coordinate of the vessel at the center of the search pattern was collected. Once the pendulum search of a grid was completed, the vessel would be moved to a new grid circle, and the pendulum grid search pattern was repeated, until the accessible portion of the survey area had been covered by the search divers. In addition to the divers scanning the survey area, the field crew ran the vessel's sonar fish finder equipment during the period of the diving survey. The sonar was continuously monitored while the vessel was operating in the area. In this manner, the portion of the South Terminal FDS exclusion area where the water depth at the time of the survey was greater than approximately 3-feet (i.e., the portion of the area that was accessible and was likely to contain fish if any were present), was surveyed.

The fish finder used for the survey was a Simrad NSS7, and the video was shot using a DeepSea Power and Light Multi SeaLight and Multi SeaCam attached to a diving scooter, and controlled

by an in-water diver. The video recorded by the diver was transmitted in real time to the monitoring screen on the diving support vessel.

Use of this diver pendulum search method allowed for survey coverage of the largest portion of the FDS South Terminal exclusion area given the tidal conditions at the time. To the extent practical, given weather and daylight restrictions associated with the time of year, future surveys will be conducted during more advantageous tidal conditions if possible.

3.1.2 CAD Cell Area Assessment Methods:

On January 15, Apex's assessment subcontractor attempted to access the CAD FDS exclusion area with their survey vessel and was unable to do so because the silt curtain booms fully enclosed the area. A field decision was made to conduct a diver/video survey (see description above – methodology was similar to that described for the South Terminal survey) at the CAD Cell, but with the survey vessel located on the outside edge of the FDS exclusion silt boom, and the divers located inside the silt-barrier-enclosed FDS exclusion area. Using this method with the supplied-air-extended to the limits of the unibillical, the divers were able to search a large proportion of the CAD Cell FDS exclusion area. Upon review of the field inspection crew's methods at the CAD Cell FDS exclusion area, Apex decided to conduct a secondary conformational sonar survey of the CAD Cell FDS exclusion area for completeness. Weather conditions (which deteriorated rapidly after January 16 when winds started to blow at greater than 25 mph and exceeded 40 mph through January 20), precluded the collection of the sonar survey data until the weather conditions improved. The weather improved to allow the sonar survey to be conducted on January 21, at which time Apex conducted a fish detection sonar survey of the entire CAD Cell #3 FDS exclusion area.

Transects of the CAD Cell#3 area were conducted with the Apex pontoon vessel because the pontoon vessel represents a very stable survey platform that can run straight transects at very low survey speeds (as low as 1-knot). Fish Finder data was collected along north-south traverses run on a 100-foot line spacing within the enclosed FDS exclusion area.

3.2 Fish Assessment Findings:

Had fish been identified during the surveys, the number of encounters, whether or not the fish were schooled in groups of three or greater, and (from the diver and video surveys) the types of fish would have been recorded.

3.2.1 South Terminal Area Survey Results:

- No flatfish were noted during the diver/video survey of the accessible portion of the FDS exclusion area.
- No other fish were noted during the diver/video survey of the accessible portions of the FDS exclusion area.
- No schools of fish were noted on the sonar that was run from the dive vessel as it was operating in the area.

3.2.2 CAD Cell #3 Area Results:

- No flatfish were noted during the diver/video survey of the CAD Cell #3 FDS exclusion area.
- No other fish were noted during the diver/video survey of the CAD Cell #3 FDS exclusion area.
- No fish "anomalies" were noted during the sonar survey of the CAD Cell #3 FDS exclusion area.

3.3 Recommendations for Future Assessment Survey Improvement:

It is recommended that a standardized form for field notes be created that can be quickly filled out in the field so that survey operations do not need to be interrupted to take notes. It should be a checklist form as much as possible as it is difficult to make free form notes under the current weather conditions present in the Harbor. It is also recommended that future assessment surveys of the South Terminal area be conducted on the incoming tide (to the extent practical) to allow for maximum survey coverage via vessel. (This was not possible for the first scheduled survey as the timing of the survey was dictated by the completion of the installation of the FDS system).

3.4 Schedule for Next Assessment Survey:

The next Assessment Survey of the CAD Cell #3 and South Terminal FDS areas is scheduled for January 24 and January 25, 2013.

4. Initial Fish Startle Activities Undertaken Upon Deployment:

Even though the monitoring surveys did not reveal the presence of fish within the exclusion areas, Apex personnel conducted Fish Startle activities within the FDS areas in order to test out the equipment under real in-field conditions. The following sections describe the fish startle activities that were undertaken at each of the two FDS work areas (CAD Cell #3 and South Terminal Area), including the Fish Startle Equipment utilized, as well as the Fish Startle methods employed.

Equipment and Personnel Utilized:

Support Vessel: Apex "Xepa IV", 22-foot moon-pool-equipped pontoon platform vessel.
Personnel: G. Dolan, J. Ray, J. Frishman (Apex).
Weather: Cool: 32-37 degrees F throughout the day. Cloudy with snow. Winds approximately 5-15 knots from the North. Seas moderate to calm (inside hurricane barrier).
Water visibility: 5 to 10 feet.

4.1 Description of Fish Startle System Components:

Fish startle activities were conducted utilizing Apex's Xepa IV 22' pontoon boat equipped with light, sound and tactile startling devices. The light startling device consists of two "Fish

Deterrent Light Tubes" manufactured by Aquatic Control Engineering of Rampton, Notts, England, and containing three randomly flashing strobe lights capable of generating 300 watts per second of flash energy. Sound startling is achieved using a Clark Synthesis™ AQ339 underwater speaker coupled with a Audiopipe™ 1000 watt amplifier, and a random sweep sound recording ranging from 20 hertz – 20,000 hertz. The tactile startling device was designed specifically for this project to startle ground fish species which are less sensitive to light and sound startling devices, and consists of 25 5/16^{ths} inch diameter round steel "eye" rods attached to a 25' long spreader bar, which was gently drawn along the bottom to startle any ground fish in the path of the system.

4.2 Description of Fish Startle System Activities:

On January 15th, 2013 Apex staff mobilized the fish startle system equipped XEPA IV to New Bedford Harbor to test the equipment and initiate test fish startle efforts. During the exclusion efforts, the XEPA IV was driven at approximately 2 knots through the exclusion areas with all three startling systems operating concurrently. The light bars were submerged to ensure maximum light penetration within the water column, and the sound startling system was operated continuously at approximately 158 dB. The vessel was navigated with the aid of Hypack survey software coupled with a Differential GPS capable of sub-meter accuracy, allowing the operator to carefully ensure complete coverage of the fish exclusion area. Exclusion effort transects were run on 25 foot line spacing, and the tactile startle system was raised and lowered through the water column with a pair of winches to ensure constant soft bottom contact of the "eye" rods.

4.2.1 CAD Cell #3 Area:

On January 16, 2013, Apex staff opened a 200 foot long section of modified silt barrier along the southern edge of the CAD Cell #3 fish exclusion area, and began fish exclusion transects running east-west on 25' line spacing, beginning on the north side of the exclusion area and proceeding to the south. The open section of the modified silt barrier provided an outlet for any fish species which may have been present within the FDS exclusion area; and exclusion effort transects were conducted to encourage any fish present to move toward the outlet. At the conclusion of the exclusion transects, the modified silt barrier sections were again closed to prevent fin and flatfish species from entering the fish exclusion area.

4.2.2 South Terminal Area:

Also on January 16, 2013, Apex staff turned off the bubble curtain operating at the north end of the South Terminal fish exclusion area, and began fish exclusion effort transects running east-west on 25' line spacing, beginning on the south end of the exclusion area and proceeding to the north. The shut-down bubble curtain section provided an outlet for any fish species which may have been present within the FDS exclusion area; and exclusion effort transects were conducted to encourage any fish present to move toward the outlet. At the conclusion of the exclusion transects, the bubble curtain was turned back on to prevent fin and flatfish species from entering the fish exclusion area.

5. FDS Component Inspection:

As noted in the Fish Deterrent Plan (FDP), weekly inspections of the physical components that make up the FDS are conducted. This includes inspections of the Silt Curtain that encloses the FDS areas, the Fish Weir that encircles the Silt Curtain, and the Bubble Curtain. Weekly maintenance is conducted on the FDS system to address issues identified during the weekly inspections.

5.1 FDS Component Inspection Activities:

Inspections of the physical components that make up the FDS were conducted at both the CAD Cell #3 area and the South Terminal FDS exclusion areas on January 15, 2013. Inspection was conducted by surface vessel (for the surface components), and using camera equipped divers with surface-supplied-air for the submerged components. The inspection vessel was anchored at a point approximately 100-feet from a corner of the silt curtain (to allow maximum survey length given the umbilical length of the diver's surface-supplied-air hoses). Inspection of the silt curtain was conducted from the farthest point from the vessel to the vessel anchoring point, and then past the vessel to the farthest extent that supplied-air allows. The vessel was then moved to a point farther along the circumference of the FDS enclosed area and the survey pattern repeated. Inspection of the silt curtain was conducted from the outside of the silt curtain so that inspection of the Fish Weir (which is located around the outside of the silt curtain) could be conducted using the same vessel setup.

Vessel: Fathom Research 24-foot research vessel, diver equipped.
Support Vessel: Apex "Xepa", 19-foot Ocean Scout research vessel.
Support Vessel: Apex "Xepa IV", 22-foot moon-pool-equipped pontoon platform vessel.
Personnel: R. Dahlberg, E. Grenert, W. McIntyre, J. Potts (Fathom), G. Dolan, J. Ray, J. Frishman, C. Stillman (Apex).
Weather: Mild temperatures ranging from 36-42 degrees F throughout the day. Cloudy. Winds approximately 5-10 knots from the N. Seas moderately calm (inside hurricane barrier).
Water visibility: 5 to 10 feet.

5.1.1 South Terminal Area Inspection Activities:

Inspection was conducted using a dive team of two or three divers on surface-supplied-air proceeding along the length of the silt curtain. The survey vessel was positioned at various distances along the barrier alignment and was utilized as a base of operations for the divers along each section of the system. A "saw-tooth" search pattern was utilized by the divers in the inspection of the silt curtain and the weir such that the divers would traverse from the floats at the top of the system down the face of the curtain (or netting) to the bottom, then swim along the bottom, then traverse up the face of the silt curtain (or netting) to near the surface, swim a short distance, and then repeat the pattern. The FDS anchoring systems and anchor lines were also inspected as they were encountered along the length of the FDS system. The bubble curtain was inspected from the face of South Terminal to its outboard extents past the point where the silt curtain ends. During the inspection of the bubble curtain, a team of divers swam along the

alignment of the bubble curtain system (while it was operating) at a depth of approximately 3-feet off the bottom of the harbor.

5.1.2 CAD Cell #3 Area Inspection Activities:

The inspection of the FDS at the CAD Cell #3 area was conducted starting at one corner of the Cell and proceeded along the outside of the Silt Curtain until a total circuit of the Cell was completed. Inspection was conducted using a team of divers on surface-supplied-air. The survey vessel was positioned at various distances along the barrier alignment and was utilized as a base of operations for the divers along each section of the system. Similar to the component survey conducted in the South Terminal area, a "saw-tooth" search pattern was utilized by the divers in the inspection of the silt curtain and the weir. The FDS anchoring systems and anchor lines were also inspected as they were encountered along the length of the FDS system.

5.2 FDS Component Inspection Results:

The results of the FDS component inspections are summarized in the sections below.

5.2.1 South Terminal Area Inspection Results:

Silt Curtains: The field inspection crew indicated that, in general, the silt curtain system at the South Terminal FDS exclusion area was in moderate condition. Silt curtain material was attached to the orange floats (i.e., was not torn) around the perimeter of FDS area. The silt curtain was misaligned with the weir net around a large portion of the perimeter of the FDS (i.e., the silt curtain and the weir net were not parallel). There was evidence of anchor drag on the down-wind side of the FDS, apparently the result of forces from the recent high winds pulling upward on the surface floats (and thus on the anchor mooring lines) and lifting the anchors, indicating that the anchoring weights and/or deployment geometries were inadequate to fully overcome the stresses associated with high winds. In some places, anchor drag was noted over estimated distances of 25-feet. In some locations, the anchoring lines for the silt curtain had become entangled in the weir netting that runs along the outside of the silt curtain. Divers noted areas where silt curtain seams (the junction point, or 'joint', where the separate silt curtain sections were connected during the deployment process) were disconnected, which could be the result of the way the seams were sewn together, or could be the result of stresses on the curtain caused by wind forces.

Fish Weir: The fish weir netting was new when it was installed. The field inspection crew indicated that the weir overall was in fair to moderate condition. The silt curtain had been pushed (by wind forces) into the weir at several locations, pushing the weir netting down to under 1-foot in places, and in a few places, the weir netting had been silted over. At some locations, the weir netting had become entangled in the anchors and mooring/buoy lines associated with the silt curtain. Tidal flow was pushing the weir netting over at an angle of approximately 45-degrees in a few places.

Bubble Curtain: The bubble curtain was inspected while it was operating. While the design alignment of the curtain called for the curtain to run straight out from the face of South Terminal, some slight meandering (lateral bends in the hose alignment) was noted, particularly in the area of the former sunken vessel off of the southeast corner of the South Terminal bulkhead, where it was evident that the bubble curtain had been laid in an alignment such that it went around the sunken vessel and did not run over the (uneven bottom surface) of the remnants of the sunken vessel. The end of the bubble curtain hose was misaligned with the beginning of the silt curtain where the two meet, causing a small gap between the two systems. Multiple loops in the bubble curtain bottom hoses were noted, in some localized places causing the curtain to not fully contact the bottom. In one location, approximately 25 yards east of the existing South Terminal pier face, a loop in the bubble curtain hose caused an uneven flow of air through the system over an approximately 10-foot section, resulting in a localized gap in the bubbles.

Siltation and Water Quality: As reported above, water clarity was good during the inspection. As construction is not underway yet, turbidity monitoring is not yet being conducted.

5.2.2 CAD Cell #3 Area Inspection Results:

Silt Curtains: The field inspection crew indicated that, in general, the silt curtain system surrounding the CAD Cell #3 area, which was fabricated new for this project, was in fair to moderate condition. Silt curtain material was attached to the orange floats around the perimeter of FDS area. The silt curtain was misaligned with the weir net around much of the perimeter of the FDS (i.e., the silt curtain and the weir net were not parallel). The bottom of the Silt Curtain met the sediment surface around most of the perimeter of the FDS exclusion area, however there were some locations where a small gap was noted between the bottom of the silt curtains and the harbor. There was evidence of anchor drag on the down-wind side of the FDS, apparently the result of wind forces from the recent wind event pulling upward on the surface floats (and thus on the anchor mooring lines) and lifting the anchors, indicating that the anchoring weights were inadequate to fully overcome the stresses associated with high winds. In some places, anchor drag was noted over distances of 50 to 70-feet. At one location, where the weir system was aligned close to the silt curtain, the toe of the silt curtain and anchoring system for the silt curtain had become entangled in the weir netting that runs along the outside of the Silt Curtain. Several separations in the seams (the junction point where the separate silt curtain sections were connected during the deployment process) were noted, which could be the result of the way the seams were sewn together, or could be the result of stresses on the curtain caused by wind forces. At the location of steep bathymetric variation (the location where CAD Cell #3 overprints on the portion of CAD Cell #2 where "top-of-dredge" material was previously removed - thereby deepening the bottom profile), the bottom of the silt curtain did not contact the bottom over the entire slope (i.e. - at the inflection point between the flat bottom and the side slopes into the deeper area, there was a small gap between the bottom of the silt curtain and Harbor bottom).

Fish Weir: In some areas the silt curtain anchors had been dragged up to and on top of the weir netting, forcing the lower portion of the netting to contact the Harbor bottom. In a few locations, the danforth anchors anchoring the silt curtain had been dragged into the weir netting, pushing the net down to under 1-foot. Because of these conditions, the field inspection crew indicated that the weir netting was noted as being in poor-moderate condition. In some locations, the

bottom portion of the weir netting was lying on the Harbor bottom, and in some places the weir netting was completely covered by silt. Anchoring issues and entanglement with the silt curtain were noted at several locations, and the weir netting was lifted up off the Harbor bottom between 6 and 18 inches in several locations.

Siltation and Water Quality: As reported above, water clarity was relatively good during the inspection. No observed instances of the FDS system creating turbidity were recorded. As construction is not underway yet, turbidity monitoring is not yet being conducted.

6. Actions Taken to Date: Post-Inspection Maintenance Activities Completed:

As a result of the FDS Component Inspection Activities outlined above, the following actions were taken:

1. A list of recommended actions was prepared.
2. A punch-list of maintenance activities was prepared.
3. Significant maintenance activities were completed on January 16th, 17th, 21st and 22nd.

List of Recommended Actions and Actions Taken

The following is a summary of the recommendations prepared as a result of inspection activities conducted, and the actions taken to address those recommendations to date:

- Recommendation: It was recommended that the silt curtain be returned to its original alignment and that the anchors be reset, and that additional anchor weight and potentially anchor line scope be added to overcome the wind forces pushing on the boom/silt curtain system.
- Actions Taken: Silt curtain was realigned and additional anchors added.
- Recommendation: It was recommended that the spacing of the anchors be modified in the areas of uneven bottom topography such that there is an anchor right at the top of a slope and one at the bottom, which should enhance the ability of the silt curtain to follow the bottom contours.
- Actions Taken: Additional Anchors have been added, efficacy of this method to be evaluated in upcoming inspection.
- Recommendation: It was recommended that the silt curtain seams should be fully attached.
- Actions Taken: Seam (junction point) lacing is to be inspected in detail and replaced where it is deficient.
- Recommendation: It was recommended that where mooring lines were reported as tangled in the weir netting, the anchors should be pulled and reset.
- Actions Taken: Anchors have been disentangled from the weir netting and have been reset.
- Recommendation: It was recommended that once the silt curtain is realigned (as noted above), the weir netting should be reset and realigned.

- Actions Taken: The silt curtain has been realigned, and the condition of the weir netting has been assessed. Realignment, repair, and resetting of the weir netting is currently on-going.
- Recommendation: It was recommended that better anchoring and repositioning of the silt curtain and weir netting would reduce interference between the silt curtain and the weir systems.
- Actions Taken: Additional anchors have been added, and existing anchors have been reset.
- Recommendation: Although immediately subsequent to the inspection, the looped sections of the bubble curtain were untangled and the hose was smoothed out on the Harbor bottom, straightening out the flow of bubbles along those sections, it was recommended that the 10-foot section of stressed bubble curtain hose should be checked again and replaced if necessary. The end of the bubble curtain hose should be realigned with the beginning of the silt curtain.
- Actions Taken: A new line of bubble curtain was installed while preparations are made to remove/repair and replace the poorly functioning one.
- Recommendation: It was recommended that future inspections should monitor the alignment of the bubble curtain on the harbor bottom to ensure that the compressed air force is not causing the hoses to meander along the bottom.
- Actions Taken: Future inspections will note the location of the bubble curtain to determine if meandering is occurring.
- Recommendation: It was recommended that a more convenient access point through the silt booms should be added to allow for easier access to the interior of the system.
- Actions Taken: An access point has been installed along the shallow north side of the CAD Cell #3 area in advance of the next scheduled inspection.

For more information on the actions taken to date, please refer to the "Maintenance Activities Completed to Date" section below.

Punch List Preparation

The above-summarized list of recommendations, was utilized to create a punch-list of items requiring attention (as noted during the initial inspection, and described in the sections above). The punch-list was utilized to focus initial maintenance work on the areas of highest priority, and then to proceed subsequently through the remaining items in order of urgency.

Maintenance Activities Completed to Date

A maintenance crew was dispatched on January 16 and 17 to begin the maintenance on the items. The crew was able to complete a number of the items on the punch list (as detailed below). From January 18th through the 20th an extreme weather event occurred in New Bedford Harbor, with wind gusts of up to 50 mph. Maintenance work had to be suspended during this period.

On Monday, January 21 maintenance activities resumed and a re-inspection of the FDS areas was conducted. Some additional movement of the anchors for the silt curtain and fish weir had

occurred during the storm event, though not as much as might have been anticipated – this is believed to be because: 1) the resetting of the anchors just before the storm helped; and 2) it is thought that after some initial movement, the anchors had "bitten-in" to the bottom by the time the storm had hit.

Maintenance activities continued Monday (1/21) into Tuesday (1/22), during which time the silt curtain system and weir systems were re-aligned in accordance with their original alignment, and additional anchors and anchoring lines were added. A late afternoon wind event on Tuesday afternoon (winds to 35mph) occurred, and subsequent surface observations made of the silt curtain and weir systems indicated that they had remained stable (the modified additional anchoring is working). The second weekly inspection of the systems is scheduled for either January 24 or 25 (weather dependant).

More specific descriptions of the maintenance activities is presented in the sections below.

For Maintenance 1/16-17:

Construction Barge with Crane (Diligent Marine Services): Work Barge 18'x48' with mounted Crane (9ton/70' boom).
Work Skiff (Diligent Marine Services): 18-foot Steel, Outboard.
Support Vessel: Apex "Xepa", 19-foot Ocean Scout research vessel.
Support Vessel: Apex "Xepa IV", 22-foot moon-pool-equipped pontoon platform vessel.
Personnel: J. Belanger, D. Fitzgerald (Diligent Marine); G. Dolan, J. Ray, J. Frishman, C. Stillman (Apex).
Weather: Cool, temperatures ranging from 31-42 degrees F throughout the day. Cloudy. Winds approximately 5-20 knots from the north to northwest. Seas moderately calm (inside hurricane barrier).
Water visibility: 5 to 10 feet.

For Maintenance 1/21-22:

Barge "Topcat" (Lindberg Marine): Work Barge with mounted Crane (10ton/70' boom)
2 Work Skiffs (Lindberg Marine): 18-foot steel, outboard.
Construction Barge with Crane (Diligent Marine Services): Work Barge 18'x48' with mounted Crane (9ton/70' boom).
Work Skiff (Diligent Marine Services): 18-foot Steel, Outboard.
Carolina Workboat (Pioneer Mooring Services): 20-foot fiberglass workboat with outboard, over-the-side davit crane.
Support Vessel: Apex "Xepa", 19-foot Ocean Scout research vessel.
Support Vessel: Apex "Xepa IV", 22-foot moon-pool-equipped pontoon platform vessel.
Personnel: G. Lindberg, 2 Helpers (Lindberg Marine); J. Belanger, D. Fitzgerald (Diligent Marine); S. Gomes, 2 Helpers (Pioneer Mooring Services); G. Dolan, J. Ray, J. Frishman, C. Stillman (Apex).
Weather: Cold, temperatures ranging from 13-30 degrees F throughout the day. Winds approximately 5-20 knots, from the northwest. Mostly sunny to cloudy and snow. Seas moderately calm (inside hurricane barrier).
Water visibility: 5 to 10 feet.

6.1 South Terminal Area:

On January 21st, Apex, Linberg Marine Construction, Fathom Research, and Pioneer Mooring realigned the South Terminal Silt Curtain, and untangled the anchors which had become fouled in the fish weir. The fouled portion of the fish weir was manually inspected, righted, and redeployed by Fathom Research. One of the 250 pound mushroom anchors mooring the Silt Curtain was replaced with a 460 pound steel mooring plate. The removed mushroom anchor was repurposed as the corner anchor of the fish weir. As the curtain was realigned in 200 foot steps by Linberg Marine, a crew from Pioneer mooring followed the realignment operation, and secured an additional fourteen 22-pound danforth anchors and forty-two 50-pound mushroom anchors.

6.2 CAD Cell #3 Area:

On January 16th and 17th, the one mushroom anchor at each of the corner points of the Silt Curtain was replaced with 460 pound steel mooring plates, and the other mushroom anchor was realigned to match the alignment of the adjacent curtain. The removed mushroom anchor was redeployed as the corner point of the fish weir. 10 additional 50-pound mushroom anchors were placed on the windward side of the CAD Cell silt curtain.

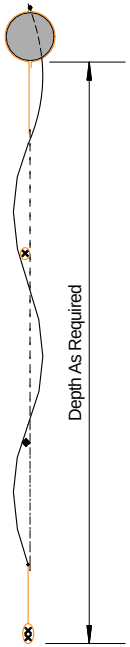
On January 21st, Apex and Diligent Marine Services, realigned the silt curtain encompassing the CAD Cell #3 fish exclusion area, and deployed an additional forty-two 50-pound mushroom anchors, and twenty-six 22-pound danforth anchors along the length of the silt curtain. The fish weir was manually inspected, and anchors which had become fouled in the weir were removed, and reset. The fouled portions of the weir were then righted and reset manually.

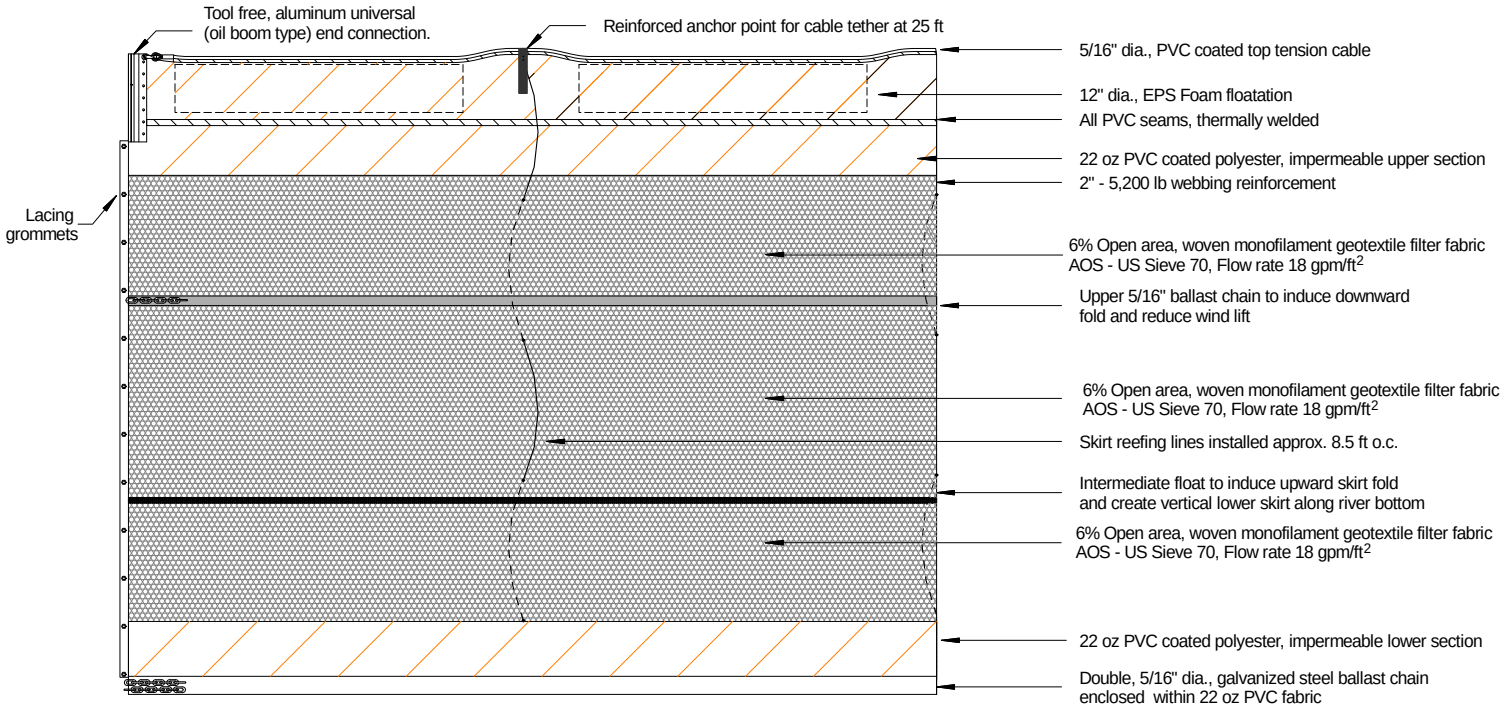
6.3 Comments for Next Inspection:

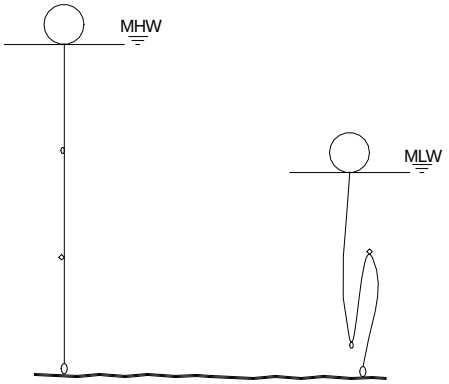
Be aware that:

- Silt Curtain and Weir were realigned again on 1/21-22/13 at both locations (CAD Cell and South Terminal);
- Additional anchoring was added to silt curtain and weir – additional anchor lines added at both locations (CAD Cell and South Terminal);
- Bubble curtain hose reset at South Terminal.
- Check and record any anchor drag – does the additional anchoring seem sufficient?

Attachment A





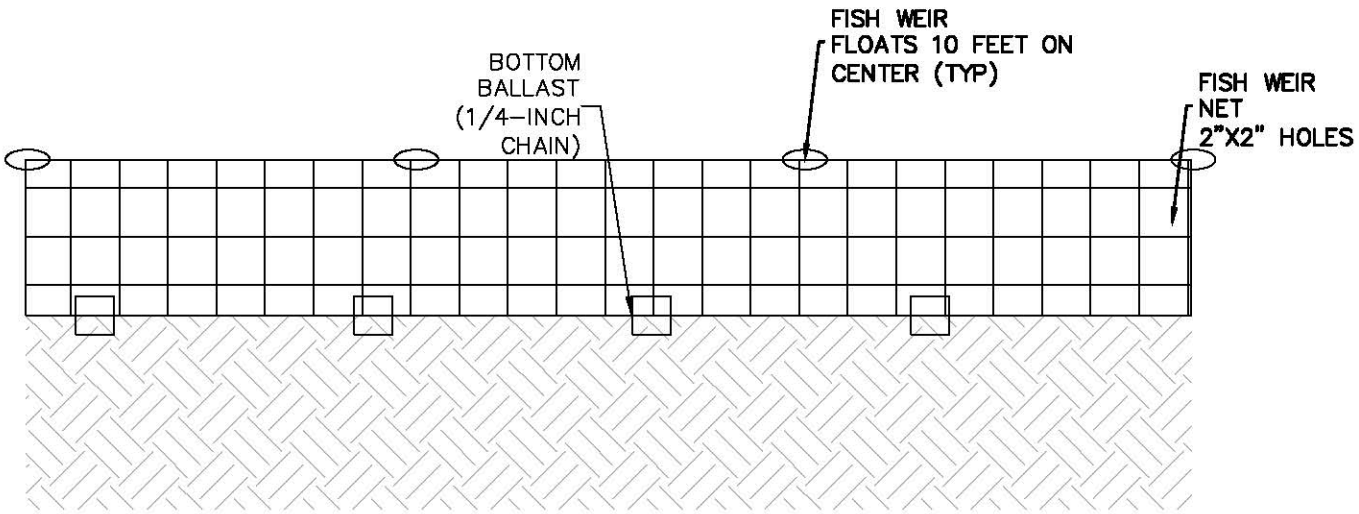


SELF ADJUSTING SKIRT

Self adjusting skirt prevents the lower skirt from laying out across the bottom at low tide, where it could become buried or entrenched in the bottom sediments. Lower ballast chain will be in contact with the mudline at low tide.

IWT/ Cargo-Guard
"Protecting The Environment"
PO Box 454
Waretown, NJ 08758
609-971-8810 Fax 609-971-8805
www.iwtcargoguard.com

PROJECT:
LOCATION:
SHEET NO.:
DATE:
SCALE: Not To Scale
DRAWN BY: TJP



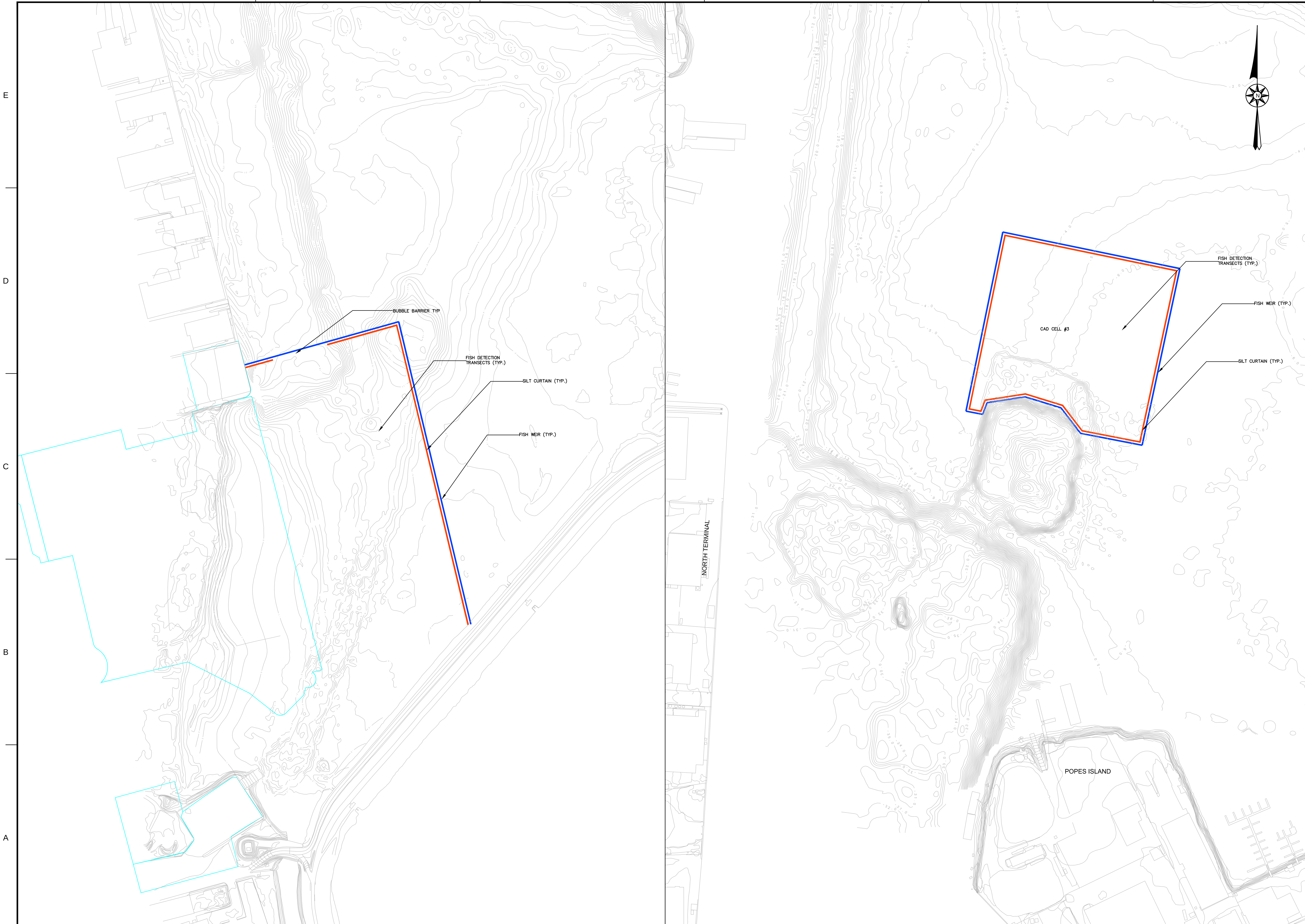
NOTE: ALL DIMENSIONS ARE APPROXIMATE

FIGURE 3:
FISH WEIR
DETAILS

FISH PROTECTION
PLAN
NEW BEDFORD MARINE
COMMERCE TERMINAL

APEX
184 High Street, Suite 502
Boston, Massachusetts
Phone: (617) 728-0070

Attachment B



APEX

ROCKVILLE, MD
SOUTH WINDSOR, CT - BOSTON, MA - NEW BEDFORD, MA - HOLYOKE, MA

184 HIGH STREET, SUITE 502
BOSTON, MA 02210

58H CONNECTICUT AVENUE
SOUTH WINDSOR, CT

PROJECT

NEW BEDFORD MARINE COMMERCE TERMINAL

OWNER

MASSACHUSETTS CLEAN ENERGY CENTER
55 SUMMER STREET, 9TH FLOOR
BOSTON, MA

NO.	DATE	DESCRIPTION	BY

PROJECT NO.	6690
CADD FILE	GIFFORD_ST
DESIGNED BY	JER
DRAWN BY	JER
CHECKED BY	CHM
DATE	9-27-12
DRAWING SCALE	1"=150'

GRAPHIC SCALE

SCALE: 1"=150'

0 75 150 300

SHEET TITLE

NEW BEDFORD MARINE COMMERCE TERMINAL FISH BARRIER

DRAWING NO.

FIGURE 2

1 OF 1

Attachment C

January 11, 2013 Bubble Curtain Deployment Testing

January 13 CAD Cell #3 Silt Curtain Deployment

January 13 CAD Cell #3 Silt Curtain Deployment

January 13 CAD Cell #3 Silt Curtain Deployment

January 13 CAD Cell #3 Silt Curtain Deployment

January 13 CAD Cell #3 Fish Weir Deployment

January 13 CAD Cell #3 Fish Weir Deployment

January 13 CAD Cell #3 Fish Weir Deployment

January 13 CAD Cell #3 Fish Weir Deployment