RETURN TO UAO AR INDEX

USACE CONTRACT NO. DACW33-94-D-0002
TOTAL ENVIRONMENTAL RESTORATION CONTRACT

New Bedford
6-4
289079

TASK ORDER NO. 017, OPERABLE UNIT #1
CONFINED DISPOSAL FACILITY C
DESIGN CRITERIA OUTLINE
NEW BEDFORD HARBOR SUPERFUND SITE
New Bedford, Massachusetts

March 2000

Prepared for
U.S. Army Corps of Engineers
New England District
Concord, Massachusetts

2000-17-0064
04/05/00

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Prepared by
Foster Wheeler Environmental Corporation
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Boston, MA 02110

Revision	Date	Prepared By	Approved By	Pages Affected
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2000-17-0064
04/05/00

USACE CONTRACT NO. DACW 33-94-D-002
T.O. NO. 17, OPERABLE UNIT #1
CONFINED DISPOSAL FACILITY C

DESIGN CRITERIA OUTLINE

1.0 DESIGN PURPOSE AND LIFE

- 1.1 EPA Record of Decision
- 1.2 Proposed Cleanup Plan
- 1.3 USACE Scope of Work for Remedial Design
- 1.4 USACE Draft Engineering Guidance for Scope of Work for Remedial Design

2.0 DESIGN OBJECTIVES AND CRITERIA

- 2.1 Foster Wheeler Remedial Design Work Plan
- 2.2 CDF C Design Concept (March 2000)

3.0 REGULATORY REQUIREMENTS FOR CDF DESIGN (ARARs)

1.0 DESIGN PURPOSE AND LIFE

1.1 Excerpts from Record of Decision – September 1998

- Remedy is a hybrid of FS Alternatives #3 and #8.

- Dredged sediments will be palced in four shoreline confined disposal facilities (CDFs) (Figures 21a, b).

- Upon reaching storage capacity, first an interim and then a final cap will be installed at each CDF.

- Sidewalls of CDFs will be lined with a synthetic impermeable material, but not the bottom of the CDFs.

- Each CDF will include a perimeter groundwater monitoring program to verify that they are operating safely.

- Once the CDFs have been filled with sediment, an interim cap (approx. 6 inches of soil or sediment) will be installed to prevent escape of PCB-dust or PCB volatilization (X.E).

- It is anticipated that approximately three years of sediment consolidation will be required before final capping.

- Once the dredged sediment and interim caps have sufficiently consolidated, the final impermeable CDF caps can be constructed. The caps will consist of three layers to promote surface drainage, prevent infiltration, allow collection and venting of any gas emissions (X.F).

- The selected remedy attains or appropriately waives ARARs.

- State of Massachusetts through its concurrence on the ROD agrees the remedy is properly managed under TSCA.

- EPA is using TSCA chemical waste landfill standards to design CDFs in the most protective manner possible.

- TSCA chemical waste landfill standards, such as hydrogeological conditions, leachate collection and bottom liner requirements... will be waived under TSCA.

- Conceptual CDF designs do include the sediment underlying the CDFs and a cover system both of which meet a drainage impermeability of 10^{-7} cm/sec.

- The CDF concept also includes groundwater, surface water and air emission monitoring during operation closure, post closure and erosion and stormwater drainage controls.

- Toxicity characteristic (TC) constituent concentrations are below TC regulatory limits for hazardous waste therefore sediment disposal is subject to MA solid waste management regulations. The substantive requirements of the MA SWM regulations that are more stringent than TSCA regulations for liners covers, monitoring or post closure will be followed.

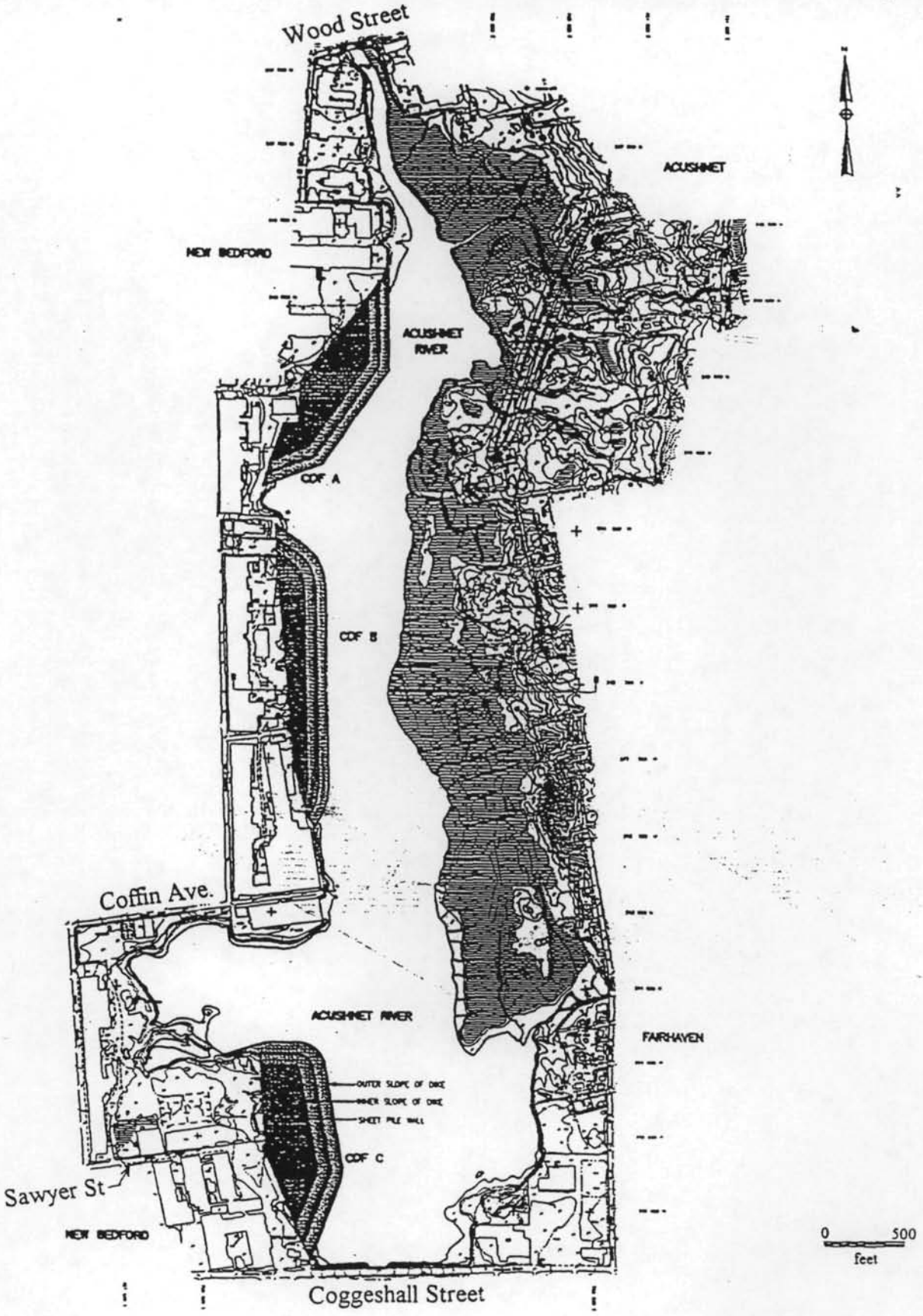


Figure 21a - Conceptual locations of upper harbor CDFs A, B and C
New Bedford Harbor Superfund Site, ROD 2

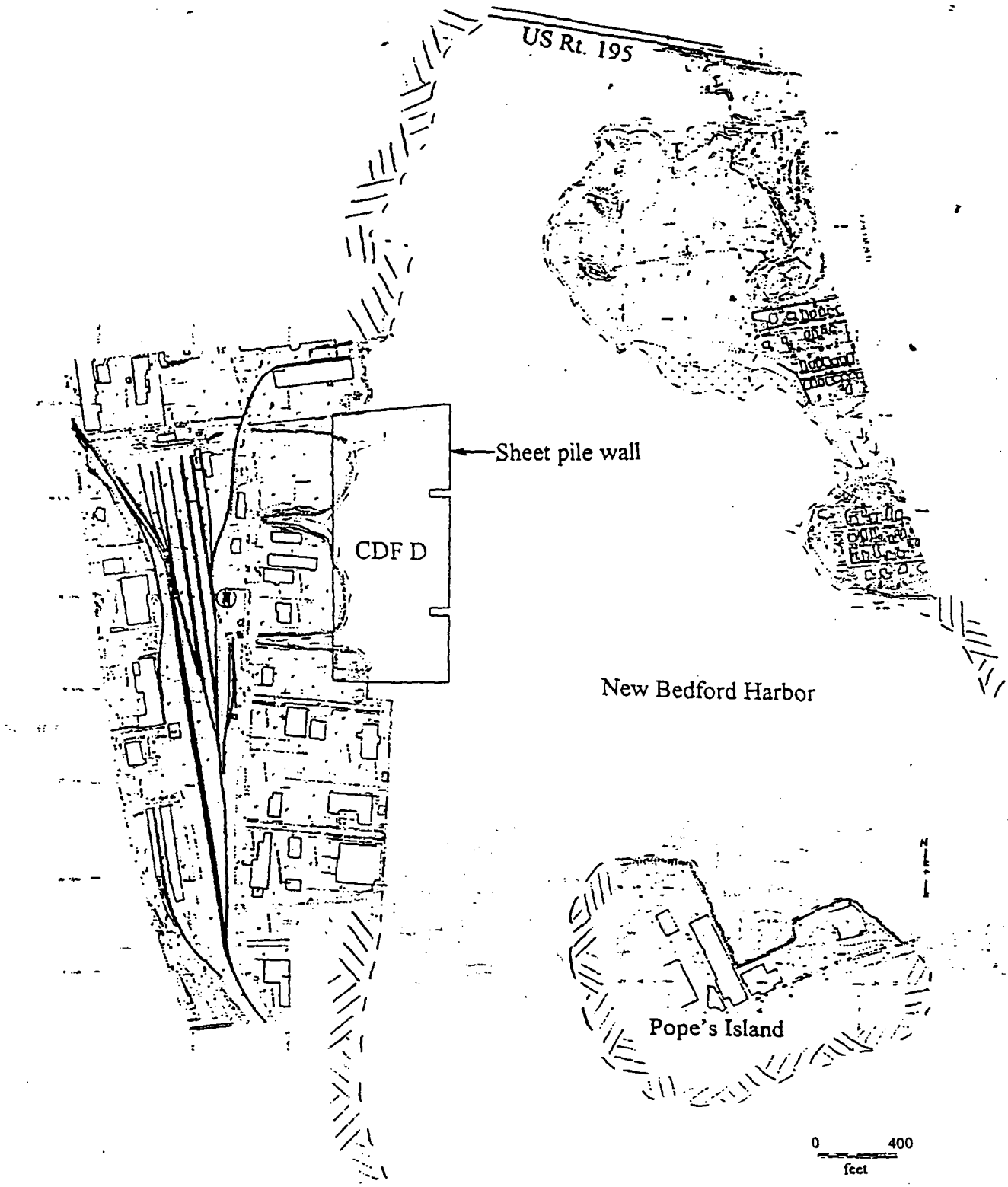


Figure 21b - Conceptual location of the lower harbor CDF D
New Bedford Harbor Superfund Site, ROD 2

- The selected remedy permanently isolates sediments from human and environmental receptors by containing them in shoreline CDFs in perpetuity in a safe and protective fashion.

1.2 Exerpts from Proposed Cleanup Plan – Upper & Lower New Bedford Harbor – November 1996

Construction of CDFs and Water Treatment Facilities

- First step in cleanup process is to design and construct the CDFs and associated water treatment facilities. Dredged contaminated sediments will then be piped into the CDFs and passively dewatered.

- The sidewalls of these CDFs will be lined with a synthetic impermeable material, but not the bottom of the CDFs, since a) the existing sediments in these areas are very low in permeability, b) the integrity of a man-made impermeable liner constructed in saturated conditions can't be guaranteed, c) the dredged sediments themselves will form into a highly impermeable product. Computer modeling indicates that long-term worst case PCB leakage rates from the CDFs would be at least 98 percent lower than the current rate of PCBs in the water fluxing seaward at the Coggeshall Street Bridge. Each CDF will include perimeter groundwater monitoring wells in order to verify that they are operating safely.

1.3 Excerpts from Scope of Work – Revised October 14, 1998 - USACE Remedial Design of New Bedford Harbor Superfund Site

OU #1 Upper and Lower Harbor

Task # 1 Work Plan For Remedial Design

Confined Disposal Facilities (CDFs)

- The location of the four CDFs are shown in the Record of Decision.

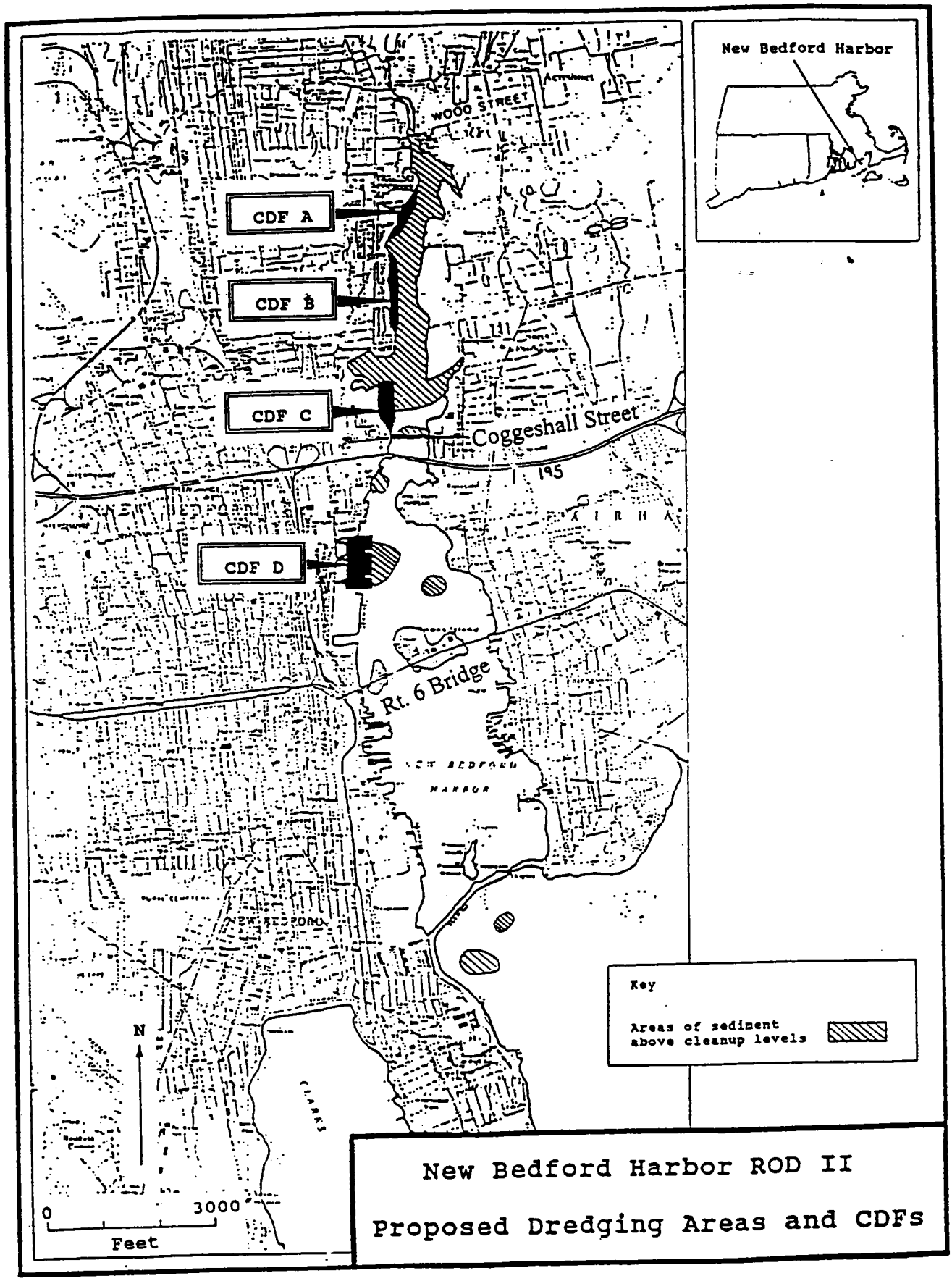
- The design of the first CDF should proceed to allow for the initiation of remedial dredging as soon as reasonably possible.

- One design challenge regarding the CDFs will be the control of PCB volatilization.

- The contractor shall evaluate airborne PCB control methods for the CDFs including floating covers, using foam and division of the CDFs into smaller cells.

- Once the CDFs are full, first an interim and then a final cap will be required. The purpose of the interim caps is to minimize infiltration and prevent escape of PCB laden dust while the underlying dredged sediment consolidates.

- An important element of the final cap design will be the beneficial reuse of the completed CDFs. Potential reuse possibilities for the three upper harbor CDFs include shoreline bird sanctuaries, parks or athletic fields.



New Bedford Harbor ROD II

Proposed Dredging Areas and CDFs

1.4 Excerpts from USACE Draft Engineering Guidance for Scope of Work Dated 14 October 1998 for Remedial Design of New Bedford Harbor Superfund Site OU #1 Upper and Lower Harbor 13 November 1998

1. The remedial design shall be accomplished in accordance with the Record of Decision dated 25 September 1998 and shall be prepared in compliance with all applicable Federal, State and local laws and regulations.

2.5.1 Remedial Design Objectives

Confined Disposal Facilities A, B and C

Foster Wheeler shall be responsible for developing a SOW for one geotechnical exploration and laboratory testing program to develop safe and economical dike and sheet pile wall sections, interim and permanent cover designs and dewatering systems for CDFs A, B and C.

Lessons learned and experience gained from the design, construction and use of the pilot study CDF shall be fully utilized in writing the Scope for the program.

2.5.1.1.2 Safe and economical sections for CDFs A, B and C shall be designed in accordance with the lessons learned and experience gained from the design, construction and use of the pilot study CDF, TM 5-818-8 Engineering Use of Geotextiles, EM 1110-2-1913.

Design and Construction of Levees and EM 1110-2-5027
Confined Disposal of Dredged Material

Consideration should be given to excavate/replace dike sections where the soft contaminated foundation materials are thin. New and innovative dike sections should be considered if it appears they are safe and economical. Methods of dewatering and consolidation of the sediments will also need to be explored.

2.5.1.1.3 Sheet Pile Wall Design

The landside feature of CDFs A, B and C is proposed to consist of sheet pile walls. Foster Wheeler is responsible to design the sheet pile wall sections, connections, and installation procedures for all three of these CDFs. The steel sheet pile walls shall be designed in accordance with the lessons learned and experience gained from the design, construction and use of the pilot study CDF, EM 1110-2-2504 and the current Corps of Engineers Guide Specification for steel sheet piling. The sheet pile walls shall be protected against corrosion commensurate with the appropriate design life for hazardous waste CDFs.

2.5.1.1.4 Interim and Permanent Cover Design

Design safe and economical interim and permanent caps for CDFs A, B and C that meet the requirements of ROD Sections X.E and X.F.

2.0 DESIGN OBJECTIVES AND CRITERIA

2.1 Excerpts from Foster Wheeler Remedial Design Work Plan

CDF C will consist of an approximate 6 to 8 acre near-shore facility to be located along the west shore of the Acushnet River, immediately north of the existing Coggeshall Street Bridge embankment, as shown on Figure 2-2. The facility will be located adjacent to an active gasoline service station and a combination of operating and abandoned manufacturing buildings along the shore. The Hot Spot operable unit and pilot dredging disposal facility are located within the northern portion of the CDF C site. The shoreline wall of the CDF will be placed outside the Hot Spot CDF which will be used as a settling basin for dredging discharge water after flowing out of the CDF. The existing Pilot Dredging CDF dike will be graded and sloped to accommodate the CDF C sidewall liner. The preliminary sidewall design will determine if a sheet pile wall is needed in this location. In accordance with the conceptual design defined in the ROD for OU#1, containment will be provided by a combination of a steel sheet pile wall along the shore and an earthen dike constructed within the river, combined with a liner along the interior sides of the facility, as shown in Figure 2-3 (both the inboard dike slope and the existing sloped shoreline, up to the proposed sheeting). The liner will extend up the sheet pile wall if the water or dredged material comes in contact with it. As indicated in the ROD for OU#1, the bottom of the facility will not require either a liner or a leachate collection system. Final design will include a relatively impermeable cover system with gas venting and drainage layers, among other components. The facility will be designed for future use as determined during the design phase, with input from the City of New Bedford. It is assumed that the future use will be recreational in nature.

Design of CDFs falls under the TSCA chemical waste landfill standards relative to PCB contamination. The ROD for OU#1 details specific TSCA requirements (hydrogeologic conditions, leachate collection and bottom liner requirements) which have been waived by the Regional Administrator. Relative to other possible hazardous substances in the sediment, the ROD for OU#1 indicates that the substantive requirements of the Massachusetts Solid Waste Management (MSWM) regulations shall be followed where they are more stringent than TSCA (with the exception that the same waivers obtained under TSCA apply to MSWM regulations). For the purposes of preparation of this Work Plan and associated Cost Estimate, Foster Wheeler has assumed that local, state, and federal permits and/or authorizations will not be required as part of the design; however, appropriate substantive requirements will be included.

The USACE October 14,1998 Scope of Work for OU#1, Remedial Design of New Bedford Harbor Superfund Site Upper and Lower Harbor, states the remedial design and action will be accomplished in accordance with the ROD dated 25 September 1998. The ROD states that the bottom of the CDFs will not be lined since the "existing sediments in the areas of the CDFs are inherently impermeable, the integrity of a man-made impermeable liner constructed in saturated conditions cannot be guaranteed and the dredged sediments themselves will compact into a highly impermeable material." The ROD also states that computer modeling indicates the leakage rates from the CDFs will be insignificant, and perimeter groundwater monitoring will be done to verify the CDFs are operating safely. In discussing how the selected remedy attains or appropriately waives ARARs, the ROD states "the conceptual CDF designs do include the sediment underlying the CDFs and a cover system both of which meet a drainage impermeability of 10^{-7} cm/sec". Foster Wheeler's basis of design for CDFs assumed in this Work Plan is the CDF concept from the ROD described above. It is further assumed the drainage impermeability of 10^{-7} cm/sec for the sediment underlying the CDFs is not a design criteria.

During field investigations, Foster Wheeler proposes to sample sediments in the areas where the CDFs will be constructed to obtain data for characterizing the thickness, classification, and engineering properties of the subsurface soils. Samples will be tested in the field and laboratory as described in Sections 2.2.3.8 and 2.2.5.3.1. This data will be compared to characterization data for soils sampled to develop the conceptual designs to determine if the site conditions are similar to those described in the

conceptual designs. The results of the sediment sampling and laboratory testing will be evaluated and described in the BD/DA reports. Issues of concern that arise from this evaluation will be considered in developing the basis of design for individual CDFs. Laboratory permeablility testing of sediments at the bottom of the CDFs and modeling of CDF leakage have not been included in this Work Plan because it is assumed site conditions (impermeable sediments) will be as anticipated in the CDF design concept in the ROD. Should field data indicate further analyses are needed and the USACE agree, Foster Wheeler will propose an amendment to this Work Plan and Cost Estimate.

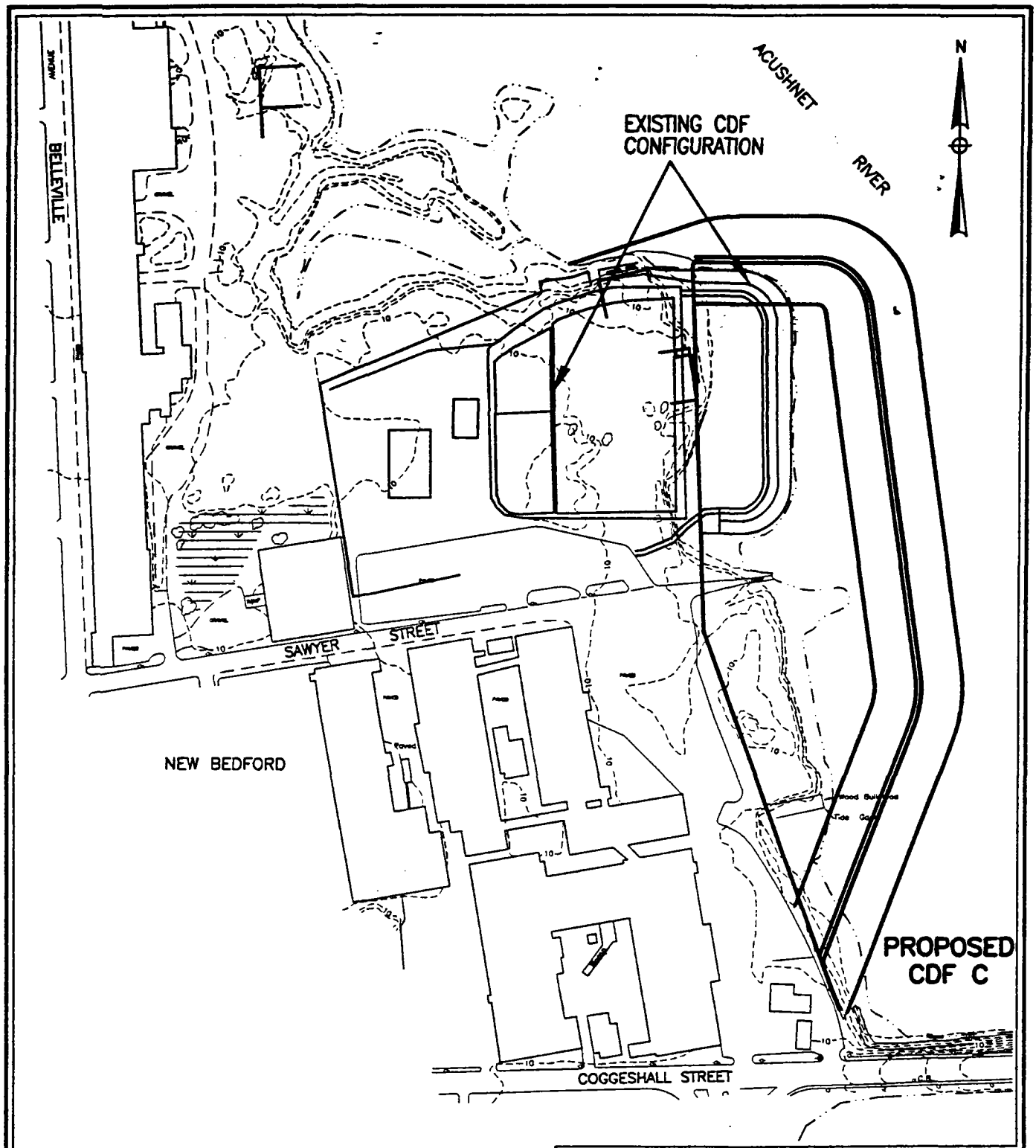
The following provides a brief description of the individual design elements as they relate to the overall CDF C design.

Dike Design

Based on the existing subsurface information and the engineering analyses conducted as part of the pilot dredging feasibility study, the dike design for CDF C requires various interrelated engineering analyses to determine maximum dike height assumed to be elevation +12 MLW and geometry, including stability and settlement analyses, design of a geomembrane support to allow fill placement over soft sediment, design of a wick drain system to accelerate strength gain and settlement, as well as staged fill and surcharge analyses. Depending on actual subsurface conditions encountered, Foster Wheeler will evaluate alternative conceptual dike designs to determine the most cost effective approach. The cost estimate for the 30% Design is based on evaluating the feasibility of extending the dike to the Coggeshall Street Bridge embankment and one other alternative, such as a higher dike to increase capacity. Foster Wheeler has assumed that the sand deposit anticipated below the organic clay strata is not susceptible to liquefaction in an earthquake event and will verify this during the geotechnical analysis and CDF dike design. If zones of loose sand are encountered below the proposed dike alignment, additional analyses for liquefaction or seismic densification will be required. The analyses required and cost estimate to perform them will be proposed as an amendment to this Work Plan should soil boring information indicate loose sands are present.

Sheet Pile Design

The conceptual design of the sheet pile wall on the land side of the CDF involves use of steel sheet piling to allow placement of material in the CDF to the preliminary finish grade of El. 12 (mean low water [MLW] datum), which is approximately 5 feet above existing site grade at CDF C. It is not anticipated that the sheeting will be required to directly retain contaminated dredged sediments in the final condition. Maximum elevation of the contaminated sediment is anticipated to be approximately El. 7 to El. 8; therefore, the above grade portion of the sheeting will be in direct contact only with the cap material. It is



NOTE:
BASE TOPOGRAPHY DOES NOT REFLECT EXISTING TOPOGRAPHY AT LOCATION OF EXISTING CONFINED DISPOSAL FACILITY AT NORTH END OF PROPOSED CDF C

0 500
SCALE IN FEET

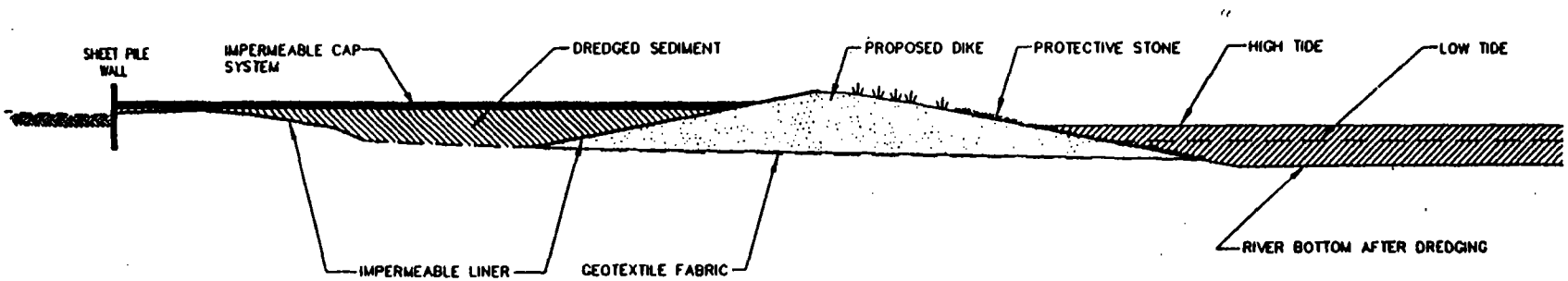
FIGURE 2-2

NEW BEDFORD HARBOR SUPERFUND SITE
NEW BEDFORD, MASSACHUSETTS

SITE PLAN
CDF C

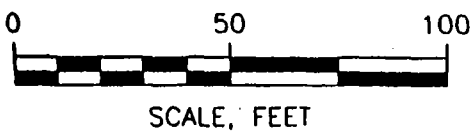
FOSTER WHEELER ENVIRONMENTAL CORPORATION
NEW ENGLAND TERC

CADDFILE: 5197NB14.DWG



TYPICAL CDF CROSS - SECTION

(to scale)



assumed, therefore, that it will not be necessary to line the sheeting, or evaluate means for reducing the permeability of the interlocks. Should the elevation of the sediment be high enough to contact the sheeting, it will be lined or the interlocks will be sealed. Structural design of the sheeting is anticipated to be based on the cantilever final condition, with a proposed cap finish grade of El. 12. Temporary construction conditions may require structural analysis of the sheeting for an interim grade higher than El. 12 if sediment dewatering utilizing a surcharge system is to be evaluated.

CDF Volume and Hydraulic Design

The initial volume estimate for CDF C will be prepared based on a detailed review of the design analyses and as-built data available for the pilot dredging feasibility study, as well as the Hot Spot sediment dredging and disposal. In addition, existing and proposed column settling and consolidation test data will be evaluated to account for differences in proposed dredging technologies and, possibly, differences in sediment characteristics (relative to final design of the overall dredging plan). Design parameters (such as bulking factors) will be evaluated during and subsequent to dredging operations associated with CDF C such that volume estimates for the subsequent CDF designs can be refined. It is envisioned that configurations (footprint area and/or height) of subsequent CDFs (A, B, and D) will be modified based on construction phase experience at the initial CDF (C). Additional information for these activities will be provided from the Dredging Technologies Subtask (20.91.01) and the Mass Balance Subtask (21.96).

Sidewall Liner

The interior of the CDF will incorporate a sidewall liner, which will be designed for the landward side of the earthen dike and the upland side (shoreline area) of the CDF. Liner design will involve analysis for appropriate geomembrane characteristics including strength, stability, and chemical compatibility. Associated activities involve grading and subgrade support design, design of a protective layer (if required) above the geomembrane, design of connections to sheet piling and other structural elements, and design of penetrations and anchor trenches. It has been assumed that existing utilities will be relocated or removed prior to liner design (i.e., no utility penetrations are envisioned to be required).

Floating Cover

Based on the Hot Spot dredging experience, air emissions control during dredging and filling of the proposed CDFs are anticipated to be of significant concern. It was necessary to provide a floating membrane cover over the Hot Spot CDF to reduce fugitive emissions. CDF C design will therefore involve development of a floating cover or alternate system to address this issue. Experience with the floating membrane cover utilized for the Hot Spot dredging operation identified system performance limitations which would need to be addressed prior to application for proposed CDFs. The larger size and irregular footprint of the proposed CDFs will further complicate design of a membrane floating cover system. Foster Wheeler will conduct a literature search to identify potential technologies which would either alleviate emissions concerns prior to the dredged material being placed in the CDFs, or accommodate a temporary cover to reduce emissions during dredging and CDF filling operations. The conceptual design relative to this issue has not advanced to the point where a preliminary scope and design estimate can be prepared. For this reason, the Work Plan does not include a specific design cost for a floating cover. Rather, the feasibility level literature search has been included as part of the 30% Design. The results of the evaluations will be reported in a technical memorandum and will include recommendations for a specific alternative for review by USACE and EPA. When an alternative is accepted, a design modification will be proposed to USACE.

Sediment Dewatering/Consolidation

Dewatering or stabilization of the dredged sediment will be required in order to provide a stable base for construction of the final cover and to accommodate future use of CDF C. Consolidation of the sediment under its own weight will presumably result in a sediment consistency similar to that which currently exists in the Hot Spot CDF, which is not adequate for cap construction or proposed future use. The anticipated problems with air emissions preclude relying on dessication (of the surface of the sediment when exposed to air over time) to partially accomplish dewatering or stabilization. Based on current knowledge of dewatering techniques, it has been assumed that the sediment will require dewatering within the CDF (vs. prior to placement). Some sediment dewatering methodologies will be evaluated as part of the work scope for removal of Hot Spot dredged material (Task Order No. 15). The results of the efforts for the Hot Spot work will be evaluated relative to application to CDF C sediment dewatering. Similar to the floating cover, the sediment dewatering design will require additional feasibility level review prior to establishing a specific design scope. A feasibility level review of sediment dewatering/stabilization technologies has been included in 30% Design. The results of the evaluations will be reported in a technical memorandum and will include a recommendation for a specific alternative for review by USACE and EPA. When an alternative is accepted, a Work Plan modification will be proposed to USACE.

Interim Cap

The conceptual design of CDF C includes provision for an interim cap (possibly consisting of "clean" navigation channel dredged material) designed to reduce emissions from the contaminated dredged material after the CDF is filled, and prior to construction of the final cap. Depending on magnitude and time rate of anticipated settlement (of both the subgrade and the dredged sediment itself), it may be necessary to design the interim cap to function as a surcharge to reduce post-cap construction settlement durations. Design of the interim cover will be partially dependent on the methodology selected for sediment dewatering, relative to surcharge requirements. We will evaluate alternatives as part of the design and recommend an approach to USACE before proceeding with the design. If navigation channel dredged material is to be used, physical characteristics data will be needed during the design. It is assumed this data will be made available to Foster Wheeler.

Final Cover

A final cover for CDF C will be designed which meets the applicable requirements of MSWM regulations. Design of the final cover will be done in two phases. The first, to be done with CDF dike design, will entail preparation of typical cross-sections with assumed final elevations of dredged material and the interim cover. The second will be done after the CDF is filled and the interim cover is in place. The cap will be designed to meet a drainage permeability of less than or equal to 10^{-7} cm/sec, in accordance with the ROD for OU#1. Cap components will consist of a geomembrane liner, gas transmission layer, drainage layer, low permeability soil layers, and cover soil capable of providing frost protection. The surface soil layer of the cover shall be capable of sustaining vegetative growth. This final cover will accommodate future use design considerations described below. It will include consideration of sloping and terracing of the final surface to accommodate future use without raising dike heights.

A gas management system will be designed to convey gases through the impermeable cap layer (geomembrane). It is assumed that the gas venting layer will be passive and will consist of surficial vents open to the atmosphere rather than an active extraction system designed to trap and treat gases. Based on the ROD for OU#1, evaluation of the need for treatment of gas emissions will be done when the CDF is in place and emissions can be sampled. The geocomposite drainage layer and subsurface drainage piping will be sized utilizing the U.S. Army Hydraulic Evaluation of Landfill Performance (HELP) model to assess the effects of surface storage, infiltration, soil moisture storage, and lateral drainage. Overall cap

stability, system performance, and anchor trench design will be analyzed relative to interface friction and estimated differential settlement.

A stormwater management plan to control the surface water run-off volume that results from a 24-hour, 25-year storm event will be prepared for the entire CDF and surrounding area. Necessary run-on control features will be designed using the peak discharge for a 25-year storm event to minimize surface water run-on to components of the CDF. Stormwater controls for the final cap will be sized using Soil Conservation Service (SCS) TR-20 or TR-55 methodologies. Applicable stormwater treatment measures and erosion/sediment control practices will be incorporated into the final design in accordance with Best Management Practices. Cap design includes permanent "armoring" of the seaward side of the berms with compatible habitat for the area and vegetated cover for the final cap. It is assumed that the USACE will provide hydraulic and/or hydrologic data for the design of the CDF based on the pre-existing conditions (before the CDFs are constructed) and post-construction conditions (based on preliminary layout and configuration of all CDFs). Information to be provided should include:

- 100-year floodplain, flood hazard area, and/or floodway water surface profile data in the upstream and downstream vicinity of the proposed CDF and supporting hydraulic calculations and/or modeling results.
- Hydraulic data that presents tidal influences and fluctuations for the Acushnet River in the vicinity of the proposed CDF.
- 100-year floodplain, flood hazard area, and/or floodway boundary data delineated on topographic base mapping in the upstream and downstream vicinity of the proposed CDF.
- Results and supporting documentation from available previous hydraulic studies that address or present channel velocity conditions, scour potential, and/or accepted Manning's roughness coefficient data for the Acushnet River in the vicinity of the proposed CDF.
- Available historical flood data including high water elevations with occurrence dates and nature/extent of flooding.

2.2 CDF C Design Concept (March 2000)

Summary of the Current Concept for CDF C

The first CDF being designed is CDF C. The base case concept design is an earthen dike within the water constructed on a geotextile fabric with fill placed in multiple lifts to achieve consolidation of underlying soft silt and clay sediments. The shoreline side of the CDF will be comprised of an earthen berm sloped to the water line. Due to the existing shoreline elevation being sufficient to support the sidewall liner, the earthen berm is easier to construct and less costly then the sheetpile wall option. The sidewalls of the CDF will be lined with a flexible membrane liner that will intersect the bottom sediments within the CDF. Once the sidewalls of the CDF are constructed and lined, the dredged material will be pumped and or placed in the CDF and will be allowed to settle and consolidate (or dewatered). The conceptual design for CDF C does not include a floating cover like the cover used in filling the Hot Spot CDF with dredged material. Foster Wheeler is preparing a Technical Memorandum that presents and evaluates alternatives to the floating cover. Alternatives to the floating cover to control PCB losses to ambient air will be evaluated further in the pre-design field tests of new dredging technologies.

When it is filled with consolidated dredged sediments CDF C will be covered with an impermeable cap. The cap will include a passive gas collection system. Gas collected and vented will be sampled and analyzed for constituents and treatment needs after the CDF is completed. The final land use design for the Surface of CDF and C will be determined during the final stages of the design through USACE and EPA consultation with the City of New Bedford.

Design Criteria

Design Criteria for CDF C were obtained from the previously designed project documents and from project meetings and discussions with USACE and EPA-Region 1. The design criteria can be categorized by each element of the CDF based on their specific design objectives. Table 2-1 presents the objectives and associated design criteria.

Table 2-1
CDF C Design Criteria

CDF Feature	Design Objective	Design Criteria
In-Water Dike	• Contain dredged sediments; optimize storage capacity. • Support sidewall liner. • Support final cap. • Provide habitat compatible with Acushnet River Estuary. • Withstand river currents and wave runup. • Maximum dike height = 4 to 5 feet above existing ground surface.	• Dike height = +10.7 feet NGVD. • Side slope < 3:1.
Shoreline Wall	• Contain dredged sediments; optimize storage capacity. • Support sidewall liner. • Support final cap. • Withstand stormwater runoff. • Maximum dike height = 4 to 5 feet above existing ground surface.	• Riprap dike face with stone = up to 100-year flood elevation. • Dike height = +10.7 feet NGVD. • Side slope < 3:1.
Sidewall Liner	• Prevent leaching of PCBs. • Withstand settlement of supporting soils.	• Control drainage, erosion for 24-hour, 25-year storm. • Dike height = +10.7 feet NGVD. • Liner permeability < $1x10^{-7}$ cm/sec.
Dredged Sediments	• Consolidate to support final cap. • Retain PCBs.	• Sediment permeability = 10^{-7} cm/sec.
CDF Hydraulic Structures	• Provide retention of dredge slurry. • Convey supernatant to Hot Spot CDF.	•
Interim Cap	• Control PCB volatilization from dewatered sediments in the CDF.	• Sand layer to be 6" thick.
Final Cap	• Prevent precipitation from entering CDF. • Collect CDF gases. • Withstand precipitation runoff. • Support final recreational land use. • Withstand dredged material settling.	• Permeability ≥ $1x10^{-7}$ cm/sec. • Passive gas collection. • Slop surface at > 5%. • Control drainage, erosion for 24-hour, 25-year storm.
Stormwater Controls	• Capture and convey precipitation to prevent flooding and erosion.	• Control drainage, erosion for 24-hour, 25-year storm.

3.0 REGULATORY REQUIREMENTS FOR CDF DESIGN

3.1 Fish and Wildlife, Endangered Species, and Cultural and Historical Resources

The design of the CDFs must consider the potential impacts to fish, wildlife, endangered species, as well as to areas where historical (e.g. sunken ships) and Native American artifacts may be located.

Under the Fish and Wildlife Coordination Act (16 USC Part 661 et. seq.; 40 CFR 6.302(g)), the Fish and Wildlife service and appropriate state agencies must be consulted during CDF design to determine ways to minimize adverse effects to fish and wildlife because CDF construction will result in structural modifications to New Bedford Harbor.

Given that CDF C will be located along the western shoreline, encompassing the existing Hot Spot CDF, the Sawyer Street combined sewer outfall, and industrial shoreline, it is anticipated that impacts to fish and wildlife will be minimal. USACE will review the CDF design. Also, Foster Wheeler scope for the CDF dike design design includes designing the waterfront portions of the dike to be compatible with the coastal estuary environment of the Acushnet River. As the dike design is developed beyond the conceptual stage the details of the habitat design will be discussed with USACE.

The federal Endangered Species Act (16 USC Part 1531 et. seq.; 40 CFR 6.302(h)) (ESA) requires consultation with appropriate federal and state agencies if a threatened or listed species or their habitat may be affected by a federal action. The CDF C location will be reviewed for ESA considerations by USACE as part of their design.

The National Historic Preservation Act of 1966 (16 USC 470 et. seq.; 40 CFR 800), as amended, and the National Preservation of Historical and Archeological Data Act of 1974 (16 USC 469 et. seq.) requires an assessment be conducted to determine potential project impacts to cultural resources which are eligible for, nominated to, or listed in the National Register of Historic Places (NRHP). Specifically, cultural resources concerns will involve evaluation of project impacts to potentially significant (per 36 CFR 60.4 - NRHP Criteria for Evaluation) cultural resources including:

- Standing structures (view sheds);
- Archeological sites (prehistoric and/or historic sites) which may be within the shoreline areas where the CDFs are located; and
- Underwater archeological resources.

Foster Wheeler has completed an Archaeological Survey (equivalent to a Stage IA investigation) of the CDF C vicinity based on this survey.

3.2 TSCA Design Standards

In the ROD, EPA has documented their determination that TSCA landfill requirements for the bottom liner, leachate collection and hydrologic conditions were not appropriate for shoreline CDFs and that the resulting CDF design would not pose an unreasonable risk to health or the environment. Therefore, the EPA Regional Administrator waived the following TSCA chemical waste landfill requirements for the CDFs:

- Soils (except soils which meet permeability requirement):
  - In-place soil thickness of 4 feet or compacted soil liner thickness of 3 feet,
  - Greater than 30% soil passing the No. 200 sieve,

- Liquid Limit >30, and
- Plasticity Index >15,
- Hydrologic conditions,
- Leachate collection, and
- Bottom liner.

Based on review of both the TSCA landfill and Massachusetts solid waste regulations, the following Massachusetts solid waste requirements are more stringent:

- Covers,
- Surface water and groundwater protection,
- Groundwater, surface water and gas monitoring systems, and
- Closure/post closure.

The TSCA requirements for flood protection are more stringent and must be met. Therefore, the CDF design must incorporate the TSCA flood protection requirements. Per 40 CFR 761.75 (b)(4)(i), if the facility site is below the 100-year flood water elevation, the site must have surface water diversion dikes around the perimeter with a minimum height equal to two feet above the 100-year floodwater elevation.

Under the OU#1 Remedial Design Work Plan the USACE will perform hydrologic modeling of the Acushnet River to provide information on flood elevations and river flow velocities with CDF C in place. Foster Wheeler will use this information to design dike protection from flooding and wave and current erosion. The CDF C dike is anticipated to have a top elevation of 12 feet above mean low water. This elevation will be compared to the USACE developed 100-year flood water elevation to determine if this requirement can be met.

CDFs will meet the TSCA soil permeability standard of 1×10^{-7} cm/sec (40 CFR 761.75(b)(1)(i)).

3.3 Massachusetts Solid Waste Management Facility Design Standards

The MADEP, under 310 CMR 30.501(3)(a), exempts facilities that store, manage, treat and dispose of PCBs greater than 50 ppm from the Massachusetts hazardous waste regulations provided that the facilities are properly managed under TSCA. Since Massachusetts, through its concurrence with the ROD (Section XII (B)), agreed that the remedy is properly managed under TSCA, the Massachusetts hazardous waste regulations (310 CMR 30.00) for the design of the CDFs do not apply. However, sediment disposal within the CDFs is subject to the relevant and appropriate requirements of the Massachusetts Solid Waste regulations, 310 CMR 19.00, as stated in the ROD. It was determined that the substantive, relevant and appropriate requirements of the Massachusetts solid waste program which are more stringent than TSCA regulations for covers, monitoring, surface water and groundwater protection, closure and post-closure will be followed. Hence, Foster Wheeler has designed CDF C to comply with the following substantive, relevant and appropriate requirements under the Massachusetts solid waste regulations:

- The cap, side walls, and bottom material will meet a maximum permeability standard of 1×10^{-7} cm/sec;
- Cover system (including gas venting, drainage, top slope $\geq 5\%$, erosion protection, infiltration protection, and freeze/thaw protection);
- Stormwater controls;
- Surface and groundwater protection;
- Air quality protection systems;
- Groundwater, surface water, and gas monitoring systems;

- Operation and maintenance;
- Environmental monitoring; and
- Closure/post-closure.

The following Massachusetts solid waste landfill requirements are not considered appropriate for the CDF design:

- Bottom liner (referenced in the surface water and groundwater protection requirements), and
- Leachate collection requirements.

3.3.1 CDF Cover Systems

CDF C will comply with the following Massachusetts solid waste landfill final cover system requirements, per 310 CMR 19.112.

The final cover will meet the following general design standards, if appropriate for the CDF final use:

1. Have a final top slope of not less than five percent (5%) and side slopes no greater than three horizontal to one vertical (3:1),
2. Be constructed of material(s) that are compatible with gases expected to be generated,
3. Be constructed so as to minimize erosion of all layers of the final cover by using terraces or other appropriate stormwater controls,
4. Be constructed so that the low permeability layer is protected from the adverse affects of frost and/or freeze thaw cycles, and
5. Be constructed to maintain slope stability.

The final cover system will consist of, at a minimum, the following components if appropriate for CDF final use:

1. The subgrade layer,
2. A CDF gas venting layer (unless the subgrade layer is designed to function as a gas venting layer, or there is an active gas collection and extraction system),
3. A low permeability layer or layers,
4. A drainage layer,
5. Filter material (when required),
6. A layer capable of supporting vegetation, and
7. A vegetative cover.

The final cover system components (numbered 1-7 above) will meet the detailed requirements given in 310 CMR 19.112 (4) through (10), if appropriate for CDF final use.

3.3.2 Stormwater Controls

CDF C will comply with the following stormwater control requirements for solid waste landfills, per 310 CMR 19.115, if appropriate for CDF design.
The stormwater controls will prevent erosion, discharge of pollutants and protect the physical integrity of the CDF. These controls will be designed to:

1. Prevent flow onto the active portion of the CDF during the peak discharge from a 24-hour, 25-year storm, and

2. Control the run-off from the active portion of the CDF of at least the water volume resulting from a 24-hour, 25-year storm.

3.3.3 Surface Water and Groundwater Protection

The CDFs will comply with the following Massachusetts surface water and groundwater protection requirements for solid waste landfills, per 310 CMR 19.116, if appropriate for CDF design.

The CDFs will be designed to prevent direct discharge of contaminated run-off from the facility to any surface water bodies or to groundwater. The CDF cap, cover and side walls will be designed to prevent contaminated run-off. A groundwater monitoring system will be installed to check for potential contaminants in the groundwater.

3.3.4 Air Quality Protection Systems

Passive gas collection and vents are being designed into the CDF C cap. The gas vents will meet the appropriate performance and design standards detailed in 310 CMR 19.117 (3)(a) and (b). The gas vents will be installed concurrently with the phased construction of the CDF. The OU #1 Work Plan explains that the need for treatment of gases vented from CDF C will be evaluated after the CDF is built and capped.

3.3.5 Groundwater, Surface Water, and Gas Monitoring Systems

The CDFs must comply with the following substantive, relevant and appropriate Massachusetts groundwater, surface water and gas monitoring requirements for solid waste landfills, per 310 CMR 19.118. These monitoring systems must be capable of detecting and quantifying the release of contaminants into the ground, groundwater, surface water or the air.

Groundwater Monitoring System: The groundwater monitoring system must be capable of yielding representative groundwater samples for analysis and consist of sufficient number of wells properly located and screened at appropriate depths to detect the release of contaminants from the CDF into the groundwater. The groundwater monitoring system will, as appropriate:

1. At a minimum, be composed of one (1) monitoring well, or cluster of wells, installed hydraulically upgradient from the limit of the filled or proposed fill area capable of yielding groundwater samples which are representative of background water quality,
2. At a minimum, be composed of three (3) monitoring wells, or clusters of wells, installed within 150 meters of filled areas, areas proposed to be filled or at the property boundary (which ever is less), and be located hydraulically downgradient from the limit of the filled areas or areas proposed to be filled, and be capable of detecting contaminants that migrate from the CDF to the groundwater,
3. Be composed of wells constructed in a manner that ensures the integrity of the monitoring well and facilitates sample collection,
4. Be composed of wells readily accessible to sampling equipment and located so that they do not interfere with routine CDF operations,
5. Be composed of wells designed with locking caps and secured to prevent tampering with or vandalism, and
6. Be composed of wells which should be made as permanent as possible.

The requirements for downgradient groundwater monitoring wells will be met in the following manner:

- Before CDF construction: wells will be installed in the harbor, if feasible, and
- During CDF construction: wells will be installed through the dike on the water side (i.e., outside of the containment liner).

Surface Water Monitoring System: Permanent surface water sampling location markers will be established upstream and downstream of the CDF in sufficient numbers and locations to adequately represent surface waters flowing through or past the facility. All surface water sampling locations will be readily accessible to sampling equipment and located so that they do not interfere with routine CDF operations.

Gas Monitoring System: Gas monitoring wells for the monitoring of explosive and other landfill gases will be provided to determine if gas is migrating beyond the CDF boundaries. The gas monitoring wells also must be capable of yielding representative air samples for analysis and consist of a sufficient number of wells properly located to detect the presence and migration of landfill gases.

3.3.6 CDF Operation and Maintenance

Operation and maintenance of the CDF C will comply with the following substantive, relevant and appropriate solid waste landfill requirements, per 310 CMR 19.130, as appropriate for CDF final use.

The CDFs will be operated in accordance with appropriate conditions, such as proper sequencing of CDF operations, proper grading of the CDF, proper maintenance of drainage systems and application of adequate amounts and appropriate types of cover materials, which will prevent pollution of groundwater, surface water and air quality, and prevent nuisance conditions from developing.

Based on the ROD, the CDF will not be used to dispose of any federal or Massachusetts hazardous wastes. Although materials containing PCBs ≥ 50 ppm are usually considered a Massachusetts hazardous waste (i.e., MA02), these wastes will be disposed in accordance with the federal TSCA PCB regulations, per 310 CMR 30.501(3)(a). Consequently, these PCB wastes are not considered Massachusetts's hazardous wastes because they are adequately regulated under TSCA.

The CDF will be operated such that vectors, dust, odors and other nuisance conditions are prevented from developing.

The CDF will have sufficient stormwater drainage controls and diversion structures, channels or ditches to promote drainage off of the CDF, minimize run-on onto the CDF, prevent ponding on the CDF or uncontrolled ponding adjacent to the filled area. Stormwater drainage structures will be designed, constructed and maintained so as to ensure integrity of the drainage structures and so as to prevent erosion of the CDF.

Soil erosion control measures will be instituted as are necessary to ensure the retention and integrity of the cover(s). The CDF will be operated such that no solid waste or leachate are carried off-site due to erosion and that siltation due to erosion must not migrate off-site. Where significant settlement, ponding of waters or erosion of the CDF or cover material occurs during operation, closure or post-closure, corrective actions will be instituted immediately.

The CDF will be designed to incorporate property boundary markers and elevation markers.

The final cover will be designed to meet the substantive, relevant and appropriate standards of 310 CMR 19.112. These cover requirements are more stringent from TSCA requirements. Some Massachusetts solid waste cover requirements, however, are not appropriate for CDFs due to final use (see section 3.8.3.1 above).

Access roads will be constructed, graded and maintained to ensure that traffic flow will not be interrupted by inclement weather or traffic patterns.

No materials are to be stored, held, maintained or placed at the CDF in such a manner as to pose a fire hazard. Any disruption of the finished grade or covered surfaces as a result of fire fighting activities will be repaired or replaced immediately upon termination of such activities.

3.3.7 Environmental Monitoring

Environmental monitoring of surface water, groundwater and landfill gas at the CDFs will comply with the following solid waste landfill requirements, per 310 CMR 19.132, as appropriate for CDF design.

Surface Water & Groundwater Monitoring: Sampling and analysis of surface water and groundwater will be:

1. Conducted in accordance with methods approved by the EPA,
2. Conducted at sampling points as agreed to by the EPA,
3. Conducted on a schedule as agreed to by the EPA, and
4. Performed semi-annually, at a minimum (however the EPA may require more frequent or additional monitoring in cases where data are determined to be unacceptable).

Background groundwater quality data has been collected at sampling points hydraulically upgradient of the CDF. Existing harbor sampling data is considered sufficient to meet the intent of establishing background surface water quality.

3.3.8 Maintenance of Environmental Control and Monitoring Systems

Maintenance of environmental control and monitoring systems at CDF C will comply with the following Massachusetts solid waste landfill requirements, per 310 CMR 19.133, as appropriate for CDF final use.

The CDF will be operated in a manner that will protect all environmental control systems and monitoring systems. All CDF environmental control systems will be regularly maintained per the approved Operations and Maintenance Plan. The EPA will be notified if environmental control systems, monitoring devices or surface water sampling location markers are damaged or destroyed and the extent of the damage will be reported, in writing, within 14 days of discovery and must provide a schedule for repair or replacement before the next scheduled sampling round.

Surface water, groundwater and gas monitoring locations will be maintained so as to meet the requirements in 310 CMR 19.118 (Groundwater, Surface Water & Gas Monitoring Systems), given in Section 1.2.3.5 above.

3.3.9 CDF Closure

Closure of CDF C will comply with the following solid waste landfill requirements, per 310 CMR 19.140, as appropriate for CDF final use.

The CDF will be designed to eliminate any conditions that could attract vectors or cause nuisance conditions and must take all practicable measures to prevent pollution of the environment and prevent a threat to public health and safety. The design also must incorporate any additional closure requirements that may be imposed by the EPA.

3.3.10 CDF Post-Closure

Post-closure of CDF C will comply with the following Massachusetts solid waste landfill requirements, per 310 CMR 19.142, as appropriate for CDF final use.

During the post-closure period, the CDFs must be maintained and monitored to detect and prevent any adverse impacts of the CDF on public health, safety or the environment. The following activities will be performed:

1. Corrective actions must be taken to remediate and/or mitigate conditions which would compromise the integrity of the final cover,
2. Maintain the integrity of liner system (e.g., sidewall liners) and final cover system,
3. Monitor and maintain the environmental monitoring systems for surface water, groundwater and air quality,
4. Maintain access roads,
5. Maintain landfill gas collection control systems, and
6. Protect and maintain any surveyed benchmarks.

3.4 Clean Water Act - Section 404 & Rivers and Harbors Act Requirements

Since CDF construction will occur below mean high water, CDF C is a regulated structure placed in navigable waters and thus must comply with the substantive requirements of a Section 10 of the Rivers and Harbors Act permit (construction of the structures) and a Section 404 of the Clean Water Act permit (dredging and filling of tidal waters) during CDF construction.

Since the project involves activities in tidal waters and wetlands, and will require greater than 1 acre of fill, the project activities must meet the substantive requirements of an individual Section 404 permit.

The design of CDF C must minimize impacts to the environment by avoiding, minimizing and mitigating impacts as follows (40 CFR 230.70-76):

- Silt screens/curtains or other appropriate methods will be used during CDF construction and project activities to confine suspended particulates/turbidity;
- The CDF will be oriented to minimize undesirable obstruction to the water current or circulation pattern in New Bedford Harbor;
- The CDF will be designed to minimize or prevent the creation of standing water bodies in areas of normally fluctuating water levels and will minimize or prevent the drainage of areas subject to fluctuations;
- Sediments will be dewatered in the CDF to reduce their liquid components; chemical flocculants may be added to enhance dewatering;
- The CDF will have side walls to reduce the potential for erosion, slumping, or leaching of sediments into the aquatic ecosystem;
- The CDFs will be capped with clean material;
- Diked areas of the CDF will be protected from erosion by runoff and wave action vegetation; and

- The CDF design will utilize natural bottom contours and shoreline grading to minimize the size of the mound(s).

Although permits will not be required for project activities, the activities must meet the substantive requirements under Section 10 and Section 404 permitting programs, respectively. The USACE has authority for implementing Section 10 and Section 404 regulatory programs. These requirements will be complied with through their review and approval of the CDF C design.

3.5 Erosion and Sedimentation Control Plan

The Sedimentation and Erosion Control Plan for the CDF C will be prepared as part of the Remedial Action Plan for CDF construction.

3.6 Stormwater Management Plan

Foster Wheeler will prepare a Stormwater Management Plan designed to control the surface water run-off that results from a 24-hour, 25-year storm event for the CDF C work area. Elements of the plan will include:

- Stormwater run-on controls to be designed using the peak discharge from 25-year storm events to minimize surface water run-on to the CDFs;
- Stormwater controls for the final caps to be sized and designed using Soil Conservation Service (SCS) TR-20 or TR-55 methodologies, and
- Applicable stormwater treatment measures and sedimentation and erosion control measures will be incorporated into the final design and detailed in the Project Erosion and Sedimentation Control Plan.

3.7 NPDES Stormwater Discharge Requirements

Although NPDES stormwater discharge permits are not required for activities under CERCLA, the CDF design must meet NPDES Stormwater Discharge requirements for industrial activities (40 CFR 122.26(a)(14)(v)) because the CDFs are regulated as landfills. The CDF final design and operations will comply with the following substantive requirements; Foster Wheeler will prepare an Erosion and Sedimentation Control Plan as part of the Remedial Action Plan which specifies how sedimentation and erosion controls will be implemented at CDF C to prevent off-site siltation. The plan will include:

- The location and nature of the construction activity;
- The total area of the site that is expected to be disturbed;
- Proposed measures, including Best Management Practices (BMP) and state and local erosion and sediment control requirements, which will be used to control pollutants in stormwater discharges during construction;
- Proposed measures, including BMP and state and local erosion and sediment control requirements, which will be used to control pollutants in stormwater discharges after construction is completed;

3.8 Massachusetts Stormwater Management Policy

MADEP has issued a Stormwater Management Policy implemented under the Massachusetts Wetlands Protection Act (WPA), 310 CMR 10.00, which applies to work conducted within coastal and inland wetlands, riverfront areas and land subject to coastal storm flowage. In New Bedford, the regulated area extends 25 feet inland from the riverfront, within 100 feet of coastal wetlands, and the land between mean low water and the landward boundary of the 100-year flood. Since the CDF C will be constructed in or

within 100 feet of the coastal wetlands, these activities will comply, to the extent possible, with the Massachusetts WPA Stormwater Management Policy. The requirements that will be considered are:

- All new stormwater discharges will be treated to remove at least 80% of the Total Suspended Solids (TSS) (untreated discharges are not allowed);
- The Stormwater Management Plan will include sedimentation and erosion controls designed to remove at least 80% of the TSS from stormwater discharges related to CDF construction,
- Post-development discharge rates will not exceed pre-development peak discharge rates;
- Loss of annual recharge to groundwater will be minimized;
- Sedimentation and erosion controls will be installed; and
- An Operation & Maintenance Plan will be prepared for the stormwater management system.

3.9 Air Monitoring and Fugitive Emissions Control

Even though fugitive air emissions are expected to be minimal because sediments will be already be wet during excavation and handling activities, Foster Wheeler will implement air monitoring and fugitive emission controls. An appropriate level of air monitoring and BACT will be required to control potential air releases from the capped CDFs in excess of the Ambient Air Levels (AALs). The AAL for PCBs is 0.0005 $\mu g/m^3$ for an annual average. Foster Wheeler will develop and implement controls to limit fugitive emissions during sediment excavation, dewatering and placement in the CDF to minimize on-site exposure to and off-site migration of site contaminants. The emissions program has the following elements:

- A pre-design field test of new dredging systems and sediment handling dewatering is being planned for the spring and summer of 2000. Air Monitoring will be performed during this field test to obtain data in sources of airborne PCBs and ambient levels during dredging and CDF filling;

- An air monitoring program has been conducted at each CDF to establish baseline conditions prior to construction activities. The air monitoring program is described in Section 2.2.3.3 of the Work Plan and subsections for the SAP. In addition to the baseline sampling, air monitoring has also been conducted around the perimeter of the Hot Spot CDF at the Sawyer Street area. Results from the CDF baseline and Sawyer Street air monitoring will be used to establish ambient air action levels for future construction activities. Air monitoring samples analyzed for PCB congeners as specified in the SAP;

- The current plan for the CDF design includes maintaining a two-foot water layer above sediments placed in the CDFs and placing an interim cap consisting of six inches of soil or sediment on top of the dredged sediments after the CDFs have been filled. This interim cap will prevent emission of PCB dust or PCB volatilization while the underlying sediment consolidates; and

- Water sprays and covers on stockpiles will be used to control fugitive dust emissions during material handling. Run-off from water sprays must be contained and managed in accordance with the Stormwater Management Plan.

3.10 Wetlands Protection Requirements

CDF construction activities have the potential to impact areas protected under the Massachusetts Wetlands Protection Regulations (310 CMR 10). If project design can not meet the performance

standards, then either mitigation methods or evaluating a variance of the requirement will be employed. Mitigation methods applicable to CDF C construction are listed in Table 1-2.

3.11 Waterways Regulations

The MADEP Waterways regulations focus on the long-term viability of marine industrial uses within the New Bedford Designated Port Area, maintaining or improving public access, and protecting public rights in tidelands. Public rights include fishing, fowling, and navigation in Commonwealth tidelands. The CDF C construction will comply with substantive requirements to the extent predictable. If the performance standards cannot be met, then mitigation methods may be considered.

3.12 Water Quality Certification

Water Quality Certification Standards are satisfied through the remedy meeting the substantive requirements of Section 402 of the Clean Water Act and the Massachusetts Wetlands Regulations.

3.13 Massachusetts Coastal Zone Management Program (MCZM)

The MCZM program is a federally funded and approved state Coastal Zone Management (CZM) Program under the Federal Coastal Zone Management Act of 1972. The MZCM has established policies that are based upon existing Massachusetts Water Quality, Wetlands and Waterways regulations. The ARARs from these regulations have already been identified elsewhere in this section.

3.14 Compliance with Project Decision Documents

Remediation activities will be conducted in accordance with the following:

- The U.S. EPA Record of Decision, dated September 1998,
- The USACE's October 14, 1998 Scope of Work,
- The November 13, 1998 Draft Engineering Guidance for the Scope of Work, and
- The Foster Wheeler Remedial Design Work Plan, dated April 1999.

All work conducted in areas deemed to be "on-site" will be conducted in accordance with these decision documents and the substantive requirements of the identified Applicable or Relevant and Appropriate Requirements (ARARs). ARARs for the OU #1 Remedial Action are listed in the RCP. Any work in areas deemed to be "off-site" will be conducted in accordance with both administrative and substantive requirements of applicable federal, state, and local regulations.

Table 3-1
Mitigation Methods Applicable to CDF C Construction

Performance Standard	Mitigation Method
• Projects shall not alter the bottom topography in a manner which increases the potential for storm damage or erosion of nearshore areas. Project activities should attempt to avoid areas with eelgrass or widgeon grass and high densities of polychaetes, mollusks or macrophytic algae (310 CMR 10.25).	• Foster Wheeler will time the construction activity to avoid the critical life stages of the various aquatic species to the maximum extent possible. • USACE and EPA will review the proposed design for CDF C to evaluate the potential for erosion and storm damage. If areas are to be impacted, Foster Wheeler will design a protective measure.
• If a proposed CDF is located in a designated port area, which is determined to be significant to marine fisheries, then water quality and water circulation interests should be protected (310 CMR 10.26).	• There are no current port areas or marine activities at the designated locations for CDF. CDF design will support existing uses and that CDF C final use design will support future water-dependent boating and recreation uses.
• Water-dependent projects on tidelands should be designed and constructed to minimize adverse effects to marine fisheries and wildlife habitat caused by alterations in water circulation, distribution of sediment grain size or changes in water quality (310 CMR 10.27). • Massachusetts water quality standards must be met for dredging operations and discharge of effluent from CDFs (310 CMR 10.27).	• Foster Wheeler will attempt to minimize the tideland and salt marsh area required by the CDFs by increasing the height and volume of the CDFs, however community concerns have limited CDF height to 4-5 feet above the existing shoreline. • The impacts to tidelands and coastal beaches have been minimized by locating CDFs on contiguous shoreline parcels with industrial land use. • Final CDF C design of the waterfront side of the CDFs will incorporate habitat for marine life. • Foster Wheeler will treat all sediment dewatering supernatant prior to discharge. The treated supernatant will meet the current numerical AWQCs for cadmium, chromium and lead. The AWQCs for PCBs and copper will be met through the phased TMDL approach. • Foster Wheeler will follow the approved sedimentation and erosion control plan during construction to minimize sedimentation in New Bedford Harbor.
• CDF construction should not destroy any portion or have an adverse effect on a salt marsh (310 CMR 10.32).	• The CDF C area is an industrial shoreline with very small (if any) salt marsh.
• If the CDF construction area underlies an anadromous or catadromous fish run, the project should not impede or obstruct the migration of fish, change the volume or rate or flow of water within the fish run or impair the capacity of the spawning or nursery habitat.	• The USACE will consult with the MADEP Division of Marine Fisheries and/or other appropriate entities regarding timing of work activities.

Table 3-1 (cont'd)
Mitigation Methods Applicable to CDF C Construction

Performance Standard	Mitigation Method
• If construction results in the increase in horizontal extent and levels of flood waters during peak flow, then the CDF design should provide compensatory storage for lost flood storage volume (310 CMR 10.57).	• The CDF design will be reviewed by the USACE and flood modeling will be performed to evaluate impacts. Results of the USACE evaluation and mitigation measures will be discussed between EPA and USACE.
• New fill in tidelands below the high water mark for water-dependent purposes can be approved only if reasonable measures have been taken to minimize the amount of fill; including relocating the fill to an area above high water.	• CDF construction will place fill below the highwater level. However EPA has committed to the City of New Bedford that the height of the CDFs will not exceed 4 to 5 feet above the existing shoreline.
• New fill in tidelands within Designated Port Areas (DPA) must be designed to accommodate water-dependent industrial use.	• The CDF C area does not support a water-dependent industrial use.
• Preserve the availability and suitability of tidelands used for water-dependent uses that are reserved primarily as locations for maritime industry or other water-dependent uses. These rights include littoral or riparian property owner's rights to approach property from a waterway and to approach waterway from their property. Project shall not disrupt off-site water-dependent use within the project vicinity without providing mitigation or compensation and project shall not displace water-dependent use in a DPA (310 CMR 9.36).	• CDF C will be designed and constructed to accommodate other water-dependent aesthetic or recreational uses such as parks, sports fields and open space. EPA will work with the City of New Bedford to provide for future use of the sites. • Alternative access to the water is available to the general public. CDF construction will not block access to the waterfront. • Appropriate mitigation will be determined based upon the degree of impact to water-dependent uses.
• Navigational impacts from capping or sediment covering must be minimized.	• Foster Wheeler anticipates minimal navigational impacts from capping or sediment covering activities for CDF C.
• All fill and structures, including the subaqueous capping of polluted sediments, should be designed and constructed in a manner that does not unreasonably restrict the ability to dredge any channels (310 CMR 9.37).	• CDF C will be located outside of customary boating channels.
• Design and timing of dredging and dredge material disposal should avoid interference with anadromous and catadromous fish runs; no activity between March 15th and June 15th without approval from Division of Marine Fisheries. • Design and timing of dredging and dredge disposal should minimize adverse effects on shellfish beds, fisheries resources and submerged aquatic vegetation (CMR 310 9.40(2)).	• The USACE will consult with Mass MADEP and other appropriate authorities regarding proposed design and timing of work activities.
• Shoreward extent of dredging should be a sufficient distance from adjacent marshes (at least 25 feet from marsh boundary) to avoid slumping; bottomslope should be adjusted with placement of clean fill after dredging (310 CMR 9.40(3)).	• Excavation will occur within salt marshes as necessary to meet cleanup goals.

3.15 Regulatory Assumptions

Consistent with the National Contingency Pan (NCP), 40 CFR 300.5, "on-site" means the Acushnet River, the existing CDF and Sawyer Street facilities, and all areas in close proximity to the site contamination. Areas associated with the investigation and relocation of combined sewer overflows/storm drains are considered to be in close proximity to the site contamination.

Consistent with CERCLA Section 121(e)(1), it will not be necessary to obtain permits for on-site activities. However, all on-site activities must comply with all substantive requirements of the state and federal rules and regulations identified as ARARs in the Record of Decision (ROD).