

EXECUTIVE SUMMARY

The Milwaukee Harbor long-term disposal study was initiated in 1993 under the Authority of Section 123, P.L.91-611. Policy and procedures regarding development, review, approval, and implementation of Dredged Material Management Plans (DMMP) were subsequently established in July 1994. To conform to the new policy, this Phase II Final DMMP Document has been prepared and phases the study into the new procedures. This document identifies specific measures necessary to manage the volume of material likely to be dredged over a 20 - year period.

The Milwaukee Harbor Federal Navigation Project is located on the west shore of Lake Michigan at the city of Milwaukee, Wisconsin which is about 85 miles north of Chicago, Illinois, and approximately 83 miles west of Grand Haven, Michigan. The project is a commercial harbor at the confluence of the Milwaukee, Menomonee, and Kinnickinnic Rivers. With the current dredging cycle the Jones Island Confined Disposal Facility (CDF), utilized for disposal of maintenance material, would be at full capacity in 2011. Due to an anticipated event of disposal of 176,000 cubic yards of permittee dredged material, the CDF could be at capacity in 2008. This permittee action would place material dredged from the Kinnickinnic River, as part of an effort sponsored by the Environmental Protection Agency, Wisconsin Department of Natural Resources and the Milwaukee Port Authority. A tipping fee will be assessed to cover the cost of the permittee dredging capacity. A disposal plan to accommodate, at a minimum, 20-years of future dredged material (510,000 cubic yards of material), is needed. Maintenance dredging of Milwaukee Harbor would allow continued economic benefits associated with navigation of this commercial harbor. Accommodating the permittee dredging while providing DMDF capacity for navigation will have positive economic and environmental effects in providing a synergistic and cost-reducing approach in comparison to the implementation of a single-purpose project for either purpose, and is determined to be in the public interest.

Numerous alternatives for dredged material disposal at the Harbor have been investigated to date. These range from new upland dredged material disposal facilities, in-water placement, beneficial use of material such as beach nourishment, and no action. This study seeks a disposal solution that is the least costly, engineeringly, economically and environmentally feasible project alternative.

Based upon the investigation presented in this Phase II Dredged Material Management Plan document, the alternative plan to construct a DMDF (Dredged Material Disposal Facility) on top of the existing Milwaukee Jones Island CDF, is designated as the "Base Plan". This Base Plan forms the basis for future actions leading toward implementation of a disposal facility to adequately handle dredged material disposal for a minimum of 20 years for Milwaukee Harbor.

Please note that any references in this report regarding elevations refer to International Great Lakes Datum (IGLD), 1955. To convert to IGLD 1985, add 0.7 feet.

**PHASE II REPORT
DREDGED MATERIAL MANAGEMENT PLAN
MILWAUKEE HARBOR, WISCONSIN**

January 2008

**U.S. ARMY CORPS OF ENGINEERS
DETROIT DISTRICT**

PHASE II REPORT
FINAL DREDGED MATERIAL MANAGEMENT PLAN
MILWAUKEE HARBOR, WISCONSIN

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MILWAUKEE HARBOR, WISCONSIN DREDGED MATERIAL MANAGEMENT PLAN (DMMP)

1. PROJECT DESCRIPTION

Milwaukee Harbor is located in the city of Milwaukee, Milwaukee County, Wisconsin, which is located about 85 miles north of Chicago, Illinois (See Figure 1). Milwaukee Harbor is a deep draft harbor at the confluence of the Milwaukee, Menomonee, and Kinnickinnic Rivers. The authorized project at Milwaukee Harbor has two segments which consist of an outer and inner harbor (See Figure 2). The outer harbor is situated between the harbor's breakwaters located approximately 3,000 feet offshore and the shoreline, over a length of about 3.5 miles. The north and south breakwaters in the outer harbor have lengths of 9,954 feet and 9,646 feet, respectively, and are separated by a 500 foot entrance channel into Lake Michigan. The inner harbor extends the commercial navigation channel to portions of the Milwaukee, Menomonee, and Kinnickinnic Rivers, as well as the South Menomonee and Burnham Canals. The entrance channel into the inner harbor is formed by piers on the north and south sides of the channel which are 1,656 feet and 1,621 feet in length, respectively. The width between the piers is 358 feet at the outer harbor and 552 feet at the entrance to the Milwaukee and Kinnickinnic Rivers.

2. SCOPE OF THE STUDY

This study is conducted under the guidance of the Planning Guidance Notebook (ER 1105-02-100), Appendix E, paragraph 15, dated 22 April, 2000. The purpose of this Dredged Material Management Plan (DMMP) study is to determine if additional suitable dredged material placement sites are located in the vicinity of Milwaukee County that will satisfy future dredge disposal needs of a 20-year capacity associated with the Milwaukee Harbor. The decision to recommend implementing the final Management Plan is based upon a preliminary appraisal that at least one potential solution would be engineeringly, economically and environmentally feasible, will be in accord with current Federal policies and budgetary priorities, and will be supported by the project's sponsor, the Milwaukee Port Authority.

The purpose of this DMMP document is to: (a) present studies that have been conducted to date; (b) provide an economic assessment to justify continued maintenance dredging; (c) discuss potential options that appear viable for disposal of dredged material; and (d) select a Base Plan for Milwaukee Harbor dredged material disposal.

The level of detail in this Phase II DMMP document is limited by the extent of information available in the study time frame. In the Phase II DMMP document phase of the study process, problems and opportunities of the project are defined and potential alternatives

are formulated and analyzed to identify a plan (or plans) that would handle the dredging volume for a 20-year period.

3. AUTHORIZATION AND DEVELOPMENT HISTORY

3.1 General

Authorizing legislation for the dredging Milwaukee Harbor has evolved over the years. Legislation specific to Milwaukee Harbor is shown on Table 2.

Prior to 1976, dredged material for the Milwaukee Harbor was generally open water placed. In 1976 the Jones Island Confined Disposal Facility (CDF), constructed by the Corps, began accepting dredged material from Milwaukee Harbor and has been the primary placement site of dredged material. A summary of disposal locations for annual maintenance dredging is displayed below in Table 1.

3.2 Permittee Disposal at Jones Island CDF

With the current dredging cycle the Jones Island Confined Disposal Facility (CDF), utilized for disposal of maintenance material, would be at full capacity in 2011. Due to an anticipated event of placement of 176,000 cubic yards of permittee dredged material, the CDF could be at capacity in 2008. This permittee material would be dredged from the Kinnickinnic River in an area upstream of the navigation channel and placed at a designed cell within the CDF. The Great Lakes Legacy Act material would be placed within the capacity of the existing Milwaukee Confined Disposal Facility and is not part of the new Dredged Material Disposal Facility being proposed. Dredging of the Kinnickinnic River is being pursued by the Environmental Protection Agency (EPA), Wisconsin Department of Natural Resources (DNR) and Milwaukee Port Authority as a Great Lakes Legacy Act action. As a condition of using the remaining capacity, a tipping fee will be assessed for the permittee dredging.

The large amount of material associated with dredging of the Kinnickinnic River hastens the filling of the Jones Island CDF. To facilitate accommodating future disposal needs the Port of Milwaukee has indicated a willingness to share the future cost of material disposal and act as the local sponsor for the base plan developed under this study. The Port of Milwaukee has received a 1.8 million dollar grant from the Wisconsin Department of Transportation to expand their disposal capability.

Table 1
Channel Maintenance History

FY	Total Cost ¹	Cubic Yards	Cost/CY ¹	Placement Site	Contractor or Government
1957	N/A	190,000	N/A	N/A	Contractor
1960	N/A	169,495	N/A	N/A	Government
1962	N/A	150,454	N/A	N/A	Government
1963	\$234,564	26,119	\$8.95	N/A	Government
1964	\$131,666	29,866	\$4.39	N/A	Government
1965	\$48,758	56,220	\$0.81	N/A	Contractor
1965	N/A	214,057	N/A	N/A	Government
1965	\$266,203	34,747	\$7.65	N/A	Government
1965	N/A	2,750,166	N/A	N/A	Government
1966	\$2,226,583		N/A	N/A	Government
1966	\$9,658,420		N/A	N/A	Government
1966	N/A	387,426	N/A	N/A	Government
1966	N/A	1,207,856	N/A	N/A	Government
1967	\$3,194,320	197,300	\$16.19	N/A	Government
1967	\$550,002	50,650	\$10.89	N/A	Government
1968	N/A	80,075	N/A	N/A	Government
1969	N/A	59,333	N/A	N/A	Government
1976	\$4,575,274	465,833	\$9.83	Jones Island CDF	Government/ Contractor
1977	\$445,040	125,000	\$3.55	Jones Island CDF	Government
1978	\$2,602,168	208,389	\$12.50	Jones Island CDF	Contractor
1981	\$1,270,606	92,500	\$13.74	Jones Island CDF	Contractor
1982	\$874,536	83,016	\$10.54	Jones Island CDF	Contractor
1987	\$2,687,226	307,656	\$8.73	Jones Island CDF	Contractor
1990	\$315,650	28,033	\$11.25	Jones Island CDF	Contractor
1990	\$211,026	10,757	\$19.62	Jones Island CDF	Contractor
1991	\$913,138	95,597	\$9.55	Jones Island CDF	Contractor
1993	\$756,982	108,067	\$7.01	Jones Island CDF	Contractor
1995	\$280,016	18,934	\$14.79	Jones Island CDF	Contractor
1999	\$720,525	54,259	\$13.28	Jones Island CDF	Contractor
2001	\$26,426	1,218	\$21.69	Jones Island CDF	Contractor
2007	765,600	72,000	\$10.63	Jones Island CDF	Contractor
Totals	\$32,725,302	7,287,908			

¹ All values in FY07 dollars. Years 1963 through 1967 updated using Engineering News Record (ENR) cost index, subsequent years updated using Civil Works Construction Cost Index System.

Section 123 of the 1970 River and Harbor Act (Public Law 91-611) authorized the Corps of Engineers to construct, operate, and maintain contained placement areas for contaminated dredged material in the Great Lakes area. This law provided for the construction of CDFs specific to the region, with local interests supplying lands, easements and right-of-ways. Construction of the existing CDF at Milwaukee Harbor under Section 123 was at 100% Federal cost. A 25% non-Federal cost share was waived in cases that the sponsor was participating in a wastewater treatment program and was not violating water quality standards. However, construction of a new CDF under Section 123 is no longer possible due to a change in policy.

Until passage of the Water Resources Development Act (WRDA) of 1996, there was no specific administrative policy for cost sharing the construction of a new CDF. Administration policy had followed criteria per a 23 July 93 Assistant Secretary of the Army, Civil Works (ASA-CW) memorandum that the Army could accept contributions from non-Federal interests for the pre-1986 projects for all expenses associated with a CDF, unless precluded by authorizing legislation. If a project's authorization was vague regarding responsibility for CDF construction, it was not to be 100% Federal.

Cost sharing for construction of Dredged Material Disposal Facilities (DMDF) associated with the construction and operations and maintenance of Federal navigation projects for harbors and inland waters was established by WRDA '96. It specifies that land-based and aquatic dredged material disposal facilities shall be considered as general navigation features of the project. Section 101 of WRDA '86, as amended by Section 201 of WRDA '96, that pertain to cost sharing for maintenance dredging are as follows;

SEC. 101 HARBORS.

(a) Construction.-

(1) **PAYMENTS DURING CONSTRUCTION.** - The non-Federal interests for a navigation project for a harbor or inland harbor, or any separable element thereof, on which a contract for physical construction has not been awarded before the date of enactment of this Act shall pay, during the period of construction of the project, the following costs associated with general navigation features:

(A) 10 percent of the cost of construction of the portion of the project which has a depth not in excess of 20 feet; plus

(B) 25 percent of the cost of construction of the portion of the project which has a depth in excess of 20 feet but not in excess of 45 feet; plus

(C) 50 percent of the cost of construction of the portion of the project, which has a depth in excess of 45 feet.

(2) **ADDITIONAL 10 PERCENT PAYMENT OVER 30 YEARS.** - The non-Federal interests for a project to which paragraph (1) applies shall pay an additional 10 percent of the cost of the general navigation features of the project in cash over a period not to exceed 30 years, at an interest rate determined pursuant to section 106. The value of lands, easements, rights-of-way, and relocations (LERRDs) provided under paragraph (3), and the costs of relocations borne by the non-Federal interests under paragraph (4) shall be credited toward the payment required under this paragraph.

(3) **LANDS, EASEMENTS, AND RIGHTS-OF-WAY.** -The non-Federal interests for a project to which paragraph (1) applies shall provide the lands, easements, rights-of-way, and relocations (other than utility relocations, under paragraph (4)) necessary for the project including lands, easements, rights-of-way, and relocations (other than utility relocations accomplished under paragraph (4) that are necessary for dredged material disposal facilities.

(4) **UTILITY RELOCATIONS.** - The non-Federal interests for a project to which paragraph (1) applies shall perform or assure the performance of all relocations of utilities necessary to carry out the project, except that in the case of a project for a deep draft harbor and in the case of a project constructed by non-Federal interests under Section 204, one-half of the cost of each such relocation shall be borne by the owner of the facility being relocated and one-half of the cost of each such relocation shall be borne by the non-Federal interests.

(5) **DREDGED MATERIAL DISPOSAL FACILITIES FOR PROJECT CONSTRUCTION.** - In this subsection, the term “ general navigation features” includes constructed land-based and aquatic dredged material disposal facilities that are necessary for the disposal of dredged material required for project construction and for which a contract for construction has not been awarded on or before the date of enactment of this paragraph.

TABLE 2
AUTHORIZING LEGISLATION

ACT	WORK AUTHORIZED	DOCUMENTS
Aug 30, 1852	North Pier ¹	S. Doc 175, 25th Cong., 2nd Sess.
Mar 3, 1883	Inner 7,600 feet of breakwater ¹²	Annual Report, 1881, p 2122
Mar 2, 1907	South Pier. Extending north breakwater. 1,000 feet	Annual Report, 1906, p. 1752 (No prior survey or estimate affecting breakwater extensions)
Sep 22, 1922	Extend north breakwater; a south breakwater; Present dimensions of inner entrance channel.	H. Doc 804, 66th Cong., 2nd Sess.
Aug 30, 1935 ²	Dredging a portion of outer harbor to 21-foot depth	H. Doc. 289, 72d Cong., 1st Sess.
Mar 2, 1945 ³	Dredging river channels to 21-foot depth	S. Doc. 29, 76th Cong., 1st Sess.
Jul 14, 1960	Deepen South Menominee and Burnham Canals to 21 feet	H. Doc. 285, 86th Cong., 2nd Sess.
Oct 23, 1962	Deepen an approach channel to 30 feet by 800 feet wide and 300 feet wide through breakwater, deepen entrance channel 28 feet through piers, outer harbor to 28 feet south of entrance channel, and a channel 27 feet in Milwaukee River to Buffalo Street, and in Kinnickinnic River to Chicago & North Western R.R. bridges.	H. Doc. 134, 87th Cong., 1st Sess ⁴ .

1. Completed under previous project

2. Uncompleted portion was de-authorized December 31, 1989 under section 1001, P.L. 99-662.

3. Uncompleted portion was de-authorized 1977 (dredging Milwaukee River from Buffalo Street to north Humboldt Ave Bridge.

4. Contains the latest published map

3.3 Milwaukee Harbor

The Milwaukee Harbor is located on the west side of Lake Michigan approximately 85 miles north of Chicago, Illinois. The River and Harbor Acts of 30 Aug 1935, 2 Mar 1945, 14 July 1960, and 23 October 1962 authorized the construction of breakwaters and dredging of the harbor to accommodate robust commercial shipping activity. See Figure 2 for project map of the harbor.

3.4 Milwaukee (Jones Island) CDF

The existing 44 acre Jones Island CDF was completed in 1975 at a cost of \$5,962,806 and is located in the south side of the outer harbor. This facility was authorized by the Chief of Engineers, U.S. Army Corps of Engineers, under Section 123 of the River and Harbor Act of 1970 (Title I of Public Law 91-611). Section 123 of this act provided for the construction of CDFs which have a capacity to hold 10 years of dredged material placement needs specific to the Great Lakes Region, with local interests supplying lands, easements, and rights-of-way. Construction of the CDF at Milwaukee Harbor was accomplished at 100 percent Federal cost. Its purpose is to receive dredged material that is unsuitable for open lake placement from both Milwaukee Harbor and Port Washington Harbor, which is located approximately 25 miles north of Milwaukee Harbor. This placement facility was designed to use both mechanical and hydraulic dredging operations. The facility contains filter cells. The design capacity of the facility was to hold 1,600,000 cubic yards of contaminated dredged material. See Figure 3 for aerial photo of the harbor.

3.5 Previous Studies

U.S. EPA formally selected the site as a Great Lakes Legacy Act project and provided funds to finalize the Milwaukee Harbor Concept Design in 2005.

Wisconsin Department of Natural Resources formally requested use of the Milwaukee CDF, June 2004.

Milwaukee Harbor Concept Design Document, Under Section 401(a) of the Water Resources Development Act (WRDA) 1990 (as amended) the Wisconsin Department of Natural Resources requested that the Corps provide assistance for the planning and engineering portion of a project to remove sediments from the Kinnickinnic River. An agreement to provide the assistance was executed 13 August 2002.

Milwaukee Harbor, Wisconsin Phase I Scoping Document- Summary Report, Dredged Material Management Plan (December 1997). Five sites were evaluated for potential CDF locations under the authority of PL 91-611.

Repair of North Detached, South Detached and South Shore Connector Breakwaters, Milwaukee Harbor, Environmental Assessment & 404(b)(1) evaluation (February 1995).

Rehabilitation of Sections of the North Breakwater and North Entrance Pier at Milwaukee Harbor, Revised Environmental Assessment & 404(b)(1) evaluation (February 1985).

General Design Memorandum, Rehabilitation of the North Breakwater and North Pier, Milwaukee Harbor, (October 1984).

Rehabilitation of the North Breakwater and Entrance Pier at Milwaukee Harbor, Environmental Assessment & 404(b)(1) evaluation (July 1984).

Milwaukee Harbor South Breakwater Head Repair, Environmental Assessment (March 1982).

Review Report, Milwaukee Harbor, (March 1974)

Maintenance Dredging at Milwaukee Harbor, Wisconsin, Final Environmental Statement (November 1974).

Navigation Improvements at Milwaukee Harbor, Wisconsin Draft Environmental Impact Statement (November 1973)

Milwaukee Diked Disposal Area, Final Environmental Statement (April 1972). The report evaluates the impacts for the Jones Island disposal site.

4. DESCRIPTION OF EXISTING CONDITION

4.1 General

Evaluation of Milwaukee Harbor channel sediments was completed (2002) in accordance with the Great Lakes Dredged Material Testing and Evaluation Manual USEPA/USACE, (1998). The Manual presents guidance on testing and evaluation for proposed discharges of dredged material into U.S. waters of the Great Lakes Basin. The physical and chemical testing conducted indicated that the sediments in the outer and inner harbor areas may have deleterious impacts to water quality and benthic organisms. Therefore the material is not suitable for unrestricted in water disposal.

The channel limits identified in the Milwaukee Harbor Dredged Material Management Plan (DMMP) study are all Federal channels generally from the harbor entrance to approximately 1.75 miles to the upstream limit of the Menominee River. Results from 2002 sampling and analysis of channel sediments indicate 85% fine material (silt with clay). Levels of metals were moderately high, with above background conditions for arsenic, barium, cadmium, chromium, and lead. Semi-volatile organic compounds were moderately high. PCB levels were mostly non-detectable, with a few stations just above 1.0 ppm. Pesticides were non-detectable. Appropriate disposal would isolate the material preventing impacts to water

quality and benthic organisms including the lower reaches of the Milwaukee and Kinnickinnic Rivers.

4.2 Outer Harbor

Extending from Lake Michigan, the project depth and width in the lake approach channel are 30 feet and 800 feet, respectively. At the entry into the outer harbor, the width reduces to 300 feet and then expands to 600 feet inside the outer harbor breakwaters. From this point, the width varies in the outer harbor. The project depth is 28 feet in the south outer harbor and at the entrance channel, and 21 feet northward.

Most of the north breakwater was rehabilitated from 1957 to 1964. Major rehabilitation of the navigation structures, including 4,240 linear feet of the north breakwater and 1,656 linear feet of the north entrance, is complete. Additional major rehabilitation work completed includes removal of an existing barrier on the outer 754 feet of the north shore connected breakwater.

4.3 Inner Harbor

In the entrance channel to the inner harbor, the width is 280 feet at the outer harbor and 452 feet at the entrance to the Milwaukee and Kinnickinnic Rivers. The width of the Federal channel varies from approximately 200 feet at the downstream end to approximately 80 feet at the upstream end.

Following is a brief description of major public channels and canals that comprise the inner Milwaukee Harbor;

- Milwaukee River; The project depth is 27 feet to the Chicago and Northwestern Railway Swing Bridge at mile 0.2 and 21 feet to the East Buffalo Street Bridge.
- Kinnickinnic River; The project depth is 27 feet from the inner harbor entrance, extending to the Chicago and Northwestern Railway Swing Bridge at mile 1.0, then decreasing the depth to 21 feet, extending to the upstream project limit at South Kinnickinnic Avenue Bridge (State Highway 32).
- Menomonee River; The project depth is 21 feet, from the confluence between the Milwaukee River and the Menomonee River, extending to the upstream limit of the Federal navigation channel, which is approximately 1,500 feet downstream of the US 41 bridge.
- South Menomonee Canal; The project depth is 21 feet, from the confluence between the Menomonee River and the South Menomonee canal, extending to the upstream project limit of the Federal navigation channel, which is approximately 1,100 feet upstream of I 94 bridge.
- Burnham Canal; The project depth is 21 feet, from the confluence between the South Menomonee canal and the Burnham canal, extending to the upstream limit of the Federal

navigation Channel, which is approximately 400 feet upstream of I-94 bridge.

4.4 Jones Island CDF

Currently, the dredged material from Milwaukee Harbor (defined above) is placed in the Jones Island Confined Disposal Facility (CDF), also referred to as the Milwaukee Harbor CDF. The Jones Island CDF is located adjacent to the shoreline at the southern extremity of the outer harbor. In 1998, a portion of the south end of the Jones Island CDF was converted to a docking facility for car ferry service. Jones Island continues to receive dredged material that is unsuitable for open lake placement from Milwaukee Harbor. Although in the past dredged material from Port Washington Harbor was placed in the CDF, there are no longer commercial users in Port Washington and therefore it is not anticipated to be dredged in the future. The original design of the CDF included a filter cell, which allows for hydraulic or mechanical method of dredging, but since the WI DNR does not allow a discharge, only mechanical method is used. See Table 3 below with the channel maintenance history of Port Washington.

FY	Total Cost ¹	Cubic Yards	Cost/CY ¹	Placement Site	Contractor or Government
1977	\$980,002	14,372	\$68.18	Jones Island CDF	Government
1978	\$139,173	0	\$0.00	Jones Island CDF	Government
1981	\$857,666	16,484	\$52.02	Jones Island CDF	Contractor
2003	\$224,520	11,204	\$20.05	Jones Island CDF	Contractor
Totals	\$2,201,361	42,060			
¹ All values in FY07 dollars.					

The future DMDF must be able to contain at a minimum, a 20-year dredged material capacity (including backlog), which in this case is 350,000 cubic yards (cy). Permittee dredging is calculated at 160,000 cubic yards (cy). The 20-year maintenance dredging capacity is based on a dredge cycle of 4 years and an average quantity of 70,000 cy.

The dredging volume for the Milwaukee Harbor has been considerably reduced with the construction of the “Big Tunnel” storm water retention basin under the City of Milwaukee (See Chart 1 on page 11). In addition there is a large backlog of approximately 270,000 cubic yards in the Navigation Channel due to a lack of funds available to completely maintain the channel. The backlog volume was not included in future dredging calculations. The 17,500 cy/year figure was based on reviewing dredging volumes for the last 20 years. Those figures were annualized to spread the volume over a per year basis (See Chart 2 on page 11). As can be seen, the 17,500 cy/year figure allows an ample quantity of volume. The 70,000 figure was based on an estimate of 17,500 cubic yards per year of dredging and dredging cycles of

approximately 4 years. Capacity figures include the volume of the dikes so excavating material from the CDF or DMDF to construct on-site berms does not create any additional capacity.

Chart 1. Dredging Volumes expressed on a per year basis for Milwaukee Harbor.

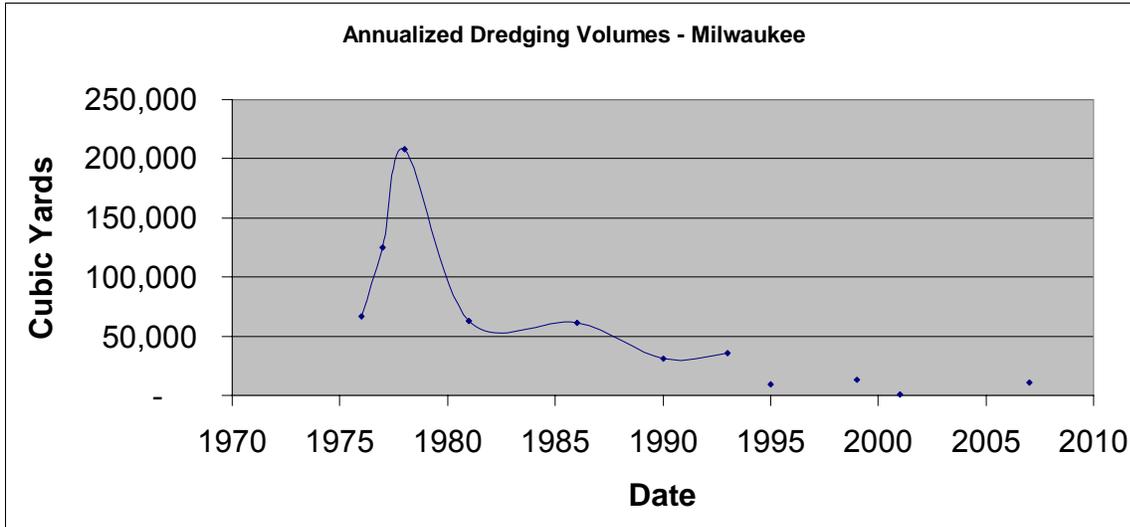
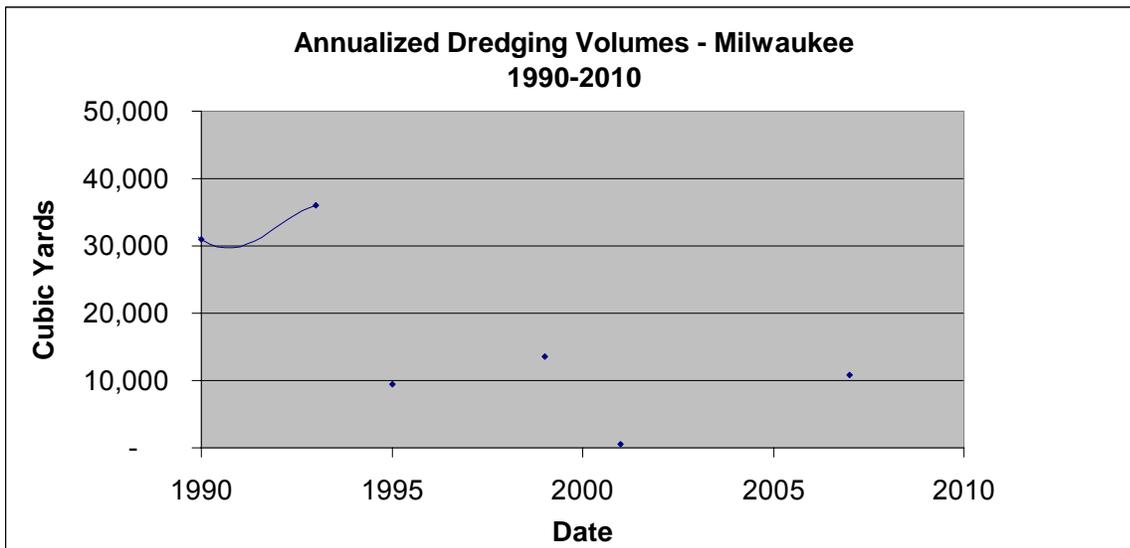


Chart 2. Dredging Volumes in Milwaukee over the period 1990-2010.



5. PROJECTION OF FUTURE CONDITIONS IN THE ABSENCE OF A MANAGEMENT PLAN

In the absence of a Management Plan, there is approximately enough remaining capacity for 5 years. After that, the lack of dredging would result in shoal buildup, which reduces channel depth, forcing ships to light load (partially load) or discontinue transit into the Milwaukee Harbor. Also, shoaled channels cause more sediment re-suspension from ship hulls and prop wash. Light loading reduces draft, which allows the vessels to clear the shoals, but increases per-unit shipping costs, which consequently increases costs to industry and the consumer.

Without project conditions remaining dredged cycles

Calendar Year	Project Year	Sediment Placed In existing CDF	
2007	1	72,000	
2008	2	30,000	Scheduled
2009	3		
2010	4		
2011	5	70,000	* CDF will be essentially full
2012	6		
2013	7		
2014	8		
2015	9	70,000	New site required
2016	10		
2017	11		
2018	12		
2019	13	70,000	New site required
2020	14		
2021	15		
2022	16		
2023	17	70,000	New site required
2024	18		
2025	19		
2026	20		
2027	21	70,000	New site required
2028	22		
2029	23		
2030	24		
2031	25	70,000	New site required

Milwaukee Harbor was last dredged in 2001. Approximately 1,218 cubic yards was dredged and placed in Milwaukee's current CDF. After dredging in 2001, the Milwaukee CDF has an estimated maximum of 176,000 cubic yards of capacity remaining out of its 1,600,000 cubic yard design capacity. It is anticipated that between 70,000 and 162,000 cubic yards will be dredged by 2011. The 2011 dredging cycle will essentially fill the current Milwaukee CDF to its design capacity. There would be insufficient storage space in the current CDF for another dredging cycle. Therefore, after the 2011 dredging cycle, a new DMDF will have to be found for all future sediments.

Below is a brief discussion of future economic trends. For a detailed discussion, see Appendix C, entitled "Economic Assessment" presents support for continued Operation & Maintenance (O&M) dredging.

Aggregate commodity traffic shipped through Milwaukee Harbor has experienced a 4.8% average annual growth rate since 1993. In more recent history, traffic at the Harbor since 2001 has experienced a 2.4% growth rate. Based on increasing rail costs, congestion, and capacity limitations, and an analysis of the most recent trends, traffic at Milwaukee Harbor can reasonably be expected to increase by approximately 2% annually for the foreseeable future.

The National Economic Development (NED) benefit of dredging a project is the reduction of commodity transportation costs. A transportation rate analysis of Milwaukee Harbor performed in 2005 indicated that, at the authorized depth, the cost of alternative land transportation for commodities shipped through Milwaukee Harbor exceeded the waterborne transportation cost by 179.6%. Maintaining the harbor to the authorized depth clearly yields NED benefits.

The fleet servicing the Harbor demonstrates to the economic rationale for decreasing the number of shallow-depth loadings and maximizing vessel draft to the authorized channel depth. Doing so reduces the number of needed trips, thereby increasing shippers' savings, a NED benefit. In 2006, the U.S. Army Corps of Engineers, Buffalo District performed an analysis to ascertain the increased cost to shippers resulting from increased depth. Corps personnel utilized a model called GLLAPOM (Great Lake Level Analysis of Port Operation and Maintenance). Results from the model indicate that at one foot above the authorized depth at Milwaukee Harbor, indicating one foot of shoaling, transportation costs per ton increase by approximately \$0.24. At two feet above authorized depth, per ton costs increase by approximately \$0.57. Using 3.3 million tons, the average of the last 12 years of commodity traffic, such shoaling would cause total cost increases of \$792,000 and \$1.88 million, respectively. However it should be noted that GLLAPOM assumes that the originators and receivers of cargo will bring in the same amount of cargo regardless of the increased costs. In many cases, originators or receivers ship less when costs exceed a certain point. Therefore, these cost increase estimates are likely biased upward. Yet, the model does indicate that NED benefits are reduced by lack of maintenance dredging. For more information regarding the methodology used in this analysis, please see the Economic Assessment in Appendix C.

6. PROBLEMS AND OPPORTUNITIES

This section summarizes problems (current) and opportunities that were developed during the evaluation for placement of dredged material from Milwaukee Harbor.

6.1 Problems and Current Status

There is approximately 5 years of dredged material capacity remaining in the Jones Island CDF under its current design. Presently, commercial navigation use of the harbor will maintain near present tonnage levels but if continued dredging does not take place, significant shoaling within the navigation channel will result. Coal is shipped to the harbor for fueling the three local electric generating plants, which if restricted, would increase utility costs significantly.

6.2 Opportunities

The opportunity statements presented in this section evolved from evaluating the area resources and problems evident in the development of the Dredged Material Management Plan (DMMP) for Milwaukee Harbor:

- (a) Provide additional use of the existing CDF property;
- (b) Locate upland site(s) for future (long-term) consideration to place dredged material;
- (c) Evaluate beneficial uses for dredged material.

7. ALTERNATIVE PLANS

The alternatives that are presented in the following paragraphs are those that remain as potential options for consideration in handling future maintenance dredging needs of Milwaukee Harbor navigation channels. The Milwaukee Harbor management plan considers a full range of measures, which includes; open water disposal, development of a new disposal site, and beneficial use of the dredged material. A summary of alternative placement options for the annual maintenance-dredging program is displayed at the end of Section 8 in Table 4.

7.1 Alternative 1 - Construct the Milwaukee Harbor (Jones Island) DMDF on top of the existing Milwaukee Harbor (Jones Island) CDF.

This alternative proposes to continue using the existing Milwaukee Harbor (Jones Island) site by constructing a raised perimeter dike offset from the existing dikes around the CDF to create a new DMDF on top of it. The DMDF will be located within Milwaukee Harbor (See Figure 4 for general location, Figure 5 for Plan view and Figure 6 for cross section view).

The EPA and Wisconsin DNR are proposing to use the existing Jones Island CDF for placement of contaminated dredged material from the Kinnickinnic River in a specially designed cell within the CDF. The dredging of the Kinnickinnic River and construction of the special cell within a cell would be funded through the Legacy Act. This is not a confinement cell as much as a segregation cell and will be constructed from mounded dredged material. The dikes will not be constructed using the segregated Kinnickinnic River dredged material. No special liners or clay/bentonite are required. The purpose of constructing a special cell within a cell is to separate the Kinnickinnic River dredged material, because the Great Lakes Legacy Act material is at a level of contamination that is comparable to historic dredging within the harbor, while current Operation and Maintenance (O&M) dredged material placed in the CDF is cleaner and has potential for beneficial reuse. The District indicated to the local sponsor (Milwaukee Port Authority) that the Legacy Act dredging (approximately 176,000 cubic yards) would effectively fill the CDF to 100% capacity under existing conditions.

As a result, the Milwaukee Port Authority requested and received a state grant to cost share building a DMDF over the existing Jones Island CDF and has requested the Corps to design and construct the DMDF through International & Interagency Services (IIS) agreement (previously SFO). Creating the DMDF would provide 20-year dredged material capacity.

The existing Milwaukee CDF was constructed under 91-611 authority. Under the provisions of 91-611 the Corps set aside capacity for non-Federal Navigation Channel dredging. This capacity was typically about 20% of the Federal Navigation capacity. The Legacy Act material would be placed under this authority. The proposed modification would involve using dredged material already deposited within the existing Jones Island CDF. This configuration would allow for more efficient use of the site and expand its usefulness.

7.2 Alternative 2 - Construct a DMDF adjacent to the existing Milwaukee Harbor (Jones Island) CDF.

This alternative provides for the construction of a new DMDF which would extend north of the existing Jones Island CDF. The dredged material capacity of this expansion facility would be similar to that of the future 20-year capacity. Construction work would involve adding on to the existing facility and would involve the construction of new dikes. The new dikes would be constructed as a rubble mound structure. However, the north dike of the existing Jones Island CDF would serve as a connecting structure between the existing CDF and the northward expansion structure. This alternative would also use the Jones Island CDF for placement of the contaminated Kinnickinnic River material, which would essentially fill it. Plan views showing the location of this alternative are shown on Figure 7.

7.3 Alternative 3 – Open Water placement.

This alternative proposes to place dredged material in an Open Water Disposal site, with a 3 - foot thick cap, approximately 8 miles southeast from Milwaukee Harbor entrance, Lake Michigan. The character of the dredged material is classified as silty, therefore, it can easily

disperse with wave currents. The purpose of the Cap is to prevent the dredged material from dispersing. The parameters to conduct a stability analysis include; determining the location for placement of the dredged material, the grain size of the Capping material and the current velocities. The analysis results determine the placement depth which would cause minimal particle movement of the dredged material.

7.4 Alternative 4 - Beach Nourishment

Alternative 4 considers the placement of the dredged material on the beaches within Lake Michigan shoreline, which would serve a beneficial use.

Beach nourishment is becoming a more utilized option where local conditions warrant. Beach nourishment is ideal in shoreline areas that are classified as “erosional”, where more material is lost through natural erosion than is deposited via littoral drift. Also, beach nourishment helps to expand recreational beaches at local or state parks, if near by. Lastly, sandy material can be placed on shorelines in preserve areas to enhance shoreline habitat.

7.5 Alternative 5 - No Action

With the Milwaukee Harbor (Jones Island) CDF at approximately 94% capacity, it is anticipated that by the year 2011, the CDF will be at full capacity and dredging of material from Federal navigation channels will not occur without identifying a new dredged material disposal facility.

8. EVALUATION OF ALTERNATIVE PLANS

8.1 Alternative 1 - Construct the Milwaukee Harbor (Jones Island) DMDF on top of the existing Milwaukee Harbor (Jones Island) CDF.

This alternative would create future capacity by constructing a DMDF over an existing CDF. Funding for the construction of the 20-year dredged material capacity would be cost shared with the Milwaukee Port Authority (65% Fed / 35% non-Fed) and the betterment (additional capacity) would be 100% non- Federal funded.

The Corps would benefit from supporting the EPA/DNR’s project to remove the higher level contaminated Kinnikinnic River material, which is located upstream of our O&M dredging. If the Kinnikinnic River material is not removed, it may migrate downstream and impact our channels. By constructing a cell within a cell, it will isolate the higher level contaminated dredged material from the O&M dredging. (Under the Remedial Action Plan (Sect 401a, WRDA 1990) Program the Detroit District studied the Kinnickinnic River and recommended placement of the material in the Milwaukee CDF) The EPA and the State of Wisconsin have continued pursuing this alternative under the Legacy Act and have worked with the Detroit District to develop this alternative.

The top elevation of the existing Jones Island CDF is +10 feet above the Low Water Datum (LWD) elevation of 576.8 feet International Great Lakes Datum (IGLD), 1955. It will also be the final elevation of the segregated cell for placement of the Kinnikinnic River dredged material. Building the new offset dikes to + 18 feet to elevation 594.8 feet above LWD will provide the 20-year dredged material capacity in the amount of 510,000 cy. Figure 6 shows a typical cross section. The cost estimate for constructing the new DMDF is approximately \$ 2,865,313. Conceptual costs for this alternative are shown in Appendix B.

8.2 Alternative 2 - Construct a DMDF adjacent to the existing Milwaukee Harbor (Jones Island) CDF.

This alternative could provide additional placement capacity, at approximately 510,000 cubic yards. The cost to construct the rubble mound design disposal site to accommodate 510,000 cy capacity in Milwaukee harbor site was determined through extrapolation of the costs from the Draft *Phase I Scoping Document, Dredged Material Management Plan Study, Milwaukee Harbor* (Dec 1997) report. Using the CIVIL WORKS CONSTRUCTION COST INDEX SYSTEM, CWBS Feature Code 12: Navigation Ports and Harbors, (EM 110-2-1304), the projected dollars in 2007 dollar worth for construction of a 510,000 cy capacity DMDF would cost approximately \$ 12,307,141. In order to compare equivalent costs and capacity, the Rubblemound design from the Phase I document with a capacity of 829,427 cy and a cost of \$13, 236,000 (1997 dollars) was reduced to an equivalent 510,000, cy capacity and \$8,138,582 (1997 dollars). The \$8,138,582 cost was then extrapolated to current costs. By extending northward from the north dike of the existing Jones Island CDF, construction costs would be less compared to a structure requiring new dikes on all four sides. This alternative would provide capacity for 20-years of dredged material placement at Milwaukee Harbor. However, in comparing construction cost and Federal cost sharing, to Alternative 1 - Construct the Milwaukee Harbor (Jones Island) DMDF on top of the existing Milwaukee Harbor (Jones Island) CDF, this alternative is not the least costly alternative. As discussed above the Corps would benefit from the EPA/DNR's project.

8.3 Alternative 3 – Open Water placement.

The use of open water sites would result in the burial of bottom habitat, releases of turbidity and associated contaminants into the water column, and will require a clean cap to isolate the material from local benthos (bottom dwelling organisms).

Sediments are contaminated with metals, polychlorinated biphenyls (PCBs), and **polycyclic aromatic hydrocarbons** (PAHs). Due to the nature of the physical character (fine grain) and contaminants in the dredged material, a cap would be difficult to place. The fine grain material contains mainly silts and fine sand. The dispersion of the exceptionally “fine grain” material would require a large cover area (approx. 1,800 feet x 1,420 feet x 3 feet) to confine the dredged material for the 20 year period in order to prevent it from becoming exposed and contaminating the waters of Lake Michigan. A sand cap of approx. 284,000 cubic yards would be barged to the site. (Reference; The draft “Phase I Scoping Document,

Dredged Material Management Plan, Milwaukee Harbor, December 1997”, Appendix C, Hydrology & Hydraulic Analysis for Alternative I – Open Water Disposal.) The analysis determined a site approximately 8 miles southeast of the harbor entrance with depths approximately 75-100 feet. Note; the Milwaukee's municipal water intake was a factor in the location. The cost for open water placement over a 20-year period is \$8,251,440.

Current Wisconsin Department of Natural Resources water quality standards do not permit open water placement of dredged material; therefore, it is not likely that the State would issue a 401 Water Quality Certification for this alternative. Costs to transport dredged material and a sand cap (by barge) to this open water location (8 miles) would be higher than the costs to transport dredged material to the Milwaukee Harbor (Jones Island) CDF located in the harbor.

8.4 Alternative 4 - Beach Nourishment

This alternative considers the feasibility of using the material to enhance area beaches or return the material into the natural system from which it came.

The District has been very proactive in attempting to develop beneficial uses for the dredged material from the Milwaukee Harbor. Unfortunately the dredged material is fine-grained organic silts with low but detectable levels of PCBs, PAHs, and metals. The State of Wisconsin regulates dredged material as a solid waste and has stringent limits with regard to the beneficial use of solid waste. These limits are often so low as to be below laboratory detection limits. Therefore the District and the local sponsor cannot ensure that the dredged material complies with State regulations. This issue has been broached with the State on more than one occasion and the District continues to follow developments in this regard.

The “fine grain” nature of this material makes it physically unsuitable for beach nourishment. In addition, the contaminate nature of the sediment makes it unsuitable for beneficial reuse. Current Wisconsin Department of Natural Resources water quality standards do not permit open water placement of dredged material; therefore, it is not likely that the State would issue a 401 Water Quality Certification for this alternative.

8.5 Alternative 5 - No Action

Unless additional disposal areas are developed, dredging of material from designated navigation channels could not occur which would threaten the viability of the channel as a means to efficiently move goods and commodities. Under the "No Action" option, a backlog of maintenance dredging would grow, which will limit full utilization of the channel, resulting in increased transportation costs. Therefore, this alternative is not acceptable as a solution.

TABLE 4 - Summary of Alternatives					
Alternative	Placement	Capacity cubic yards	Construction Costs (\$)	Annualized Average cost	Recommend to Phase II
Construct DMDF on top of CDF	Upland	350,000 ¹ 160,000 ²	1,977,066 ³ 888,247 ⁴	156,968 70,522	Y
Construct DMDF adjacent to CDF	Upland	350,000 ¹ 160,000 ²	8,491,927 ³ 3,815,213 ⁴	674,211 302,906	N
Open Water	Open Water	350,000 ¹ 160,000 ²	5,693,494 ⁷ 2,557,946 ⁷	320,208 143,855	N
Beach Nourishment	Beach Nourishment	Unlimited	----- ⁵		N
No Action	N/A	N/A	-----		N
1. 20- year Navigation Capacity 2. Additional Permittee Capacity (betterment) 3. Cost for 20- year Capacity (including 20% contingency) 4. Cost for Additional Capacity (betterment) including 20% contingency 5. The dredged material that was determined to be environmentally unacceptable. 6. Construction will occur in one construction season. 7. Amounts are discounted to FY07 dollar values. 8. The Federal cost does not include Great Lakes Legacy Act funds.					

9. TRADE-OFF ANALYSIS

Each of the following alternatives is compared in the following paragraphs as to their advantages and disadvantages if implemented.

9.1 Alternative 1 - Construct the Milwaukee Harbor (Jones Island) DMDF on top of the existing Milwaukee Harbor (Jones Island) CDF.

Advantages: The CDF is located the nearest to the Federal navigation channels compared to open water or beach nourishment alternatives. No additional Real Estate is required. The Port Authority is willing to cost share the base plan and fund the additional capacity. The site is adequate in size to meet the 20 - year capacity, is engineeringly feasible, environmentally acceptable and least costly.

As such, this alternative has been determined to be the least costly and engineeringly feasible, and environmentally advantageous and therefore is the “recommended alternative”, which will be carried forward for implementation. Milwaukee Port Authority has agreed to sponsor the project and is willing to cost share the project.

Disadvantages: Temporary disturbance to wildlife habitat during construction, additional height on structure.

9.2 Alternative 2 - Construct a DMDF adjacent to the existing Milwaukee Harbor (Jones Island) CDF.

Advantages: The site is adequate in size to meet the 20 - year capacity, engineeringly feasible and environmentally acceptable. The CDF is also located the nearest to the Federal navigation channels compared to open water or beach nourishment alternatives.

Disadvantages: This alternative is not the least costly, occupation of additional estuary bottomland. Therefore, Alternative 2 will not be considered further.

9.3 Alternative 3 – Open Water Placement.

Advantages: It has an unlimited space; therefore it will meet the 20-year capacity requirement.

Disadvantages: Sediments are contaminated with metals, PCB, and PAHs, costly capping would be required, long haul distance. The Wisconsin Department of Natural Resources regulations do not permit open water placement of dredged material; therefore, it is highly unlikely that the State would issue a 401 Water Quality Certification for this alternative. Considering the contaminate levels in the dredged material, and the cost of transportation, this alternative will not be considered further.

9.4 Alternative 4 - Beach Nourishment

Advantages: This alternative could meet the 20 - year capacity.

Disadvantages: The dredged material is not suitable for beach nourishment. Sediments are contaminated with metals, PCB, and PAHs. The Wisconsin Department of Natural Resources regulations do not permit open water placement of dredged material; therefore, it is highly unlikely that the State would issue a 401 Water Quality Certification for this alternative.

As such, Alternative 4 is not engineeringly feasible or environmentally acceptable and will not be considered as a candidate for implementation.

9.5 Alternative 5 - No Action

Advantages: None

Disadvantages: The backlog of maintenance dredging would continue to accrue, which will continue to limit full utilization of the channel, resulting in increased transportation costs.

10. SELECTION OF FINAL PLAN

10.1 Base Plan

Original studies to investigate disposal options for dredged material in the Milwaukee Harbor were initiated prior to the establishment of DMMP guidelines. This document has been prepared in accordance with recent procedures established for development, review and implementation of DMMP's. Based on current information in this Phase II DMMP Document, *Alternative 1 - Construct the Milwaukee Harbor (Jones Island) DMDF on top of the existing Milwaukee Harbor (Jones Island) CDF* meets the criteria as engineeringly feasible, environmentally acceptable and least costly. Accordingly, information that follows is presented on the basis that reflects this option as the Base Plan.

The south end of the existing Jones Island CDF will continue to be used by the Port Authority for Car Ferry service. New dikes offset from the perimeter of the CDF will be constructed to + 18 which will include the 20-year dredged material capacity and the additional capacity (betterment). See figure 5 & 6, which shows a plan view and typical dike cross section. The DMDF dikes will be constructed with onsite dredged material, and will be wider at the base and higher in elevation than the existing dikes to meet the 20-year capacity requirements. The positioning of the offset dike is based on obtaining maximum volume and bearing capacity to support the dike within the existing Jones Island CDF. The entire dike construction may be accomplished in the initial construction.

The DMDF will continue to allow for placement by mechanical dredging since the WDNR will not issue a discharge permit. With regards to effluent, when needed, the Port Authority will connect to the wastewater treatment plant, therefore a new filter cell will not be needed. All rainfall that lands on the outside of the new dikes will flow to a central sump and then to the Waste Water Treatment Plant. The EPA will also use that method to pump water levels down in the existing Jones Island CDF, so that they can construct the Legacy Act cell more easily.

10.2 Project Advantages

Construct the Milwaukee Harbor (Jones Island) DMDF on top of the existing Milwaukee Harbor (Jones Island) CDF alternative was chosen over the other sites because of the following major advantages: it is least costly, while being both engineeringly feasible and environmentally acceptable. Other advantages include that the site is sufficient enough in size

to meet the required 20 - year capacity while being situated where a mechanical offloading is easily accessed. This site is much closer to the dredging operation areas compared to the much greater distance of hauling dredged material to open water. Onsite dredged material could be used to construct dikes, which contributes to making this alternative less costly than other alternatives.

This alternative would create additional capacity. Funding for the construction of the 20-year dredged material capacity would be cost shared with the Milwaukee Port Authority (65% Fed / 35% non-Fed) and the betterment (additional capacity) would be 100% non-Federal funded.

10.3 Real Estate

The local sponsor already acquired the necessary real estate interests when the Milwaukee Harbor (Jones Island) CDF was constructed. The construction of the offset dikes will not necessitate additional LERRD acquisition. For more detailed analysis, see Appendix D, “Real Estate Plan”.

10.4 Project Design

The Design Report (see Appendix A) includes a brief narrative, location map, plan view, cross sections, detail, and quantitative calculations for developing the alternative, *Construct the Milwaukee Harbor (Jones Island) DMDF on top of the existing Milwaukee Harbor (Jones Island) CDF*.

10.5 Project Construction

The project construction would consist of building offset perimeter dikes on top of the existing CDF for the DMDF. On-site sub-grade material would be excavated from the CDF to be used to construct the offset perimeter dikes. The rich soil would quickly vegetate, which would provide for a natural appearance to the placement site.

The construction sequence is such that the entire perimeter dike will be constructed in one construction season. A typical construction operation would consist of (a) stripping the topsoil, (b) compacting the surface area immediately under the proposed perimeter dike, (b) excavating and stockpiling the dredged material for dike construction, and, (c) shaping and compacting the dikes (See appendix A for details) If a specific dredging operation requires a cordoned off area, then the contractor could use temporary push up berms to isolate such areas.

10.6 Project Cost

Table 5¹					
Cost Estimate for Alternative 1 - Construct the Milwaukee Harbor (Jones Island) DMDF on top of the existing Milwaukee Harbor (Jones Island) CDF. (2007 price level)					
	Feature – Capital Costs	Quantity	Unit	Unit Price⁽⁴⁾	Estimated Cost (\$)
1	Mob & Demob	1	L.S.	\$145,000	\$ 145,000
2	Compacted fill	71,000	C.Y.	\$ 11.47	\$814,370
3	Riprap – Armor Stone	10,500	TN	\$ 69.64	\$ 731,220
4	Crushed Aggregate	5,000	C.Y.	\$ 36.28	\$ 181,400
5	Geotextile	20,000	S.Y.	\$ 4.11	\$ 82,200
6	Portland Cement	703	TN	\$178.61	\$125,563
7	Site Restoration	1	LS	\$14,500	\$14,500
9	Load & Transport Material in Cell	71,000	CY	\$10.86	\$ 771,060
	Total Construction				\$ 2,865,313
	Escalate Total Const. to FY09 -1.021%				\$ 2,925,484
	Feature – Indirect Costs	Quantity	Unit	Unit Price	Estimated Cost (\$)
	Engineering & Design pre. Const. (6% of capital costs)	1	LS	\$ 717,900	\$ 171,900
	Construction Management S&A (9%)	1	LS	\$257,900	\$ 257,900
	E & D During Const.	1	LS	\$ 28,700	\$ 28,700
	Contract Award	1	LS	\$10,000	\$10,000
	Real Estate				0.00
	Subtotal, Non-Construction				\$ 468,500
	Contingency (15%)				\$ 70,300
	Total Non-Construction				\$ 538,800
	Escalate Total Non-Construction to FY09 - 1.021%				\$ 550,115
	Total Project Cost Escalate to FY09				\$ 3,475,599 ²
	Annualized Average Cost				\$ 275,917 ³
	Annual O&M Cost				\$ 12,000
	Total Annualized Average Cost				\$ 287,917
<p>1 See detailed cost estimate provided in Appendix B.</p> <p>2 As construction will occur during a single season, no interest during construction was estimated.</p> <p>3 Amortized over the 20-year project life using the FY07 discount rate of 4.875%.</p> <p>4 Construction Contingency of 20% was added to the unit price.</p>					

The Cost Engineering Appendix shows the costs with contingencies for the project (See Appendix B). The appendix includes a brief narrative, cost summary table, and a detailed cost estimate. Table 5 shows a cost summary for Alternative 1 - *Construct the Milwaukee Harbor (Jones Island) DMDF on top of the existing Milwaukee Harbor (Jones Island) CDF*.

11. DESCRIPTION OF SELECTED MANAGEMENT PLAN

11.1 General

The plan is intended to provide a means to manage the dredged material from the Milwaukee Harbor for a period of 20 years. The design capacity of the proposed DMDF for the selected site must achieve a 20 - year capacity, be the least costly and engineeringly feasible, while meeting all Federal environmental standards.

11.2 Cost Apportionment

Project implementation will be cost shared in accordance with Sections 101 and 214 of WRDA 86 as amended and Section 217 of WRDA 96 and per Policy Guidance Letter No 47, *Cost Sharing for Dredged Material Disposal Facilities and Dredged Material Disposal Facilities Partnerships* dated, 3 April 1998. TITLE I of WRDA '96 (see discussion on Page 3, Paragraph 3) which states that, "Dredged Material Disposal Facilities for O&M will now be considered a general navigation feature (GNF) and cost shared in accordance with Title I of WRDA '86. According to WRDA '86, SEC 101 HARBORS, subsection (a)(1) PAYMENTS DURING CONSTRUCTION, the cost to the non-Federal interest is based on the authorized depth of the channel. The authorized channel depth for the Milwaukee Harbor varies between 28 feet below IGLD at the harbor entrance and to 21 feet at the upstream limit on the Menominee River; therefore it meets the criteria within the 20 to 45 ft range, which has a non-Federal cost share of 35% :25% during the construction of the DMDF and 10% in cash over a period not to exceed 30 years.

The sponsor will also be responsible for 100% of the construction costs associated with additional DMDF capacity beyond that required for maintenance of the Federal Navigation Channel.

12. ENVIRONMENTAL CONSIDERATIONS

12.1 General

An Environmental Assessment (EA), Dredged Material Disposal Facility at Jones Island CDF, Milwaukee Harbor, Wisconsin was prepared in accordance with the National Environmental Policy Act of 1969. This EA along with The Milwaukee Harbor Draft Dredged Material Management Plan Study document were made available for agency and public review November 25, 2007.

Review of the proposed Dredged Material Disposal Facility at Jones Island CDF project plan and a single positive public review comment indicate that the proposed base plan action does not constitute a major Federal action significantly affecting the human environment; therefore, an environmental Impact Statement will not be prepared and a Finding of No Significant Impact has been signed and is attached.

13. RESULTS OF COORDINATION WITH LOCAL, STATE AND FEDERAL AGENCIES

On June 28, 2004 the State of Wisconsin requested the use of the CDF in Milwaukee Harbor to use as a disposal site for Kinnickinnic River contaminated material located outside the Federal navigation channel. We informed the State that the remaining capacity in the CDF was limited and construction of a new DMDF would be required, which included cost sharing. As a result, the Governor recognizing the need for the new facility requested and received State funds in the amount of \$1.8 million for Milwaukee Harbor. EPA then provided funding to the Corps to design a segregated cell for the contaminated Kinnickinnic River material under its Great Lakes Legacy Act Program. The Corps provided a design to the Port of Milwaukee for review on July 30, 2007. Numerous coordination meetings were held between the Corps, EPA, Milwaukee Port Authority and the Wisconsin Department of Natural Resources with the goal of obtaining efficiencies and saving in an approach to a joint project that will provide savings over the implementation of any single purpose economic or environmental project. Some of the correspondence is included in Appendix E – “Correspondence”.

14. COST SHARING AND FINANCING

14.1 Management Plan Studies

The cost associated with Management Plan studies for continued maintenance of existing Federal navigation projects are O&M costs and are 100% Federally funded. Project sponsors, port authorities, and other project users, are partners in dredged material management and must pay the costs of their own participation in the dredged material management studies including participation in meetings, providing information and other coordination activities.

Budgeting priorities for the navigation purpose is limited to the Base Plan. Therefore, the cost for any component of a management plan study attributable to meeting local or state requirements of Federal laws and regulations shall be a non-Federal cost. The COE does not anticipate any additional costs will be incurred beyond those associated with the execution of the base plan related to compliance with any required local or state laws and regulations. Study activities related to dredged material management for the Federal project but not required for continued maintenance dredging and dredged material disposal, will not be funded by the Federal Government and will not be included in the dredged material management studies unless funded by others.

14.2 Implementation

Costs for implementing Management Plans for existing projects are O&M costs and shall be shared in accordance with navigation O&M cost sharing provisions applicable to the project as authorized. The cost for any component of a Management Plan attributable solely to meeting state water quality standards (which are generally more restrictive than those satisfying the Base Plan) will be a non-Federal cost.

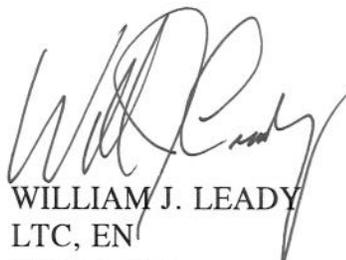
Table 6 Federal / Non Federal Cost			
	Total Cost	Federal Cost	Non- Federal Cost
Construction of DMDF 350,000 cy capacity ⁽¹⁾	\$ 2,018,584 ⁽³⁾	\$ 1,312,080	\$ 706,504
E&D, S&A, Contract Award, Contingency for 350,000 CY ⁽⁴⁾	\$ 379,580 ⁽³⁾	\$ 246,727	\$ 132,853
Construction of DMDF 160,000 cy capacity ⁽²⁾	\$ 906,900	\$ 0.00	\$ 906,900
E&D, S&A, Contract Award, Contingency for 160,000 CY ⁽⁴⁾	\$ 170,535	\$ 0.00	\$ 170,535
	\$ 3,475,599	\$ 1,558,807	\$ 1,916,792
1 350,000 cy is for navigation capacity 2 160,000 cy is for permittee capacity 3 Cost share , 65Fed /35 Non Fed. The Federal cost does not include Great Lakes Legacy Act funds. 4 See Table 5 for details. 5 Estimated costs are escalated to FY 2009.			

15. CONCLUSION/RECOMMENDATION

The Milwaukee Harbor is in need of additional dredged material placement capacity as the existing Jones Island CDF is reaching its capacity. Lack of additional capacity would result in dredging of the Milwaukee Harbor being curtailed, or not taking place. With the increased shoaling, the navigation capability would be adversely affected.

Approval of the project assumes and is predicated upon the Corps of Engineers granting of permit authority for use of most remaining CDF capacity for the Great Lakes Legacy Act project, since concurrent approval and implementation of actions serving both environmental and navigation purposes would best serve the public interest.

Accordingly, it is recommended that the Detroit District proceed with detailed design and plans and specifications to construct the Base Plan presented in the Phase II Final Dredged Material Management Plan document to provide management of dredged material for a 20-year period for Milwaukee Harbor.



WILLIAM J. LEADY
LTC, EN
Commanding