APPENDIX D

NEPA COORDINATION

U.S. Army Corps of Engineers
Buffalo District

ENVIRONMENTAL IMPACT STATEMENT
CLEVELAND HARBOR, CUYAHOGA COUNTY, OHIO
DREDGED MATERIAL MANAGEMENT PLAN

PUBLIC SCOPING INFORMATION PACKET

March 16, 2006

ANNOUNCEMENT OF PUBLIC SCOPING MEETINGS

The U.S. Army Corps of Engineers (USACE), Buffalo District, is proposing to identify problems and opportunities associated with the management of dredged material at Cleveland Harbor and identify significant issues that we should address during the Dredged Material Management Plan (DMMP) development process. The USACE is the Federal lead agency directing preparation of the Environmental Impact Statement (EIS) for the proposed DMMP. The EIS will be prepared in accordance with the requirements of the federal National Environmental Policy Act (NEPA) of 1969 and its implementing regulations, and associated rules and regulations of the Council on Environmental Quality (CEQ). The EIS is also expected to satisfy the environmental review requirements of the State of Ohio.

The Buffalo District will conduct a public scoping meeting in Cleveland, Ohio, to solicit public comment and input on issues related to the proposed DMMP that will be addressed in the EIS, and on the studies that are proposed to be conducted for the EIS. The date of the public meeting has not been arranged yet, however, the meeting is anticipated to be held in the summer of 2006.

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1.0 INTRODUCTION

The U.S. Army Corps of Engineers (USACE) is preparing an Environmental Impact Statement (EIS) for the proposed **Cleveland Harbor Dredged Material Management Plan (DMMP)** (the action) and other alternatives to develop a long-term (20-year) strategy for providing viable dredged material placement alternatives that would meet the needs of maintaining the Federal channels at Cleveland Harbor.

Cleveland Harbor is located on Lake Erie at the mouth of the Cuyahoga River. The harbor is 191 miles southwest of Buffalo, NY and 110 miles east of Toledo, Ohio (Figure 1). Included in the study area are the Outer Harbor and Cuyahoga River Channels. The harbor measures about 1,300 acres, is 5 miles long and varies in width between 1,600 to 2,400 feet. The harbor is protected by a breakwater system: an east breakwater (20,970 feet long), a west breakwater (6,048 feet long), and the east and west arrowhead breakwaters (each measuring 1,250 feet). Authorized depths in this area range from 25 to 28 feet. The East and West Arrowhead Breakwater protect the Lake Approach Channel with an authorized depth of 29 feet. The Entrance Channel varies in width from 750 to 220 feet and is maintained at an authorized depth of 28 feet to the mouth of the Cuyahoga River. The lower Cuyahoga River Channel, from the lakeward side of the piers to immediately above the Old River confluence, is maintained to an authorized depth of 27 feet. The upper Cuyahoga River and turning basin are maintained to an authorized depth of 23 feet and 18 feet respectively.

Cleveland Harbor is dredged twice each year. The average dredging volume per year from 1998 through 2005 is 305,000 cubic yards; this includes Federal and non-Federal dredging activities.

Since the 1960's, five Confined Disposal Facilities (CDFs) have been constructed at Cleveland Harbor (9, 10B, 12, 13, and 14). The current operational CDF 10B is nearing design capacity. In accordance with joint U.S. Environmental Protection Agency (USEPA)/USACE protocols contained in the Great Lakes Dredged Material Testing and Evaluation Manual (1998), all sediment dredged from Cleveland Harbor and Cuyahoga River Channels is unsuitable for open lake and nearshore placement. All dredge material is currently disposed in a CDF.

In 1993, the Corps of Engineers initiated a program for the development of long-term plans for managing channel maintenance projects. Districts were directed to establish a Dredged Material Management Plan (DMMP) process for all deep-draft navigation projects. The Buffalo District initiated the DMMP in 2003 after identifying a lack of capacity in CDF 10B. For the Corps to pursue the DMMP in Cleveland, it was necessary for the Cleveland-Cuyahoga Port Authority and the City of Cleveland to send the Corps a letter of intent expressing interest in obtaining the Corps assistance in the planning and approval of a DMMP for Cleveland Harbor. This letter was sent on March 31, 2004. Accordingly, the USACE assumed the role of the Federal lead agency for preparation and issuance of an Environmental Impact Statement (EIS) for the proposed project, in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969.

The EIS will evaluate the social, economic, and environmental impacts that would result with the proposed action taken to address the purpose and need for the DMMP.

This public scoping information packet has been prepared as part of the formal scoping process for the Draft EIS (DEIS), pursuant to NEPA and the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR Part 1500 et seq.). The purpose of the EIS scoping process is to provide opportunity for the public and agencies to comment on and provide input to the plan of study for the development of the DEIS.

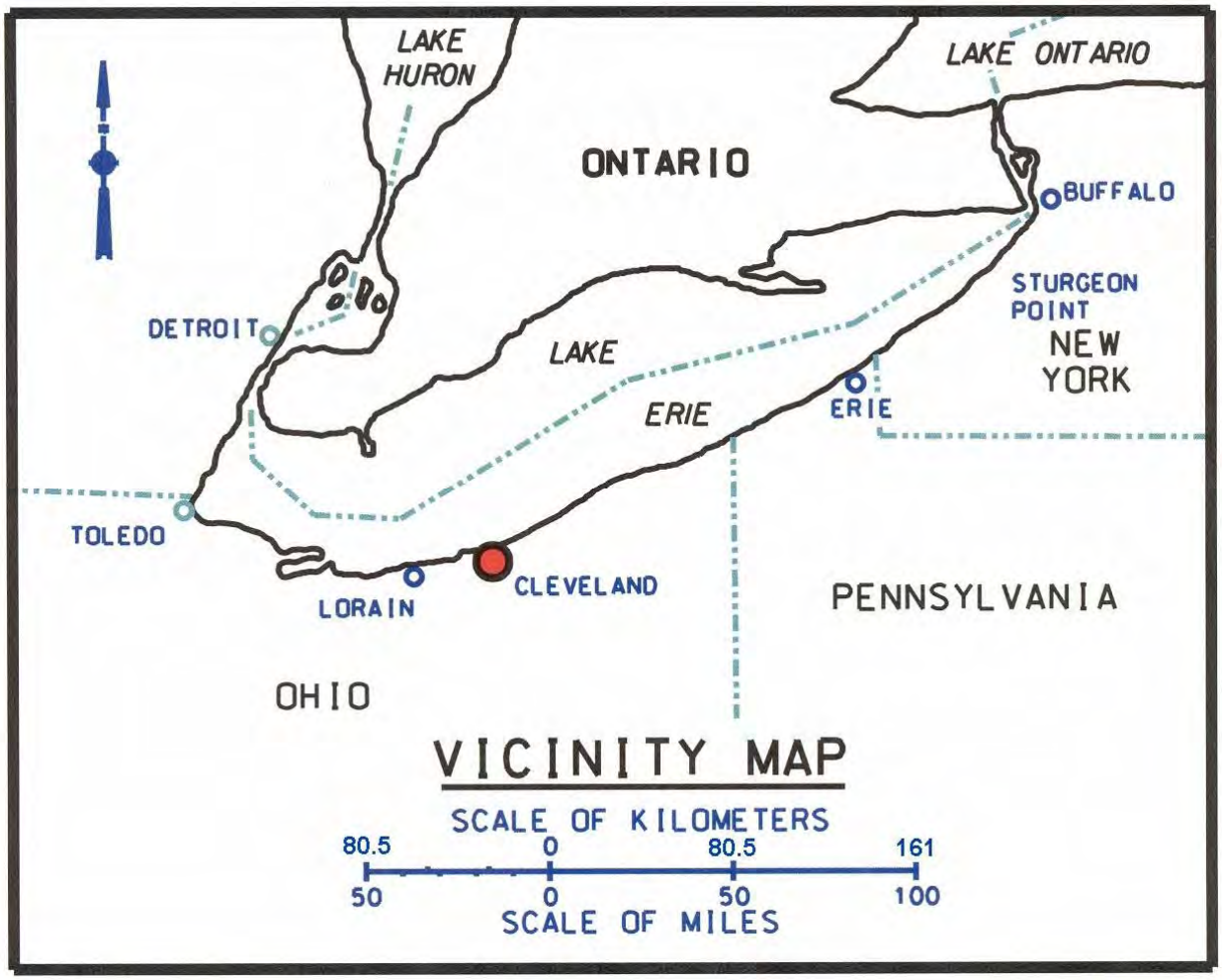

Figure 1 – Cleveland Harbor Vicinity Map

This packet provides information describing the EIS process for the proposed Cleveland DMMP, as follows:

- **Overview**: a description of the EIS process;
- **Purpose and Need for the Proposed Cleveland DMMP**;
- **Alternatives**: types to be evaluated in the EIS;
- **Social, Economic, and Environmental Impacts**;
- **Public Participation and Interagency Coordination Program**

2.0 STUDY OVERVIEW

2.1 Initiating the Process

Figure 2 shows the general steps in the EIS process. The process officially began when the Corps of Engineers initiated a program for the development of long-term plans for managing channel maintenance projects. Districts were directed to establish a Dredged Material Management Plan (DMMP) process for all deep-draft navigation projects. The Buffalo District initiated the DMMP in 2003 after identifying a lack of capacity in CDF 10B. With this information, and the City of Cleveland and Port Authority's letter to the USACE, expressing interest in obtaining the Corps assistance in the planning and approval of a DMMP for Cleveland Harbor, Buffalo District assumed the role of Federal lead agency for preparation of the EIS and is in the process of publishing a Notice of Intent (NOI) to prepare a DEIS in the Federal Register.

2.2 EIS Scoping Process

The purpose of the EIS scoping process is to provide an opportunity for the public and government agencies to comment on and provide input to help identify issues related to the proposed Cleveland DMMP to be addressed in the DEIS, and the studies that should be conducted for the DEIS. The Corps will be holding a public meeting in Cleveland, Ohio to provide information about the issues and studies for the DEIS, and to receive public and agency comments and suggestions for consideration in the DEIS.

Comments and input about the issues and studies for the DEIS will be accepted 30 days from the date of this packet and should be sent to:

Address: U.S. Army Corps of Engineers
Buffalo District
ATTN: Patti McKenna
1776 Niagara Street
Buffalo, NY 14207-3199

Point of Contact: Patti M. McKenna
Environmental Scientist
Environmental Analysis Section

Telephone: 716-879-4367
Fax: 716-879-4310
E-mail: patrice.m.mckenna@usace.army.mil

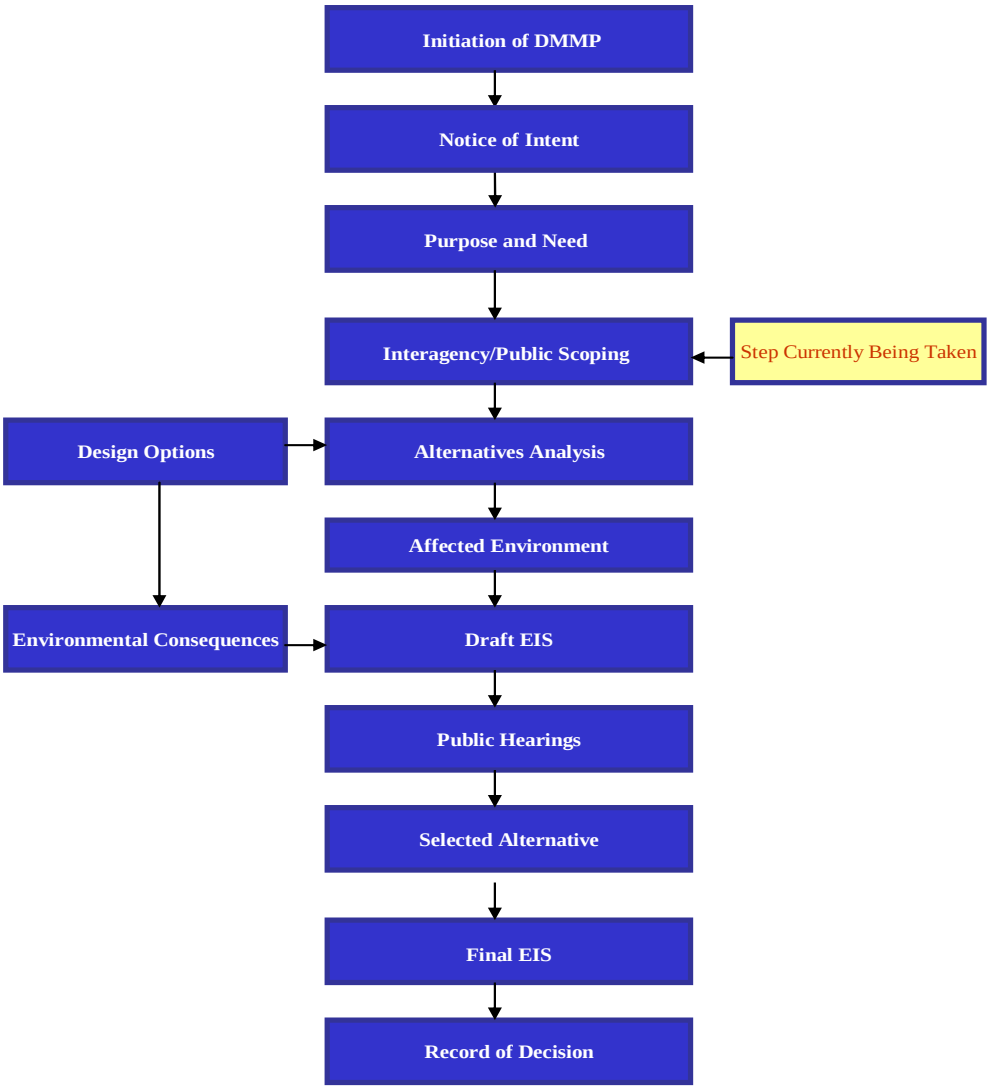

Figure 2 – Cleveland Harbor DMMP Project Development Process

2.3 DEIS Preparation

The DEIS will be prepared in accordance with NEPA regulations designed to identify significant environmental issues at an early stage and promote cooperative consultation among agencies before the DEIS is prepared. The DEIS will specifically follow the CEQ regulations implementing NEPA (40 CFR Part 1500 et seq.)

After its publication, the DEIS will be available for public and agency review and comment for a minimum 45-day period. A public hearing will be held to receive comments from the public and agencies on the document. Comments may also be provided orally at the hearing or in writing during the DEIS comment period.

3.0 PURPOSE AND NEED FOR THE PROPOSED DMMP

3.1 Overview

The purpose and need for the proposed project is to identify problems and opportunities associated with the management of dredged material at Cleveland Harbor and identify significant issues that we should address during the DMMP development process and completion of our required NEPA analysis.

3.2 Background

The U.S. Army Corps of Engineers, Buffalo District, in coordination with the U.S. Environmental Protection Agency and Ohio EPA have determined that, with the exception of some sandy material which accumulates at the upstream limit of the Cuyahoga River channel that may be used as beach nourishment material depending upon most recent test results, sediments dredged from Federal navigation channels at Cleveland Harbor would not be placed in the open lake, but would be placed in Confined Disposal Facilities.

Five Confined Disposal Facilities have been constructed at Cleveland Harbor (9, 10B, 12, 13, and 14). Sites 13 and 9 were constructed in the 1960s as part of a Great Lakes pilot project to determine the effects on water quality. Virtually all of the material dredged between 1970 and 1974 was placed in two CDF disposal areas constructed in the late 1960s. Public Law 91-611 in 1970 authorized the construction of spoil disposal facilities for a period to not exceed 10 years. Two facilities were built: Sites 12 and 14.

CDF 14 is an 88-acre facility with an estimated capacity of 6,130,000 cubic yards. This site was turned over to the non-Federal Sponsor in 1999. The site at that time was 95% filled.

A new CDF (Site 10B) was completed in 1998 adjacent to the Burke Lakefront Airport. The CDF 10B footprint is 68 acres and cost $17,500,000 to build. The actual physical inside capacity of the facility covers 58 acres. The 58-acre site provides storage for 2,900,000 cubic yards of in-place sediment.

In recent years, all sediment dredged at Cleveland Harbor has been deposited in Site 10B. The major problem relating to dredging at the harbor is that CDF 10B, originally projected to reach capacity in 2013, is now expected to reach capacity in 2007. Increased quantities of Federal dredging, dredging by private entities, and other factors have reduced the lifespan of the CDF. Plans for the future management of dredged material are now underway.

3.3 Project Goals

In order to identify acceptable dredged material management options and determine the ability of the Federal government to continue to maintain the harbor, the following considerations are important:

- availability and capacity of suitable dredged material placement sites
- effectiveness of beneficial use alternatives for the dredged material
- economic viability of the harbor
- compliance with environmental laws and regulations

4.0 ALTERNATIVES

Alternatives that will be evaluated in detail in the DEIS will be selected through a screening evaluation of potentially reasonable and feasible alternatives. A preliminary list of alternatives and the criteria for evaluating them will be defined in relation to the purpose and need of the project. Comments and suggestions received during the scoping process will be considered in the formulation of the list of preliminary alternatives and the screening criteria. Public meetings will be held during the EIS process to present and discuss the alternatives screening process and its results and conclusions.

The alternatives will represent a range of potential solutions that may address the purpose and need and satisfy the project goals, as described below:

Measure A – No Action: Under this alternative, the Federal Government would do nothing to address the need for future placement of dredged material. Without dredging, the navigation channel would progressively shoal in and impede commercial navigation. Deep-draft commercial navigation would become economically nonviable and gradually cease.

Measure B – Beneficial Use: Beneficial use of dredged material includes recreation, agricultural, and habitat development, beach nourishment, and innovative engineering alternatives such as dredge soil. In order to successfully implement beneficial uses, the alternative must be technically and economically feasible, obtain public support, and address legal and regulatory issues.

Measure C – Open-Lake Placement: A designated open lake disposal site is located 9 miles east of the north breakwater. In accordance with joint U.S. Environmental Protection Agency (USEPA)/USACE protocols contained in the Great Lakes Dredged Material Testing and Evaluation Manual (1998), all sediment dredged from Cleveland Harbor and Cuyahoga River Channels is unsuitable for open lake placement.

Measure D – New Confined Disposal Facility (CDF): USACE, Buffalo District has identified eight locations for future CDF development (Figure 3); the proposed locations are categorized as Inner (south of the breakwater) and Outer Harbor (north of the breakwater) CDFs. The alternative sites were selected during Phase I of the DMMP. The sites were selected by the Sponsors, USACE, and other City and County entities to include areas that were commensurate with the City of Cleveland's 50 Year Waterfront Development Plan. If additional CDF sites are developed during the alternative assessment phase, they will be evaluated fully.

Measure E – Management of Existing Confined Disposal Facilities to Extend Their Useful Life: The USACE, Buffalo District has constructed a number of CDF's in the past that have been filled or are essentially filled. Various actions such as construction of internal dikes and elevation of existing CDF walls could extend the useful life of these existing CDF's.

Measure F – Best Management Practices: Best Management Practices (BMP's) in the Cuyahoga River Watershed will also be considered in this study. BMP's would be generally designed to reduce sediment loads to the watershed and eventually to the Federal channels requiring dredging. BMP's include but are not limited to such watershed actions as no till farming; proper zoning along streambanks (e.g. buffer strips); and upstream sediment traps.

The identified alternatives will be screened against criteria to assess their fundamental feasibility and likely ability to satisfy the project purpose and need. Preliminary alternatives that are clearly infeasible or unreasonable, or do not have the potential to minimally satisfy most of the project objectives, will be eliminated from further study. The No-Action alternative will also be included in the detailed DEIS evaluations, serving to define the future baseline condition against which potential impacts of the DMMP alternatives will be compared.

5.0 SOCIAL, ECONOMIC AND ENVIRONMENTAL IMPACTS

Future conditions with the No-Action alternative and potential impacts with the proposed action and its alternatives will be assessed for the following social, economic, and environmental categories:

- Biological Resources
- Recreation
- Cultural Resources
- Socioeconomics
- Transportation
- Geology & Soils
- Water Resources
- Solid Waste Management
- Contaminated Materials
- Air Quality
- Noise
- Aesthetics
- Native American Tribes
- Environmental Justice

Figure 3 – Cleveland Harbor, Proposed CDF

6.0 PUBLIC PARTICIPATION AND INTERAGENCY COORDINATION PROGRAM

Throughout the scoping process, stakeholders and interested parties are invited to provide comment on the alternatives that will be evaluated in the DMMP/Environmental Impact Statement (EIS). The DMMP/EIS will address the potential social, economic and environmental benefits and adverse impacts that would result from each alternative plan selected for detailed analysis.

Compliance with Environmental Protection Statutes:

National Environmental Policy Act (NEPA). In accordance with the Council on Environmental Quality's "Regulations for Implementing the Procedural Provisions of the NEPA of 1969" (40 CFR 1500-1508) and Engineer Regulation 200-2-2 (Procedures for Implementing NEPA), the USACE, Buffalo District will assess the potential significant environmental impacts of the eventual recommended plan in an Environmental Impact Statement.

Clean Water Act. If a plan is proposed for implementation that involves the placement of dredged or fill material below the ordinary high-water mark of Lake Erie or any other waters of the United States, the project will be evaluated in accordance with the guidelines promulgated by the Administrator of the U.S. Environmental Protection Agency in conjunction with the Secretary of the Army under the authority of Section 404(b)(1) of the Act. A Section 404(a) Public Notice will be issued and any party that may be significantly impacted by the project will be afforded the opportunity to request a public hearing. Under Section 401 of the Act, USACE, Buffalo District will request certification from the OEPA that the proposed project is in compliance with established effluent limitations and water quality standards.

Under Section 402 of the Act, if a recommended DMMP measure disturbs greater than one acre of ground surface, USACE, Buffalo District would develop a Stormwater Pollution Prevention Plan for the construction activity and submit it along with a Notice of Intent application to OEPA for coverage under their general permit.

Coastal Zone Management Act. For those measures recommended under the preferred DMMP that are reasonably likely to affect any land or water use or natural resource of the State of Ohio's designated coastal zone, USACE, Buffalo District will assure that those activities or projects are consistent, to the maximum extent practicable, with the State's approved coastal management program. The USACE, Buffalo District will prepare a Federal Consistency Determination that will be coordinated with the Ohio Department of Natural Resources for their concurrence.

National Historic Preservation Act. Under Section 106 of this Act, this Scoping Information Packet also initiates consultation with the National Park Service, State Historic Preservation Office (Ohio Historical Society), potentially interested Indian tribes, historic preservation organizations and others likely to have knowledge of, or concern with, historic properties that may be present within the area of potential effect.

Other Coordination Requirements. In addition to the aforementioned Federal statutes, the proposed project must also comply with other applicable or relevant and appropriate Federal laws. Table 1 presents a comprehensive list of environmental protection statutes, executive orders, *etc.* Therefore, an additional intent of this fact sheet is to disseminate pertinent project information to meet the applicable coordination/consultation requirements required under their provisions.

Table 1. Federal Environmental Protection Laws, Orders, Policies.

1. PUBLIC LAWS

(a) American Folklife Preservation Act, P.L. 94-201; 20 U.S.C. 2101, *et seq.*
(b) Anadromous Fish Conservation Act, P.L. 89-304; 16 U.S.C. 757, *et seq.*
(c) Antiquities Act of 1906, P.L. 59-209; 16 U.S.C. 431, *et seq.*
(d) Archaeological and Historic Preservation Act, P.L. 93-291; 16 U.S.C. 469, *et seq.* (Also known as the Reservoir Salvage Act of 1960, as amended; P.L. 93-291, as amended; the Moss-Bennett Act; and the Preservation of Historic and Archaeological Data Act of 1974.)
(e) Bald Eagle Act; 16 U.S.C. 668.
(f) Clean Air Act, as amended; P.L. 91-604; 42 U.S.C. 1857h-7, *et seq.*
(g) Clean Water Act, P.L. 92-500; 33 U.S.C. 1251, *et seq.* (Also known as the Federal Water Pollution Control Act; and P.L. 92-500, as amended.)
(h) Coastal Barrier Resources Act of 1982, 16 U.S.C. § 3501 *et seq.*; 12 U.S.C. § 1441 *et seq.*
(i) Coastal Zone Management Act of 1972, as amended, P.L. 92-583; 16 U.S.C. 1451, *et seq.*
(j) Endangered Species Act of 1973, as amended, P.L. 93-205; 16 U.S.C. 1531, *et seq.*
(k) Estuary Protection Act, P.L. 90-454; 16 U.S.C. 1221, *et seq.*
(l) Federal Environmental Pesticide Control Act, P.L. 92-516; 7 U.S.C. 136.
(m) Federal Water Project Recreation Act, as amended, P.L. 89-72; 16 U.S.C. 460-1(12), *et seq.*
(n) Fish and Wildlife Coordination Act of 1958, as amended, P.L. 85-624; 16 U.S.C. 661, *et seq.*
(o) Historic Sites Act of 1935, as amended, P.L. 74-292; 16 U.S.C. 461, *et seq.*
(p) Land and Water Conservation Fund Act, P.L. 88-578; 16 U.S.C. 460/-460/-11, *et seq.*
(q) Migratory Bird Conservation Act of 1928; 16 U.S.C. 715.
(r) Migratory Bird Treaty Act of 1918; 16 U.S.C. 703, *et seq.*
(s) National Environmental Policy Act of 1969, as amended, P.L. 91-190; 42 U.S.C. 4321, *et seq.*
(t) National Historic Preservation Act of 1966, as amended, P.L. 89-655; 16 U.S.C. 470a, *et seq.*
(u) Native American Religious Freedom Act, P.L. 95-341; 42 U.S.C. 1996, *et seq.*
(v) Resource Conservation and Recovery Act of 1976, P.L. 94-580; 7 U.S.C. 1010, *et seq.*
(w) River and Harbor Act of 1899, 33 U.S.C. 403, *et seq.* (Also known as the Refuse Act of 1899.)
(x) Submerged Lands Act of 1953, P.L. 82-3167; 43 U.S.C. 1301, *et seq.*
(y) Surface Mining and Reclamation Act of 1977, P.L. 95-89; 30 U.S.C. 1201, *et seq.*
(z) Toxic Substances Control Act, P.L. 94-469; 15 U.S.C. 2601, *et seq.*
(aa) Watershed Protection and Flood Prevention Act, as amended, P.L. 83-566; 16 U.S.C. 1001, *et seq.*
(bb) Wild and Scenic Rivers Act, as amended, P.L. 90-542; 16 U.S.C. 1271, *et seq.*

2. EXECUTIVE ORDERS

(a) Executive Order 11593, Protection and Enhancement of the Cultural Environment. May 13, 1979 (36 FR 8921; May 15, 1971).
(b) Executive Order 11988, Floodplain Management. May 24, 1977 (42 FR 26951; May 25, 1977).
(c) Executive Order 11990, Protection of Wetlands. May 24, 1977 (42 FR 26961; May 25, 1977).
(d) Executive Order 11514, Protection and Enhancement of Environmental Quality, March 5, 1970, as amended by Executive Order, 11991, May 24, 1977.
(e) Executive Order 12088, Federal Compliance with Pollution Control Standards, October 13, 1978.
(f) Executive Order 12372, Intergovernmental Review of Federal Programs, July 14, 1982.
(g) Executive Order 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements, August 3, 1993.
(h) Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, February 11, 1994.

3. OTHER FEDERAL POLICIES

(a) Council on Environmental Quality Memorandum of August 11, 1980: Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing the National Environmental Policy Act.
(b) Council on Environmental Quality Memorandum of August 10, 1980: Interagency Consultation to Avoid or Mitigate Adverse Effects on Rivers in the National Inventory.
(c) Migratory Bird Treaties and other international agreements listed in the Endangered Species Act of 1973, as amended, Section 2(a)(4)

Chagrin Valley Engineering, Ltd.
22999 Forbes Road, Suite B
Cleveland, Ohio 44146-5667
440/439-1999
Fax 440/439-1969

May 9, 2006

U.S. Army Corps of Engineers
Buffalo District
1776 Niagara Street
Buffalo, NY 14207-3199

Attention: Ms. Patti McKenna

Re: EIS: Cleveland Harbor DMMP

Dear Ms. McKenna:

Thank you for taking the time recently to speak to me regarding the Corps Dredged Material Management Plan for Cleveland Harbor. As I mentioned in our telephone conversation I am the Village Engineer for the Village of Bratenahl, Ohio. I have been asked by Mayor John Licastro and Council to act as the Village's point person for this project.

Bratenahl, Ohio is located just east of Cleveland on the Lake Erie lakefront near existing Confined Disposal Facility (CDF) #14. Bratenahl is a quiet residential community with very little commercial development. The Village is a heavily wooded, green community that prides itself on its heritage and natural charm. In fact, the Bratenahl Land Conservancy was established to secure key parcels of land and sustain them for the benefits of the community.

In light of the above, the Mayor and Council were concerned when the Village recently received the draft Environmental Impact Statement (dated March 16, 2006) for the Dredged Material Management Plan for Cleveland Harbor. The Plan includes the possible installation of proposed CDF #8, located very close to Bratenahl. Bratenahl has worked diligently to sustain it's country like atmosphere and fears that the installation of CDF #8 would have a detrimental effect of the quality of life in the Village. The work required to install CDF #8 would be extensive, resulting in noise and odor that would be offensive to the residents of the Village. The lakefront views enjoyed by many of the residents would be adversely affected, possibility resulting in reduced property values.

The Village of Bratenahl respectfully requests that proposed CDF #8 be eliminated as a possible site for dredged material.

Thank you for involving the Village in the Environmental Impact Statement Process. Please do not hesitate to contact me if you have any questions or comments.

Respectfully submitted,

Donald P. Bierut, PE
Village Engineer

cc: Mayor John Licastro

OhioEPA

State of Ohio Environmental Protection Agency

STREET ADDRESS:
Lazarus Government Center
122 S. Front Street
Columbus, Ohio 43215

TELE: (614) 644-3020 FAX: (614) 644-3184

MAILING ADDRESS:
P.O. Box 1049
Columbus, OH 43216-1049

Martin P. Wargo, Chief
Environmental Analysis Section
U.S. Army Corps of Engineers-Buffalo District
1776 Niagara Street
Buffalo, New York 14207-3199

Re: Cleveland Harbor, Cuyahoga County, Operations and Maintenance of Dredged Material Management Plan (DMPP)

Dear Mr. Wargo:

Thank you for the opportunity to comment on the above-referenced document. As the principal environmental regulator in the State of Ohio, Ohio EPA is extremely interested in the Cleveland Harbor DMMP. While I understand the need to ensure that the Cleveland Harbor remains open and functional and fully support that goal, Ohio EPA also has a responsibility to ensure that the waters of the state are adequately protected.

I instructed staff from the Division of Surface Water to review this document, and their comments and questions are provided in the attached document. If you have any questions regarding these comments, you can contact Randy Bournique, Division of Surface Water, at (614) 644-2013 or via email at randy.bournique@epa.state.oh.us.

In the larger context, I am very concerned that insufficient time has been allotted to address the issue of the existing CDFs. If your projections are correct and the existing CDF capacity is exhausted in 2007, both of our agencies will then have to expend considerable resources in a short period of time to deal with this problem.

Ohio EPA is committed to addressing all of the issues related to the harbor maintenance dredging, and we look forward to working with you on our mutual interests in the Cuyahoga River Federal Navigation Channel.

Sincerely,

Joseph P. Koncelik
Director

JPK:rb

Bob Taft, Governor
Jennette Bradley, Lieutenant Governor
Christopher Jones, Director

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Division of Surface Water Comments on the March 21, 2006 Scoping Information Packet for the Cleveland Harbor DMMP April 20, 2006

1. On page 4, the data provided indicates that the average dredging volume per year between 1998 and 2005 is 305,000 cubic yards. Ohio EPA has only authorized 250,000 cubic yards of dredging in the 401 water quality certifications issued over this time period. It was our understanding that the 250,000 cubic yards estimate included a 20-25% excess in the event of an unusual amount of sedimentation occurring. Please explain the discrepancy in the sediment dredging volume as the current projection now estimates that the current Cleveland Confined Disposal Facility (CDF 10b) will reach capacity in 2007, 6 years earlier than anticipated.

2. Please evaluate how many more years contaminated sediments are anticipated in the Cuyahoga Navigation Channel. Since the contaminated material has been sequestered and upstream sources are continually being reduced, eventually the sediments should be clean enough for beneficial re-use or dredging volumes should be significantly reduced. Ohio EPA requests that the Corps evaluate the future sediment quality and quantity during this process. Ohio EPA would also like to see the completed report on the Cuyahoga River Sediment Transport Study. Ohio EPA requests that the Corps sample the sediments more frequently than once every 5 years to discern the trends for when the sediments would be considered "safe" enough for beneficial reuse.

3. Ohio EPA requests a detailed economic analysis of all the options proposed to be evaluated. The study should include the construction costs for all the alternatives as well as long-term maintenance and operation costs versus letting the river fill in and initiating barging or other alternative transportation methods.

4. Ohio EPA requests that the background section of the Environmental Impact Statement acknowledge the impact of the channel morphology on water quality and habitat degradation and that this is the cause of impairments in this section of the Cuyahoga River Area of Concern. The channel morphology, deepened to allow for commercial ship traffic and resulting slower time of travel, is the primary factor affecting dissolved oxygen levels. The instream dissolved oxygen is low due to a low instream re-aeration rate in a slow-moving, dredged navigation channel, even if there was no discharge loading.

5. Ohio EPA would like to encourage beneficial use of the dredge material as well as require more progress on the use of the fish bulkhead habitats along the river. All new bulkheads that need to be replaced along the navigation channel should incorporate one of the bulkhead habitat designs.

6. Per comments from the Ohio Department of Natural Resources Natural Heritage Database, there is one 1991 record of the potentially threatened Richardson's Pondweed (Potamogeton richardsonii) within the Whiskey Island area of Cleveland Harbor between the mouth of the Cuyahoga River and the ore docks to the west. Care should be taken to avoid natural areas that are being restored in the Cuyahoga River.

7. Please provide the most recent sediment data collected by the Corps for review by our technical staff.

8. Please explain how the Corps considers open lake placement of contaminated sediments that exceed the federal standard.

9. Ohio EPA requests a thorough review of Confined Disposal Facility (CDF) best management practices (BMPs), including soil washing techniques, that would allow clean uncontaminated sand to be returned to the nearshore environment.

10. Please provide a spreadsheet that shows the volumes of material added to CDF 10b and the sources (federal and private). Please explain if private parties that dispose of sediments in the CDFs pay the Corps for disposal.

11. Please provide a legible detailed map(s) of all the CDFs 1 through14, plus 10b, and including the location of cell 10a.

12. Please explain if it would ever be technically feasible to daylight the portion of Doan Brook that runs underneath CDF 14.

Mckenna, Patrice M LRB

From: Sanders, Randy [Randy.Sanders@dnr.state.oh.us]
Sent: Thursday, April 27, 2006 4:56 PM
To: Mckenna, Patrice M LRB
Subject: 06-0077; EIS for Cleveland Harbor Maintenance Dredging.
Attachments: image001.gif; image001.gif; image001.gif; 06-0077.jpg

ODNR COMMENTS TO Patti McKenna, U.S. Army Corps of Engineers, Buffalo District, 1776 Niagara Street, Buffalo New York, 14207-3199.

Location: Cleveland Harbor is located on Lake Erie at the mouth of the Cuyahoga River.

Project: The USACE is preparing an EIS for the proposed Cleveland Harbor Dredged Material Management Plan and other alternatives to develop a long-term (20-year) strategy for providing viable dredged material placement alternatives that would meet the needs of maintaining the Federal channels at Cleveland Harbor.

The Ohio Department of Natural Resources (ODNR) has completed a review of the above referenced project. These comments were generated by an inter-disciplinary review within the Department. These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the National Environmental Policy Act, the Coastal Zone Management Act, Ohio Revised Code and other applicable laws and regulations. These comments are also based on ODNR's experience as the state natural resource management agency and do not supersede or replace the regulatory authority of any local, state or federal agency nor relieve the applicant of the obligation to comply with any local, state or federal laws or regulations.

Rare and Endangered Species: The ODNR Natural Heritage Database contains the following data in the project area, as shown on the attached map:
A. Cleveland Lakefront State Park - ODNR, Division of Parks & Recreation
1. *Potamogeton richardsonii* - Richardson's Pondweed, potentially threatened
2. *Bartramia longicauda* - Upland Sandpiper, threatened
3. *Potamogeton richardsonii* - Richardson's Pondweed, potentially threatened

Fish and Wildlife: The ODNR, Division of Wildlife recommends no in-water work from March 15 to June 30 to reduce impacts to aquatic species.

Coastal Management: The Office of Coastal Management comments that many of the alternatives outlined in section 4.0 will likely require a federal consistency determination. Please coordinate all related activities with the ODNR Office of Coastal Management as early as possible.

Geological Survey: Proposed CDFs 2, 3, 4, 5, 6, 7A, 7B, and 7C probably will not have a significant adverse impact on coastal processes or coastal sand resources. Proposed CDF 8 may impound sand transported westward by northeast storm waves. Although there is not a lot of sand on the downdrift (east) side of Cleveland Harbor, waves transport sand westward along the east part of the Cleveland waterfront, depositing sand in the intake channel at the power plant and atop the sidewalk on east of E 55th Street Marina. If sand accumulates shoreward of the proposed CDF 8 provision should be made for returning the sand to the littoral system farther east.

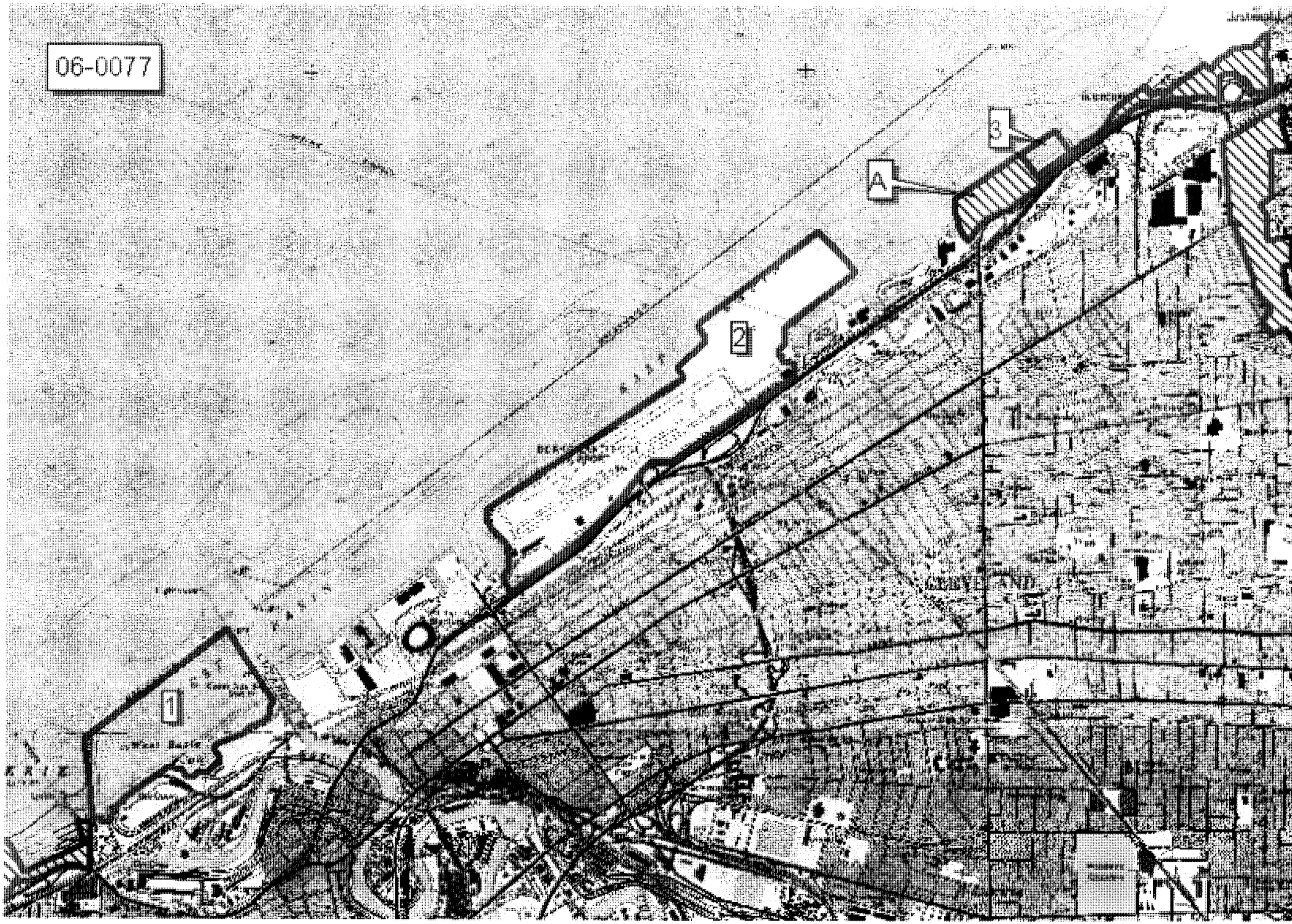
The Corps should continue to explore opportunities for beneficial reuse of sandy sediment deposited in the CDFs. For a number of years, the Corps has been using the west end of Dike 10B for disposal of sandy sediment dredged from the upstream end of the navigation channel. The west end of Dike 10B now contains primarily sandy sediment; however, chemical analysis of this sediment in 2005 showed the sand contained elevated levels of some contaminants. Washing the sand to remove traces of fine-grained sediment and contaminants might make the sediment better suited for nearshore disposal east of Cleveland. Using sand from the CDF to nourish the littoral system east of Cleveland would extend the life of the CDFs, would forestall the need to construct additional CDFs, and would mitigate some of the harbor's impact on regional sand transport.

Special Flood Hazard Area: The proposed project may or may not be located in a Special Flood Hazard Area. To assist you in this determination, please contact the community's floodplain administrator. A list of community floodplain

administrators can be found on the ODNR - Division of Water website at http://www.dnr.state.oh.us/water/floodpln/. To view a copy of a Flood Insurance Rate Map for your project area, you can either contact the community floodplain administrator, or obtain a copy online from the FEMA Flood Map Store at http://store.msc.fema.gov/.

ODNR appreciates the opportunity to provide these comments. Please contact Randy Sanders at 614.265.6344 if you have questions about these comments or need additional information.

Randall E. Sanders
Environmental Administrator
Division of Real Estate & Land Management
Ohio Department of Natural Resources
2045 Morse Rd, C4
Columbus, Ohio 43229-6693
614.265.6344
fax 614.267.4764
randy.sanders@dnr.state.oh.us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CLEVELAND

U.S. Department
of Transportation

**Federal Aviation
Administration**

**Detroit Airports District Office
11677 South Wayne Road
Suite 107
Romulus, MI 48174**

April 24, 2006

U.S. Army Corps of Engineers
Buffalo District
ATTN: Patti McKenna
1776 Niagara Street
Buffalo, NY 14207-3199

Dear Ms. McKenna:

Cleveland Harbor Dredged Material Management Plan
Public Scoping Information Packet

We received a copy of the Scoping Information Packet for the Cleveland Harbor Dredged Material Management Plan (DMMP) from Dana Ryan of the Cleveland Airport System on April 10, 2006. We also received a copy of Mr. Ryan's comments on the DMMP dated April 13, 2006. We agree with his comments and also offer the following:

1. The existing Confined Disposal Facilities (CDF) are considered wildlife attractants. Documented bird/aircraft hazards at Burke Lakefront Airport (BKL) make the CDF's an incompatible land use. FAA has repeatedly expressed concern regarding the continuation of the CDF's without the City and the COE addressing the wildlife hazard created by the dredge disposal operations.
2. The proposed CDF's may increase the bird/aircraft hazards at BKL.
3. Mitigation measures to reduce the bird/aircraft hazards for both the existing and proposed CDF's need to be addressed.
4. Please include our office and the local U.S. Department of Agriculture Wildlife Services, 1501 North Marginal Road, Cleveland OH 44114 in all future correspondence on this project.

If you have any questions, please call us.

Sincerely,

David J. Welhouse
Project Engineer

cc: Dana Ryan, DPC
Khalid Bahhur, DPC
John Lott, FAA
Ed Cleary, FAA
Randy White, USDA

CUYAHOGA COUNTY PLANNING COMMISSION

323 Lakeside Avenue West, Suite 400 ≡ Cleveland, Ohio 44113 ≡ Voice 216/443-3700 ≡ Fax 216/443-3737
e-mail: cpc@planning.co.cuyahoga.oh.us / web site: planning.co.cuyahoga.oh.us / TDD:1-800-750-0750

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KENNETH E. PATTON
ROBERT N. BROWN
for FRANK G. JACKSON

PAUL A. ALSENAS
Director

April 13, 2006

Ms. Patti McKenna
U.S. Army Corps of Engineers
Buffalo District
1776 Niagara Street
Buffalo, NY 14270-3199

RE: **Cleveland Harbor Dredged Material Management Plan**

Dear Ms. McKenna,

After reviewing the Public Scoping Information Packet for the proposed Cleveland Harbor Dredged Material Management Plan, we at the Cuyahoga County Planning Commission believe the Army Corps of Engineers has a unique opportunity as it develops a long-term strategy for the management of dredged material at Cleveland Harbor. It is evident that to date, we have not found a sustainable method of dredging the Cuyahoga River. Merely developing a confined disposal facility is not the answer. We propose that the Army Corps strongly consider a whole systems approach consistent with the goals of the Cuyahoga Valley Initiative. Therefore, the alternatives of best management practices and beneficial use should be paramount in this discussion.

It is important to remember that the Cuyahoga River drains 813 square miles in Cuyahoga, Geauga, Portage, and Summit Counties. The cumulative effect of land use throughout the entire watershed affects what ends up in the shipping channel. Our current building patterns affect the natural hydrology of the stream; therefore it is very important to aggressively pursue practices that help to prevent increased sedimentation. From construction practices to stormwater quality measures, thinking holistically about how sediment reaches the shipping channels is crucial for minimizing the amount of dredging that takes place. We support efforts that reduce the amount of sediment that must be removed from the Navigation Channel, as well as the frequency of dredging.

When dredging must take place, we support the use of best practices that would limit the level of disturbance that currently occurs with the use of mechanical means to maintain depth. The present practice of using clam shell dredges to remove sediment results in the dispersion of fine particles, including toxic materials. The use of hydraulic dredges can limit the negative effects of sediment disturbance. We recommend that the Army Corps explore this option and other practices suitable for the Cuyahoga River.

The beneficial use of the dredged material is also extremely important. Due to years of toxic chemical releases, trapping sediment before it reaches the shipping channel is necessary for reuse. Beneficial reuse provides opportunities for innovation. For example, sediment from the Cuyahoga River should be reused in landscaping or low impact development practices throughout Northeastern Ohio, provided that the sediment is proven safe for such uses.

The Cleveland Harbor Dredged Material Management Plan offers the opportunity for the Army Corps and the communities of the Cuyahoga Watershed to think differently about dredging and sedimentation. By minimizing the level and frequency of dredging, using best practices to ensure project depth as well as water quality, and taking a proactive, concerted approach to using reclaimed material, the Army Corps of Engineers may not only achieve its mission of maintaining the Navigation Channel, but can also have a positive impact on the quality of life for those that live in Northeast Ohio.

Sincerely,

Paul A. Alsenas

Paul Alsenas
Director

CLEVELAND™
AIRPORT SYSTEM

CLE CLEVELAND HOPKINS INTERNATIONAL AIRPORT

BKL CLEVELAND BURKE LAKEFRONT AIRPORT

April 13, 2006

U.S. Army Corps of Engineers
Buffalo District
ATTN: Patti McKenna
1776 Niagara Street
Buffalo, NY 14207-3199

Re: Cleveland Harbor Dredged Material Management Plan

Dear Ms. McKenna:

The U.S. Army Corps of Engineers (USACE) is proposing an environmental impact statement (EIS) that will address the ramifications of any future management of dredged material removed from Cleveland Harbor. The Cleveland Airport System (CAS) has received the information packet for this proposed action and, respectfully, offers the following comments for consideration.

The Dredged Material Management Plan (DMMP) for any future confined disposal facility has the potential to impact aircraft activity occurring at Burke Lakefront Airport. As such, the Federal Aviation Administration Detroit Airports District Office and the local office for the US Department of Agricultural Wildlife Services have been intimately involved in the on-going DMMP. CAS understands that neither office received the USACE scoping packet. Accordingly, we took the liberty of forwarding the information to both and we ask that each agency be included on all future distributions.

Section 5.0 of the scoping packet addresses the categories of potential impacts that would be explored. The listing is comprehensive, however, we call attention to three specific items that may or may not be included within a specific category. Each is deserving of attention and public disclosure:

1. Wildlife hazard: the alternative confined disposal facilities are all located within 10,000 linear feet of Burke Lakefront Airport. These facilities are known attractants for birds and other wildlife, which could pose risk to aviation. There are means to mitigate this issue that should be brought to light during the investigation.

Cleveland Hopkins International Airport
5300 Riverside Drive
P.O. Box 81009
Cleveland, OH 44181-0009
USA
1 216 265 6000

Cleveland Burke Lakefront Airport
1501 North Marginal Road
Cleveland, OH 44114-3759
USA
1 216 781 6411

clevelandairport.com

2. Land use impacts: the potential for altering on-shore land use is evident in Alternatives 4, 5, and 14. For instance, Alternate 4 suggests that relocation of the US Coast Guard, USACE and the US Naval Reserve before CDF construction could start.

3. Health: Measure C indicates that spoil from Cleveland Harbor is unsuitable for open lake placement. Recognizing that humans would eventually occupy whatever CDF alternative is selected, the effort should assess the potential for human exposure to contaminants and means to mitigate potential health issues.

In closing, the importance of the USACE effort to provide Cleveland with a future CDF can not be understated. The CAS comments on the EIS scope are given with the intent strengthening the scope and ensuring a successful project. Additional comments will be forthcoming regarding the project alternatives and means to mitigate wildlife hazard. Meanwhile, we appreciate the opportunity to provide you with our initial thoughts.

Sincerely,

Dana Ryan

Dana Ryan
Chief of Planning

Cc: D. Welhouse, FAA
C. Hicks, USDA

Cleveland Hopkins International Airport
5300 Riverside Drive
P.O. Box 81009
Cleveland, OH 44181-0009
USA
1 216 265 6000

Cleveland Burke Lakefront Airport
1501 North Marginal Road
Cleveland, OH 44114-3759
USA
1 216 781 6411

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
6950 Americana Parkway, Suite H
Reynoldsburg, Ohio 43068-4127

(614) 469-6923 / FAX (614) 469-6919

April 7, 2006

Patti McKenna
U.S. Army Corps of Engineers
Buffalo District
1776 Niagara Street
Buffalo, NY 14207-3199

Dear Ms. McKenna:

This is in response to the U.S. Army Corps of Engineers Cleveland Harbor Dredged Material Management Plan Scoping Information Packed for the proposed future management of dredged material in Cleveland Harbor, Cuyahoga County, Ohio we received on March 20, 2006.

There are no Federal wilderness areas, wildlife refuges, or designated Critical Habitat within the vicinity of the proposed site.

ENDANGERED SPECIES COMMENTS: The proposed project lies within the range of the **Indiana bat** (*Myotis sodalis*), a Federally-listed endangered species. Since first listed as endangered in 1967, their population has declined by nearly 60%. Several factors have contributed to the decline of the Indiana bat including the loss and degradation of suitable hibernacula, human disturbance during hibernation, pesticides, and the loss and degradation of forested habitat, particularly stands of large, mature trees. Fragmentation of forest habitat may also contribute to declines. Summer habitat requirements for the species are not well defined but the following are considered important:

1. Dead or live trees and snags with peeling or exfoliating bark, split tree trunk and/or branches, or cavities, which may be used as maternity roost areas.
2. Live trees (such as shagbark hickory and oaks) which have exfoliating bark.
3. Stream corridors, riparian areas, and upland woodlots which provide forage sites.

Should the proposed site contain trees or associated habitats exhibiting any of the characteristics listed above, we recommend that the habitat and surrounding trees be saved wherever possible. If the trees must be cut, further coordination with this office is requested to determine if surveys are warranted. Any survey should be designed and conducted in coordination with the Endangered Species Coordinator for this office.

The project area lies within the range of the **bald eagle** (*Haliaeetus leucocephalus)*, a Federally-listed threatened species. We recommend that you contact Mr. Mark Shieldcastle, with the Ohio Department of Natural Resources, Division of Wildlife, (419) 898-0960, for the location(s) of the

eagle nest(s) in the county. If any nests are located within ½ mile of the project site, further coordination with this office is necessary. If the nest is active, we recommend that work at the site be restricted from mid-January through July to allow pre-nesting activities, incubation, and raising of the young.

The proposed project lies within the range of the **piping plover** *(Charadrius melodus)*, a Federally listed endangered species. Plover habitat includes sand or pebble beaches with sparse vegetation along the shore of Lake Erie. If the proposed project is expected to impact habitat of this type, further consultation with this office will be necessary.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973 (ESA), as amended, and are consistent with the intent of the National Environmental Policy Act of 1969 and the U. S. Fish and Wildlife Service's Mitigation Policy. Please note that consultation under section 7 of the ESA may be warranted for this project if suitable habitat for the Indiana bat may be impacted by this project. This letter provides technical assistance only and does not serve as a completed section 7 consultation document.

We appreciate this opportunity to provide the above comments. If you have questions, or if we may be of further assistance in this matter, please contact Angela Zimmerman at extension 22 in this office.

Sincerely,

Mary Knapp

Mary Knapp, Ph.D.
Supervisor

cc: ODNR, DOW, SCEA Unit, Columbus, OH

U.S. Department of Housing and Urban Development

Ohio State (Columbus) Office
Office of Community Planning and Development
200 North High Street
Columbus, Ohio 43215-2499

April 5, 2006

Environmental Analysis Section
Attention: Patti McKenna
Department of the Army
U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, N.Y. 14207-3199

Dear Ms. McKenna:

This is in response to the request for comments concerning the project listed below. The U.S. Department of Housing and Urban Development has determined that the project is in the public interest and supports the project.

PUBLIC SCOPING
ENVIRONMENTAL IMPACT STATEMENT
CLEVELAND HARBOR, CUYAHOGA COUNTY, OHIO
DREDGED MATERIAL MANAGEMENT PLAN

Thank you for the opportunity to comment. If you should require any further input from HUD, I may be reached at (614) 469-5737, x8252 or by email at ross_carlson@hud.gov.

Sincerely,

Ross S. Carlson
Environmental Officer

United States Department of the Interior

National Park Service

Midwest Region
601 Riverfront Drive
Omaha Nebraska 68102-4226

L7619(MWR-P/G)
x39-00649,668,852,949,975)

MAR 2 7 2006

U.S. Army Corps of Engineers
Buffalo District
Attention: Ms. Patti McKenna
1776 Niagara Street
Buffalo, New York 14207-3199

Dear Ms. McKenna:

This is in response to the Public Scoping Information Packet for the Environmental Impact Statement for the Dredged Material Management Plan, Cleveland Harbor, Cuyahoga County, Ohio. These comments are provided on behalf of Regional Director Ernest Quintana who has asked me to respond to your scoping document.

The proposed Cleveland Harbor Dredged Material Management Plan, if implemented, could have impacts to sites funded with assistance from the Land and Water Conservation Fund (L&WCF). As a result, these sites are encumbered by Section 6(f)(3) of the L&WCF Act of 1965, as amended (Public Law 88-578), which states: "No property acquired or developed with assistance under this section shall, without the approval of the Secretary, be converted to other than public outdoor recreation uses."

Our findings show that L&WCF assistance was provided to several sites near the proposed project area. These sites include, but are not limited to, the following L&WCF projects:

Project Number	Project Name	Project Sponsor
29-00649	The Flats Development	City of Cleveland
39-00668	Cleveland Lakefront	Dept. of Natural Resources
39-00852	The Flats II	City of Cleveland
39-00949	Cleveland Edgewater Area	Dept. of Natural Resources
39-00975	Cleveland Lakefront Bikeway	Dept. of Natural Resources

The U.S. Army Corps of Engineers (USACE), Buffalo District, should consult with the official who administers the L&WCF program in Ohio to determine whether any impacts will occur at these sites. Please contact Mr. Samuel W. Speck, Director, Department of Natural Resources, 2045 Morse Road, Building D-3, Columbus, Ohio 43229.

TAKE PRIDE IN AMERICA

These comments are provided as informal technical assistance and are not intended to reflect our response to any document which may be prepared in this matter to comply with the National Environmental Policy Act of 1969, as amended. If you have any questions regarding these comments, please contact me at 402-661-1550.

Sincerely,

Marilyn K. Gillen

Marilyn K. Gillen
Outdoor Recreation Planner
Partnerships/Grants

DEPARTMENT OF DEFENSE

Department of The Army; Corps of Engineers

Intent To Prepare a Draft Environmental Impact Statement for a Proposed Dredged Material Management Plan for Cleveland Harbor, OH

AGENCY: Department of the Army, U.S. Army Corps of Engineers, DoD.

ACTION: Notice of intent.

SUMMARY: Pursuant to Section 102(2)(c) of the National Environmental Policy Act (NEPA) of 1969 as implemented by the Council on Environmental Quality regulations (40 CFR Parts 1500–1508) and Public Law 102–484 Section 2834, as amended by Public Law 104–106 Section 2867, the Department of the Army hereby gives notice of intent to prepare a Draft Environmental Impact Statement (EIS) for the subject Dredged Material Management Plan (DMMP). The Buffalo District of the U.S. Army Corps of Engineers will be the lead agency in preparing the EIS.

The EIS will consider Federal actions associated with the development of a DMMP for the Federal harbor in the city of Cleveland, Cuyahoga County, OH. The DMMP is a study conducted to develop a long-term (20-year) strategy for providing viable dredged material placement alternatives that would meet the needs of maintaining the Federal channels at Cleveland Harbor. The overall goal of the DMMP is to develop a plan to maintain channels necessary for commercial navigation within Cleveland Harbor and to conduct dredged material placement in the most economically and environmentally sound manner, and maximize the use of dredged material as a beneficial resource.

FOR FURTHER INFORMATION CONTACT: Mr. Michael Asquith, Project Manager, Buffalo District, Corps of Engineers, CELRB–PM–PM, 1776 Niagara Street, Buffalo, NY 14207–3199, telephone (716) 879–4352, or Ms. Patti McKenna, NEPA Coordinator, Buffalo District, Corps of Engineers, 1776 Niagara Street, Buffalo, NY 14207–3199, Telephone: (716) 879–4367.

SUPPLEMENTARY INFORMATION: Cleveland Harbor is located on Lake Erie at the mouth of the Cuyahoga River. Included in the study area are the Outer Harbor and Cuyahoga River Channels. The harbor is protected by a breakwater system: an east breakwater (20,970 feet long), a west breakwater (6,048 feet long), and the east and west arrowhead breakwaters (each measuring 1,250 feet). Cleveland Harbor is dredged twice each year. The average dredging volume per year from 1998 through 2005 is 305,000 cubic yards, which includes Federal and non-Federal dredging activities. In accordance with joint U.S. Environmental Protection Agency (USEPA) and the U.S. Army Corps of Engineers (USACE) protocols contained in the Great Lakes Dredged Material Testing and Evaluating Manual (1998), all sediment dredged from Cleveland Harbor and Cuyahoga River Channels is unsuitable for open lake and nearshore placement. All dredged material is currently placed in a Confined Disposal Facility (CDF). Since the 1960s, five CDFs have been constructed at Cleveland Harbor (9, 10B, 12, 13, and 14). The current operational CDF (10B) is nearing design capacity. Planning efforts are underway for interim placement solutions at CDF 10B. However, to address long-term dredging and dredged material management needs, additional placement sites for dredged material disposal must also be made available.

Proposed Action: In accordance with U.S. Army Corps of Engineers Regulation 1105–2–100, a DMMP is prepared for a Federal navigation project to ensure that maintenance dredging activities are performed in an environmentally acceptable manner, use sound engineering techniques, are economically warranted, and that sufficient confined disposal facilities are available for at least the next 20 years. The proposed DMMP will focus on the management of dredged material from maintaining Federal navigation channels at Cleveland Harbor, and will take into consideration non-Federal dredging projects permitted by the Buffalo District. The approved DMMP will be consistent with sound engineering practices and meet all Federal environmental compliance standards, including those established by the Clean Water Act. In addition, the DMMP will be consistent with State plans such as the Ohio Coastal Zone Management Program.

Reasonable Alternatives: The alternatives for the DMMP will consist of an array of disposal and beneficial use options. It is Corps of Engineers planning policy to consider all practicable and relevant alternative management measures. Options for managing dredged material at Cleveland Harbor that are being considered include the following: (1) Open-lake Placement. To date, all sediment dredged from Cleveland Harbor and Cuyahoga River Channels is unsuitable for open lake placement; (2) Confined Disposal. Additional capacity would be created in one of the existing CDFs through adaptive management and/or the construction of internal dikes; (3) New Confined Disposal Facility. The construction of a new in-water CDF will also need to be evaluated. There are eight potential locations that are being assessed; (4) Beneficial Use. Dredged material would be transported to upland sites for use as cover or fill, with particular emphasis on the value of restoring or creating habitat; (5) Best Management Practices. Measures will be considered to reduce erosion and sedimentation within the watershed and consequently reduce harbor dredging needs; and (6) ''No Action''. No Federal action would be taken to address dredging needs at Cleveland Harbor. The EIS will address measures, alternatives and impacts to the selected or preferred alternative(s).

Scoping Process: The Corps of Engineers invites affected Federal, State and local agencies, affected Native American tribes, and other interested organizations and individuals to participate in the development of the EIS. The Corps of Engineers anticipates conducting a public scoping meeting for this EIS in the summer of 2006. The exact date, time and location of this meeting has not yet been determined. This information will be publicized once the meeting arrangements have been made.

The Draft EIS is currently scheduled to be available for public review in June 2007. The Final EIS is currently scheduled to be available for public review in January 2008.

Brenda S. Bowen,

Army Federal Register Liaison Officer.

[FR Doc. 06–2603 Filed 3–16–06; 8:45 am]

BILLING CODE 3710–GP–M

DEPARTMENT OF EDUCATION

Notice of Proposed Information Collection Requests

AGENCY: Department of Education.

SUMMARY: The IC Clearance Official, Regulatory Information Management Services, Office of Management, invites comments on the proposed information collection requests as required by the Paperwork Reduction Act of 1995.

DATES: Interested persons are invited to submit comments on or before May 16, 2006.

SUPPLEMENTARY INFORMATION: Section 3506 of the Paperwork Reduction Act of 1995 (44 U.S.C. Chapter 35) requires that the Office of Management and Budget (OMB) provide interested Federal agencies and the public an early

CLEVELAND HARBOR
OPERATIONS & MAINTENANCE
(DREDGED MATERIAL MANAGEMENT PLAN - EAST 55th STREET CDF)
CUYAHOGA COUNTY, OHIO

SECTION 404(a) PUBLIC NOTICE AND
SECTION 404(b) (1) EVALUATION

U.S. ARMY CORPS OF ENGINEERS
BUFFALO DISTRICT
AUGUST 2009

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207-3199

REPLY TO
ATTENTION OF:

Environmental Analysis Team

PUBLIC NOTICE

CLEVELAND HARBOR
OPERATIONS & MAINTENANCE
(DREDGED MATERIAL MANAGEMENT PLAN - EAST 55th STREET CDF)
CUYAHOGA COUNTY, OHIO

This Public Notice has been prepared and distributed pursuant to Section 404(a) of the Clean Water Act (33 USC 1344). Its purpose is to specify the nature and extent of dredged and/or fill material that would be discharged into waters of the United States by implementation of the proposed project. This notice provides an opportunity for any person who may be affected by such discharge to submit comments or request a public hearing. A Section 404(b)(1) Evaluation is included with this Public Notice, which evaluates the impacts of the proposed discharge of dredged and/or fill material into waters of the United States.

The U.S. Army Corps of Engineers (USACE)-Buffalo District is responsible for maintaining harbor structures and authorized depths within the authorized Federal navigation channels. It is a primary objective of the USACE Maintenance Dredging Program to meet the expectations of the dredging customers and stakeholders consistent with the Section 404(b)(1) guidelines and available Federal funding.

The existing Federal navigation project at Cleveland Harbor is located along the southern shore of Lake Erie in Cuyahoga County, Ohio. The harbor is situated approximately 176 miles southwest of Buffalo, New York, and 96 miles east of Toledo, Ohio (Figure 1). The harbor consists of a breakwater-protected Outer Harbor that encompasses about 1,300 acres (five miles long and 16,000 to 2,400 feet wide). The harbor's breakwater system is comprised of a 20,970–foot long East Breakwater, a 6,048-foot long West Breakwater connected to the shore (with a 201-foot gap), and East and West Arrowhead Breakwaters each 1,250 feet long. The Federal navigation channel extends approximately 5.5 miles up the Cuyahoga River (Figure 3).

Since the 1960's, five confined disposal facilities (CDF) have been constructed in Cleveland Harbor (Figure 2). There is currently one operational facility (CDF 10B), which is currently maintained by the Buffalo District. The remaining four facilities (CDFs 9, 12, 13, and 14) were transferred to the local project sponsors (City of Cleveland and Cleveland-Cuyahoga County Port Authority) once the facilities were filled to their respective design capacities. USACE recently acquired access and use of CDFs 9 and 12 to provide additional short term capacity for dredged material.

USACE-Buffalo District continually monitors the current CDF capacity at Cleveland Harbor

as it relates to dredging and dredged material management needs at the harbor. A Dredged Material Management Plan (DMMP)/Environmental Impact Statement (EIS) has been prepared by USACE-Buffalo District to formulate a plan for the maintenance dredging and disposal of dredged materials from Cleveland Harbor. The DMMP/EIS evaluated alternatives in order to provide a minimum of 20 years of dredged material disposal.

The Federal objective of water and related land resources project planning is to contribute to National Economic Development consistent with protecting the Nation's environment, pursuant to Federal, State and local environmental protection statutes and regulations, as well as applicable Executive Orders, Memoranda, and other Federal planning requirements.

In the DMMP/EIS, in addition to considering the No Action Plan (Without Project Condition) alternative, USACE considered a wide array of alternatives. These plans were evaluated for engineering and economic feasibility, environmental and social acceptability, and their ability to meet the planning objectives. The recommended plan was identified as the cost effective, technically feasible, environmentally sound, and socially acceptable.

The following description is for the proposed construction of a new CDF at the East 55th Street site (Also see Section 2.13.1 of the Cleveland Harbor DMMP/EIS). To the south, the East 55th Street site would be bound by an improved East 55th Street marina breakwater, the natural shoreline at the lakeward terminus of East 55th Street, and a to be constructed perimeter wall/dike. A portion of the eastern boundary would be formed by the existing First Energy circulating water intake and the remainder of the perimeter would be formed by steel sheet pile walls, which could support vessel mooring if any future development of the site warrants.

The proposed CDF would encompass approximately 157 acres and would consist of three cells. It is expected that CDF construction would begin in 2012 with Cell 1 and would be constructed over a three-year period. The next cell would be constructed over a three-year period beginning in 2019 and the third cell would be constructed beginning in 2024. It is anticipated that the construction of the proposed CDFs will utilize marine construction equipment for placement and grading of the rubblemound stone structure and to drive the sheet steel pile cells.

Under routine harbor maintenance operations, approximately 300,000 cubic yards of dredged material would be dredged from Cleveland Harbor and placed annually into the proposed East 55th Street CDF by USACE contractors. Dredging operations at Cleveland Harbor generally are scheduled to be performed during the period between May until November each year.

Sediment sampling at the harbor is normally conducted once every five years. The purpose of the sediment sampling is to assess the physical and chemical characteristics of the sediments and determine any particularized management needs. Recent sediment and associated water quality sampling and analyses conducted indicate that the material to be dredged is comprised almost entirely of silts and clays and some sands. Chemical and toxicity analysis of the sediment and affected water samples classifies all sediments, with the periodic exception of those collected near the upstream limit of the Federal project, as being contaminated and not suitable for unconfined open-lake placement. (USACE 2007)

In addition to maintenance dredging of the Federal channels, other public and private

interests may apply for Department of the Army (DA) permits to dredge areas adjacent to the Federal channel and to discharge these materials at the proposed CDF. The attached Section 404(b)(l) Evaluation also applies to DA permits for the placement of dredged material resulting from these activities. Separate evaluations would be performed for permit requests involving the placement of material at other sites.

Corps of Engineers Regulation ER 200-2-2, "Policy and Procedures for Implementing the National Environmental Policy Act (NEPA)", provides guidance for insuring that the Corps actions comply with the National Environmental Policy Act (NEPA). This project is being reviewed under applicable Federal and State environmental protection statutes and regulations, and applicable Executive Orders and Memoranda. Previous NEPA documentation for Cleveland Harbor includes ***Final Environmental Impact Statement (FEIS)Operations and Maintenance Diked Disposal Area Site No. 12, Cleveland Harbor, Cuyahoga County Ohio (1973), FEIS, Operation and Maintenance, Cleveland Harbor, Ohio (1974); and FEIS, Harbor Maintenance and Confined Disposal Facility Site 10B, Cleveland Harbor, Ohio (1994).*** These documents, and supplemental documentation, have been filed with the USEPA. Copies are available for examination at the USACE, Buffalo District office.

The Draft DMMP/EIS [including this Clean Water Act Section 404(a) Public Notice and Section 404(b)(1) Evaluation] are being coordinated for agency and public review and comment. If there are no substantial objections to the proposed plan, a Record of Decision will be signed and coordinated and the project would proceed into Plans and Specifications, Contract, and Construction.

The proposed CDF site has not been previously designated by the Administrator of the U. S. Environmental Protection Agency. Designation of the proposed CDF site for receipt of fill and dredged material associated with construction and operation of this Federal project has been made through the application of the Section 404(b)(1) Guidelines. Preliminary assessment of proposed project impacts (as discussed in the Section 404(b)(l) Evaluation applying the guidelines for specification of disposal sites for dredged or fill material in 40 CFR 230) concludes that the proposed work would not cause unacceptable disruption to water quality uses of the affected aquatic ecosystem. Section 401 State Water Quality Certification (WQC) from the Ohio Environmental Protection Agency is required for this action. USACE-Buffalo District submitted an application for WQC to the Ohio Environmental Protection Agency on 21 August 2009.

Based on the review of available environmental data and consultation with the U.S. Fish and Wildlife Service and Ohio Department of Natural Resources, it has been determined that the proposed work will not affect any species proposed or designated by the U.S. Department of the Interior as threatened or endangered, nor will it affect the critical habitat of any such species. Therefore, unless information forthcoming indicates otherwise, no further consultation pursuant to Section 7 of the Endangered Species Act Amendments of 1978 will be undertaken with the U.S. Fish and Wildlife Service.

Consultation with the National Register of Historic Places (NRHP), Ohio Historic Preservation Office and other historic preservation interests and an evaluation of the project's area of potential effect indicate that no properties listed in or eligible for listing in the NRHP would be affected by this project. By this Notice, the National Park Service is advised that presently

unknown archeological, scientific, prehistoric, or historic data may be lost or destroyed by the work to be accomplished.

The proposed project would be constructed in a manner consistent to the maximum extent practicable with the State of Ohio Coastal Management Program, as determined by the Federal Consistency Determination. Concurrence with this determination has been requested from the Ohio Department of Natural Resources on 21 August 2009.

This Notice is published in conformance with Title 33, Code of Federal Regulations 337.1. Copies of this Notice (or notification thereof) have been furnished to Federal, State and local agencies, and interests including:

U.S. Environmental Protection Agency
U.S. Department of the Interior, Fish and Wildlife Service
U.S. Department of the Interior, National Park Service
U.S. Coast Guard
Ohio Environmental Protection Agency
Ohio Department of Natural Resources
Ohio Historic Preservation Office
Cuyahoga County
City of Cleveland
Cleveland/Cuyahoga County Port Authority

Any interested parties and/or agencies desiring to express their views concerning the proposed discharges may do so by filing their comments, in writing, no later than 4:30 p.m., 30 days from the date of the issuance of this Notice. A lack of response will be interpreted as meaning that there is no objection to the proposed work.

Any person who has an interest which may be affected by the discharge of the dredged or fill material may request a public hearing. The request must be submitted in writing to the District Commander within 30 days of the date of issuance of this Notice and must clearly set forth the interest which may be affected and the manner in which the interest may be affected by this activity.

Correspondence pertaining to this matter should be addressed to: District Commander, U.S. Army Corps of Engineers-Buffalo District, 1776 Niagara Street, Buffalo, New York 14207-3199; ATTN: Ms. Christine Cardus. If you have any questions or require any additional information, please contact Ms. Cardus of my staff at number: 716- 879-4130, Fax: 716-879-4357, or Email: christine.m.cardus@usace.army.mil

MARTIN P. WARGO, PWS
Chief, Environmental Analysis Team

NOTICE TO POSTMASTER: It is requested that the above Notice be conspicuously displayed for 30 days from the date of its issue.

SECTION 404(b)(l) EVALUATION

CLEVELAND HARBOR
OPERATIONS & MAINTENANCE
(DREDGED MATERIAL MANAGEMENT PLAN - EAST 55th STREET CDF)
CUYAHOGA COUNTY, OHIO

INTRODUCTION

Section 404 and Section 404(b)(1)of the Clean Water Act (33 USC 1344) requires the evaluation of discharge sites and the water quality effects of discharges of dredged and/or fill material into waters of the United States. The evaluation for the proposed project has been prepared using U.S. Environmental Protection Agency guidelines in conjunction with those of the Secretary of the Army for civil works. The evaluation includes all aspects of the project which involve the discharge of dredged and/or fill material.

1. PROJECT DESCRIPTION

1.1 Location

1.1.1 Cleveland Harbor is located on the south shore of Lake Erie, at the mouth of the Cuyahoga River, approximately 176 miles southwest of Buffalo, New York, and 96 miles east of Toledo, Ohio (Figure 1). The commercial harbor includes a breakwater-protected Outer Harbor and Cuyahoga River and Old River navigation channels. The proposed East 55th Street CDF would be constructed within the East Basin of the Outer Harbor. To the west, the East 55th Street site would be bound by an improved East 55th Street marina breakwater. On the south, the CDF would be bound by the natural shoreline near the lakeward terminus of East 55th Street and a to-be-constructed perimeter dike. The eastern boundary would be formed by the existing First Energy circulating water intake (necessary improvements would be made to the structure) and to-be-constructed dikes.

1.2 General Description

1.2.1 The proposed plan would involve the construction of a new CDF at Cleveland Harbor. After completion of the CDF, bottom sediments to be dredged annually from the Cleveland Outer Harbor, Old River Channel, Cuyahoga River Channel, and some permitted adjacent channels and placed into the CDF. Anticipated volume is 6,850,000 cubic yards, which would provide approximately 20 years of capacity and be operational from 2015 through 2034.

1.2.2 The CDF would be constructed as a series of three optimally sized cells in order to spread out construction costs over time while balancing cost effectiveness. Cell size and sequencing has not yet been finalized, but the combined footprint would not exceed what is shown in Figure 4. The volume capacity of the CDF would be approximately 6,850,000 cubic yards, which would provide approximately 20 years of capacity assuming an annual dredging volume of about 338,220 cubic yards

per year. The first cell would be constructed from 2012 through 2014, allowing filling operations to begin in 2015. Additional cells would follow, with each subsequent cell becoming operational as the previous cell is filled.

1.3 Authority and Purpose

1.3.1 This project is being proposed for construction under the Cleveland Harbor Operations and Maintenance (O&M) authority. This study is 100 percent Federally funded through the O&M program to continued maintenance of Congressionally authorized channel depths at the harbor and sufficient capacity for dredged material disposal for a minimum of 20 years. The study was conducted pursuant to existing authorities for individual navigation feasibility studies, Preconstruction Engineering and Design (PED) investigations, construction, or O&M, as provided in Congressional Committee study resolutions and public laws authorizing specific projects.

USACE-Buffalo District has completed a Dredged Material Management Plan (DMMP)/Environmental Impact Statement (EIS) that has formulated and evaluated a plan for maintenance dredging and the disposal of dredged materials from Cleveland Harbor through the year 2029.

1.3.2 The purpose of this Section 404(b)(1) Evaluation is to assess the water quality and associated impacts of constructing a CDF located at the East 55 Street site and the discharge of dredged contaminated material into that facility. This evaluation utilizes current USEPA Guidelines (40 CFR part 230) and considers placement of fill and dredged material. This evaluation also applies to Department of the Army permit applications for the placement of contaminated dredged material from areas adjacent to the Federal Channel into the proposed CDF.

1.4 General Description of Dredged and Fill Material

1.4.1 *General Characteristics of Material*.

1.4.1.1 CDF Walls. The perimeter walls would consist of both quarry-run stone rubblemound dikes (similar in construction to that of existing Dike 10B at Cleveland Harbor) and back-to-back open cell wall design. Since this site may be developed in the future by the local sponsor, the local sponsor has requested a vertical surface along the northern, eastern, and a portion of the western outer walls for possible areas for mooring vessels.

For the rubblemound portions of the East 55th Street site, typical stone cross-sections for the existing CDF at Dike 10B were assumed applicable to this site (Figure 5). It is assumed the phased construction would progress east to west.

The vertical wall system consists of parallel combi-walls (steel sheet pile and wide flange king piles) 60 feet apart anchored together near the top with double steel channel walls and threadbar tie rods. The space between the vertical walls is filled with granular fill and capped with a temporary concrete slab as protection against loss of fill from wave overtopping. The vertical wall system initially functions as a containment structure as the CDF is being filled with dredged material. The intent of the

vertical walled cell is to reduce the footprint of the cell and its corresponding encroachment on the existing Federal channel. Inside the cell, the vertical walls maximize available disposal capacity in what is a relatively small disposal space.

This design is only suitable for cells inside the protected harbor, as they are not able to withstand the wave and ice action of the open lake water. The CDF is designed to contain the contaminated sediments through the use of a geotextile membrane, a thick filter layer, and limestone dike material construction.

Pumpout facilities would not be constructed or provided as part of the CDF construction.

The CDF overflow weir would be constructed with removable boards or slide weir to provide for an adjustable weir top elevation.

1.4.1.2 Dredged Material. The dredged material is comprised almost entirely of silts and clays and some sands.

1.4.2 *Quantity of Material*.

1.4.2.1 CDF Walls. Approximately 89,795 tons of "B" stone, 1,500,866 tons of "C" stone, 293,500 tons of "F" stone, 83,412 tons of "H" stone, and 972,500 tons of granular fill would be used to construct the proposed CDF dike. Approximately 1,424,447 square feet of steel sheet pile would be placed. The total of length of steel sheet pile incorporated into the cells would be 15,039 feet.

1.4.2.2 Dredged Material. Approximately 338,000 cubic yards of bottom sediments are dredged from Cleveland Harbor each year. The capacity of the CDF would be approximately 6,850,000 cubic yards. For the life of the CDF, the dredged material discharge rate into the site would be about 338,000 cubic yards per year.

1.4.3 *Source of Material*.

1.4.3.1 CDF Walls. Stone materials and manufactured steel products would be obtained from available commercial sources.

1.4.3.2 Dredged Material. Dredged material to be placed into the CDF would be obtained from the Cleveland Outer Harbor, the Old River Channel, the Cuyahoga River Channel, and some permitted adjacent channels. These sediments generally originate from upstream erosion throughout the Cuyahoga River watershed, including streambank and shoreline erosion. Channel bottom sediments are primarily bedload deposits laid down by the Cuyahoga River with some material deposited by littoral currents moving along the Lake Erie shoreline and around harbor navigation structures.

1.4.4 *Preliminary Evaluation of Dredged Material*

1.4.4.1 Sediment Quality Analyses. USACE-Buffalo District conducts sediment sampling at Cleveland Harbor every five years. Cleveland Harbor sediments (including Cuyahoga River Channels) were last sampled and analyzed by USACE-Buffalo District in 2007 under contract to Environment

and Engineering Incorporated (EEI). Figures 11 - 16 show the sampling site locations. Sampling sites CH-1 through CH-22 represent the River Channels, CH-23 through CH-30 represent the Outer Harbor, and CL-1 through CL-4 represent the open-lake reference sediments (See USACE 2007). The sediment testing included analyses for inorganic parameters (metals, nutrients, total organic carbon [TOC], etc.), organic contaminants (Polychlorinated Biphenyls [PCBs], Pesticides, Polynuclear Aromatic Hydrocarbons [PAHs]) and elutriate analyses. The following is a summary of the test results:

a. *Particle Size Analysis*. The River Channel material was comprised of between 35.7% (Site CH-1) and 98.3 % (Site CH-13) silts and clays, with the remainder sands. The Upper End material within the River Channel was comprised of between 49.8% (Site CH-4) and 64.3% (Site CH-1) sands, with the remainder silts and clays. The Old River Channel material was composed of between 39.8% (Site CH-22) and 63.4% (Site CH-21) sands, with the remainder silts and clays. The Outer Harbor Channel material was comprised of between 90.9% (Site CH-30) and 99.1% (Site CH-27) silts and clays, with the remainder sands. Sediments at the open-lake reference area were comprised predominantly of silts and clays (98.3% [Site CL-4] to 98.9% [Site CL-2]), with a very small fraction of sands. Table 1 shows the results of the particle size analysis.

b. *Inorganic Analyses*. Relative to open-lake reference area levels, heavy metal concentrations in the Federal navigation channel sediments were generally comparable. Some sediment samples showed significantly elevated heavy metals concentrations when compared to those at the open-lake reference area. Arsenic concentrations at Sites CH-9, CH-12, CH-13, CH-14, CH-25 and CH-29, which range from 17.4 mg/kg to 20.3 mg/kg, may be of toxicological concern. At Site CH-6, the mercury concentration of 2.88 mg/kg could be acutely toxic. The lead concentration of 127 mg/kg at Site CH-22 would appear to be acutely toxic. Zinc concentrations at Sites CH-9, CH-13 and CH-17, which ranged from 379 mg/kg to 428 mg/kg, may be of toxicological concern. Based on these data, the following heavy metal COCs were identified: mercury at Site CH-6; arsenic and zinc at Site Ch-9 and CH-13; arsenic at Site CH-12, CH-14, CH-25, and CH-29; zinc at Site CH-17; and lead at Site CH-22. Tables 2 and 3 show the results of the inorganic analysis.

c. *TOC, Ammonia, and Cyanide*. TOC levels in the Federal navigation channel sediment samples ranged from 6,780 ppm (Site CH-22) to 40,000 ppm (Site CH-30). At the open-lake reference area, TOC concentrations ranged from 27,000 ppm (Site CL-4) to 30,600 ppm (Site CL-2). TOC levels at all sites, except for Sites CH-6, CH-7, CH-9, CH-10, CH-13, Ch-23 and CH-30, were significantly below the lowest open-lake reference area TOC level of 27,000 ppm. However, the sediment TOC in Cleveland Harbor exceeds the TOC limit of 5,000 ppm identified in the Ohio Department of Natural Resources (ODNR) and Ohio Environmental Protection Agency (OEPA) guidelines for sediment placement in the littoral system. With respect to other inorganic contaminants, ammonia levels at Sites CH-3, CH-10 and CH-25 (ranging from190 mg/kg to 201 mg/kg) may be toxicologically significant. With respect to cyanide, concentrations at Sites CH-21 and CH-22 (ranging from 2.62 mg/kg to 3.63 mg/kg) could be of toxicological concern. Based on these data, ammonia and cyanide were identified as contaminants of concern (COC) at the respective sites. Tables 2 and 3 show the results of the TOC, ammonia and cyanide analysis.

d. *Organic Analyses (PAHs)*. Total PAH concentrations in the Federal navigation channel sediments ranged from 1.13 mg/kg (Site CH-11) to 7.18 mg/kg (Site CH-6). Total PAH levels at the open-lake reference area were quite low, ranging from 0.03 mg/kg (Site CL-1) to 0.69 mg/kg (Site CL-

4). While total PAH concentrations at all of the Federal navigation channel sites exceeded those at the open-lake reference area, many may not be of significant toxicological concern. Nevertheless, given the TOC level throughout the Federal navigation channel sediments, and an assumed low fraction of black carbon, some PAH compounds may be more bioavailable and therefore capable of exerting acute toxicity. Tables 4 and 5 show the results of organic analysis.

e. *PCBs*. PCBs were measured at all of the Federal navigation channel sites; Aroclors 1242, 1254 and 1260 were predominantly detected. Quality Control (QC) checks were completed. Individual Aroclor mixtures that were detected ranged from 22.2 µg/kg of Aroclor 1254 at Site CH-8 to 260 µg/kg of Aroclor 1254 at Site CH-27_{QC}. "Total PCB" concentrations (the sum of the three predominant Aroclors, valuing non-detectable concentrations at the laboratory reporting limit [LRL]) in the Federal navigation channel sediments ranged from 96.6 µg/kg to 504 µg/kg at Sites CH-14 to CH-27_{QC}, respectively. Aroclor 1254 was the only PCB mixture detected in the open-lake reference area sediments, ranging in concentration from 35.4 µg/kg (Site CL-3) to 42.8 µg/kg (Site CL-2). Since Aroclor 1254 was the only detected PCB mixture, the measured level was assumed to represent the "total PCB" concentration. Total PCB concentrations at all of the Federal navigation channel sites exceeded those at the open-lake reference area sediments. Table 6 shows the results of the PCB analysis.

f. *Pesticides*. Most pesticides in the Federal navigation channel sediment samples were non-detectable at LRLs ranging from 1.02 µg/kg to 623 µg/kg. With the exception of dieldrin at Site CH-10 (11.6 µg/kg), 4,4'-dichlorodiphenyltrichloroethane (DDT) and its metabolites/breakdown products 4,4'-dichlorodiphenyldichloroethylene (DDE) and 4,4'-dichlorodiphenyldichloroethane (DDD) were detected at most of the Federal navigation channel sites. DDD was the only pesticide detected in the open-lake reference area sediments, ranging in concentration from 7.89 µg/kg to 8.95 µg/kg at Sites CL-1 and CL-2, respectively. Tables 7 and 8 show the results of pesticide analysis.

g. *Elutriate Testing*. The results showed releases of some heavy metals, ammonia and cyanide from the sediments (Table 3.10). Evidenced heavy metal releases from the harbor sediments were low, and maximum releases (dissolved) generally occurred from MUs CH-URMU and CH-LRMU sediments. The highest releases of copper and mercury (dissolved) were 1.5 µg/L and 0.0024 µg/L from MU CH-URMU sediments, respectively. Releases of PAH compounds (dissolved) were indicated at several of the Federal navigation channels sites (Table 5) Maximum benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(ghi)perylene, chrysene, fluoranthene and pyrene releases (dissolved) were 0.156 µg/L, 0.181 µg/L, 0.405 µg/L, 0.143 µg/L, 0.172 µg/L, 0.254 µg/L and 0.386 µg/L at MU CH-LRMU in the Lower River channel reach, respectively. With respect to PCBs, no releases (dissolved) were shown at LRLs ranging from 0.0102 µg/L to 0.104 µg/L (Table 3.12). Pesticide releases (dissolved) from the sediments were non-detectable at LRLs ranging from 0.0222 µg/L to 2.78 µg/L (Table 6).

The overall data results indicate that sediment within the Federal Channels fails to meet Federal Guidelines (specifically PAHs and heavy metals), and in accordance with joint USEPA/USACE protocols contained in the Great Lakes Dredged Material Testing and Evaluation Manual (1998), is unsuitable for open-lake and nearshore placement. Therefore, all dredged material would be placed in the proposed CDF.

1.4.4.2 <u>Potential Sources of Sediment Contamination</u>. The Cleveland Harbor vicinity had been and to

a large degree remains a predominately urban and industrial area. Contaminants associated with bottom sediments at Cleveland Harbor originate from past and current industrial (e.g., steel-making, stone processing) and municipal discharges, stormwater runoff from impervious surfaces such as roads, parking lots, etc., residential sewage disposal systems, and runoff from agricultural lands.

1.5 Description of the Discharge Site

1.5.1 *Location.* The East 55th Street CDF site is located on Lake Erie at the eastern end of the Cleveland Harbor Approach and Entrance Channel (Figure 4). Toe the west, the site is bound by the East 55th Street marina's eastern breakwater. On the south, the site is bound by the natural shoreline near the terminus of East 55th Street. On the east, the site is bound by the existing First Energy circulating water intake.

1.5.2 *Size.* The site encompasses an area of approximately 157 acres.

1.5.3 *Type of Site*. The proposed CDF site is currently unconfined, albeit partially sheltered by the marina breakwater to the west, water intake to the east and the Cleveland Harbor East Breakwater (located approximately 2,500 feet lakeward.)

1.5.4 *Type of Habitat.* An underwater dive at the site was conducted by a USACE biologist in July 2008 at the CDF site to determine the general habitat characteristics of the area. Five transects were traversed by the biologist through the area in both the open water and nearshore portions of the site. The diver observed that the sediment layer throughout the project site consisted of a homogeneous layer of sandy loam mixed with crushed zebra (*Dreissena polymorpha)* and quagga mussel *(Dreissena rostriformis bugensis)* shells. Due to the homogenous and flat nature of the bottom substrate, it is not expected that any significant fish spawning beds occur at the site, and none were observed by the diver. Freshwater drum (*Aplodinotus grunniens*) and numerous exotic invasive round goby (*Neogobius melanostomus*) were observed during the dive throughout the proposed project area. A few small largemouth bass and yellow perch were observed near the nearshore areas containing submerged stone riprap. In general, no outstanding aquatic habitat was found at the project site. Recent fisheries surveys (1994 and 2002) conducted by the OEPA-Division of Surface Water Ecological Assessment Unit in the vicinity of the proposed project area indicated the primary species found, in terms of numbers, were pumpkinseed sunfish, rock bass, and largemouth bass.

1.5.5 *Timing and Duration of Discharge*. It is estimated that three construction seasons would be needed to complete installation of the stone and cellular steel sheetpile dikes for the CDF. Dredging and discharge of dredged material normally occurs over 3 to 4 months between May and September. Approximately 338,000 cubic yards of dredged material would be discharged into the CDF on an average annual basis. Discharges from the CDF's overflow weir would not occur until the facility has been nearly filled to capacity.

1.6 Description of the Discharge Method.

1.6.1 Construction of the stone rubblemound portions proposed CDF would be conducted by a private contractor under contract with the Corps of Engineers. It is anticipated that the contractor

would utilize barges and a barge-mounted crane to construct the facility. Stone would be brought from the quarry to the barge-loading site by trucks or train and most likely placed onto barges by conveyor or land-based crane. The stone would then be transported over water to the project site. Smaller bedding, core, and filter stone would be placed by dumping, chute, or clamshell bucket, whereas the larger sized armor stone on the outside surfaces of the dike would be placed by the barge-mounted crane. The loss of fine material during construction is expected to be minimized by the fact that the stone placement would occur within a relatively protected area. An excessive loss of fine material would be further controlled by requiring the construction contractor to immediately place filter fabric and cover stone over the filter stone, along with restricting placement of filter stone to calm water periods in the harbor.

1.6.2 Construction of the steel bulkhead portions of the proposed CDF would be conducted by a private contractor under contract with the Corps of Engineers. Essentially, the sheet steel pile bulkheads consist of two continuous and parallel bulkheads placed approximately 60 feet apart and filled with virgin granular material. It is anticipated that the contractor would utilize land based construction equipment, barges, and a barge-mounted crane to construct the facility. Steel sheet pilings would be brought from mill to the barge-loading site by trucks or train and most likely placed onto barges by land-based crane. The steel sheet piles would then be transported over water to the project site. Smaller bedding and granular fill for the voids between the parallel sheet steel pile walls would be placed by dumping, chute, or clamshell bucket. The loss of fine material during construction is expected to be minimized by the fact that the stone placement will occur between two parallel sheet steel pile bulkheads.

1.6.3 During the past few decades, maintenance dredging in Federal navigation channels of Cleveland Harbor was accomplished by mechanical (i.e., clamshell bucket) means, although in the mid- to late 1970's, hopper dredges were also used. With regard to the discharge of dredged material into the completed CDF, such work would likely be accomplished either by use of a scow and clamshell bucket whereby the dredged material in the scow would be removed by the clamshell bucket and then deposited directly into the CDF, or by use of a scow and hydraulic pump, whereby dredged material would be pumped from the scow directly into the CDF via a pipeline. The current mode of operation requires the dredging contractor to provide the necessary equipment to transfer the dredged material from the transporting vessel to the CDF.

1.6.4 When the CDF is filled to approximately mean lake level +8 LWD, after dredged material is deposited in the CDF and allowed to settle, the dredged material supernatant would be discharged through the facility's overflow weir. CDF weir discharges are generally only utilized during the later use of the CDF, when the fill material reaches above lake level. Even during the middle stages of the life of the CDF, ponded water would not likely be released via evapotranspiration. The overflow weir discharge may also used to avoid undesirable conditions, such as a potential outbreak of avian botulism.

2. FACTUAL DETERMINATIONS

2.1 Physical Substrate Determinations.

2.1.1 *Substrate Elevation and Slope.* The proposed CDF site consists of a sloping lake bottom

substrate that slopes from the shoreline lakeward to the U.S. harbor line and a depth of about 23 feet below LWD[1]. As the CDF is filled, the substrate within the CDF would be gradually be raised and converted to a more horizontal slope. The discharge of suspended solids (with the deployment of the overflow weir during the latter years of the life of the CDF) would result in negligible changes in substrate elevation and slope at the site.

2.1.2 *Sediment Type*. The CDF construction materials would replace the sandy loam and shell substrate with material with large armor stone, toe stone units (likely consisting of limestone), and steel sheet piles. Within the CDF, the existing substrate would be replaced by predominantly silt and clay, with some sandy material.

2.1.3 *Dredged/Fill Material Movement*. No significant movement of stone material used to construct the proposed CDF dikes is anticipated. Any movement of dredged material discharged into the CDF would be confined to the interior of the diked area. No movement of dredged material through the marina dike, water intake dike, or to-be-constructed cellular SSP dike is anticipated. As the area is filled, dredged material would spread throughout the remainder of the containment area and further settling would occur as the material is allowed to consolidate. During dredged material discharge, the CDF cells would serve as settling basins for the deposition of suspended sediments contained in the discharge supernatant. During the latter stages of CDF filling, suspended solids contained in the dredged material supernatant would be discharged into Lake Erie via the facility's overflow weir. After allowing for sufficient settling within the CDF, the total suspended solids concentration within the discharge would be limited to 100 ppm or less.

2.1.4 *Physical Effects on Benthos*. Stone placement and the construction of cellular steel sheet pile dike to construct the CDF would disrupt, displace and destroy existing benthic invertebrate organisms within the footprint of the facility. Some benthic organisms would be smothered during dike construction whereas others would be disrupted and displaced. Turbidity caused by disruption of the water column and substrate silt and detritus re-suspension would locally and temporarily aggravate breathing and feeding mechanisms of benthic life. As suspended sediments settle out, additional benthic organisms could also be smothered. Within the 157-acre CDF site, the annual discharge of dredged material would smother additional organisms. Surviving benthic organisms at the site and those contained within the dredged material would continue to re-colonize the interior of the CDF to some degree. With the eventual filling of the entire site, the CDF would be converted from aquatic to terrestrial habitat.

2.1.5 *Actions Taken to Minimize Impacts*. The recommended CDF utilizes, to the maximum extent practicable, existing structures (i.e., marina breakwater, water intake and shoreline) to minimize the construction of confining dikes. Overflow discharges from the CDF would be monitored and controlled to limit the release of total suspended solids to a maximum concentration of 100 ppm.

2.2 Water, Circulation, Fluctuation, and Salinity Determinations

2.2.1 *Water*

[1] Low Water Datum in Lake Erie is 569.2 feet above mean sea level at Rimouski, Quebec, Canada (IGLD 85).

a. Salinity. Not applicable.

b. Water Chemistry. CDF construction would not significantly alter the pH of the receiving waters. The discharge of dredged material into the CDF would also not significantly alter pH or water temperature. However, with reduced circulation and water volume within the CDF, water temperatures would be subject to more rapid seasonal fluctuations.

c. Clarity. The re-suspension of bottom sediments during dike construction and dredged material discharges would cause temporary localized increased turbidity that would contribute to a short-term reduction in water clarity, until materials in suspension settle out and ambient conditions return. The discharge of effluent via the facility's overflow weir would temporarily increase turbidity, mainly within the mixing zone near the CDF.

d. Color. Water color in the vicinity of the project site is normally turbid and dark in color. During the period of dike construction, the water column would temporarily be altered to a darker color as bottom sediments become re-suspended into the water column. During dredged material discharges, changes in water color would be restricted to the interior of the proposed CDF.

e. Odor. No significant disagreeable odor would be anticipated during dike construction. Some localized temporary adverse odor may occur as dredged material is discharged into the CDF site.

f. Taste. No significant alteration in water taste would be anticipated by dike construction. Although deterioration in taste from ambient conditions would likely occur in water within the CDF during periods of dredged material discharge, this area is not a source of drinking water.

g. Dissolved Gas Levels. No effect as a result of dike construction. Some temporary alteration in dissolved gas levels (i.e., dissolved oxygen) would occur within the CDF as a result of decreased water circulation and the discharge of dredged material.

h. Nutrients. No effect as a result of dike construction. A decrease in dissolved gas levels (i.e., dissolved oxygen) would occur within the CDF as a result of decreased water circulation and the discharge of dredged material.

i. Eutrophication. No effect as a result of dike construction. Although eutrophication would probably be accelerated or altered to some degree within the CDF by significantly reduced water circulation and the discharge of dredged material, no increase in eutrophication in water outside the CDF is expected. Reductions in circulation may result in an excessive build-up of bacteria, thereby impacting human health for users of the water resource. However, the modeling results for the proposed CDF showed that the proposed CDF should not cause eutrophication as there is not an excessive build-up or concentration of neutrally buoyant and negatively buoyant particles (USACE 2008).

2.2.2 *Current Patterns and Circulation*

a. Current Patterns and Flow. A two-dimensional, depth-averaged, version of the hydrodynamic advanced circulation (ADCIRC) model was applied in this study (USACE 2008). Potential adverse impacts due to the proposed CDF were determined by examining changes in model-

generated current circulation and thermal transport patterns. ADCIRC modeling efforts concentrated on quantifying the change in circulation patterns with and without the CDF in place for storm and quiescent/non-storm conditions. This model required grid development and calibration/validation of the bathymetric grid to wind forcing. For the model calibration and validation, ADCIRC results were compared with 12 National Ocean Service (NOS) water level gauges throughout Lake Erie and the Comprehensive Mapping and Engineering Data System (CMEDS). The calculated water levels from the ADCIRC simulation compared well in range and phase with the NOS gauge measurements considering that the locations of the eastern gauges were well outside the area of high resolution in the project area. Under easterly wind conditions, the proposed CDF would increase peak storm-induced westerly currents within the channel from about 0.05 meters per second (m/s) to approximately 0.4 m/s. The stronger currents induced by the planned CDF is attributed to the reduced cross-sectional area within the channel. (Figures 7 through 10)

Currents at the East 55th Street Marina entrance were characterized as weak. A change in current strength at the marina was attributed to sheltering caused by the planned dike configurations. Circulation modeling also indicated minimal impacts to water circulation near the proposed CDF site when compared to Without Project Conditions (Figure 9). In fact, the normally channelized flow running lateral to the shoreline and along the deeper Federal channel seemed to be accelerated by the in-place project condition. This is to be expected, as the CDF would slightly reduce channel size, which naturally accelerates flow. Additionally, the slight projection of the CDF into the natural channel would cause some flow to “catch” on the northwest corner of the CDF and redirect to the south, creating a circular and active flow (Figure 10). This phenomenon is best attributed to a cavitational flow condition created by the projection of the proposed CDF and the harbor “cavity” created between the existing CDF 12 and the proposed CDF.

The proposed CDF would have no impact to the combined sewer overflow discharges; impacts are limited to the effects of changes of the receiving waters, primarily potential circulation and volume changes. Reductions in circulation sometimes result in an excessive build-up of bacteria, thereby impacting human health for users of the water resource. However, the modeling results showed that the proposed CDF should not cause eutrophication as there is not an excessive build-up or concentration of neutrally buoyant and negatively buoyant particles.

b. Velocity. As stated above, the model study indicated accelerated water velocity as a result of the slight reduction in channel size.

c. Stratification. No significant effect.

d. Hydrologic Regime. No significant effect.

2.2.3 *Normal Water Level Fluctuations*. No significant impact on normal water level fluctuations is anticipated.

2.2.4 *Salinity Gradients*. Not applicable.

2.2.5 *Actions Taken to Minimize Impacts.* A consideration in the selection of the proposed CDF site was that it would have minimal disruptions to existing current patterns and flows.

2.3 Suspended Particulate/Turbidity Determinations

2.3.1 *Expected Changes in Suspended Particulates and Turbidity in the Vicinity of the Discharge Site.* The re-suspension of bottom sediments during dike construction and dredged material discharges would cause temporary localized increased turbidity that would contribute to a short-term reduction in water clarity, until materials in suspension settle out and ambient conditions return. The discharge of effluent via the facility's overflow weir would temporarily increase turbidity, mainly within the mixing zone adjacent to the CDF.

2.3.2 *Effects on Chemical and Physical Properties of the Water Column.*

a. Light Penetration. Temporary decreases in light penetration would occur during dredged material discharges into the CDF and, to a lesser extent, during dike construction. Discharges from the CDF's overflow weir would result in minimal decreases in light penetration.

b. Dissolved Oxygen. Temporary decreases in dissolved oxygen would occur during dredged material discharges into the CDF and, to a lesser extent, during dike construction. Discharges from the CDF's overflow weir would result in minimal decreases in light penetration.

c. Toxic Metals and Organics. Two major processes occur when dredged material is placed in the CDF to separate sediments and associated adsorbed pollutants (most pollutants are adsorbed to sediment particulate) from the water: (1) Sediments and pollutants are filtered out while some effluent passes through the dike wall and (2) sediments and pollutants settle out from the ponded water column; after which the relatively clean water is left to evaporate or is decanted from the CDF through the CDF discharge control weir. No significant releases of toxic metals, organics, and pathogens are expected from the CDF.

d. Pathogens. Avian botulism is due to the ingestion of a toxin produced by the bacteria *Clostridium botulinum*. Botulism can become a concern at CDFs when dredged material forms shallow ponds or is raised slightly above water. These shallow ponded areas can provide an attractive food source for waterfowl. When the conditions necessary for bacterial growth occur in CDFs, the potential for a botulism outbreak and bird mortality can be established (USEPA. 1994).

e. Aesthetics. The operation of construction and dredging equipment during CDF construction and subsequent dredged material discharge operations would result the temporary increased turbidity, noise, fumes, odors, dust and short-term degradation in the aesthetic qualities of Cleveland Harbor and Lake Erie at the CDF site. Construction of the CDF dike would permanently add a new structure at the waterfront and add to the developed man-made appearance at the East 55th Street site.

2.3.3 *Effects on Biota.*

a. Primary Production. Construction of the proposed CDF adversely effect and eventually eliminate the aquatic habitat functions of the site. Short-term increases in turbidity and decreases in sunlight penetration during construction of the CDF would likely cause some localized decrease in primary production of plankton. Ultimately, the CDF would be completed filled with dredged material and converted to terrestrial habitat.

b. Photosynthesis. Short-term increases in turbidity and decreases in sunlight penetration during construction of the CDF would likely cause some localized decrease in photosynthesis.

c. Suspension/Filter Feeders. Turbidity increase resulting from CDF construction activities temporarily aggravate breathing and filtration mechanisms of suspension and filter feeders.

d. Sight Feeders. Due to increased turbidity, some short-term adverse impact on finding prey by sight feeders may occur in the general vicinity of the project site. However, many sight feeders would probably tend to avoid aquatic habitat in the immediate vicinity of construction, until work ceased and turbidity subsided.

2.3.4 *Actions Taken to Minimize Impacts.*

In order to help minimize adverse impacts on aquatic biota, the contractor would be required to complete the project within three construction seasons.

In accordance with Corps of Engineers Civil Works Construction Guide Specification for "Environmental Protection" (USACE 1970), the construction contractor and dredging contractor would be required to minimize the potential for accidental spillage of fuel, oil, and/or grease.

The operation of the CDF would be conducted in a manner that would maximize retention of dredged material within the facility, thereby limiting the movement of suspended sediment over the weir into the harbor and lake. Maximum retention of suspended particulates would be accomplished in two ways. First, the CDF weir would be constructed with removable boards. In this way, sufficient retention times and ponding depths would be provided to ensure a weir effluent total suspended solids concentrations no greater than 100 ppm for the mid- to final years of operation. In the final year of operation of the CDF, the suspended solids level is expected to remain below 100 ppm. Sporadic use of the CDF by large vessels from the outer harbor discharging at higher rates would be regulated to provide an acceptable effluent quality.

Because botulism occurs in mud flats and shallow ponded areas, a preventive strategy for botulism could be part of the CDF's water management program. Proper placement of dredged material and drainage of the CDF through the overflow weir would help prevent the development of extensive mud flats and ponded areas. A second approach for the prevention of botulism would be to schedule the dredging/disposal operations during the cooler seasons. If mud flats or ponded areas develop during these cooler seasons, the potential for a botulism outbreak is minimized because of the inhibition of toxin production by cooler temperatures.

If a botulism outbreak occurs, every possible effort must be made to control its spread. Limitation of the spread of botulism can be implemented by attempting to eliminate the toxin production and by making the site unattractive to waterfowl. This can be accomplished using short-term and long-term methods. Short-term methods include making the site unattractive using noisemakers, power boats in the area, or imitation predators. The removal of bird carcasses from the affected areas is also a necessary short-term action to eliminate toxin production.

At a nearby CDF (Dike 14), the Corps of Engineers implemented a pilot project, wherein plant

materials were installed prior to the discharge operations so that a vegetative cover would rapidly appear as the CDF dewatered. The specific vegetation on the dewatering dredged material was selected to make the CDF unattractive to shorebirds, wading birds, and waterfowl susceptible to avian botulism.

Long-term methods involve changing the environmental conditions to eliminate the toxin production. Flooding the site with about 30 cm of water or draining the site to allow the dredged material to dry would eliminate shallow ponded areas. Drainage of shallow pond areas is an effective technique that can be accomplished by using pumps and/or constructing trenches.

2.4 Contaminant Determinations

2.4.1 The term "contaminant" is defined by USEPA Guidelines 40 CFR 230.3 (e) as "a chemical or biological substance in a form that can be incorporated into, onto, or be ingested by and that harms aquatic organisms, consumers of aquatic organisms, or users of the aquatic environment, and includes but is not limited to the substances on the 307(a)(l) list of toxic contaminants."

2.4.2 The material to be placed into the waters of Lake Erie to construct the CDF dikes would consist of clean quarry-run stone and manufactured steel sheet piles. Similar materials would be utilized to maintain the dikes, if such maintenance is needed in the future. The fill stone meets exclusion criteria for testing the chemical-biological interactive effects - outlined in 40 CFR 230.4 - 1(b), (2), and (3), and no testing on this material will be conducted. Such material may be excluded from the aforementioned testing if any of the exclusion criteria as defined in 40 CFR 23O.4-l(b)(i), (ii), or (iii) are met. Briefly stated, these exclusion criteria are: (i) that the dredged or fill material is composed predominately of sand, gravel, or other naturally occurring sedimentary material with particle sizes larger than silt, usually found in high energy environments; (ii) that the material is suitable and being used for beach nourishment; (iii) that the material proposed for discharge is primarily the same as at the proposed discharge site. This final criteria requires that the material proposed for discharge is sufficiently removed from sources of contamination to provide reasonable assurances that the material is not contaminated from such sources, and that adequate conditions are provided on the placement method to provide reasonable assurance that the placement material will not be moved by currents or otherwise in a manner that is damaging to the environment outside the disposal area. The stone fill proposed for placement below the ordinary high water mark at the CDF site is considered to be non-contaminated.

2.4.3 A discussion of contaminant levels of the dredged material be placed into the proposed CDF is included in Section 1.4.4 of this evaluation.

2.5 Aquatic Ecosystem and Organism Determinations

2.5.1 *Effects on Plankton.* During operation of the CDF, populations of phytoplankton and zooplankton within the facility would be cyclic, due to the influence of the annual discharge of dredged material. Eventually, all habitat for plankton within the CDF would be eliminated when the site is completely filled and converted from an aquatic to a terrestrial environment.

2.5.2 *Effects on Benthos.* Construction of the CDF and subsequent discharge of dredged material

into the facility would result in the destruction of benthic organisms inhabiting the substrate at the project site. An area of approximately 157 acres of lake bottom would be covered by dredged material. Although the dredged material would continue to provide habitat for re-colonization by surviving organisms, eventually suitable habitat for these organisms would be destroyed when the site is completely filled and is converted from an aquatic to a terrestrial environment. The submerged dike slopes and toe stone along the steel sheet pile cells would continue to provide long-term habitat for benthic invertebrate colonization. Submerged stone would provide habitat for colonization by nuisance species, such as zebra mussels. (See Section 1.5.4)

2.5.3 *Effects on Nekton.* Turbidity during CDF construction may temporarily aggravate gill systems of fish in the general vicinity of the project site and cause fish to temporarily avoid the water column zone being disrupted by active construction. CDF construction and the subsequent discharge of dredged material would eliminate approximately 157 acres of lacustrine habitat for fish, including the entire overlying water column. The submerged stone along the CDF dikes would help diversify aquatic habitat and continue to provide long-term feeding and cover habitat for local fish species.

2.5.4 *Effects on the Aquatic Food Web*. Eventual elimination of aquatic habitat associated with the construction of the proposed CDF would contribute to a reduction in planktonic and benthic production that would reduce the amount of available food sources for local fish species. Except for waterfowl, terns and gulls that would likely utilize the CDF, aquatic biota within the CDF would be isolated from the aquatic food web in Lake Erie. Relatively rapid colonization of the submerged stone along the CDF dikes by algae and benthic organisms is anticipated, which would help replace some of the food chain organisms lost by the construction of the facility. If zebra mussels proliferate along the submerged stone surfaces, there may be an adverse impact on warmwater fish spawning along such habitat. However, zebra mussels may provide food for some species of diving ducks and warmwater fish (i.e., freshwater drum).

2.5.5 *Effects on Special Aquatic Sites.*

a. Sanctuaries and Refuges. No effect.

b. Wetlands. No significant effect.

c. Mud Flats. No effect.

d. Coral Reefs. Not applicable.

e. Riffle and Pool Complexes. No effect.

2.5.6 *Threatened and Endangered Species*. No effect.

2.5.7 *Other Wildlife.* The proposed CDF is located in a heavily industrialized/ commercialized area and is located at the foot of East 55th Street. As dredged material begins to fill the CDF to a point where fill material is protruding above the waterline, the temporary exposed damp mudflats may attract foraging shorebirds and possibly result in some temporary seasonal increased use by gulls, until the CDF becomes entirely filled, becomes better drained and dense natural vegetation establishes over the area. Annual discharges of dredged material into the CDF would progressively decrease the

amount of open-water habitat availability for use by aquatic birds (i.e., gulls, terns, waterfowl). Once the site reverts to entirely terrestrial habitat and becomes invaded by natural woody and herbaceous vegetation, upland wildlife (such as cottontail rabbits, squirrels and other rodents, as well as ring-necked pheasants and songbirds) would likely be attracted to the nesting, brooding and feeding habitat that established on site.

2.5.8 *Actions Taken to Minimize Impacts*.

a. The proposed CDF would allow the continued dredging and confinement of contaminated sediments from Cleveland Harbor and permitted adjacent channels, thereby contributing towards reduced degradation of the Cuyahoga River and Lake Erie aquatic ecosystem.

b. Discharge effluent from the CDF would be managed to reduce the release of total suspended solids concentrations to 100 ppm or less.

c. The predictability of a future avian botulism outbreak at the CDF is uncertain due to variables such as weather, lake level, future dredging/discharge volumes, and other unknown or little understood environmental factors. However, some precautionary strategies would be taken to help prevent or minimize the likelihood or intensity of an occurrence of avian botulism. Inspections of the CDF would be made periodically between June 15 and September 15. Between June 15 and August 1, such inspections would be made at least once every two weeks. During the most critical period - approximately August 1 through October 31 - inspections would be made at least once per week. If dead or sick waterfowl or shorebirds are found in the facility, the following actions would be immediately taken:

(1) USACE field personnel would contact the USACE-Buffalo District office who would contact the U.S. Fish and Wildlife Service's Ecological Services Office and ODNR field representative;

(2) USACE field personnel would bury all carcasses immediately, or place carcasses in plastic bags for prompt removal from the site to an approved disposal area; sick birds collected would be given water and provided to the ODNR field representative for determination as to whether or not botulism is present in the affected bird.

If botulism is found to be a recurring problem, either a stable water level over the entire CDF could be maintained or the dredged material discharge pattern could be adapted to help minimize ponding. If needed, dredged material exposed above the waterline could be planted with herbaceous plant species to make these areas less attractive to wading birds and waterfowl. Covering the exposed dredged sediment with a grass mixture may also assist to some degree in dewatering such material.

2.6 Proposed Discharge Site Determinations

2.6.1 *Mixing Zone Determination.* The mixing zone for the CDF project discharge should generally be considered to be the discharge area within the containment dike. The facility would be operated in a manner that would maximize the retention of the particulate and pollutant matter within the CDF. The following factors were considered in determining the acceptability of the mixing zone as required

by USEPA Guidelines: water depth; current velocity, direction, and variability; degree of turbulence; stratification, discharge vessel; rate of discharge; ambient concentration of constituents and dredged material characteristics; number of discharge actions per unit time; and other factors affecting rates and pattern of mixing.

a. Water Depth. The average existing depth at the CDF site is 22 feet below LWD. The final dredge fill elevation would be 8 feet above LWD.

b. Current Velocity, Direction, and Variability. Currents at the East 55th Street Marina entrance are characterized as weak and the planned configuration does not appear to have an appreciable impact on current strength in the marina.

c. Degree of Turbulence. Due to the protected nature of the CDF site, there is generally a low degree of turbulence at the site.

d. Stratification. Not Applicable

e. Discharge Vessel. Construction equipment and dredging vessels would be stationary during CDF construction and subsequent discharges of dredged material.

f. Rate of Discharge. Due to the very weak soils at the proposed site, stability considerations will limit the combi-wall crest elevation to 10 feet above Low Water Datum (LWD) despite the sheet pile being driven to 80 feet below LWD. To form the combi-walls, two parallel rows of wide flange 40x215 sections interspaced with PZC 13 steel sheet pile will be driven and tied together near the top using a wale system. The interior distance between the walls will be 60 feet and the area between the walls will be filled with a granular material and capped with a one-foot concrete paving.

Dike stone would be discharged at the approximate rate of 1,630 tons per day. The rate of discharge of dredged material into the CDF would be up to 3,000 to 6,000 cubic yards per hour. Once the ponded water level within the CDF reaches the level of the overflow weir, the rate of effluent discharge from the CDF into the harbor would be about 20 to 40 cubic yards per second during disposal operations.

g. Dredged Material Characteristics. See Section 1.4.4

h. Number of Discharge Actions per Unit Time. The sheet steel pile bulkheads consist of two continuous and parallel bulkheads placed approximately 60 feet apart and filled with virgin granular material. Approximately 1,424,447 square feet of steel sheet pile would be placed in order to construct the CDF. The total of length of steel sheet pile incorporated into the cells would be 15,039 feet. In order to place dike stone, it is estimated about 250 stone deposition actions may occur during the first construction season; 300 stone deposition actions during the second construction season, and about 300 stone deposition actions during the third construction season.
With regard to the placement of dredged material into the completed CDF, the number of discharge actions would be variable depending on transport times, dredging conditions and equipment used. The number of weir effluent discharges into the harbor per unit time would be equal to or less than the number of dredged material discharge actions and dependent on ponded water levels in the CDF.

2.6.2 *Determination of Compliance with Applicable Water Quality Standards.*

2.6.2.1 Ohio Environmental Protection Agency (OEPA) water quality standards for the proposed work areas are described in Chapter 3745-1 of the Ohio Administrative Code. Use designation includes Exceptional Warm Water Habitat, Bathing Water, and State Resource Water.

2.6.2.2 Deposition of relatively inert non-polluted stone and filter material to construct the CDF dike would not significantly alter the physical and chemical characteristics of the receiving water of the lake. See Sections 2.6.3 and 3.4.2.

2.6.2.3 Elutriate testing results showed releases of some heavy metals, ammonia and cyanide from the sediments (Table 9). Evidenced heavy metal releases from the harbor sediments were low, and maximum releases (dissolved) generally occurred from MUs CH-URMU and CH-LRMU sediments. The highest releases of copper and mercury (dissolved) were 1.5 µg/L and 0.0024 µg/L from MU CH-URMU sediments, respectively. Releases of PAH compounds (dissolved) were indicated at several of the Federal navigation channels sites (Table 10). Maximum benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(ghi)perylene, chrysene, fluoranthene and pyrene releases (dissolved) were 0.156 µg/L, 0.181 µg/L, 0.405 µg/L, 0.143 µg/L, 0.172 µg/L, 0.254 µg/L and 0.386 µg/L at MU CH-LRMU in the Lower River channel reach, respectively. With respect to PCBs, no releases (dissolved) were shown at LRLs ranging from 0.0102 µg/L to 0.104 µg/L (Table 11). Pesticide releases (dissolved) from the sediments were non-detectable at LRLs ranging from 0.0222 µg/L to 2.78 µg/L (Table 12).

2.6.2.4 Turbidity increases would unavoidably occur during CDF construction through the re-suspension of bottom sediments and within the facility as a result of subsequent discharges of dredged material. During dredged material discharge, compliance with water quality standards would not be expected within the CDF. The mixing zone for the discharge into the CDF should generally be considered the entire area within the containment dikes.

2.6.2.5 Total suspended solids concentrations in any effluent discharged from the CDF's overflow weir would be no greater than 100 ppm. Depending on a number of variables, it would generally take from one to several days for suspended solids to settle out from the supernatant within the CDF to reach this concentration. It is anticipated that a mixing zone distance of 1,000 feet would be required to reduce the concentrations to ambient levels. While there is no State water quality standard for total suspended solid discharges, the limit of 100 ppm would not violate any standards outside the mixing zone and would result in negligible additions of pollutants to Lake Erie over the 3 to 4 months that dredging normally occurs. Monitoring of the weir effluent would continue periodically to determine future if adjustments are needed for the use of the overflow weir.

2.6.9 *Potential Effects on Human Use Characteristics*.

a. Municipal and Private Water Supply. There will be no effect on municipal and private water supply as part of the construction of this project.

b. Recreational and Commercial Fisheries. Due to the CDF's connection to shore, waterfront land use is affected. Impacted community assets include 2,200 linear feet of shoreline fishing comprised of 1,900 linear feet of sheet steel pile bulkhead and 300 feet of large-stone rubblemound dike that forms the guidewall for the First Energy water circulation system intake structure. This loss

of shoreline access may adversely affect property values and diminish community cohesion that results from recreational and social activities on the waterfront. It is also believed that much of the fishing conducted from the First Energy intake platform is for sustenance.

c. Water-Related Recreation. No effect.

d. Aesthetics. The operation of construction and dredging equipment during CDF construction and subsequent dredged material discharge operations would result the temporary increased turbidity, noise, fumes, odors, dust and short-term degradation in the aesthetic qualities of Cleveland Harbor and Lake Erie at the CDF site. Construction of the CDF dike would permanently add a new structure at the waterfront and add to the developed man-made appearance at the East 55th Street site. The CDF development is consistent with the City of Cleveland waterfront development plans.

e. Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, Or Similar Preserves. No effect.

2.7 Determination of Cumulative Effects on the Aquatic Ecosystem.

2.7.1 CDF construction and the subsequent discharge of dredged material at the site would add to continued encroachment on the aquatic environment in the coastal zone waters of Lake Erie and, would cumulatively add to the amount of aquatic habitat that has been converted to terrestrial habitat in the lake.

2.7.2 The construction of a suitable site for the confinement of polluted dredged material would allow the continued maintenance and operation of Cleveland Harbor and preserve its importance to the local and regional economies. The continued removal of these bottom sediments from the harbor would contribute towards a reduction in the degradation of the Cuyahoga River-Lake Erie aquatic ecosystem.

2.8 Determination of Secondary Effects on the Aquatic Environment

2.8.1 Construction of the proposed CDF would enable continued dredging and confined disposal of polluted and not suitable for unrestricted open-lake discharge harbor/river sediments, thereby contributing toward improvement of aquatic substrate quality in the River.

2.8.2 After the proposed CDF has been filled to capacity, the operation and maintenance of the facility would be transferred to the City of Cleveland. The ultimate development of the site would be the prerogative of the City of Cleveland subject to approval by the Corps of Engineers.

FINDING OF COMPLIANCE

CLEVELAND HARBOR
OPERATIONS & MAINTENANCE
(DREDGED MATERIAL MANAGEMENT PLAN - EAST 55th STREET CDF)
CUYAHOGA COUNTY, OHIO

1. No significant adaptations of the USEPA Guidelines were made relative to this evaluation.

2. Several alternatives were evaluated during the development of the recommended plan for the proposed CDF. Based on engineering, economic, environmental, and social considerations, the construction of a new CDF at the proposed site at the East 55th Street site was identified as the preferable alternative.

3. The planned discharges of dredged and fill material would not violate State water quality standards outside the designated mixing zone. The discharge of dredged and fill material would not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

4. The proposed discharge site would not jeopardize the continued existence of any species listed as endangered or threatened under the Endangered Species Act of 1973, as amended, or result in the likelihood of the destruction or adverse modification of their critical habitat.,

5. The proposed placement of dredged and fill would not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. Significant adverse effects on the life stages of aquatic wildlife or other wildlife would not be anticipated. No significant adverse effects on aquatic ecosystem diversity, productivity and stability, or recreational, aesthetic and economic values would occur.

6. Although habitat throughout Cleveland Harbor is generally of low quality, construction of a CDF will result in some habitat losses. As a result, mitigation measures will be included as part of the selected plan. In a Fish and Wildlife Coordination Act Report dated April 2007, USFWS provided a number of recommendations for mitigation that could be implemented to help to offset the loss of aquatic habitat. Based on these recommendations, the Corps will implement the following mitigation measures:

- Maximizing the use of existing CDF's.
- Take necessary actions during maintenance dredging to minimize impacts to water quality in the harbor.
- Fully implement BMPs during construction of the new CDF to maximize capacity.
- Coordinate with USFWS to meet seasonal restrictions on dredging to minimize impacts on fish spawning.
- If possible, manage the CDF for wildlife during periods of non-activity or after filling. However, this would be limited at the East 55th Street site due to concerns regarding collisions between birds and aircrafts.

- Encourage local landowners and municipalities to implement BMPs to minimize the volume of eroded materials entering Cleveland Harbor.
- Include fish spawning habitat along the outside of new and existing CDFs.

Of the recommendations provided by USFWS, the measure that will best mitigate for the aquatic habitat losses is the construction of fish habitat along the outside of CDF dikes. While a number of options exist for providing habitat, the presence of invasive species in Cleveland Harbor suggests that efforts should focus on vegetative rather than rocky habitat. Rocky habitat is more likely attract zebra mussel. Instead, "fish hotels" and/or habitat baskets which focus on providing vegetative cover and food would be a more appropriate measure as they would provide habitat that for native fish species rather than exotics such as the goby. These fish hotels have been constructed along the Chicago River in Illinois and have provided good results. A typical fish hotel would consist of:

- A floating structure with native aquatic plants on the surface to attract insects for fish to eat.
- A submerged level with more wetland plants for shelter.
- Several deeper fish cribs, where bigger fish can linger and hide.
- Typical dimensions may be 10 feet by 50 feet with depths around 9 feet.

Habitat baskets have been implemented along the lower 5.5 miles of the Cuyahoga River to provide viable habitat that supports larval fish and adults as they migrate through the river to and from Lake Erie. A habitat basket is designed to fit in the recesses of corrugated steel sheet pile. Each basket holds a plant pillow that can hold a variety of wetland plants. The mesh plant pillow prevents carp and geese from eating the plant seeds and roots.

A number of these structures could be placed throughout the harbor. Although the exact design and placement of the hotels and/or baskets will be developed in conjunction with ODNR, USFWS, and the City of Cleveland during the design phase of the study, it is anticipated that they will attract all of the species currently found in the harbor, and would also attract those fish species found at the site just outside of the harbor. These increases will occur due to fish being attracted to the new spawning/resting areas and predator fish that would be attracted to feed on these fish. As a result, the richness values (r) for those areas of the harbor which contain the hotels/baskets would be 1 (28/28). Although the actual size of the fish hotels is relatively small (~500 square feet each), they may serve to increase the richness factor not only within the hotel, but within the immediate vicinity. Habitat baskets provide 1.5 cubic feet of habitat and may also increase the richness value of the area. As a result, it is anticipated that construction of several (less than 10) fish hotels and installing multiple habitat baskets may provide enough high quality habitat to provide sufficient habitat units to justify the loss of poor habitat due to CDF construction. Based on the hotels used in the Chicago River Project, estimated cost for the hotels is approximately $50,000 each. Therefore, each alternative plan has a $500,000 mitigation component included in the cost estimates and economic analysis. Habitat baskets cost approximately $300 each, including installation.

7. On the basis of the Guidelines, the proposed CDF is specified as complying with the requirements of these Guidelines, with the inclusion of appropriate and practical conditions to minimize pollution and adverse effects on the aquatic ecosystem.

REFERENCES

USACE 1970, Civil Works Construction Guide Specifications for Environmental Protection. No. CE 1300. Washington: U.S. Government Printing Office.

USACE 2007, Project Report Chemical, Biological and Physical Testing for Sediment Samples Collected at Cleveland Harbor, Ohio.

USACE 2008, Cleveland Harbor Ohio Thermal Plume Transport Investigation.

USEPA 1994, ARCS Remediation Guidance Document.

Figure 1. Cleveland Vicinity Map

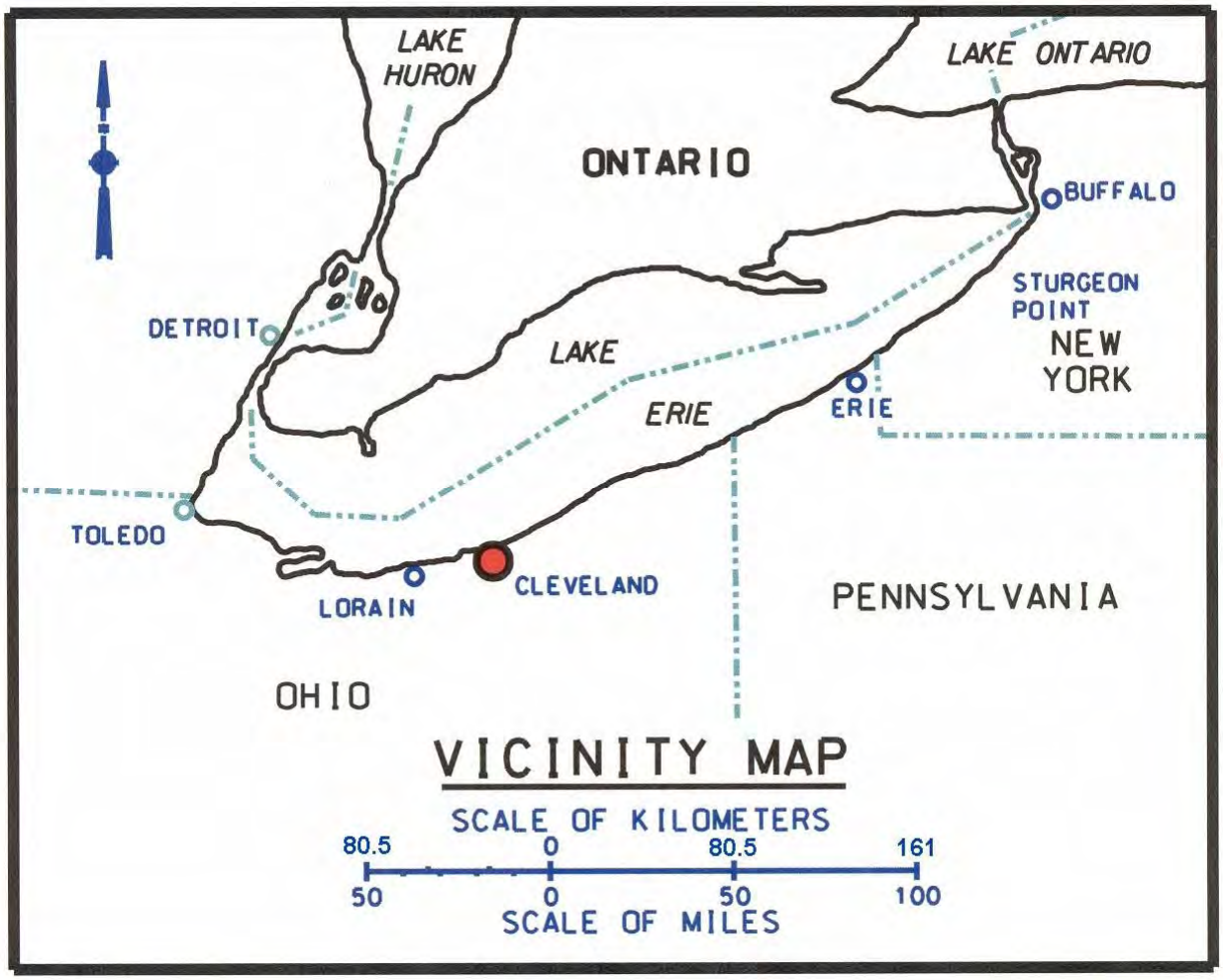


Figure 2: Cleveland Outer Harbor

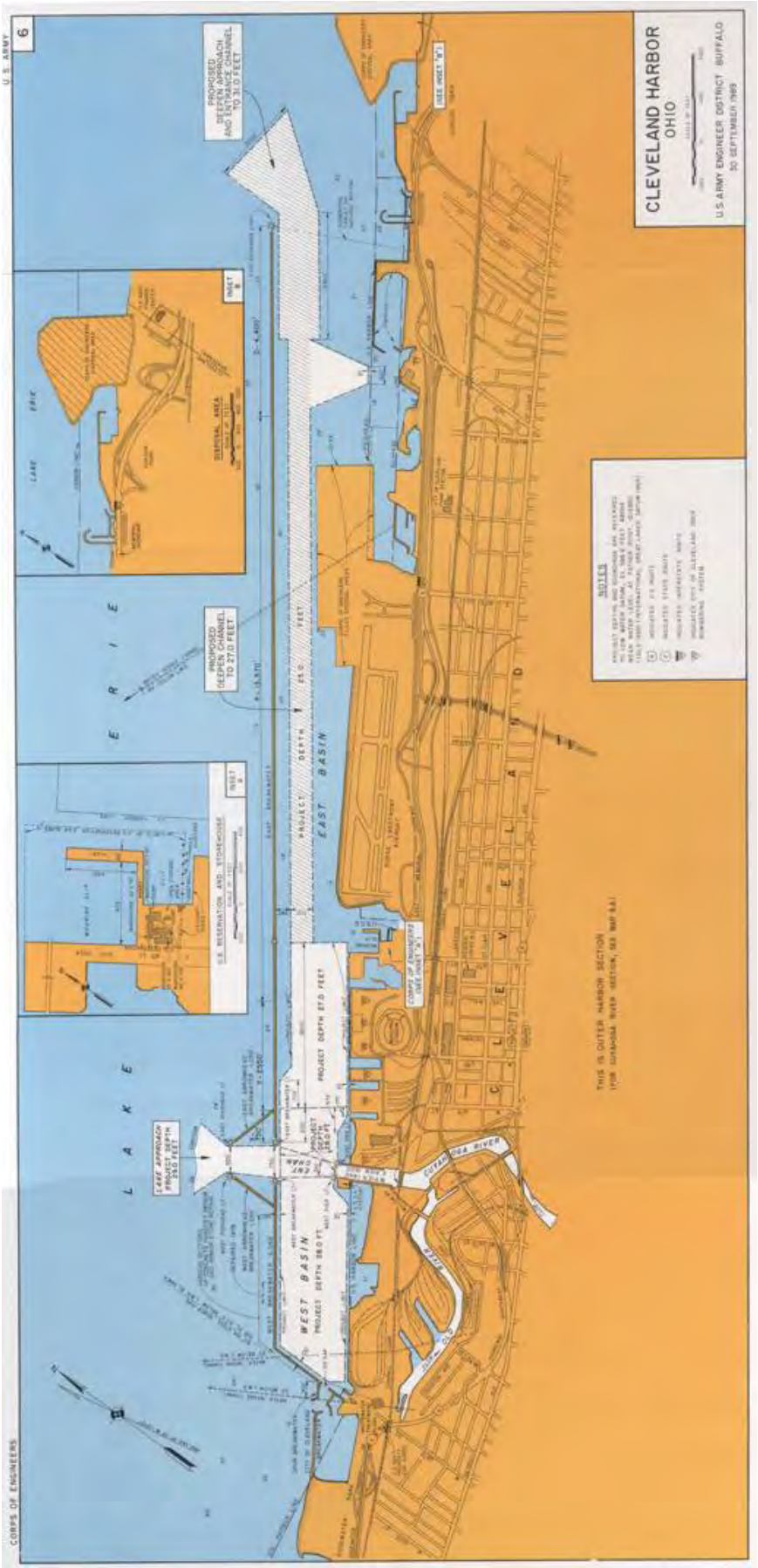


Figure 3. Cleveland Inner Harbor

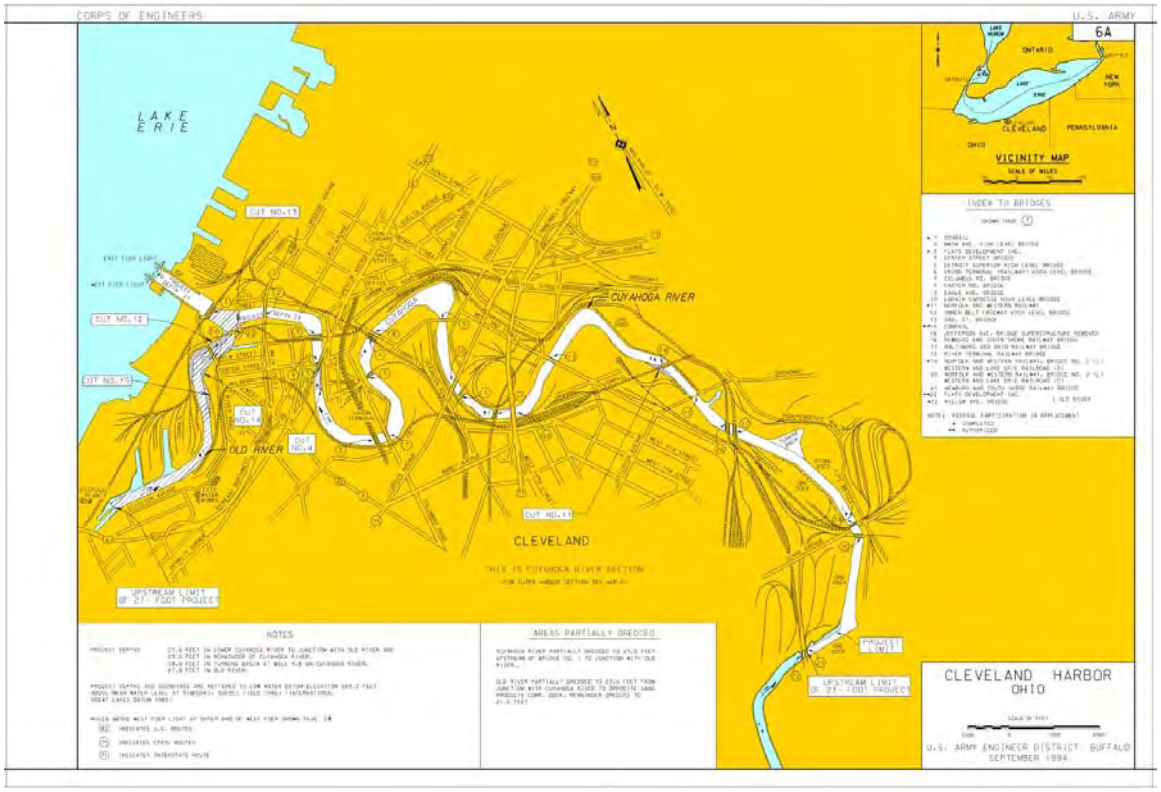


Figure 4: East 55th Street CDF

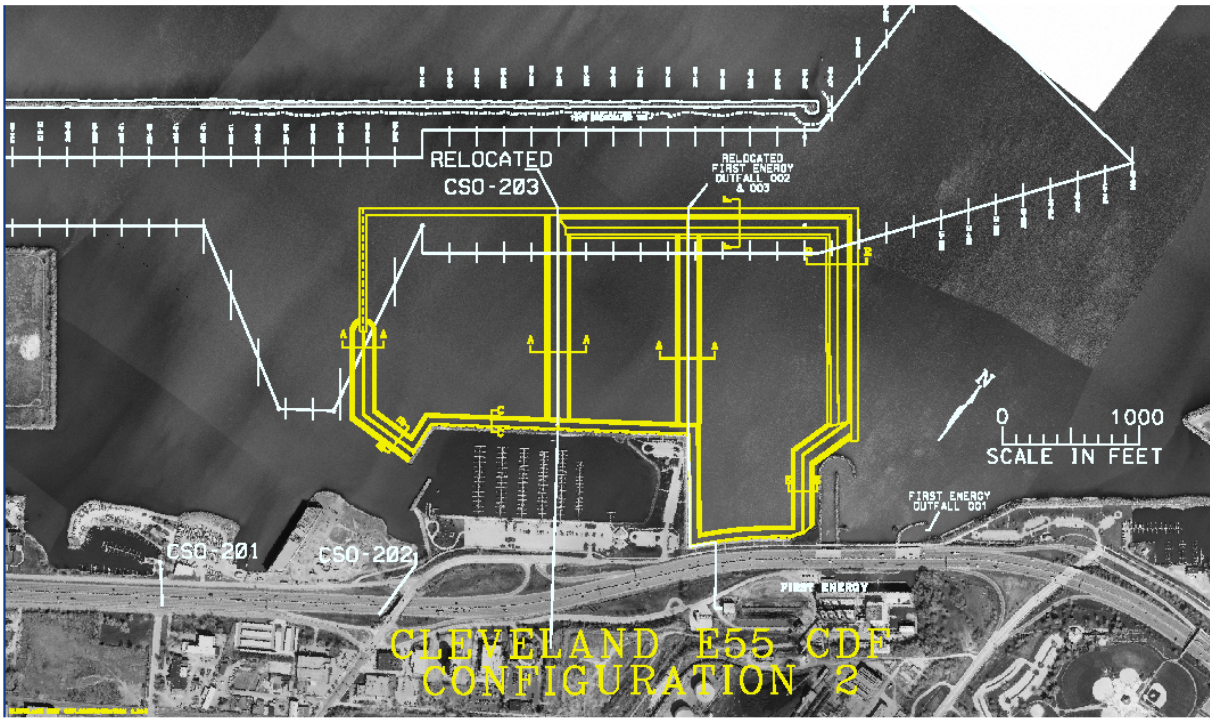


Figure 5: Typical Cross-section of rubble mound portion

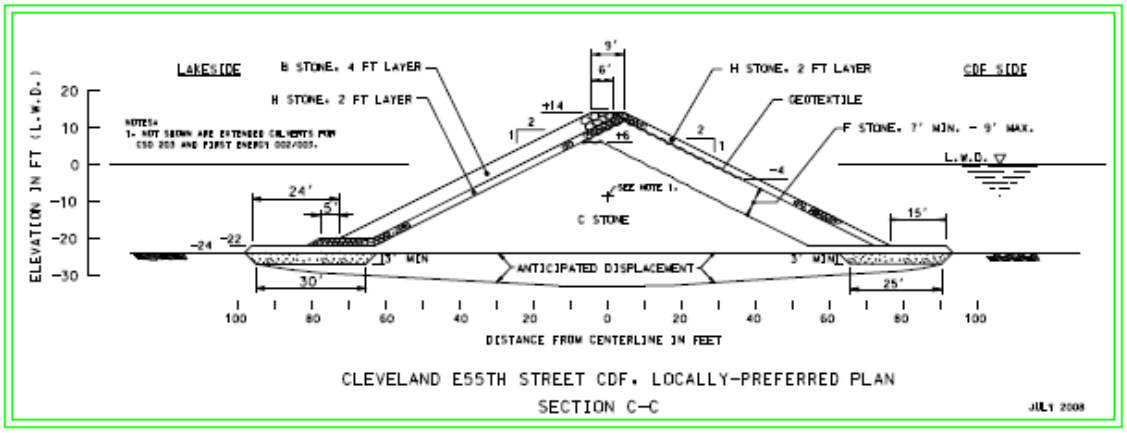


Figure 6: Typical Cross-section of steel sheet pile section

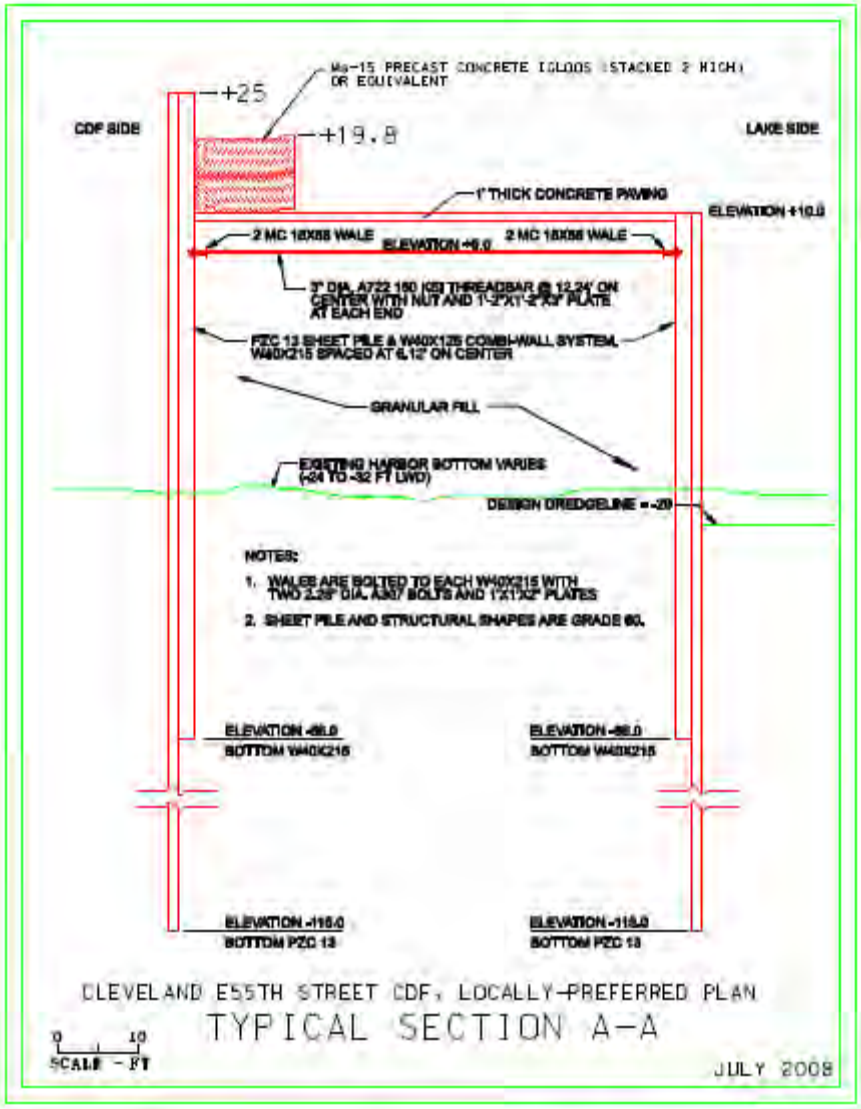


Figure 7. AVI snapshot of temperature differences during an easterly wind event with East 55th Street CDF in place

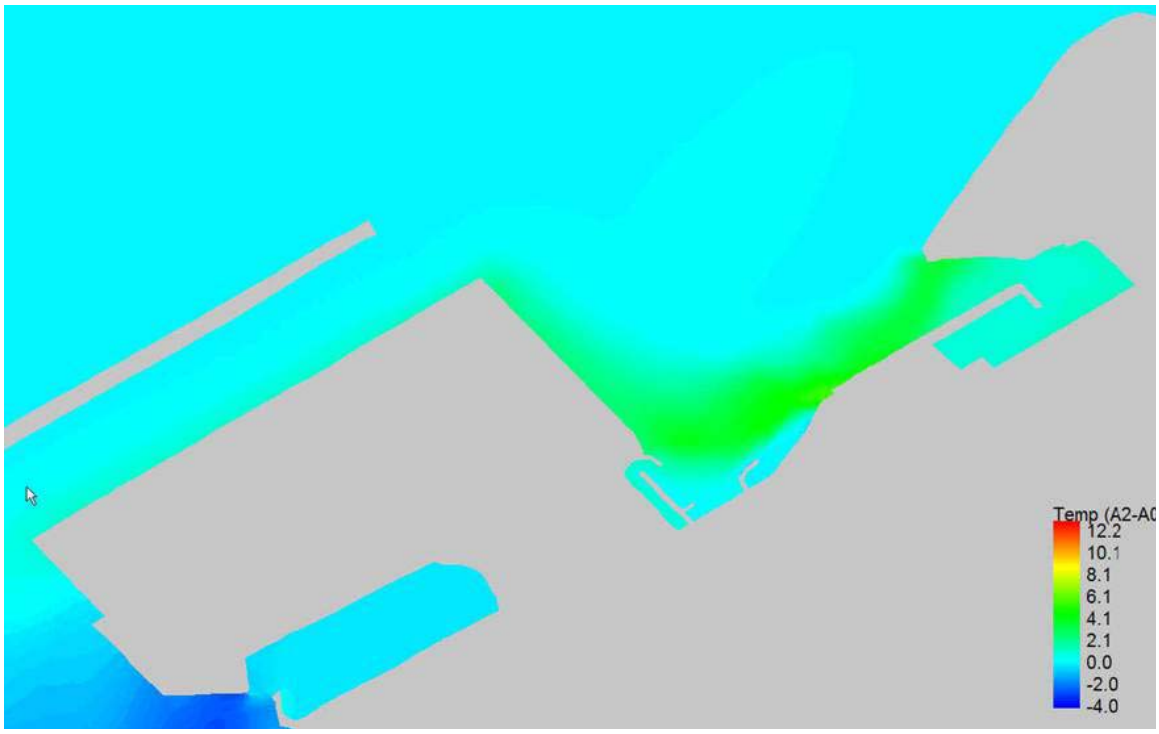


Figure 8. Advanced Visual Image (AVI) snapshot of temperature differences during a westerly wind event with East 55th Street CDF in place

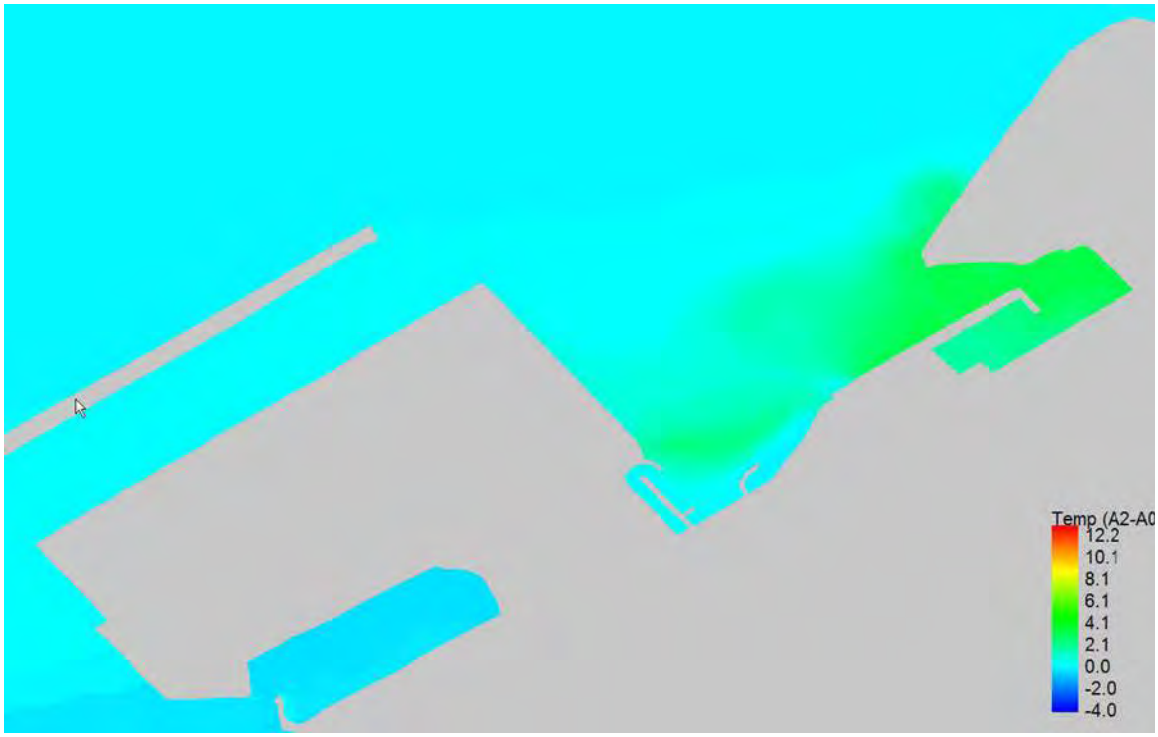


Figure 9. Existing Conditions: Peak model-generated current during November 2004 storm.

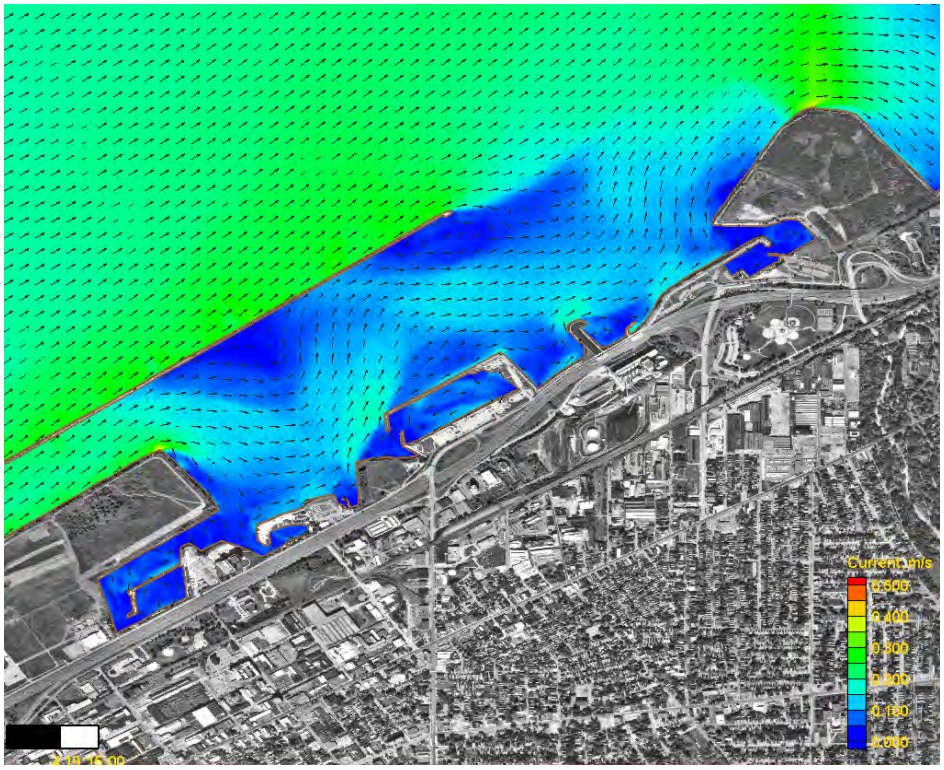
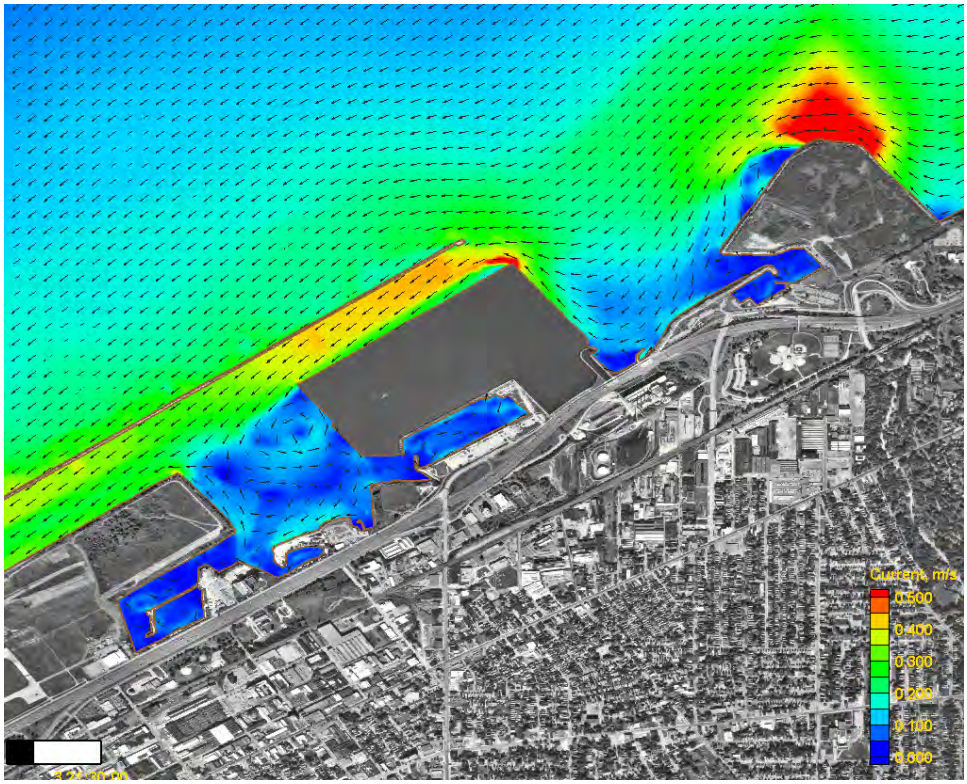


Figure 10. East 55th Street CDF: Peak model-generated current during November 2004 storm.



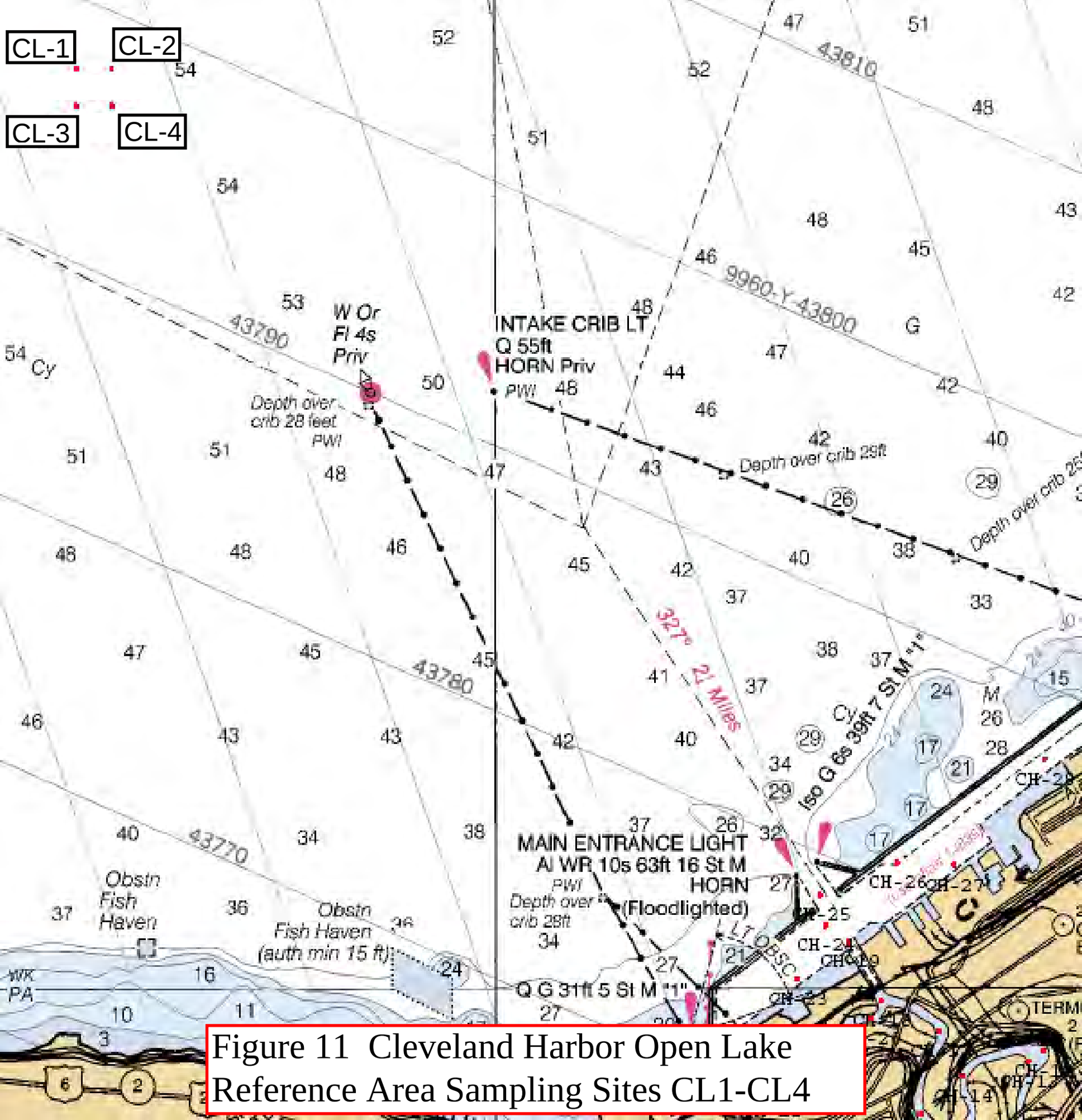


Figure 11 Cleveland Harbor Open Lake Reference Area Sampling Sites CL1-CL4

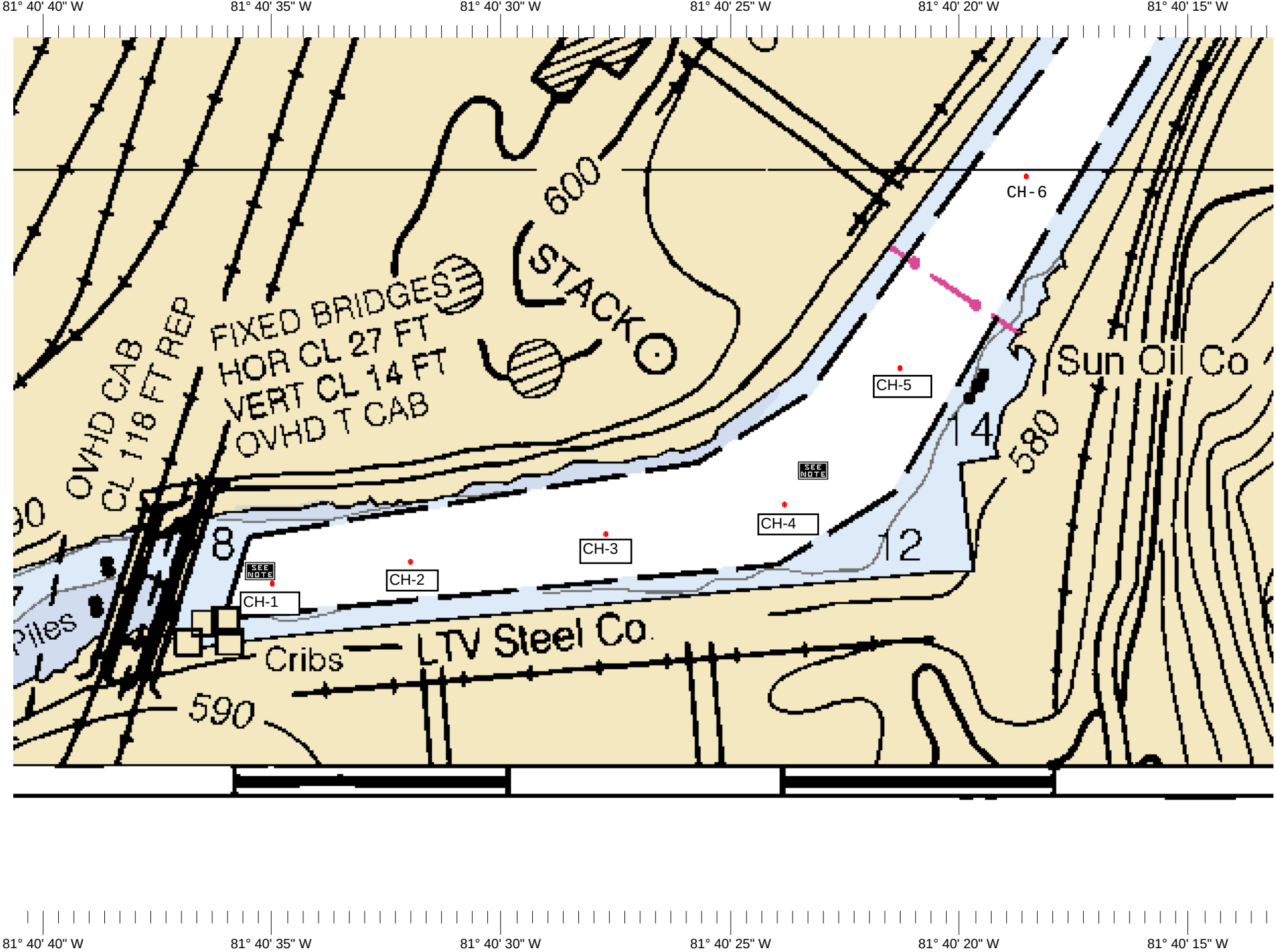


Figure 12 Cleveland Harbor Cuyahoga River Sampling Sites CH1-CH6

® MAPTECH, INC.

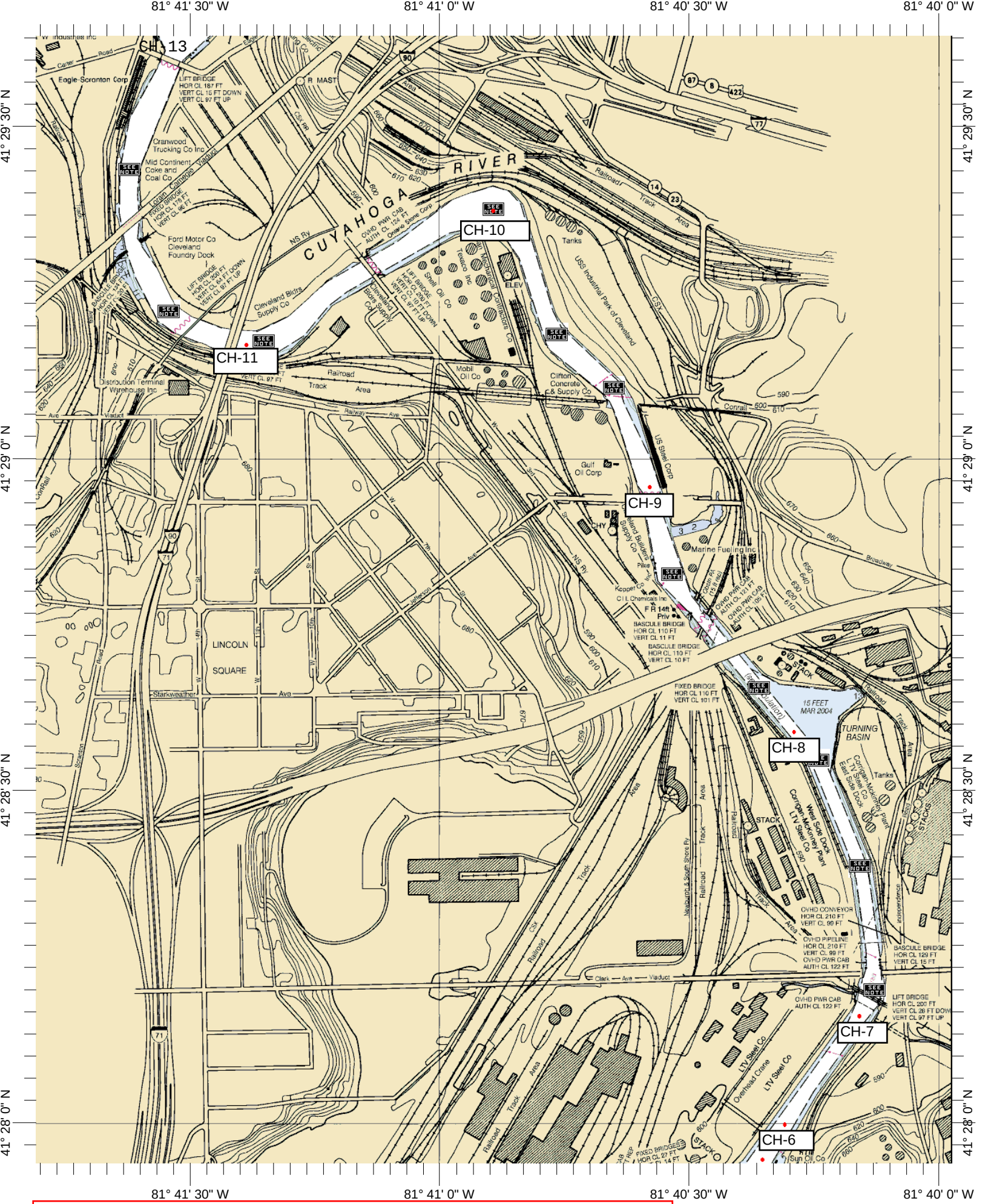


Figure 13 Cleveland Harbor Cuyahoga River Sampling Sites CH6-CH11

® MAPTECH, INC.

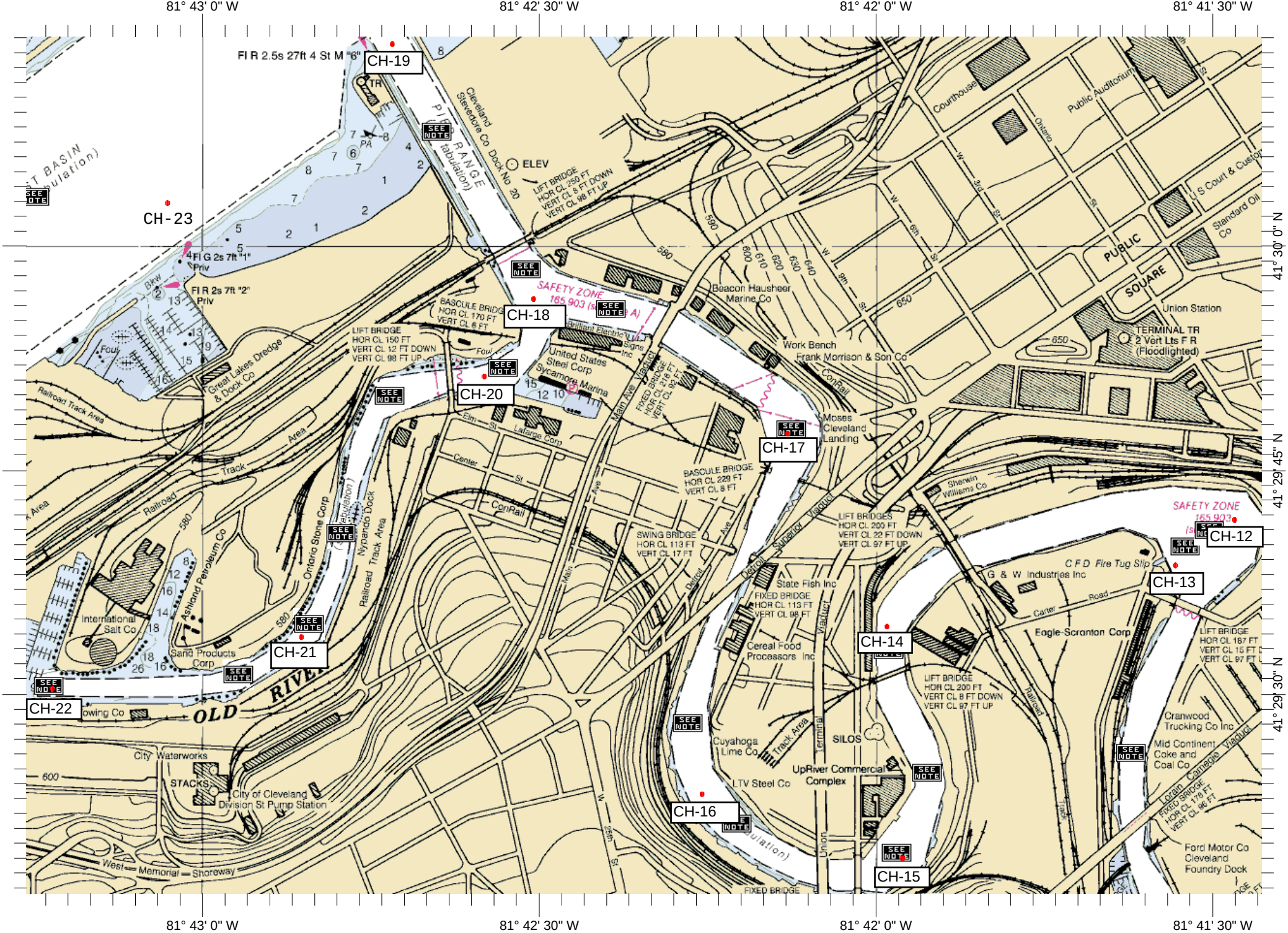


Figure 14 Cleveland Harbor Cuyahoga River Sampling Sites CH12-CH23

® MAPTECH, INC.

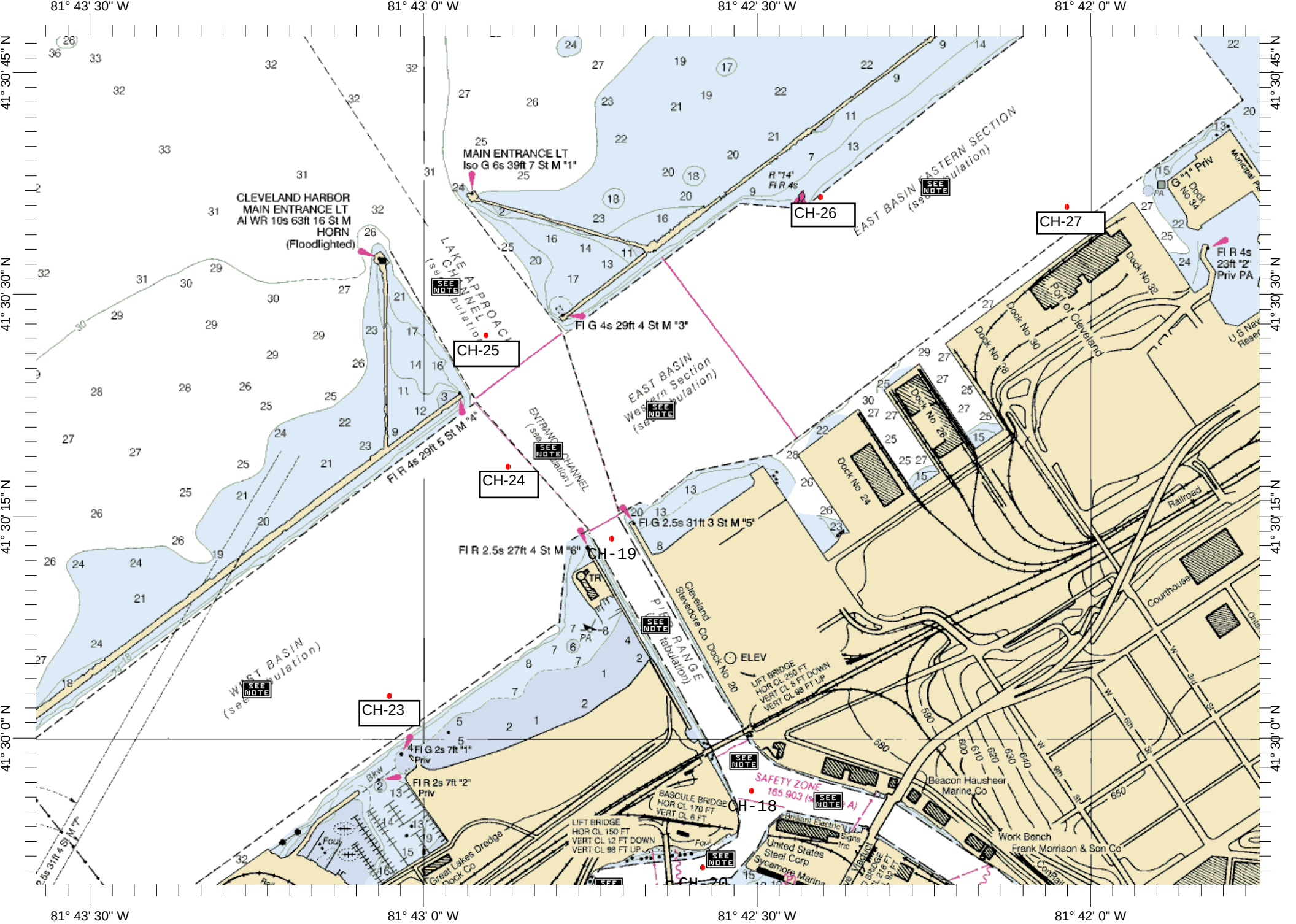


Figure 15 Cleveland Harbor Sampling Sites CH23-CH27

® MAPTECH, INC.

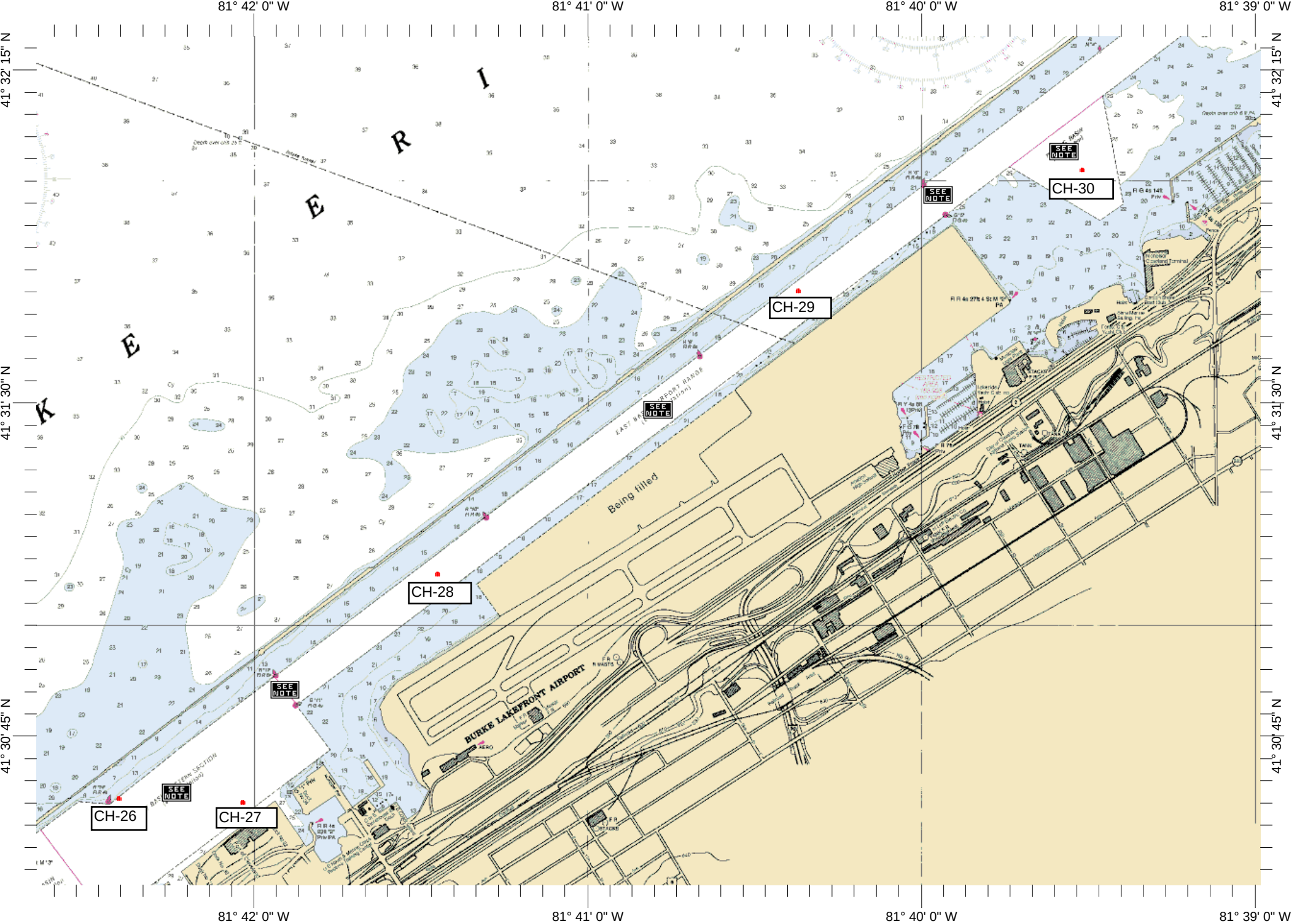


Figure 16 Cleveland Harbor Sampling Sites CH26-CH 30

® MAPTECH, INC.

Table 1. Particle size distribution of Cleveland Harbor Federal navigation channel sediments (from EEI 2007).

Particle Size Distribution	Harbor Sediments																
	Sampling Sites																
	CH-1	CH-2	CH-3	CH-4	CH-5	CH-6	CH-7	CH-8	CH-9	CH-10	CH-11	CH-12	CH-13	CH-14	CH-15	CH-16	CH-17
Clay	8.1	11.2	12.6	10.6	8.4	15.1	15.3	11.2	25.4	25.2	31.1	25.8	33.1	23.4	28.7	26.9	32.9
Silt	27.6	34.1	35.4	39.6	36.6	56.2	55.2	68.4	71.3	68.3	62	71.2	65.2	72.1	66.8	67.8	53.5
Sand	64.3	54.7	52	49.8	55	28.7	29.5	20.4	3.3	6.5	6.9	3	1.7	4.5	4.5	5.3	13.6
Gravel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Particle Size Distribution	Harbor Sediments													Open-Lake Reference Area Sediments			
	Sampling Sites													Sampling Sites			
	CH-18	CH-19	CH-20	CH-21	CH-22	CH-23	CH-24	CH-25	CH-26	CH-27	CH-28	CH-29	CH-30	CL-1	CL-2	CL-3	CL-4
Clay	24.1	18.6	12.6	14.3	28.2	38	26.3	25	36.9	48.9	46.3	45	30.3	33.8	28	38	33.7
Silt	69.4	73.6	29.2	22.3	32	53.5	70.6	72.2	58.3	50.2	51.1	53.5	60.6	64.7	70.9	60.7	64.6
Sand	6.5	2.8	56.5	63.4	39.8	8.5	3.1	2.8	4.8	0.9	2.6	1.5	9.1	1.5	1.1	1.3	1.7
Gravel	0	0	1.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2. Bulk inorganic analyses on Cleveland Harbor Federal navigation channel sediments CH1 through CH17 (from EEI 2007).

	Harbor Sediments																
	Sampling Sites																
Metal (mg/kg)	**CH-1**	**CH-2**	**CH-3**	**CH-4**	**CH-5**	**CH-6**	**CH-7**	**CH-8**	**CH-9**	**CH-10**	**CH-11**	**CH-12**	**CH-13**	**CH-14**	**CH-15**	**CH-16**	**CH-17**
Aluminum	6850	5860	6910	7720	7180	9040	8690	7950	11400	9130	10900	12800	13800	10300	9030	9560	10700
Antimony	0.895J*	0.782J	0.786J	0.849J	1.47U**	0.523J	1.55U	0.508J	**11**	1.31J	0.179U	0.157U	0.169U	0.146U	0.86	0.157U	0.180U
Arsenic	10.4	9.33	**11.1**	**14.1**	**12.5**	**14.5**	**16.8**	**12.8**	**17.4**	**13.7**	**16.1**	**20.3**	**20.2**	**19.4**	**14.5**	**14.3**	**14.4**
Barium	52.7	41.6	60	56.8	55.1	66.6	67.2	58.1	87.7	69.2	72.9	84	91.5	74.6	62.2	65.5	82.7
Beryllium	0.438J	0.387J	0.456J	0.553J	0.476J	0.561J	0.555U	0.515J	0.719J	0.571J	0.67	0.76	0.82	0.62	0.55	0.59	0.65
Cadmium	0.664J	0.456J	0.8	0.687J	0.577J	0.593J	0.311U	0.633J	1.31J	0.619J	0.99	0.96	1.6	1	0.37	0.47	1.2
Calcium	10400	10400	**13200**	**13700**	**14000**	**15100**	**14700**	**12500**	**18200**	**14200**	**15500**	**16300**	**19800**	**14200**	**13700**	**14500**	**16400**
Chromium	19.9	14.8	20.7	22.2	19.4	23.4	21.3	22.6	36	24.2	31	30.7	37.4	23.2	22.3	23	35.1
Cobalt	7.77	6.46	8.11	9.35	8.36	10.1	10.1	9.19	12.5	10.2	11.1	11.8	**14.2**	10.4	10	10.1	10.8
Copper	43.2	**55.5**	**56**	48.2	46.2	50.6	43.3	52.8	**67.8**	49.2	48.5	50.1	**67.6**	42.3	40.8	43.2	52
Iron	21000	18900	22800	27700	26000	30200	30300	27600	34100	29800	33100	35500	**42000**	33600	30600	32000	32100
Lead	36	26.1	41.6	39.8	36.7	41.8	38.9	38.2	**66.3**	41.3	45.4	43.9	62.3	37.9	36.4	41.7	45.9
Magnesium	4100	3370	4620	5090	4870	5700	5710	5070	6990	5640	7430	7780	8000	6590	5720	6170	6450
Manganese	455	397	485	498	517	661	576	462	580	525	528	585	580	512	443	434	486
Mercury	0.0855	0.0733	0.0708	0.0759	0.0702	**2.88**	0.0624	0.081	0.105	0.128	0.0793	0.0884	0.126	0.104	0.0766	0.0835	0.123
Nickel	25	34.7	28	31.7	31.2	31.4	29.7	27.7	39.1	30.9	34.1	34.4	41.4	29.4	28.5	28.7	31.2
Potassium	912	703	859	1000	926	1160	1070	988	1370	1230	1360	1560	1720	1180	1120	1180	1340
Selenium	0.752J	2.25U	1.46J	2.40U	1.5J	1.52J	2.34	1.72J	**13.9U**	1.62J	0.894U	0.785U	0.843U	0.729U	2	1.4	1.3
Silver	0.182J	0.155J	0.764U	0.802U	0.4J	0.198J	0.776U	0.194J	0.927U	0.192J	0.200J	0.26	0.33	0.250J	0.250J	0.2	0.33
Sodium	**232**	**207**	**224**	**222**	**198**	**254**	**216**	**214**	**304**	**247**	**269**	**236**	**328**	**232**	**255**	**252**	**269**
Thallium	2.91U	1.26J	1.36J	3.21U	1.03J	3.26U	1.14	1.07J	**18.5U**	3.31U	0.300J	0.42	0.49	0.37	1.9	1.8	0.360J
Vanadium	14.3	12.6	14.6	17.8	15.9	18.4	18.5	16.5	23.1	19.5	21	22.9	26.6	19.9	18.1	18.8	20.3
Zinc	156	130	137	193	170	189	167	**296**	**428**	**226**	**323**	243	**417**	194	216	**236**	**379**

	Harbor Sediments																
	Sampling Sites																
Misc. (mg/kg)	**CH-1**	**CH-2**	**CH-3**	**CH-4**	**CH-5**	**CH-6**	**CH-7**	**CH-8**	**CH-9**	**CH-10**	**CH-11**	**CH-12**	**CH-13**	**CH-14**	**CH-15**	**CH-16**	**CH-17**
Ammonia	48	98.7	**201**	69.4	66.9	101	90.6	68.7	116	**195**	89.9	101	105	99.7	91.1	98.3	153
Total cyanide	0.117J	0.104J	0.355J	0.197J	0.101J	0.469	0.116J	0.492	0.531	0.430U	0.195J	0.190J	0.499	0.3J	0.548	**1.03**	**1.08**
TOC	14200	20500	21200	21900	20100	25200	24100	17300	26500	27400	22900	20300	28000	14000	14500	14500	22300

*Estimated value between the detection limit and reporting limit.
**Not detected at or above the specified reporting limit.
Boldface/shaded values indicate a concentration that is greater in comparison to the open-lake reference area.

Table 3. Bulk inorganic analyses on Cleveland Harbor Federal navigation channel sediments CH18 through CH30 and CL1 through CL4 (from EEI 2007).

	Harbor Sediments													Open-Lake Reference Area			
	Sampling Sites													Sampling Sites			
Metal (mg/kg)	**CH-18**	**CH-19**	**CH-20**	**CH-21**	**CH-22**	**CH-23**	**CH-24**	**CH-25**	**CH-26**	**CH-27**	**CH-28**	**CH-29**	**CH-30**	**CL-1**	**CL-2**	**CL-3**	**CL-4**
Aluminum	9680	10600	5420	6460	10400	10800	9080	11700	9630	9490	11900	17200	11700	16600	19700	18600	17500
Antimony	**6.7**	0.190J	0.84	0.56	0.7	0.193U	1.2	**4.8**	1	0.197U	0.198U	0.239U	1.5	3.77U	3.87U	3.76U	3.74U
Arsenic	**16.3**	**16.5**	7.3	8.5	**15**	**12.8**	**15.9**	**20.2**	**12.8**	10	**13.8**	**17.5**	**12.9**	11	9.75	9.35	8.54
Barium	79.5	79.2	36.2	51.9	78.2	64.5	70.1	85.6	60.5	56.7	78	108	78.9	108	123	115	110
Beryllium	0.63	0.77	0.37	0.42	0.65	0.67	0.58	0.72	0.59	0.56	0.74	1.1	0.89	1.02J	1.22J	1.1J	1.07J
Cadmium	**3.4**	0.99	0.41	0.92	1.2	1	0.71	0.94	0.8	0.64	1.2	1.4	1.4	1.77J	1.97	1.78J	1.77J
Calcium	**14100**	**19500**	**22800**	**17400**	379	10300	11300	**13700**	9820	7130	11000	12000	9560	11900	12100	11300	10700
Chromium	41.5	26.1	14.8	21.2	38.3	27.2	23.8	26.9	24.4	22.1	31.3	44.5	36.2	46.6	55.7	49.6	49.9
Cobalt	11.5	10.8	6.1	5.6	9.7	11.1	10.2	12.2	10.3	9.3	12.2	**15.3**	11.4	12.8	14.1	13.7	12.8
Copper	**58.8**	47	24	32.5	**69.6**	38	48	47.1	40	32	49.8	**56.6**	53	46.6	53.4	49.2	47.1
Iron	30000	34400	18100	17700	34100	30100	28900	35900	29400	25000	33100	**45600**	**39800**	34100	39500	36800	35100
Lead	**71.5**	41.4	27.9	37.1	**127**	38.5	41	40.1	37.9	30.2	50.3	62.2	61.4	53.3	65.9	57.5	59.3
Magnesium	6160	9120	9350	6000	**12600**	5870	5320	6750	5590	4740	6740	9010	6580	10700	11500	10700	10100
Manganese	502	551	251	238	471	538	507	758	479	420	561	832	512	833	650	584	618
Mercury	0.151	0.0663	0.0352	0.0626	0.0177	0.0128	0.0763	0.0942	0.0118	0.0109	0.0122	0.0164	0.0211	0.253	0.294	0.286	0.345
Nickel	40.9	32.9	18.1	18.2	33.3	32.2	30.7	35.3	29.4	26.3	36.4	46.2	35.6	51	57.6	54.2	53.5
Potassium	1190	1250	710	808	1220	1540	1150	1450	1260	1360	154	2230	1560	2420	2790	2660	2490
Selenium	0.772U	0.744U	0.91	0.734U	1.5	2	1.7	0.792U	0.915U	1.4	1.1	1.19U	3.6	5.66U	3.94J	2.14J	5.60U
Silver	0.45	0.19	0.120J	0.170J	0.270J	0.330J	0.260J	0.280J	0.300J	0.43	0.31	0.53	0.75	1.89U	1.93U	1.88U	1.87U
Sodium	**252**	159	174	**445**	**306**	**203**	179	180	138	170	151	188	174	189	196	181	184
Thallium	0.49	6.2	0.240J	0.230J	0.47	0.6	0.46	0.42	0.38	0.58	0.57	0.51	0.82	7.55U	7.74U	7.52U	7.47U
Vanadium	21.2	21.7	12.2	11.7	19.8	22.1	19.4	23.4	19.3	18	23.5	33.5	25	36.7	43	40.6	38.5
Zinc	**339**	207	132	211	**307**	205	208	193	203	173	**259**	**299**	**238**	185	217	199	196

	Harbor Sediments													Open-Lake Reference Area			
	Sampling Sites													Sampling Sites			
Misc. (mg/kg)	**CH-18**	**CH-19**	**CH-20**	**CH-21**	**CH-22**	**CH-23**	**CH-24**	**CH-25**	**CH-26**	**CH-27**	**CH-28**	**CH-29**	**CH-30**	**CL-1**	**CL-2**	**CL-3**	**CL-4**
Ammonia	133	108	51.5	102	120	152	140	**190**	139	**165**	126	127	82	158	142	132	118
Total cyanide	**1.05**	0.111U	0.481	**2.62**	**3.63**	0.131U	0.189J	0.289J	0.121U	0.144U	0.148U	0.161U	0.153U	0.997U	1.01U	0.979U	0.965U
TOC	19900	17500	12500	6850	6780	26300	20700	20400	19400	15600	20400	15600	40000	30100	30600	29600	27000

*Estimated value between the detection limit and reporting limit.

**Not detected at or above the specified reporting limit.

Boldface/shaded values indicate a concentration that is greater in comparison to the open-lake reference area.

Table 4. Bulk Polycyclic Aromatic Hydrocarbon (PAH) analyses on Cleveland Harbor Federal navigation channel sediments CH18 through CH30 and CL1 through CL4 (from EEI 2007).

PAH compound (ug/kg)	Harbor Sediments													Open-Lake Reference Area			
	Sampling Sites													Sampling Sites			
	CH-18	CH-19	CH-20	CH-21	CH-22	CH-23	CH-24	CH-25	CH-26	CH-27	CH-28	CH-29	CH-30	CL-1	CL-2	CL-3	CL-4
Acenaphthene	54.8	11.5	38.2	12.5	23.1	14.8	22	8.07	14.5	15.5	19.4	13	46.4	10.7U*	11.9U	12U	6.48
Acenaphthylene	47	12.9	20.3	12.4	22.7	12.5	20.7	9	25.1	16.9	23.8	30.8	50.4	10.7U	6.12	12U	13.5
Anthracene	122	33.4	59.1	31.8	70.7	41.9	63.9	24.6	40.6	42.3	38.4	41.3	145	10.7U	8.61	12U	18.4
Benzo(a)Anthracene	379	131	182	127	236	136	283	102	138	165	107	131	510	16.8	45.2	39.6	57.2
Benzo(a)Pyrene	417	159	205	142	222	141	327	112	165	192	126	152	478	10.7U	15.5	10.5	75.5
Benzo(b)Fluoranthene	677	253	315	242	338	239	586	202	242	346	187	232	818	10.7U	17.9	11.5	103
Benzo(ghi)Perylene	249	86.2	107	75.7	114	74.9	206	64.3	83.5	117	68.2	80.2	224	10.7U	6.38	12U	46.3
Benzo(k)Fluoranthene	193	86.1	106	58.1	91.9	60.9	156	51.4	60.7	94.6	69.2	66.4	221	10.7U	9.83	10.5	44.2
Chrysene	466	168	221	143	244	136	375	113	127	202	114	122	593	10.7U	11.9U	12U	40.1
Dibenz(a,h)Anthracene	75.5	26.4	33	21.8	38.6	23.1	60.2	19	26.2	33.3	22.9	25.8	74.5	10.7U	11.9U	12U	11.6
Fluoranthene	815	318	387	256	404	283	662	247	237	367	214	237	1040	13.2	34.3	25.5	122
Fluorene	84.4	17.7	39.7	18.4	37.1	23.1	35.3	12.3	21	26.7	25.9	22.8	73.9	10.7U	11.9U	12U	11.1
Indeno(1,2,3-cd)Pyrene	227	83	99.1	67.5	105	69.1	194	59.3	79.4	106	65.9	78.7	212	10.7U	11.9U	12U	41.7
Naphthalene	38	4.86U	77.4	4.06U	3.25	6.26U	4.81U	5.31U	5.42U	6.45U	6.26U	7.6U	39.2	10.7U	11.9U	12U	11.5U
Phenanthrene	465	143	220	114	206	141	324	103	120	156	78	97.3	515	10.7U	11.9U	12U	14.8
Pyrene	714	260	357	248	393	227	563	193	197	292	167	185	1020	10.7U	7.19	12U	87.2
Total PAHs	**5024**	**1789**	**2467**	**1570**	**2549**	**1623**	**3878**	**1320**	**1577**	**2172**	**1327**	**1515**	**6060**	30	151	97.6	693.08

*Not detected at or above the specified reporting limit.

Boldface/shaded values indicate a concentration that is greater in comparison to the open-lake reference area.

Table 5. Bulk Polycyclic Aromatic Hydrocarbon (PAH) analyses on Cleveland Harbor Federal navigation channel sediments CH1 through CH17 (from EEI 2007).

PAH Compound (ug/kg)	Harbor Sediments																
	Sampling Sites																
	CH-1	CH-2	CH-3	CH-4	CH-5	CH-6	CH-7	CH-8	CH-9	CH-10	CH-11	CH-12	CH-13	CH-14	CH-15	CH-16	CH-17
Acenaphthene	16.9	10.6	9.89	31.8	32.1	46.6	24.3	18.3	6.86	14.2	9.36	25.8	14.6	29.4	14.5	21.8	17.4
Acenaphthylene	16.2	11.4	8.24	32	30.3	42	14.4	15.2	5.88	12.1	6.84	20.5	11.7	24.7	12.7	18.5	18.4
Anthracene	61.3	27.6	31.3	117	134	137	74.8	64	20.8	39.5	19.7	65.5	32.9	83.5	36.1	44.1	50.9
Benzo(a)Anthracene	213	112	142	449	424	558	270	216	102	170	84.9	224	123	355	154	168	167
Benzo(a)Pyrene	262	136	163	495	426	628	268	227	122	196	99.1	266	148	401	191	205	190
Benzo(b)Flouranthene	352	203	260	814	719	948	391	356	204	340	166	449	272	695	338	347	291
Benzo(ghi)Perylene	141	77.6	91.9	273	242	340	144	116	72.6	117	56.7	160	98.4	248	117	113	96.1
Benzo(k)Fluoranthene	131	67.1	72.3	204	165	340	135	96.5	63.5	95.8	49.2	136	79.1	202	97.3	116	97.3
Chrysene	274	149	171	594	509	657	301	246	129	225	100	312	168	497	219	231	203
Dibenz(a,h)Anthracene	38.9	21	28.7	79.2	71.8	102	39.9	33.1	21.6	31.7	16.4	43.9	26.4	69.1	32.1	36.9	30.1
Fluoranthene	534	287	334	1020	991	1310	612	487	254	419	210	548	306	863	390	400	355
Fluorene	26.9	15.2	15.3	48.8	47.4	71.6	32.7	28.7	10.2	22.2	13.2	39.9	21.3	45.2	21.8	30.2	23.1
Indeno(1,2,3-cd)Pyrene	126	70.6	84.6	257	224	314	135	106	65.9	103	51.2	144	87.4	231	109	102	91.1
Naphthalene	4.08U*	3.94U	4.47U	4.61U	6.82U	22.1U	4.79U	4.39U	5.45U	5.06U	5.03U	17.2U	5.28U	25U	5U	5.13U	5.2U
Phenanthrene	258	138	154	522	488	618	327	269	106	199	89.4	290	135	429	176	187	155
Pyrene	452	223	271	909	825	1070	508	414	202	352	159	453	240	734	317	340	296
Total PAHs	**2903**	**1549**	**1837**	**5846**	**5329**	**7182**	**3277**	**2693**	**1386**	**2337**	**1131**	**3178**	**1764**	**4907**	**2226**	**2361**	**2081**

*Not detected at or above the specified reporting limit.
Boldface/shaded values indicate a concentration that is greater in comparison to the open-lake reference area.

Table 6. Bulk Polychlorinated Biphenyl (PCB) analyses on Cleveland Harbor Federal navigation channel sediments CH1 through CH30 and CL1 through CL4 (from EEI 2007).

	Harbor Sediments																
	Sampling Sites																
Aroclor (ug/kg)	CH-1	CH-2	CH-3	CH-4	CH-5QC	CH-6	CH-7	CH-8	CH-9	CH-10	CH-11	CH-12	CH-13	CH-14	CH-15	CH-16	CH-17
1016	58.1U*	60.7U	63.8U	67.3U	63.8U	66.8U	63.9U	29.3U	36.9U	34.5U	35.9U	32.9U	38.0U	32.2U	32.5U	34.0U	36.0U
1221	58.1U	60.7U	63.8U	67.3U	63.8U	66.8U	63.9U	29.3U	36.9U	34.5U	35.9U	32.9U	38.0U	32.2U	32.5U	34.0U	36.0U
1232	58.1U	60.7U	63.8U	67.3U	63.8U	66.8U	63.9U	29.3U	36.9U	34.5U	35.9U	32.9U	38.0U	32.2U	32.5U	34.0U	36.0U
1242	58.8	56.2J**	61.6J	56.3J	**111**	51.6J	53.2J	29.3U	36.9U	34.5U	35.9U	32.9U	38.0U	32.2U	32.5U	34.0U	36.0U
1248	58.1U	60.7U	63.8U	67.3U	63.8U	66.8U	63.9U	29.3U	36.9U	34.5U	35.9U	32.9U	38.0U	32.2U	32.5U	34.0U	36.0U
1254	**163**	**75**	**63.2J**	**68**	**126**	**48.2J**	42.8J	22.2J	28.1J	30.1J	33.8J	32.9U	38.0U	32.2U	32.5U	34.0U	**46.7**
1260	29.1J	60.7U	63.8U	67.3U	32.4J	66.8U	63.9U	29.3U	36.9U	34.5U	35.9U	32.9U	38.0U	32.2U	32.5U	34.0U	27.1J
"Total"***	**251**	**192**	**189**	**192**	**269**	**167**	**160**	**80.8**	**102**	**101**	**106**	**98.7**	**114**	**96.6**	**97.5**	**102**	**110**

	Harbor Sediments													Open-Lake Reference Area Sediments			
	Sampling Sites													Sampling Sites			
Aroclor (ug/kg)	CH-18	CH-19	CH-20	CH-21	CH-22	CH-23	CH-24	CH-25	CH-26	CH-27QC	CH-28	CH-29	CH-30	CL-1	CL-2	CL-3	CL-4
1016	68.3U	65.3U	55.1U	60.9U	71.9U	77.8U	66.6U	76.4U	75.5U	90.3U	86.7U	48.8U	91.7U	78.6U	81.1U	77.1U	77.7U
1221	68.3U	65.3U	55.1U	60.9U	71.9U	77.8U	66.6U	76.4U	75.5U	90.3U	86.7U	48.8U	91.7U	78.6U	81.1U	77.1U	77.7U
1232	68.3U	65.3U	55.1U	60.9U	71.9U	77.8U	66.6U	76.4U	75.5U	90.3U	86.7U	48.8U	91.7U	78.6U	81.1U	77.1U	77.7U
1242	53.4J	43.7J	79.5	55.7J	47.7J	68.9J	60.8J	46.6J	**99.7**	**163**	**147**	48.8U	**83.0J**	78.6U	81.1U	77.1U	77.7U
1248	68.3U	65.3U	55.1U	60.9U	71.9U	77.8U	66.6U	76.4U	75.5U	90.3U	86.7U	48.8U	91.7U	78.6U	81.1U	77.1U	77.7U
1254	**56.6J**	65.3U	**73.5**	**80.9**	**75.5**	**85.3**	**64.4J**	38.7J	**138**	**260**	**221**	**62.1**	**102**	36.6J	42.8J	35.4J	37.9J
1260	68.3U	65.3U	55.1U	34.4J	30.5J	77.8U	66.6U	76.4U	44.9J	81J	62.6J	31.0J	44.4J	78.6U	81.1U	77.1U	77.7U
"Total"	**179**	**174**	**208**	**171**	**153**	**232**	**192**	**162**	**283**	**504**	**431**	**142**	**230**	36.6	42.8	35.4	37.9

*Not detected at or above the specified reporting limit.
**Estimated value between the detection limit and reporting limit.
***Sum of aroclor(s) evidenced in harbor or lake sediments, with non-detectable concentrations valued at the reporting limit.
Boldface/shaded values indicate a concentration that is greater in comparison to the open-lake reference area.

Table 7 Bulk pesticides analyses on Cleveland Harbor Federal navigation channel sediments CH18 through CH30 and CL1 through CL4 (from EEI 2007).

	Harbor Sediments													Open-Lake Reference Area			
	Sampling Sites													Sampling Sites			
Pesticide (ug/kg)	CH-18	CH-19	CH-20	CH-21	CH-22	CH-23	CH-24	CH-25	CH-26	CH-27	CH-28	CH-29	CH-30	CL-1	CL-2	CL-3	CL-4
4,4-DDD	2.28U	6.53U	5.51U	2.03U	7.19U	7.78JU	6.66J	7.64J	7.55J	8.85J	**13.5**	9.82J	**12.5**	7.89J	8.95J	15.5U	7.92J
4,4-DDE	2.28U	6.53U	5.51U	2.03U	7.19U	7.78U	6.66U	7.64U	7.55U	8.85U	8.67U	9.82U	9.17U	15.8U	16.2U	15.5U	15.6U
4,4-DDT	2.28U	6.53U	5.51U	2.03U	7.19U	7.78U	6.66U	7.64U	7.55U	8.85U	12.7	9.82U	9.17U	15.8U	16.2U	15.5U	15.6U
Aldrin	1.14U	3.27U	2.75U	1.02U	3.59U	3.89U	3.33U	3.82U	3.78U	4.43U	4.33U	4.91U	4.58U	7.89U	8.09U	7.76U	7.80U
Alpha-BHC	1.14U	3.27U	2.75U	1.02U	3.59U	3.89U	3.33U	3.82U	3.78U	4.43U	4.33U	4.91U	4.58U	7.89U	8.09U	7.76U	7.80U
Beta-BHC	1.14U	3.27U	2.75U	1.02U	3.59U	3.89U	3.33U	3.82U	3.78U	4.43U	4.33U	4.91U	4.58U	7.89U	8.09U	7.76U	7.80U
Chlordane	14.2U	40.8U	34.4U	12.7U	44.9U	48.6U	41.6U	47.7U	47.2U	55.3U	54.2U	61.4U	57.3U	98.7U	101U	97.0U	97.5U
Delta-BHC	1.14U	3.27U	2.75U	1.02U	3.59U	3.89U	3.33U	3.82U	3.78U	4.43U	4.33U	4.91U	4.58U	7.89U	8.09U	7.76U	7.80U
Dieldrin	2.28U	6.53U	5.51U	2.03U	7.19U	7.78U	6.66U	7.64U	7.55U	8.85U	8.67U	9.82U	9.17U	15.8U	16.2U	15.5U	15.6U
Endosulfan I	1.14U	3.27U	2.75U	1.02U	3.59U	3.89U	3.33U	3.82U	3.78U	4.43U	4.33U	4.91U	4.58U	7.89U	8.09U	7.76U	7.80U
Endosulfan II	2.28U	6.53U	5.51U	2.03U	7.19U	7.78U	6.66U	7.64U	7.55U	8.85U	8.67U	9.82U	9.17U	15.8U	16.2U	15.5U	15.6U
Endosulfan Sulfate	2.28U	6.53U	5.51U	2.03U	7.19U	3.89U	6.66U	7.64U	7.55U	8.85U	8.67U	9.82U	9.17U	15.8U	16.2U	15.5U	15.6U
Endrin	2.28U	6.53U	5.51U	2.03U	7.19U	7.78U	6.66U	7.64U	7.55U	8.85U	8.67U	9.82U	9.17U	15.8U	16.2U	15.5U	15.6U
Endrin Aldehyde	2.28U	6.53U	5.51U	2.03U	7.19U	7.78U	6.66U	7.64U	7.55U	8.85U	8.67U	9.82U	9.17U	15.8U	16.2U	15.5U	15.6U
Endrin Ketone	2.28U	6.53U	5.51U	2.03U	7.19U	7.78U	6.66U	7.64U	7.55U	8.85U	8.67U	9.82U	9.17U	15.8U	16.2U	7.76U	15.6U
Gamma-BHC	1.14U	3.27U	2.75U	1.02U	3.59U	3.89U	3.33U	3.82U	3.78U	4.43U	4.33U	4.91U	4.58U	7.89U	8.09U	7.76U	7.80U
Gamma-Chlordane	1.14U	3.27U	2.75U	1.02U	3.59U	3.89U	3.33U	3.82U	3.78U	4.43U	4.33U	4.91U	4.58U	15.8U	16.2U	15.5U	15.6U
Heptachlor	1.14U	3.27U	2.75U	1.02U	3.59U	3.89U	3.33U	3.82U	3.78U	4.43U	4.33U	4.91U	4.58U	7.89U	8.09U	15.5U	7.80U
Heptachlor Epoxide	1.14U	3.27U	2.75U	1.02U	3.59U	3.89U	3.33U	3.82U	3.78U	4.43U	4.33U	4.91U	4.58U	7.89U	8.09U	7.76U	7.80U
Methoxychlor	11.4U	32.7U	27.5U	10.2U	35.9U	38.9U	33.3U	38.2U	37.8U	44.3U	43.3U	49.1U	45.8U	78.9U	80.9U	77.6U	78.0U
Toxaphene	56.9U	163U	138U	50.8U	180U	195U	166U	191U	189U	221U	217U	245U	229U	395U	405U	388U	390U

*Not detected at or above the specified reporting limit.

**Estimated value between the detection limit and reporting limit.

Boldface/shaded values indicate a concentration that is greater in comparison to the open-lake reference area.

Table 8. Bulk pesticide analyses on Cleveland Harbor Federal navigation channel sediments CH1 through CH17 (from EEI 2007).

Pesticide (ug/kg)	Harbor Sediments																
	Sampling Sites																
	CH-1	CH-2	CH-3	CH-4	CH-5	CH-6	CH-7	CH-8	CH-9	CH-10	CH-11	CH-12	CH-13	CH-14	CH-15	CH-16	CH-17
4,4-DDD	4.70J*	6.07U**	6.38U	22.4U	20.0U	4.95J	2.13U	19.8U	8.16J	14.9J	2.38J	2.21J	2.58U	3.05	2.20U	2.06J	2.42U
4,4-DDE	5.81U	6.07U	6.38U	22.4U	20.0U	6.68U	2.13U	19.8U	24.9U	11.1J	7.19U	5.54	2.58U	2.18U	2.20U	2.28U	4.36
4,4-DDT	5.81U	6.07U	6.38U	**60.6**	**55.7**	10.2	11.3	19.8U	10.7J	11.7J	7.19U	9.52	11.6	9.9	10.3	13.1	2.42U
Aldrin	2.91U	3.03U	3.19U	11.2U	10.0U	3.34U	1.07U	9.90U	12.5U	11.6U	3.59U	1.11U	1.29U	1.09U	1.10U	1.14U	1.21U
Alpha-BHC	2.91U	3.03U	3.19U	11.2U	10.0U	3.34U	1.07U	9.90U	12.5U	11.6U	3.59U	1.11U	1.29U	1.09U	1.10U	1.14U	1.21U
Beta-BHC	2.91U	3.03U	3.19U	11.2U	10.0U	3.34U	1.07U	9.90U	12.5U	11.6U	3.59U	1.11U	1.29U	1.09U	1.10U	1.31	2.07
Chlordane	36.3U	37.9U	39.9U	140U	125U	41.8U	13.3U	124U	156U	145U	44.9U	16.8U	16.1U	13.7U	13.7U	14.3U	15.1U
Delta-BHC	2.91U	3.03U	3.19U	11.2U	10.0U	3.34U	1.07U	9.90U	12.5U	11.6U	3.59U	1.11U	1.29U	1.09U	1.10U	1.14U	1.21U
Dieldrin	5.81U	6.07U	6.38U	22.4U	20.0U	6.68U	2.13U	19.8U	24.9U	**11.6**	7.19U	2.21U	2.58U	1.09U	2.20U	2.28U	2.42U
Endosulfan I	2.91U	6.07U	3.19U	11.2U	10.0U	3.34U	1.07U	9.90U	12.5U	11.6U	3.59U	1.11U	1.29U	1.09U	1.10U	2.28U	1.21U
Endosulfan II	2.91U	3.03U	6.38U	22.4U	20.0U	6.68U	2.13U	19.8U	24.9U	11.2J	7.19U	2.21U	2.58U	2.18U	2.20U	1.14U	2.42U
Endosulfan Sulfate	5.81U	6.07U	6.38U	22.4U	20.0U	6.68U	2.13U	19.8U	24.95U	11.6U	7.19U	2.21U	2.58U	2.18	2.20U	2.28U	2.42U
Endrin	5.81U	6.07U	6.38U	22.4U	20.0U	6.68U	2.13U	19.8U	24.9U	23.2U	7.19U	2.21U	2.58	1.09U	2.20U	2.28U	2.42U
Endrin Aldehyde	2.91U	6.07U	6.38U	22.4U	20.0U	6.68U	2.13U	19.8U	24.9U	7.23J	7.19U	2.21U	2.58U	2.18U	2.20U	2.28U	2.42U
Endrin Ketone	5.81U	6.07U	6.38U	22.4U	20.0U	6.68U	2.13U	19.8U	24.9U	8.34J	7.19U	2.21U	2.58U	2.18U	2.20U	1.14U	2.42U
Gamma-BHC	2.91U	3.03U	3.19U	11.2U	10.0U	3.34U	1.07U	9.90U	12.5U	11.6U	3.59U	1.11U	1.29U	1.09U	1.10U	1.14U	1.21U
Gamma-Chlordane	2.91U	3.03U	3.19U	11.2U	10.0U	3.34U	1.07U	9.90U	12.5U	11.6U	3.59U	1.11U	1.29U	1.09U	1.10U	1.14U	1.21U
Heptachlor	2.91U	3.03U	3.19U	11.2U	10.0U	3.34U	1.07U	9.90U	12.5U	11.6U	3.59U	1.11U	1.29U	1.09U	1.10U	1.14U	1.21U
Heptachlor Epoxide	2.91U	3.03U	3.19U	11.2U	10.0U	3.34U	1.07U	9.90U	12.5U	11.6U	3.59U	1.11U	1.29U	1.09U	1.10U	1.14U	1.21U
Methoxychlor	29.1U	30.3U	31.9U	112U	100U	33.4U	10.77U	99.0U	125U	36J	35.9U	11.1U	12.9U	10.9U	11.0U	1.14U	12.1U
Toxaphene	145U	152U	159U	561U	501U	167U	53.3U	495U	623U	579U	180U	55.3U	64.5U	54.6U	55.0U	57.0U	60.4U

*Estimated value between the detection limit and reporting limit.
**Not detected at or above the specified reporting limit.
Boldface/shaded values indicate a concentration that is greater in comparison to the open-lake reference area.

Table 9. Inorganic Modified Elutriate Test results on Cleveland Harbor Federal navigation sediments (from EEI 2007).

	Harbor Sediments									
	Sampling Sites									
	CH-UEMU		CH-URMU		CH-LRMU		CH-OHMU		CH-ORMU	
Metal (µg/L)	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
Aluminum	4970	51.4	4970	126	2940	35.1	4530	46.9	3810	69
Antimony	1.3	0.89	2.3	0.85	1.7	1.1	0.5U	0.5U	0.8	0.75
Arsenic	16	4.6	13	9.4	16	12.1	10	4	7	4.1
Barium	81.9	32.3	83.2	46.4	82.2	59.1	104	67.7	53.4	30.2
Beryllium	0.42	0.1U*	0.31	0.1U	0.19	0.1U	0.2	0.1U	0.22	0.1U
Cadmium	0.88	0.11U	1.7	0.11U	1.1	0.11U	0.34	0.11U	0.39	0.11U
Calcium	49900	45900	55700	55400	59800	57800	44600	44200	36600	36100
Chromium	15.9	1U	17.8	1U	11	1U	7.3	1U	9.1	1U
Cobalt	5.1	1.2	4	1.6	2.5	1.1	2.8	1.1	2.1	1.2
Copper	37.5	1.3	27.9	1.5	18.1	0.66	11	1.1	13	1.5
Iron	13200	267	9090	582	5930	651	6280	245	5560	199
Lead	33.2	0.5U	30.3	0.77	20.9	0.5U	11.9	0.5U	13.8	0.5U
Magnesium	13300	11400	13500	13600	13800	13300	10800	10400	9820	8600
Manganese	748	323	430	396	591	509	1660	1530	248	157
Mercury	0.0398	0.0012	0.0391	0.0024	0.0267	0.0017	0.0212	0.00099	0.0251	0.0011
Nickel	20.6	4.1	17.3	5.4	11.7	4	9.1	3	8.2	2.2
Potassium	8030	6460	7750	7230	7080	6810	5010	4290	4520	3620
Selenium	1U	1U	1U	1U	1U	1U	1U	1U	1U	1U
Sodium	22100	21200	25500	29900	28600	25000	20700	18500	22500	23400
Thallium	0.3U	0.3U	0.3U	0.3U	0.3U	0.3U	0.3U	0.3U	0.51	0.3U
Vanadium	14.1	3U	7.4	3U	4.8	3U	5.2	3U	4.5	3U
Zinc	131	3.4	163	7.4	103	2.8	48.5	3.3	61.2	6.6

	CH-UEMU		CH-URMU		CH-LRMU		CH-OHMU		CH-ORMU	
Misc. (mg/L)	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
Ammonia	6.06	5.93	11	9.37	8.74	8.67	7.52	7.32	5.22	7.22
Total cyanide	0.00232J	0.00226J	0.0021J	0.00361J	0.0015U	0.0038	0.005U	0.00331U	0.00237J	0.0034J

*Not detected at or above the specified reporting limit.

**Estimated value between the detection limit and reporting limit.

Table 10. PAH Modified Elutriate Test results on Cleveland Harbor Federal navigation sediments (from EEI 2007).

	Harbor Sediments									
	Sampling Sites									
	CH-UEMU		CH-URMU		CH-LRMU		CH-OHMU		CH-ORMU	
PAH compound (µg/L)	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
Acenaphthene	0.481U*	0.521U	0.485U	0.521U	0.197J**	0.521U	0.481U	0.521U	0.472U	0.521U
Acenaphthylene	0.481U	0.521U	0.485U	0.521U	0.481U	0.521U	0.481U	0.521U	0.472U	0.521U
Anthracene	0.481U	0.521U	0.485U	0.521U	0.481U	0.521U	0.481U	0.521U	0.472U	0.521U
Benzo(a)Anthracene	0.104	0.0786	0.127	0.0776	0.149	0.156	0.0839	0.0855	0.091	0.0784
Benzo(a)Pyrene	0.113	0.0917	0.152	0.0961	0.168	0.181	0.122	0.112	0.137	0.0957
Benzo(b)Fluoranthene	0.201	0.184	0.36	0.125	0.223	0.405	0.241	0.129	0.23	0.118
Benzo(ghi)Perylene	0.106	0.0871	0.142	0.0704	0.129	0.143	0.0762	0.0698	0.0693	0.0609
Benzo(k)Fluoranthene	0.024U	0.026U	0.0243U	0.026U	0.024U	0.026U	0.024U	0.026U	0.105	0.026U
Chrysene	0.134	0.113	0.17	0.0929	0.167	0.172	0.0918	0.0851	0.0922	0.0786
Dibenz(a,h)Anthracene	0.0481U	0.0521U	0.0485U	0.0521U	0.0481U	0.0521U	0.0481U	0.0521U	0.472U	0.0521U
Fluoranthene	0.287	0.234	0.379	0.169	0.411	0.254	0.213	0.149	0.134	0.0989
Fluorene	0.481U	0.521U	0.485U	0.521U	0.123J	0.521U	0.481U	0.521U	0.472U	0.521U
Indeno(1,2,3-cd)Pyrene	0.0481U	0.0521U	0.0485U	0.0521U	0.0481U	0.0521U	0.0481U	0.0521U	0.0472U	0.0521U
Naphthalene	0.481U	0.521U	0.485U	0.521U	0.481U	0.521U	0.481U	0.521U	0.472U	0.521U
Phenanthrene	0.481U	0.521U	0.294J	0.521U	0.258J	0.521U	0.481U	0.521U	0.472U	0.521U
Pyrene	0.303	0.249	0.444	0.203	0.506	0.386	0.268	0.159	0.237	0.154

*Not detected at or above the specified reporting limit.
**Estimated value between the detection limit and reporting limit.

Table 11. PCB Modified Elutriate Test results on Cleveland Harbor Federal navigation sediments (from EEI 2007).

	Harbor Sediments									
	Sampling Sites									
	CH-UEMU		CH-URMU		CH-LRMU		CH-ORMU		CH-OHMU	
Aroclor (µg/L)	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
1016	0.0952U*	0.0106U	0.100U	0.103U	0.0952U	0.104U	0.098U	0.103U	0.0962U	0.0102U
1221	0.0952U	0.0106U	0.100U	0.103U	0.0952U	0.104U	0.098U	0.103U	0.0962U	0.0102U
1232	0.0952U	0.0106U	0.100U	0.103U	0.0952U	0.104U	0.098U	0.103U	0.0962U	0.0102U
1242	0.0952U	0.0106U	0.100U	0.103U	0.0952U	0.104U	0.098U	0.103U	0.0962U	0.0102U
1248	0.0952U	0.0106U	0.100U	0.103U	0.0952U	0.104U	0.098U	0.103U	0.0962U	0.0102U
1254	0.0952U	0.0106U	0.100U	0.103U	0.0952U	0.104U	0.098U	0.103U	0.0962U	0.0102U
1260	0.0952U	0.0106U	0.100U	0.103U	0.0952U	0.104U	0.098U	0.103U	0.0962U	0.0102U

*Not detected at or above the specified reporting limit.

Table 12. Pesticide Modified Elutriate Test results on Cleveland Harbor Federal navigation sediments (from EEI 2007).

	Harbor Sediments									
	Sampling Sites									
	CH-UEMU		CH-URMU		CH-LRMU		CH-OHMU		CH-ORMU	
Pesticide (µg/L)	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
4,4-DDD	0.189U	0.222U	0.200U	0.222U	0.192U	0.222U	0.0388U	0.0444U	0.196U	0.222U
4,4-DDE	0.189U	0.222U	0.200U	0.222U	0.192U	0.222U	0.0388U	0.0444U	0.196U	0.222U
4,4-DDT	0.189U	0.222U	0.200U	0.222U	0.192U	0.222U	0.0388U	0.0444U	0.196U	0.222U
Aldrin	0.0943U	0.111U	0.100U	0.111U	0.0962U	0.111U	0.0194U	0.0222U	0.098U	0.111U
Alpha-BHC	0.0943U	0.111U	0.100U	0.111U	0.0962U	0.111U	0.0194U	0.0222U	0.098U	0.111U
Alpha-Chlordane	0.0943U	0.111U	0.100U	0.111U	0.0962U	0.111U	0.0194U	0.0222U	0.098U	0.111U
Beta-BHC	0.0943U	0.111U	0.100U	0.111U	0.192U	0.111U	0.0194U	0.0222U	0.098U	0.111U
Chlordane	1.18U	1.39U	1.25U	1.39U	1.20U	1.39U	0.243U	0.278U	1.23U	1.39U
Delta-BHC	0.0943U	0.111U	0.100U	0.111U	0.0962U	0.111U	0.0194U	0.0222U	0.098U	0.111U
Dieldrin	0.189U	0.222U	0.200U	0.222U	0.192U	0.222U	0.0388U	0.0444U	0.196U	0.222U
Endosulfan I	0.0943U	0.111U	0.100U	0.111U	0.0962U	0.111U	0.0194U	0.0222U	0.098U	0.111U
Endosulfan II	0.189U	0.222U	0.200U	0.222U	0.192U	0.222U	0.0388U	0.0444U	0.196U	0.222U
Endosulfan Sulfate	0.189U	0.222U	0.200U	0.222U	0.192U	0.222U	0.0388U	0.0444U	0.196U	0.222U
Endrin	0.189U	0.222U	0.200U	0.222U	0.192U	0.222U	0.0388U	0.0444U	0.196U	0.222U
Endrin Aldehyde	0.189U	0.222U	0.200U	0.222U	0.192U	0.222U	0.0388U	0.0444U	0.196U	0.222U
Endrin Ketone	0.189U	0.222U	0.200U	0.222U	0.192U	0.222U	0.0388U	0.0444U	0.196U	0.222U
Gamma-BHC	0.0943U	0.111U	0.100U	0.111U	0.0962U	0.111U	0.0194U	0.0222U	0.098U	0.111U
Gamma-Chlordane	0.0943U	0.111U	0.200U	0.111U	0.0962U	0.111U	0.0194U	0.0444U	0.098U	0.111U
Heptachlor	0.0943U	0.111U	0.100U	0.111U	0.0962U	0.111U	0.0194U	0.0222U	0.098U	0.111U
Heptachlor Epoxide	0.0943U	0.111U	0.100U	0.111U	0.0962U	0.111U	0.0194U	0.0222U	0.098U	0.111U
Methoxychlor	0.943U	1.11U	0.100U	1.11U	0.962U	1.11U	0.194U	0.222U	2.45U	1.11U
Toxaphene	2.36U	2.78U	2.50U	2.78U	2.40U	2.78U	0.485U	0.556U	2.45U	2.78U

*Not detected at or above the specified reporting limit.