SECTION 404(b)(1) EVALUATION
OPERATIONS AND MAINTENANCE DREDGED MATERIAL
DISPOSAL AT TOLEDO, OH

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1. INTRODUCTION

Section 404(b)(1) of the Clean Water Act (33 USC 1344) states that each disposal site for dredged or fill material to be discharged into the navigable waters of the United States shall be specified through the application of Guidelines developed by the Administrator of the U.S. Environmental Protection Agency (USEPA) and the Secretary of the Army. The present Section 404(b)(1) Evaluation addresses the continued disposal of dredged material at the two established open-lake disposal sites and the Corps confined disposal facility (CDF) at Toledo, OH.

2. PROJECT DESCRIPTION

2.1 Location.

2.1.1 Toledo, OH, is located at the western end of Lake Erie about 110 miles west of Cleveland, OH, and 42 miles south of Detroit, MI. The Toledo Federal project consists of a channel and turning basins in the lower 7 miles of the Maumee River, with the channel extending northeast more than 16 miles into Lake Erie.

2.1.2 This Section 404(b)(1) Evaluation will discuss the disposal of sediments dredged lakeward to the Toledo Harbor Traffic Bouy at the junction of the Bay Channel and the Maumee Bay Sailing Course. The Sailing Course extends northeast of the Traffic Bouy. The Corps of Engineers dredges sediments from the Sailing Course on a very infrequent basis. No dredging is planned for this area in the immediate future.

2.1.3 Two open-lake disposal sites and one CDF are used to accomodate sediments dredged from the Toledo Federal project. The first open-lake site is a 1 mile square area located 3-1/4 miles from the Toledo Harbor Light at an azimuth of 80 degrees. The second site is a 1 mile square area located 1-7/8 miles from the Toledo Harbor Light at an azimuth of 130 degrees. The Toledo Federal CDF is located 355 feet southeast of the Toledo Harbor Navigation Channel and is adjacent to the Toledo Edison Company's Bay Shore Station. Private disposal facilities border the CDF. The Federal facility is boot-shaped and covers and area of about 242 acres. Maps showing the limits of the dredging area, the existing CDF, and the two open-lake disposal sites are included as Plates 1, 2, and 3.

2.2 General Description.

2.2.1 Annual maintenance dredging is performed to remove sediments deposited by the Maumee River in the Toledo Federal navigation channel. From 1976 to the end of 1983, about 7.4 million cubic yards of sediments dredged from the Federal project have been placed in the existing Toledo CDF, which has a design capacity of 11.1 million cubic yards. Under the currently proposed plans, the life of the CDF could be extended from 1987 to 1990, when the area would be filled to capacity.

2.2.2 Past disposal sites used by the Corps of Engineers include the Riverside Park, Penn 7, and Penn 8 CDF's which are located in the Maumee River. The Toledo Island 18 Disposal Site was also used by the Corps of Engineers, and is located north of the Federal Channel in Maumee Bay. All of these sites are presently filled to capacity.

2.2.3 Two open-lake disposal sites are presently used for the disposal of unpolluted Toledo Harbor sediments. Both of these sites are located in Lake Erie to the southeast of the Federal navigation channel. These two sites are the only open-lake sites used by the Federal Government at Toledo since the 1960's. They are expected to be filled to maximum capacity (water depth of 18 feet) in 3 to 4 years.

2.2.4 An average of about 800,000-900,000 cubic yards of material are annually dredged from the Toledo Federal project. In recent years, about 5 to 10 percent of this material was placed at the open-lake sites. The remainder was considered polluted and was placed in the CDF.

2.2.5 The results of 1983 sediment sampling indicate that a greater proportion of the sediments dredged at Toledo are suitable for disposal at the open-lake sites. Current plans call for about 60 percent of the material to be placed in the open lake, and about 40 percent to be placed in the Toledo CDF. The locations of sediments proposed to be placed at the respective sites are shown on Plate 4.

2.3 Authority and Purpose.

2.3.1 The purpose of this Section 404(b)(1) Evaluation is to assess the continued placement of material dredged from the Federal navigation channel at Toledo, Ohio into the existing Toledo CDF and open-lake disposal sites 1 and 2. This Evaluation will be performed using current USEPA Guidelines 40 CFR part 230 and will consider placement of the revised quantities of material in light of the 1983 sediment sampling data. This evalution will also apply to Department of the Army permit applications for the placement of polluted dredged material into the Toledo CDF. It will not address the placement of permit dredgings at the open-lake sites.

2.4 General Description of Dredged Material.

2.4.1 The location and quantity of material dredged from the Federal channel and disposed in the Toledo area are discussed in Section 2.2 above. The most recent testing of Toledo Harbor sediments was performed on sediments sampled in October 1983. The actual testing was performed by Aqua Tech Environmental Consultants, Inc., who submitted their final report to the Buffalo District in February 1984. Particle size analyses, bulk chemical analyses, elutriate tests, and bioassays were performed. Copies of the final sediment test report are available from the Buffalo District on request.

2.4.2 Based on the referenced sediment test results, the U.S. Environmental Protection Agency (USEPA) sent the Buffalo District a letter dated 9 May 1984 in which they classifed the sediments between Sites L-2M and L-7M, and those between R-5M and R-7M (See Plate 4) as unpolluted and

acceptable for open-water disposal. Sediments between L-2M and R-5M are classifed as polluted. The USEPA recommends that these polluted sediments be disposed of in some manner other than into the open waters of Lake Erie.

2.4.3 Table 1 summarizes those parameters which fall into the "heavily polluted" category for bulk sediment chemistry at the sampling points. The sector between L-1M and R-4M is heavily polluted in many more categories than the other two sectors. Table XI of the sediment test report also shows significantly higher concentrations of polynuclear aromatic hydrocarbons (PAH's) in this sector. No organic pollutants were detected from L-7M to L-4M and at R-7M, and only traces of bis (2 Ethyl Hexyl) phthalate from L-3M to O-M.

2.4.4 Bulk sediment chemistry showed cyanide and arsenic to be in the "heavily polluted" range at all sites using USEPA Region 5 criteria. Arsenic levels ranged from about 10 to 18 ppm at sites proposed for open-lake disposal and are probably within sediment background levels for the region. Cyanide levels were less than 1 ppm at all but one site (Site R-5M = 2.1 ppm cyanide) recommended for open-lake disposal. It is unlikely that these levels of total cyanide would affect lake biota or water quality. Other parameters in the "highly polluted" range for sites proposed for open-lake disposal do not appear to be highly significant for impact on open-lake water quality or biota.

2.4.5 Sediment bioassays confirm that the sediments proposed for open-lake disposal are less harmful to organisms than sediments proposed for containment as shown on Table 2. Using the sediment classification shown in the sediment report, two sediment sites (L-3M and R-5M) were classified as heavily polluted, while the remaining sites were classified as moderately polluted.

2.5 Description of Discharge Sites.

2.5.1 General plans for the Toledo CDF are shown on Plate 5. The CDF is located 355 feet southeast of the Toledo Edison Company's Bay Shore Station. The facility is boot-shaped and covers a bottom surface area of about 242 acres, including the area occupied by the dike. The "toe" of this boot shaped facility is connected to shore by the Toledo Edison Company's private CDF. The interior of the Federal CDF covers about 220 acres.

2.5.2 The rubblemound dike surrounding the containment area has a variable bottom width and a top width of 10-12 feet. The base and lower slopes of the dike consist of limestone and armor stone, with a plastic filter cloth incorporated into the lower dike slopes. The upper portion of the dike consists of clay, which has been fertilized, seeded, and mulched. Aggregate surfacing has been placed on the top of the dike to permit use by inspection vehicles. The height of the dike is about 23.5 feet above low water datum (LWD).

2.5.3 Pumpout facilities are located at both the northern and northwestern corners of the dike. Pumpout facilities are connected to discharge

pipelines which are capable of discharging material at several locations within the CDF. Dredged material disposal has been directed towards the southern "toe" of the boot-shaped facility. A large delta of dredged material presently exists in this area, while the northern part of the facility consists of shallow water habitat. Aquatic vegetation presently exists in some portions of the partially filled disposal site. This vegetation is a direct and temporary result of CDF filling. Additional vegetation would be expected to colonize the area and later be destroyed as the CDF is filled to capacity. The design capacity of the CDF is 11.1 million cubic yards. At the end of the 1983 dredging season, the facility had a remaining capacity of 3.7 million cubic yards. Under the proposed disposal plans, the life of the facility would be extended from 1987 to 1990.

2.5.4 Open-lake Disposal Site 1 is a 1 mile square area located 3-1/4 miles from the Toledo Harbor Light at an azimuth of 80 degrees. Open-lake Disposal Site 2 is a 1 mile square area located 1-7/8 miles from the Toledo Harbor Light at an azimuth of 130 degrees. Both of these unconfined sites consist of shallow water, littoral zone habitat. Bottom contours in the vicinity of Site 1 range from about 20-24 feet below LWD. Contours in the general vicinity of Site 2 range from 14-20 feet below LWD. The existing bottom elevations at Sites 1 and 2 are being raised due to open-lake disposal. Based on preliminary estimates, the two open-lake disposal sites are expected to be filled to capacity (water depth of about 18 feet) in 3-4 years.

2.6 Description of the Disposal Method (Including Timing and Duration of the Discharge).

2.6.1 The equipment used to maintain the Federal Project has in the past consisted primarily of U.S. Army Corps of Engineers hopper dredges. However, due to retirement of the U.S. Army Corps of Engineers Great Lakes dredge fleet, all future dredging will be performed by private firms contracted by the Corps of Engineers.

2.6.2 The method of disposal would be determined by the Corps Contractor for the work. However, due to the height of the dike, the most likely method for placement into the CDF would be pumping through the existing pumpout facilities. Material would be pumped into the CDF, allowed to settle, and the supernatant returned to Lake Erie through a weir and discharge pipe located at the northern corner of the facility. Some of the supernatant would also filter through the bottom of the exising dike walls and return to Lake Erie in this manner. After filling to capacity, the facility may be developed for port expansion, although long-term plans for the area have not been finalized.

2.6.3 Dredged material would probably be transported to the open-lake sites in hopper dredges or bottom dump scows. After arrival at the disposal site, the vessel would come to a stop, bottom gates would be opened, and the material would be allowed to settle to the lake bottom.

2.6.4 The timing and duration of the disposal operations would also in part be controlled by the Corps Contractor and the limitations imposed by his dredging and disposal equipment. Annual maintenance dredging at Toledo Harbor generally begins in early spring and continues through late fall.

However, in order to avoid interference with fish spawning and migration, dredging is prohibited in the Maumee River lakeward to Island 18 during the period from 15 March through 31 May. The timing and duration of disposal into the CDF by private permittees would be dependent on the equipment used, as well as the size and extent of the dredging operation.

3. FACTUAL DETERMINATIONS

3.1 Physical Substrate Determinations.

3.1.1 Substrate Elevation and Slope - Continued filling of the CDF would result in an increase in size and elevation of the delta of dredged material at the southern portion of the facility. Eventually, the bottom contours inside the facility would be raised until the entire area is filled to its final elevation of nearly 23.5 feet above LWD. Dewatering would result in consolidation of the dredged material and in the gradual conversion of the area to dry land.

3.1.2 The disposal of dredged material at open-lake Sites 1 and 2 would cause an increase in elevation at both sites. Lake currents would tend to level the bottom irregularities caused by disposal. Although precise measurements of depths at the two sites have not been made, the Buffalo District anticipates that both areas will be filled to capacity (water depth of about 18 feet) in 3 to 4 years.

3.1.3 Sediment Type - The composition of material to be placed in the CDF and at the two open-lake sites is discussed in sections 2.2 and 2.4 above. Since disposal has in the past been performed at each of the three sites, no significant impacts on sediment type are expected.

3.1.4 Dredged/Fill Material Movement - Any movement of dredged material at the CDF would be confined to the interior of the diked area. During disposal, the CDF would serve as a settling basin for the deposition of suspended sediments. As the area is filled, dredged material would spread throughout the remainder of the containment area. Further settling would occur as the material is allowed to consolidate. Some movement of material would occur at open-lake Sites 1 and 2, since these areas are unconfined and subject to Lake Erie currents. In this portion of Lake Erie, longshore drift along both the Michigan and Ohio shorelines is generally directed towards the Maumee Bay area.

3.1.5 Physical Effects on Benthos - Some mortality of benthic macroinvertebrates would occur at all three sites due to burial with dredged material, the release of pollutants during disposal, and/or the clogging of gill filaments by suspended sediment particles. The most significant benthic impacts would occur within the CDF, where all benthic habitat would ultimately be destroyed. As stated previously, the material to be placed at the open-lake sites was not found to be acutely toxic to the bioassay organisms tested. After burial with dredged material, some upward movement of surviving benthic organisms may occur. Relatively rapid recolonization by benthic organisms would be expected at the open-lake sites.

3.1.6 Other Effects/Comments - Since the CDF is protected by a containment structure, the effects of current patterns, water circulation, and wind and wave action on the movement of dredged material in this site should be minor. The discharge of material in the existing CDF should cause no significant changes in substrate elevation or slope, sediment type, or benthic populations outside the CDF. The containment structure has been designed as a permanent facility able to withstand the force of ice, wind, and waves normally occurring at the project site.

3.1.7 Actions Taken to Minimize Impacts - Impacts to the substrate, water column, and aquatic ecosystem would be minimized by using the existing sites, rather than undisturbed areas for sediment disposal. The dredged material would be handled in a manner which would minimize the spillage of dredged material during transport to the disposal sites. In an effort to limit the amount of material discharged, dredging would be confined to only shoaled portions of essential navigation channels. To the maximum extent possible, dredging would be avoided during times of peak fish spawning and migration in the Maumee River.

3.1.8 Impacts at the open-lake sites would be minimized by discharging material only while the vessel is stationary. Washing of disposal equipment would be held to the minimal amount necessary to insure operability of the equipment.

3.2 Water Circulation, Fluctuation, and Salinity Determinations.

3.2.1 Water Salinity, Chemistry Including pH, Clarity, Color, Odor, Taste, Dissolved Gas Levels, Nutrients, Eutrophication, Temperature, and Others as Appropriate - Salinity determinations are not applicable to this Section 404(b)(1) Evaluation since the discharge sites are not located in marine waters. Recent chemical testing of sediments from navigation channels in the Toledo area is summarized in Section 2.4 of this evaluation. Even though much of the material dredged from Toledo was classified by the USEPA as unpolluted, elutriate tests (Smith et al, 1984) indicated that there may be minor releases of arsenic, copper, mercury, phenols, nickel, zinc, iron, manganese, chemical oxygen demand (COD), ammonia nitrogen, total Kjeldahl nitrogen (TKN), phosphorus, and oil and grease at all three disposal sites. The elutriate tests also indicate that some limited releases of cyanide could occur at the open-lake sites, while releases of chromium could occur within the CDF. Mixing and dispersion are expected to rapidly result in pre-disposal ambient levels at the disposal sites.

3.2.2 No significant alterations in pH are expected at any of the disposal sites. Some temporary alterations in dissolved gas levels may occur within the CDF during disposal. As the area in the CDF is filled, the reduced volume of water would be subject to somewhat more rapid seasonal changes in water temperature.

3.2.3 Temporary alterations in water color, odor, and taste may occur during disposal operations at all three sites. Temporary increases in turbidity and suspended solids levels will occur to some extent at all sites and will produce associated reductions in water clarity. Any turbidity plume at open-lake Sites 1 and 2 will be controlled by existing lake currents.

3.2.4 In summary, impacts to Lake Erie water quality are expected to be temporary and should cause no significant, long-term water quality problems. The existing dike is expected to effectively retain sediment particulates and associated pollutants within the CDF. Although eutrophication would be accelerated within the CDF, no significant increase in eutrophication outside this area is expected due to the proposed discharges.

3.2.5 Current Patterns and Circulation - A very limited amount of circulation occurs within the diked area due to wind action. Although excess water does filter through the dike and pass through the overflow weir to Lake Erie, the quantity of water is relatively minor in comparison to the total volume of water in the vicinity of the CDF. No significant impacts to current patterns and flow, velocities, stratification, or hydraulic regimes outside the dike would be expectd due to continued use of the CDF or the open-lake sites. Any existing current patterns and flow, velocities, stratification, and hydraulic regimes inside the disposal area would be gradually diminished as the area is filled and converted to dry land.

3.2.6 Normal Water Level Fluctuations - Water levels within the CDF may be raised and lowered as material is discharged into the site and excess water either filters through the dike or passes through the discharge weir. Water levels would cease to fluctuate as the area is filled to capacity and converted to dry land. No significant changes in normal water level fluctuations outside the CDF would occur due to any of the proposed disposal operations.

3.2.7 Salinity Gradients - As stated previously, salinity determinations are not applicable to this evaluation.

3.2.8 Actions Taken to Minimize Impacts - Most of the actions discussed in paragraphs 3.1.7 and 3.1.8 above will also minimize impacts to water quality, circulation, and/or fluctuation. The CDF has been designed specifically to retain sediment particulates and associated pollutants within the disposal facility.

3.3 Suspended Particulate/Turbidity Determinations.

3.3.1 A discussion of the expected changes in suspended particulates and turbidity levels is included in Section 3.2 of this evaluation. Grain size analyses are discussed in Section 2.4 above and in the sediment test Contractor's report (Smith et. al, 1984). Methods to be used in minimizing suspended particulate/turbidity impacts are included in paragraphs 3.1.7 and 3.1.8 above. Disposal methods are discussed in Section 2.6 above. In summary, continued use of the Toledo CDF would result in the permanent loss of habitat in the containment area. Disposal operations would be conducted in a manner which would maximize the retention of particulates in the CDF and minimize impacts outside the CDF and at the open-lake sites.

3.3.2 Effects on Chemical and Physical Properties of the Water Column (Light Penetration, Dissolved Oxygen, Toxic Metals and Organics, Pathogens, Aesthetics, and Others as Appropriate - Discussions of chemical and physical impacts on the water column are included in Section 3.2 above. Temporary

decreases in light penetration and dissolved oxygen levels would occur during CDF filling and, to a lesser extent, during open-lake disposal. No significant releases of pathogens are expected at any of the disposal sites. Temporay aesthetic impacts may be associated with the operation of machinery, the increase in turbidity, and the possible release of odors associated with disposal. However, since the disposal operations would be performed at established sites away from significant human activity, most aesthetic impacts should be relatively minor.

3.3.3 Effects on Biota (Primary Production, Photosynthesis, Suspension/Filter Feeders, and Sight Feeders) - Except for waterfowl and other birds using the area, the remaining aquatic biota in the CDF is separated from the waters of Lake Erie by a containment dike. Turbidity caused by disposal in the CDF would cause a decrease in aquatic primary productivity and photosynthesis within the containment area. The foraging activities of suspension/filter feeders and sight feeders still inhabiting the CDF would continue to be adversely affected. Disposal into the CDF would have a negligible impact on turbidity outside the diked area.

3.3.4 Increased turbidity associated with open-lake disposal may cause a temporary and minor decrease in primary productivity and photosynthesis at the disposal sites. The foraging activities of suspension/filter and sight feeders may be temporarily impaired by an increase in suspended solids and turbidity levels. These activities would be expected to return to pre-disposal levels soon after disposal ceases.

3.3.5 Actions Taken to Minimize Impacts - Actions that would be taken to minimize impacts associated with suspended particulates are included in Paragraphs 3.1.7, 3.1.8, and 3.2.8 above.

3.4 Contaminant Determinations.

3.4.1 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)(1) list of toxic pollutants promulgated on 31 January 1978 (43 FR 4109)". Contaminants identified in Toledo Harbor sediments include arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc, cyanide, phenols, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a) anthracene, chrysene, benzo(k) fluoranthene, benzo(a) pyrene, benzidine, 3,3' dichlorobenzidine, bis (2-ethyl hexyl) phtalate, acrolein, and acrylonitrile. A discussion of contaminant levels is included in Section 2.4 above. In general, the material proposed for confinement in the CDF is heavily polluted in many more categories than material from the other two dredging sectors.

3.4.2 Within the CDF, the toxic effects of contaminants may cause the death of some organisms. Some uptake of contaminants by organisms may also occur. However, plant bioaccummulation tests performed by the Corps Waterways Experiment Station (WES) on sediments from the Times Beach Disposal Site at Buffalo, NY, the existing CDF at Toledo, OH, and Diked Disposal

Site 12 at Cleveland, OH, indicated that plant uptake of heavy metals and priority organic pollutants was of little consequence (Folson, B.L. 1982). Water quality impacts by contaminants are included in Section 3.2 above.

3.4.3 Contaminant levels in the sediments to be placed at each site would be similar to contaminant levels in sediments previously discharged. Based on sediment test results and past experience at Toledo, significant contaminant increases outside the CDF would not be expected during future disposal operations.

3.5 Aquatic Ecosystem and Organism Determinations.

3.5.1 Effects on Plankton - Reduced light penetration in the water column may cause a reduction in phytoplankton productivity during disposal. Increased suspended solids levels may also cause some reductions in zooplankton populations. Effects on plankton would be greatest in the CDF, although some minor, temporary impacts may also occur at the two open-lake sites. The release of pollutants in the CDF may also result in additional plankton mortality. As the CDF is filled and converted to dry land, planktonic populations in the confinement area would ultimately be destroyed.

3.5.2 Effects on Benthos - The placement of dredged material would result in the continued burial and mortality of benthic organisms at all three disposal sites. The release of contaminants may also contribute to benthic mortality within the CDF. Benthic communities would utlimately be destroyed within the CDF as the area is filled and converted to dry land. At the open-lake sites, relatively rapid benthic recolonization would be expected following each disposal period.

3.5.3 Effects on Nekton - Nektonic organisms (fish and other free-swimming aquatic animals) would be temporarily dispersed from the open-lake sites during disposal. Based on sediment testing and past experience, no significant toxic effects are expected at either open-lake site. Nekton remaining in the CDF would be permanently destroyed as the area is filled to capacity.

3.5.4 Effects on Aquatic Food Web - Except for waterfowl and other birds using the CDF, aquatic biota in the confinement area is isolated from aquatic food webs in Lake Erie. Aquatic food webs within the CDF would continue to be degraded and would ultimately be destroyed as the area is filled. Temporary effects on aquatic food webs at the open-lake sites are expected due to the loss of benthic organisms as described in paragraph 3.1.5 and 3.5.2 above. Impacts due to the addition of contaminants are expected to be minimal at the open-lake sites.

3.5.5 Effects on Special Aquatic Sites - The proposed discharges would result in no significant adverse impacts to presently existing sanctuaries and refuges, mud flats, vegetated shallows, coral reefs, or riffle and pool complexes. Some wetland vegetation has colonized shallow water areas of the CDF. The presence of this wetland vegetation is a direct result of placing nutrient rich dredged material within the facility. Wetland vegetation within the CDF is isolated from Lake Erie and, except for waterfowl and other

bird use, provides few benefits to Lake Erie food webs. Although additional wetland vegetation may temporarily colonize the CDF, wetland vegetation would ultimately be destroyed as the area is filled to capacity and dewatered. The continued filling of the existing Toledo CDF is expected to cause fewer adverse environmental impacts than construction of an additional shallow water site or disposing the heavily polluted sediment in the open water of Lake Erie.

3.5.6 Threatened and Endangered Species - No Federally or State-listed threatened or endangered species are known to exist at the disposal sites. No impacts to threatened or endangered species should oocur.

3.5.7 Other Wildlife - The CDF is located in a heavily industrialized and commercialized area that has previously been degraded due to the disposal of dredged material. Although some waterfowl, gulls, and shorebirds probably use the CDF as a resting and/or feeding area, use of the site by other wildlife is relatively limited. The continued filling of the CDF may cause some alteration in bird utilization of the Toledo waterfront but should have no other noticeable impacts on wildlife in the Toledo Area.

3.5.8 Neither open-lake site contains habitat that would support significant wildlife populations. Therefore, no significant impacts to wildife are expected at either site.

3.5.9 Actions Taken to Minimize Impacts - Organism and ecosystem impacts would be reduced by minimizing impacts to the aquatic habitat as discussed in paragraphs 3.1.7, 3.1.8, and 3.2.8 above.

3.6 Proposed Disposal Site Determinations.

3.6.1 Mixing Zone Determination - The mixing zone for the CDF discharge should generally be considered to be the area within the containment dike. The facility would be operated in a manner which would maximize the retention of pollutants and particulate matter within the CDF. The surface area of each open-lake site is 1 square mile. The dilutional effects of the mixing zones at the open-lake disposal sites would be expected to reduce contaminant concentrations such that applicable OEPA water quality standards will not be exceeded. The mixing zones would be localized, and in the general vicinity of each open-lake discharge site. The following factors were considered in determining the acceptability of the mixing zones as required by USEPA Guidelines:

Factor	Relevant Comments
Water Depth	In the CDF, depths vary from 0 feet at the south end to about 3 feet in the northern portion. Depths vary at the open-lake sites, but generally range from 23-28 feet at Site 1 and from 17-24 feet at Site 2.

Factor	Relevant Comments
Current Velocity, Direction, & Variability	Water movement in the CDF is negligible, except as provided by wind action. Velocity and direction variable at the open-lake sites, partly controlled by wind action. There will be considerable mixing and dispersion effected by wind.
Degree of Turbulence	Minor turbulence inside the CDF during filling. Considerable turbulence at the open-lake sites during storm conditions. However, only minor water turbulence would be generated by the disposal operation itself.
Stratification	Not applicable except for the fact that water quality at the top of the water column near the weir in the CDF would be significantly better than water quality entering the CDF from dredge pump-out.
Discharge Vessel Speed and Direction	Not applicable at the CDF. At the open-lake sites, the discharges would be made while the vessel is stationary.
Rate of Discharge	Discussed in Sections 2.2 and 2.6 above.
Ambient Concentration of Constituents of Interest and Dredged Material Characteristics	Discussed in Sections 2.4, 3.1, 3.2, 3.3, and 3.4 above.
Number of Discharge Actions Per Unit Time	Variable, depending on the transport times, dredging conditions, and equipment used as discussed in Section 2.6.
Other Factors Affecting Rates and Patterns of Mixing	Water circulation, water level fluctuation, and disposal site operation were considered previously in this evaluation.

3.6.2 Determination of Compliance With Applicable Water Quality Standards - Ohio Environmental Protection Agency (OEPA) water quality standards for the proposed work areas are described in Chapter 3745*1 of the Ohio Administrative Code. Maumee Bay is designated as an excepted area, while the Maumee River from the Route I-75 bridge to its mouth is considered limited warmwater habitat. During disposal, compliance with individual water quality

standards would not be expected throughout the CDF. However, due to the retention of particulates and associated pollutants, no significant violations of water quality standards would be expected outside the CDF. Some temporary (few hours) and minor violations of standards may occur at the open-lake sites. However, disposal operations are not expected to produce any significant violations of OEPA water quality standards outside the open-lake disposal areas.

3.6.3 Potential Effects on Human Use Characteristics - Disposal operations are expected to have no significant impact on municipal or private water supplies. No signficant impacts on recreational and commercial fishing, water-related recreation, or aesthetics are expected to occur. No parks, national or historic monuments, national seashores, wilderness areas, research sites, or similar preserves would be adversely affected.

3.7 Determination of Cumulative Effects on the Aquatic Ecosystem.

3.7.1 The cumulative effect of the proposed action would be the total filling of the CDF and the reduction of water depths at the open-lake disposal sites. Since the existing sites have been altered by past disposals, no significant impact on Lake Erie aquatic resources are expected. The construction and filling of many additional aquatic dredged material disposal sites could potentially decrease the amount of littoral zone habitat in Lake Erie. The cumulative effect of many piecemeal habitat reductions could result in a significant impairment of Lake Erie aquatic resources and could interfere with the productivity and water quality of the lake environment.

3.8 Determination of Secondary Effects on the Aquatic Environment.

3.8.1 Land created by the ultimate filling of the CDF would be owned by the Toledo-Lucas County Port Authority, which has long range plans to develop the general area for port expansion. Although future activities to be performed at the site could potentially have secondary impacts on the aquatic environment, the magnitude and extent of these impacts cannot presently be determined.

4. FINDING OF COMPLIANCE

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

4.2 Alternatives considered during preparation of the 1974 Final Environmental Impact Statement (FEIS) for the existing CDF and the 1976 FEIS for harbor maintenance included no maintenance, dredging to a lesser depth, using other types of dredging equipment, watershed management, disposal of all sediments in open water, deep water (more than 100 feet) disposal, land disposal, and pretreatment of materials. The chosen disposal methods were identified as the best immediate solution to disposal, based on environmental and economic considerations. Since the CDF and the two open-lake sites have already been used for dredged material disposal, the continued use of these areas would result in fewer environmental impacts than establishment of a new, undisturbed site.

4.3 The planned disposals of dredged and fill material should not contribute to a violation of State water quality standards outside the localized mixing zones. The disposal operations will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

4.4 Continued use of the selected disposal sites will 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. The proposed discharges will not violate any requirement imposed by the Secretary of Commerce to protect any marine sanctuary designated under the Marine Protection, Research, and Sanctuaries Act of 1972.

4.5 The proposed disposal operations will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commerical fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. Significant adverse effects on the life stages of aquatic life and other wildlife dependent on aquatic systems will not occur. The disposal will have no signficant adverse effects on aquatic ecosystem diversity, productivity, and stability, or on recreational, aesthetic, and economic values.

4.6 Appropriate steps to minimize potential adverse impacts of the discharges on aquatic systems include the following:

- using existing sites where dredged material has previously been placed,

- to the maximum extent possible, avoiding dredging and disposal during times of peak fish spawning and migration in the Maumee River,

- handling the dredged material in a manner which would minimize spillage during transport,

- confining dredging to only shoaled portions of essential navigation channels,

- discharging material at the open-lake sites when the vessel is stationary,

- restricting the washing of disposal equipment to the minimum amount necessary to insure equipment operability, and

- operating the CDF in a manner which would cause the maximum retention of particulates and associated pollutants in the CDF.

4.7 On the basis of the Guidelines, the CDF and open-lakes Sites 1 and 2 are 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.

LTC, EN
for ROBERT R. HARDIMAN
Colonel, Corps of Engineers
District Commander

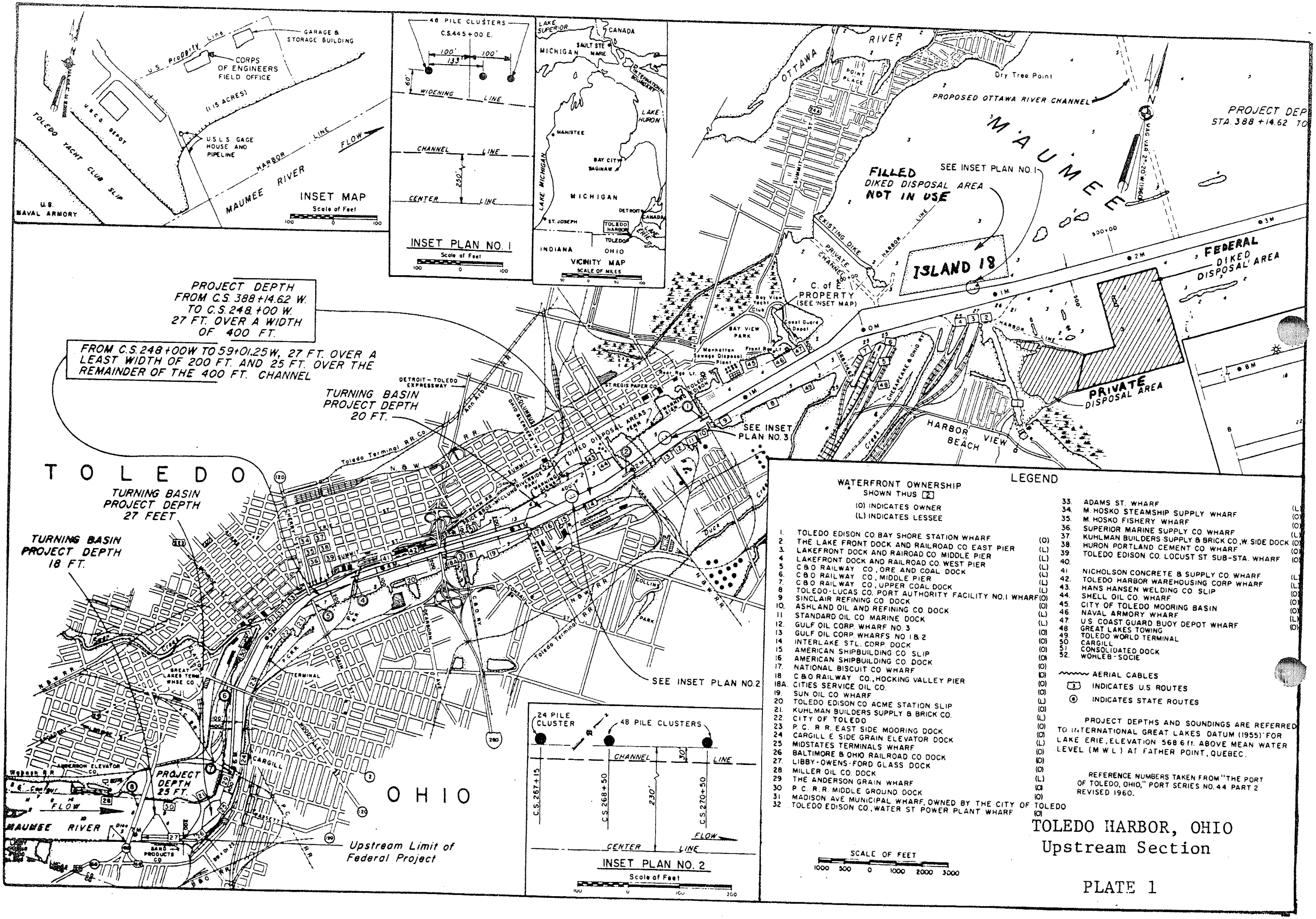
Date: 18 SEPT 84

LITERATURE CITED

Smith, J.A., Glowacky, R.S., Crerar, P.J., and B.L. Prater. 1984. Analysis of Sediment from Toledo Harbor-Maumee River, Toledo, Ohio. Aqua Tech Environmental Consultants, Inc. 82 pp.

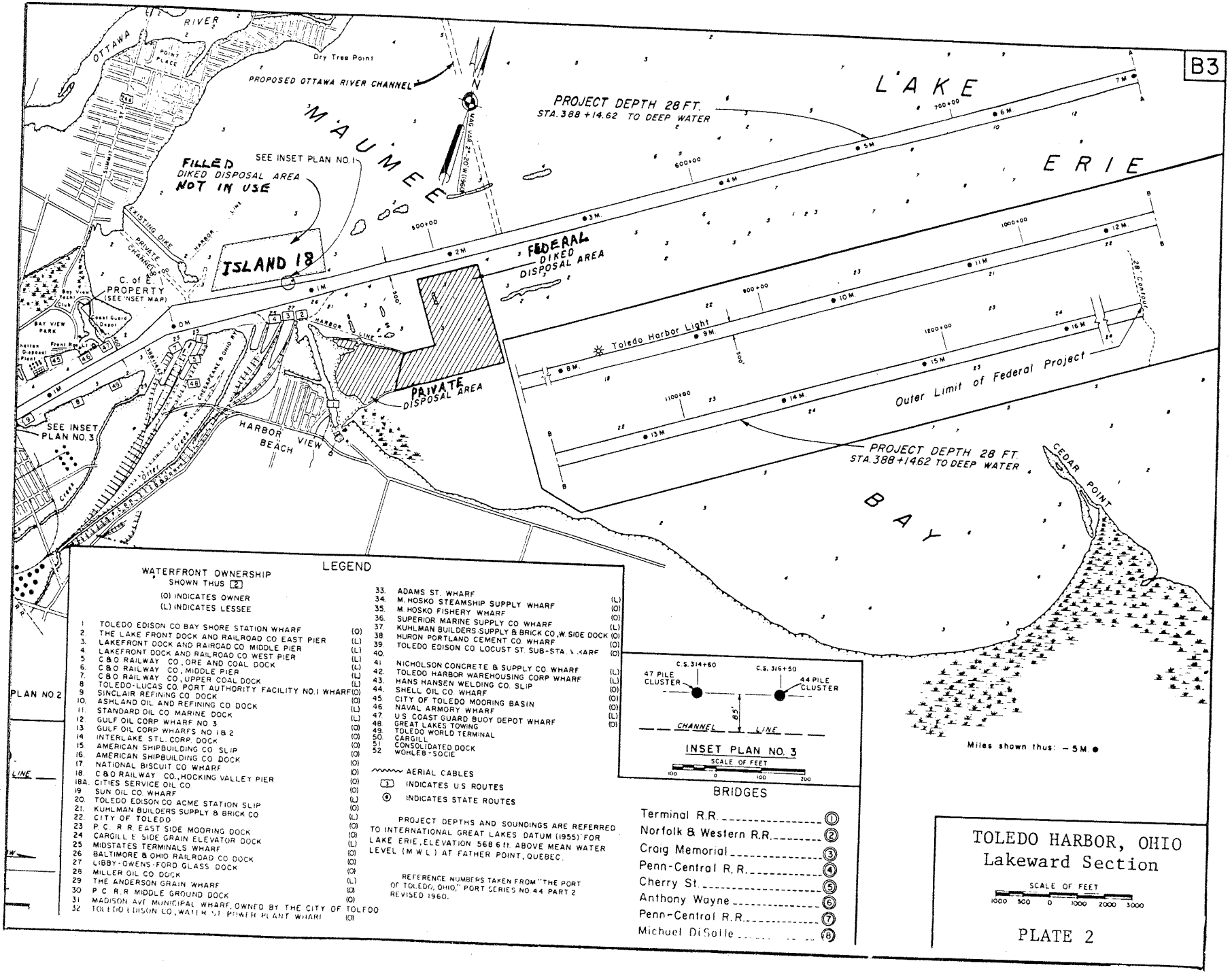
U.S. Army Corps of Engineers. 1974. Final Environmental Impact Statement, Confined Disposal Facility for Toledo Harbor, Ohio. U.S. Army Corps of Engineers, Detroit District, Detroit, MI. 95 pp, plus appendices.

U.S. Army Corps of Engineers. 1976. Final Environmental Impact Statement, Maintenance Dredging of the Federal Navigation Channel at Toledo Harbor, Ohio. 112 pp. plus appendices.



TOLEDO HARBOR, OHIO
Upstream Section

PLATE 1



LEGEND

WATERFRONT OWNERSHIP
SHOWN THUS [2]

(O) INDICATES OWNER
(L) INDICATES LESSEE

1. TOLEDO EDISON CO BAY SHORE STATION WHARF (O)
2. THE LAKE FRONT DOCK AND RAILROAD CO EAST PIER (L)
3. LAKEFRONT DOCK AND RAILROAD CO MIDDLE PIER (L)
4. LAKEFRONT DOCK AND RAILROAD CO WEST PIER (L)
5. C&O RAILWAY CO., ORE AND COAL DOCK (L)
6. C&O RAILWAY CO., MIDDLE PIER (L)
7. C&O RAILWAY CO., UPPER COAL DOCK (L)
8. TOLEDO-LUCAS CO. PORT AUTHORITY FACILITY NO.1 WHARF (O)
9. SINCLAIR REFINING CO. DOCK (O)
10. ASHLAND OIL AND REFINING CO DOCK (L)
11. STANDARD OIL CO. MARINE DOCK (L)
12. GULF OIL CORP. WHARF NO. 3 (O)
13. GULF OIL CORP. WHARFS NO. 1 & 2 (O)
14. INTERLAKE STL. CORP. DOCK (O)
15. AMERICAN SHIPBUILDING CO. SLIP (O)
16. AMERICAN SHIPBUILDING CO. DOCK (O)
17. NATIONAL BISCUIT CO. WHARF (O)
18. C&O RAILWAY CO., HOCKING VALLEY PIER (O)
18A. CITIES SERVICE OIL CO. (O)
19. SUN OIL CO. WHARF (O)
20. TOLEDO EDISON CO. ACME STATION SLIP (E)
21. KUHLMAN BUILDERS SUPPLY & BRICK CO. (O)
22. CITY OF TOLEDO (O)
23. P.C. R.R. EAST SIDE MOORING DOCK (O)
24. CARGILL E. SIDE GRAIN ELEVATOR DOCK (O)
25. MIDSTATES TERMINALS WHARF (L)
26. BALTIMORE & OHIO RAILROAD CO. DOCK (O)
27. LIBBY-OWENS-FORD GLASS DOCK (O)
28. MILLER OIL CO. DOCK (O)
29. THE ANDERSON GRAIN WHARF (L)
30. P.C. R.R. MIDDLE GROUND DOCK (O)
31. MADISON AVE. MUNICIPAL WHARF, OWNED BY THE CITY OF TOLEDO
32. TOLEDO EDISON CO., WATER ST. POWER PLANT WHARF (O)
33. ADAMS ST. WHARF
34. M. HOSKO STEAMSHIP SUPPLY WHARF (L)
35. M. HOSKO FISHERY WHARF (O)
36. SUPERIOR MARINE SUPPLY CO. WHARF (O)
37. KUHLMAN BUILDERS SUPPLY & BRICK CO., W. SIDE DOCK (L)
38. HURON PORTLAND CEMENT CO. WHARF (O)
39. TOLEDO EDISON CO. LOCUST ST. SUB-STA. WHARF (O)
40.
41. NICHOLSON CONCRETE & SUPPLY CO. WHARF (L)
42. TOLEDO HARBOR WAREHOUSING CORP. WHARF (L)
43. HANS HANSEN WELDING CO. SLIP (O)
44. SHELL OIL CO. WHARF (O)
45. CITY OF TOLEDO MOORING BASIN (O)
46. NAVAL ARMORY WHARF (E)
47. U.S. COAST GUARD BUOY DEPOT WHARF (O)
48. GREAT LAKES TOWING (L)
49. TOLEDO WORLD TERMINAL (L)
50. CARGILL (O)
51. CONSOLIDATED DOCK (O)
52. WOHLEB-SOCIE (O)

~~~ AERIAL CABLES
[3] INDICATES U.S ROUTES
(4) INDICATES STATE ROUTES

PROJECT DEPTHS AND SOUNDINGS ARE REFERRED TO INTERNATIONAL GREAT LAKES DATUM (1955) FOR LAKE ERIE, ELEVATION 568.6 ft. ABOVE MEAN WATER LEVEL (M.W.L.) AT FATHER POINT, QUEBEC.

REFERENCE NUMBERS TAKEN FROM "THE PORT OF TOLEDO, OHIO," PORT SERIES NO. 44 PART 2 REVISED 1960.

BRIDGES

- Terminal R.R. ①
- Norfolk & Western R.R. ②
- Craig Memorial ③
- Penn-Central R.R. ④
- Cherry St. ⑤
- Anthony Wayne ⑥
- Penn-Central R.R. ⑦
- Michael DiSalle ⑧

TOLEDO HARBOR, OHIO
Lakeward Section

SCALE OF FEET
1000 500 0 1000 2000 3000

PLATE 2
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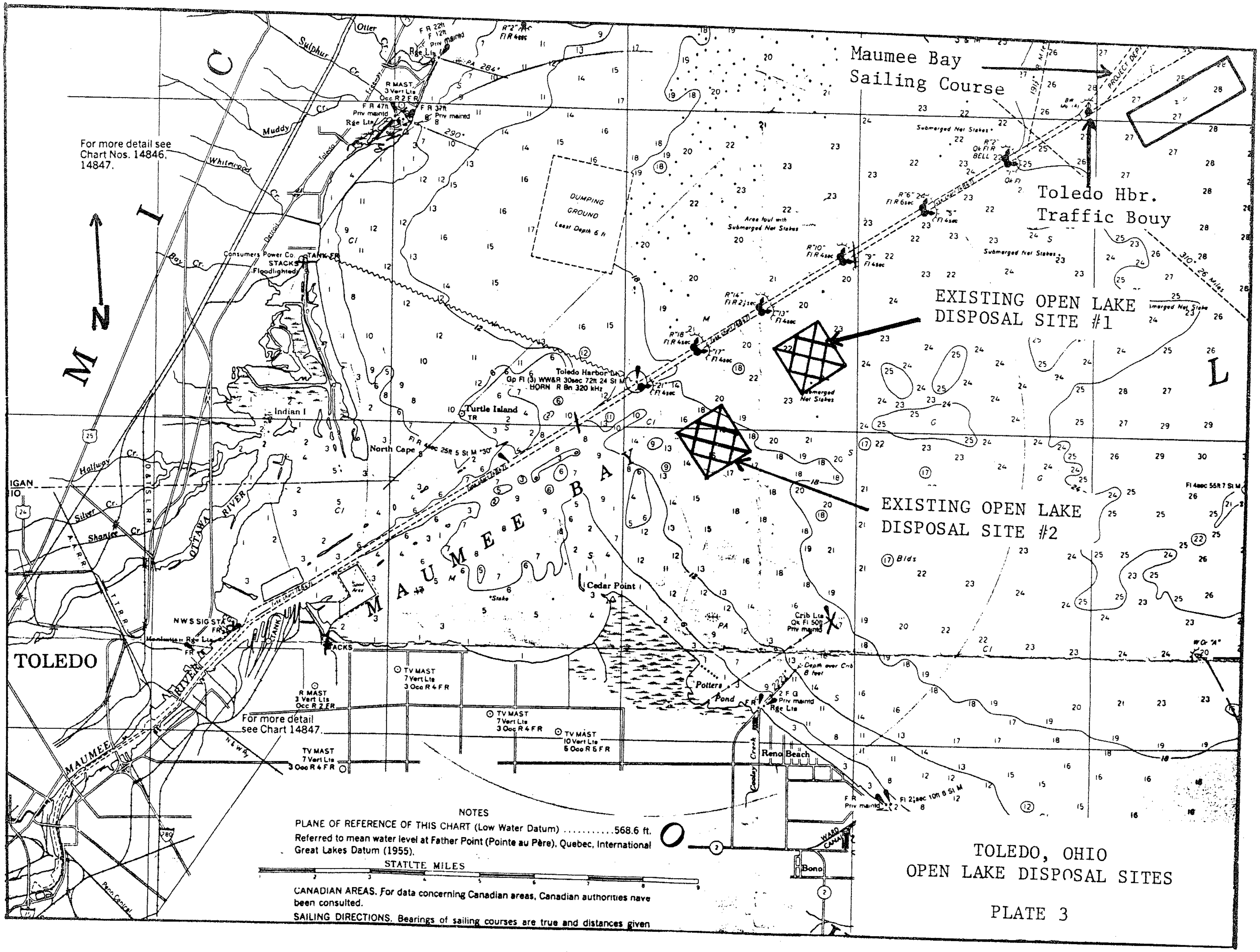
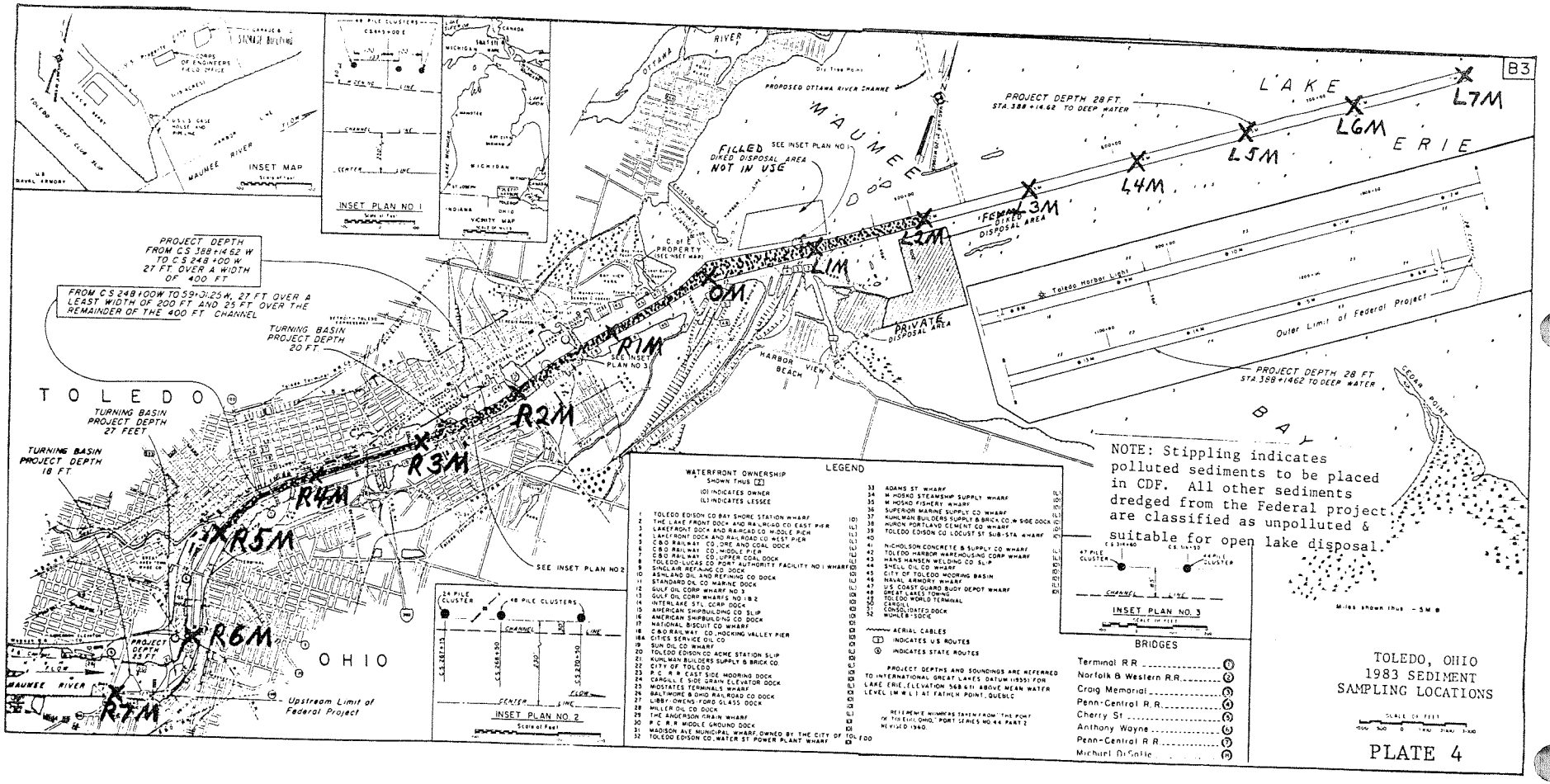


TOLEDO, OHIO
OPEN LAKE DISPOSAL SITES

PLATE 3



NOTE: Stippling indicates polluted sediments to be placed in CDF. All other sediments dredged from the Federal project are classified as unpolluted & suitable for open lake disposal.

LEGEND

WATERFRONT OWNERSHIP SHOWN THUS (2)
(O) INDICATES OWNER
(L) INDICATES LESSEE

1 TOLEDO EDISON CO BAY SHORE STATION WHARF
2 THE LAKE FRONT DOCK AND RAILROAD CO EAST PIER
3 LAKEFRONT DOCK AND RAILROAD CO MIDDLE PIER
4 LAKEFRONT DOCK AND RAILROAD CO WEST PIER
5 C&O RAILWAY CO ORE AND COAL DOCK
6 C&O RAILWAY CO MIDDLE PIER
7 C&O RAILWAY CO UPPER COAL DOCK
8 TOLEDO-LUCAS CO PORT AUTHORITY FACILITY NO 1 WHARF
9 SINCLAIR REFINING CO DOCK
10 ASHLAND OIL AND REFINING CO DOCK
11 STANDARD OIL CO MARINE DOCK
12 GULF OIL CORP WHARF NO 3
13 GULF OIL CORP WHARFS NO 1 & 2
14 INTERLAKE STL CORP DOCK
15 AMERICAN SHIPBUILDING CO SLIP
16 AMERICAN SHIPBUILDING CO DOCK
17 NATIONAL BISCUIT CO WHARF
18 C&O RAILWAY CO HOCKING VALLEY PIER
18A CITIES SERVICE OIL CO
19 SUN OIL CO WHARF
20 TOLEDO EDISON CO ACME STATION SLIP
21 KUHLMAN BUILDERS SUPPLY & BRICK CO
22 CITY OF TOLEDO
23 P C R R EAST SIDE MOORING DOCK
24 CARGILL E SIDE GRAIN ELEVATOR DOCK
25 MIDSTATES TERMINALS WHARF
26 BALTIMORE & OHIO RAILROAD CO DOCK
27 LIBBY-OWENS-FORD GLASS DOCK
28 MILLER OIL CO DOCK
29 THE ANDERSON GRAIN WHARF
30 P C R R MIDDLE GROUND DOCK
31 MADISON AVE MUNICIPAL WHARF OWNED BY THE CITY OF TOLEDO
32 TOLEDO EDISON CO WATER ST POWER PLANT WHARF
33 ADAMS ST WHARF
34 M HOSKO STEAMSHIP SUPPLY WHARF
35 M HOSKO FISHERY WHARF
36 SUPERIOR MARINE SUPPLY CO WHARF
37 KUHLMAN BUILDERS SUPPLY & BRICK CO W SIDE DOCK
38 HURON PORTLAND CEMENT CO WHARF
39 TOLEDO EDISON CO LOCUST ST SUB-STA WHARF
40
41 NICHOLSON CONCRETE & SUPPLY CO WHARF
42 TOLEDO HARBOR WAREHOUSING CORP WHARF
43 HANS HANSEN WELDING CO SLIP
44 SHELL OIL CO WHARF
45 CITY OF TOLEDO MOORING BASIN
46 NAVAL ARMORY WHARF
47 U S COAST GUARD BUOY DEPOT WHARF
48 GREAT LAKES TOWING
49 TOLEDO WORLD TERMINAL
50 CARGILL
51 CONSOLIDATED DOCK
52 WUHLER-SOCIE

AERIAL CABLES
(11) INDICATES U S ROUTES
(6) INDICATES STATE ROUTES

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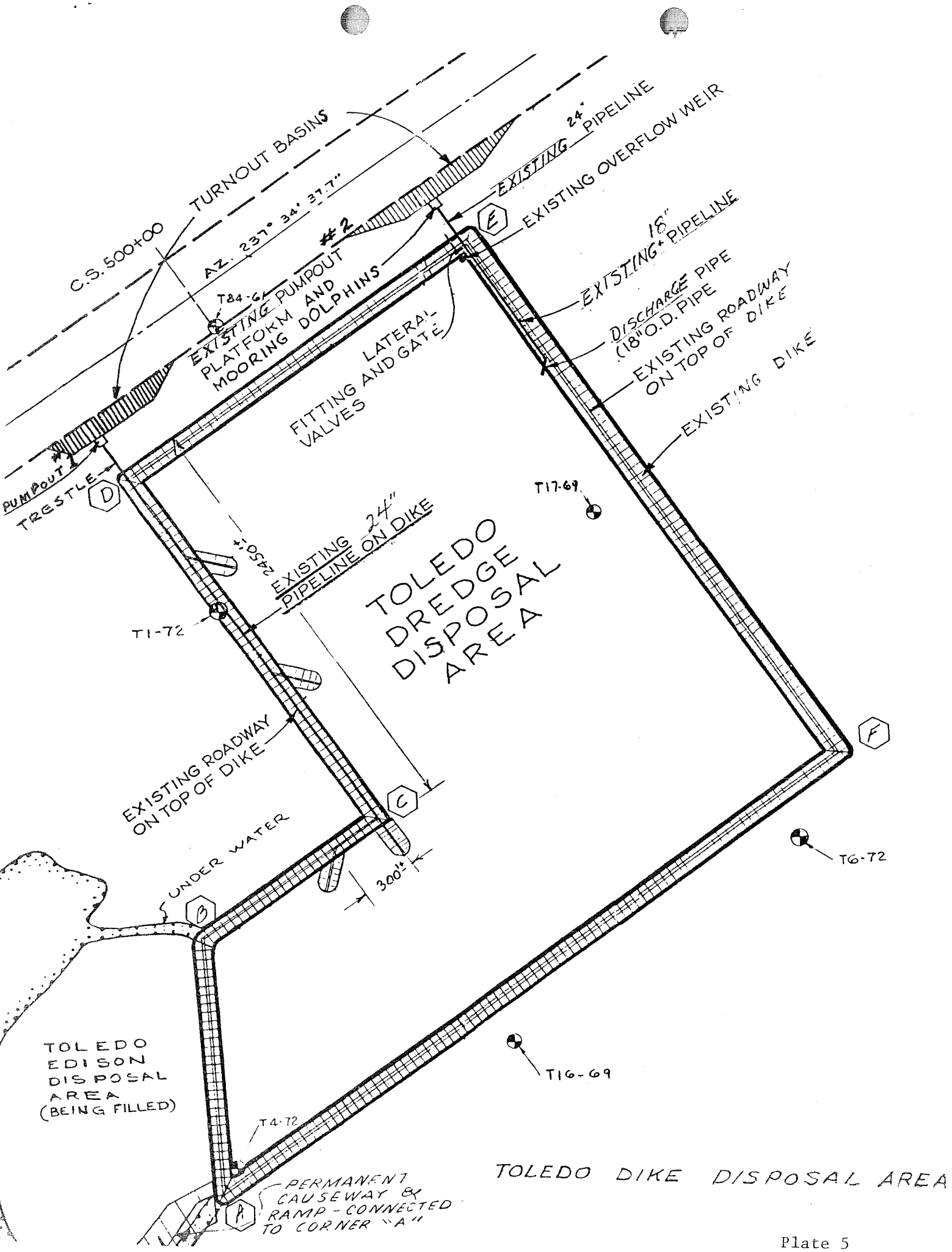
REFERENCE NUMBERS TAKEN FROM "THE PORT OF TOLEDO, OHIO," PORT SERIES NO. 44, PART 2 REVISED 1960.

BRIDGES

Terminal R R	(1)
Norfolk & Western R R	(2)
Craig Memorial	(3)
Penn-Central R R	(4)
Cherry St	(5)
Anthony Wayne	(6)
Penn-Central R R	(7)
Michael DiSalle	(8)

TOLEDO, OHIO
1983 SEDIMENT SAMPLING LOCATIONS

PLATE 4



TOLEDO DIKE DISPOSAL AREA

Plate 5

Table 1 - "Heavily Polluted" Parameters, Toledo Entrance Channel and Maumee River

		Proposed Open-Lake Disposal	Proposed Dike Disposal
L-7M	CN, As, TKN, P	X	
L-6M	CN, As, Fe, Mn, COD, NH_3, P	X	
L-5M	CN, As, Fe, P	X	
L-4M	CN, As, P	X	
L-3M	As, Fe, Mn, COD, TKN, P	X	
L-2M	CN, As, P	X	
L-1M	CN, As, Ni, Fe, Mn, COD, NH_3, TKN, P		X
O-M	CN, As, Cu, Ni, Zn, Mn, Fe, COD, NH3, TKN, P		X
R-1M	CN, As, Cu, Pb, Ni, Zn, Fe, COD, TKN, P, Oil and Grease		X
R-2M	CN, As, Cu, Ni, Zn, Fe, COD, NH_3, P, Oil and Grease		X
R-3M	CN, As, Ni, Fe, P		X
R-4M	CN, As, Cu, Ni, Fe, P		X
R-5M	CN, As, Ni, Fe, P	X	
R-6M	CN, As, Ni, Fe, P	X	
R-7M	CN, As, Fe, P	X	

Table 2 - Bioassay 96 Hour Acute Toxicity (Percent)

Site	Hexagenia	Daphnia	Promephales
L-7M - L-2M	52	15	8
L-1M - R-4M	58	22	15
R-5M - R-7M	45	11	5