Final Design Report

Kinnickinnic River Sediment Remediation
Milwaukee, Wisconsin

Prepared for
Wisconsin Department of Natural Resources

March 2008

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1.0 Introduction

This design report describes the design elements and provides plans and specifications for the contaminated sediment remediation project over the Kinnickinnic River, Milwaukee, Wisconsin between Becher Street and Kinnickinnic Avenue. The Kinnickinnic River Sediment Remediation project has been carried out by a team (KK Team) through various phases since 2002. The KK Team is comprised of the Wisconsin Department of Natural Resources (WDNR) along with U.S. Army Corps of Engineers (USACE), the U.S. Environmental Protection Agency (USEPA) Great Lakes National Program Office (GLNPO), Port of Milwaukee, land owners and residents. Prior to this final design phase (Phase III) of the project, two phases have been completed. Phase I is the sediment assessment that was completed in 2003 and Phase II is the pre-engineering design or concept design that was completed in 2004. Various documents have been produced through project Phases I and II. The KK Team has evaluated and selected a remedial alternative (WDNR, 2008a) from the alternatives evaluated in the *Concept Design Documentation Report* (CDDR) (Barr, 2004).

This report is part of the Phase III work – final engineering design. Additional design work will be completed during Phase IV – supplemental design, which is ongoing. In Phase IV, the dredging design as documented here will be further modified and incorporated with the shoreline protection design and residual management design for implementation.

The sediment proposed for removal from the project area is a potentially significant source contributing to the impairment of water quality observed in the Kinnickinnic River Estuary. The sediment will be dredged mechanically and transported by barge to the United States Army Corps of Engineers (USACE) administered Jones Island Confined Disposal Facility (CDF) where it will be disposed of. The WDNR and USEPA GLNPO will secure use of the Jones Island CDF for disposal of dredged material. This project meets the objectives of the Milwaukee Estuary Remedial Action Plan (RAP) for removing contaminated sediments within the Area of Concern (AOC) that contribute to several beneficial use impairments outlined in the Milwaukee Estuary RAP (WDNR, 1994). This project will provide short- and long-term environmental and economic benefits including reduction of resuspension and transport of contaminated sediment to the water column and downstream to Lake Michigan; reduction of toxicity and the risks of the contaminated sediments to aquatic life and human health; improvement of habitat for biota, fish, and wildlife; navigation improvements likely resulting in an increase in recreational and commercial boating; and improved redevelopment potential in the area (WDNR, 2004).

1.1 Site Background

The Kinnickinnic River discharges into Lake Michigan via the Federal navigation harbor at Milwaukee, Wisconsin. The project area, a portion of the Kinnickinnic River, is an approximately 2000-foot long and 200-foot wide section of the lower Kinnickinnic River located between Kinnickinnic Avenue, the downstream limit, and Becher Street, the upstream limit (Figure 1). The project area was historically dredged to a depth of 21 feet for commercial navigation. As deep draft commercial traffic upstream from Kinnickinnic Avenue declined, maintenance of the channel depth was discontinued sometime between 1936 and 1944. Since then, only isolated dredging has occurred within a small portion of the project area in the 1970s and 1980s. Subsequently, water depth in the dredged channel and other portions of the project area gradually declined to the current shallow conditions (0 to 10 feet of water) due to the accumulation of sediment and lack of dredging.

The river has been impacted by urban growth and development, significantly between the 1930s and late 1970s, via point and non-point discharges and spills. The historical events have resulted in contamination of the sediments, particularly within the project area, with polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs). Many regulatory and non-regulatory programs, including point source controls, spill reporting and response, hazardous site cleanups, and brownfield redevelopment programs have significantly reduced the input of contaminants into the Kinnickinnic River since the late 1970s. More recently, storm water control requirements are beginning to address non-point sources. In addition, new recreational and commercial based enterprises requiring deep-draft navigation depths have returned to the project area shoreline (WDNR, 2004).

1.2 Goals of Sediment Remediation/Restoration

This project serves multiple purposes for meeting the goals and objectives outlined in the Milwaukee Estuary Remedial Action (RAP) by removing a large mass of contaminated sediments from the Milwaukee Estuary Area of Concern (AOC) while also providing for improved conditions for recreational and commercial boating and improved habitat and aesthetics in a formerly industrial corridor experiencing redevelopment.

Specific project objectives include:

- Reduce the risks of PCB and PAH contaminated sediments to aquatic life and human health;
- Reduce the transport of PCBs and PAHs from the Kinnickinnic River downstream to the Milwaukee Harbor and Lake Michigan;

- Improve water quality in the Kinnickinnic River and Milwaukee Estuary AOC;
- Improve biota, fish, and wildlife habitat in the Kinnickinnic River;
- Expedite the process of eliminating the fish consumption advisory in the Kinnickinnic River;
- Improve recreational and commercial navigation conditions for economical development in the area;
- Improve aesthetics of the stream; and
- Reduce non-point source pollution. (WDNR, 2004)

1.3 Design Report Organization

The purpose of this report is to summarize the basis of design, provide draft design plans and specifications, provide an operations and maintenance plan that describes the use of silt curtains (if necessary) and the transfer of dredged material to the Jones Island CDF, construction schedule, and estimate of construction costs.

2.0 General Design Considerations

2.1 Performance Standards

Performance standards are critical for assessing project impacts from sediment remediation and for determining when the project is complete. If the performance standards are too restrictive, not only is there potential for technical infeasibility, but also the project schedule and budget will be significantly affected. However, if the performance standards are not protective enough, then unnecessary risk may be exerted on human health and the environment. Therefore, protection of human health and environmental needs should be balanced with technical feasibility, project schedule and budget when developing performance standards. Performance standards for Kinnickinnic River include the following items:

- Sediment Resuspension
- Dredging Residuals
- Dredging Production Rate

Review of contaminated sediment remediation projects nationwide and in Wisconsin (Shaw, 2006) combined with the specific conditions in the project area were used to develop the proposed performance standards discussed below.

2.1.1 Sediment Resuspension

Sediment resuspension occurs when sediment is removed from the river. The amount of material resuspended is dependant upon the physical characteristics of the sediment, how the sediment is removed, the rate at which the sediment is removed, and the hydraulic characteristics of the river. Best management practices (BMPs) should be implemented to limit resuspension. Some examples of BMPs to decrease resuspension in the project area during dredging could include: a dunk tank for the mechanical bucket to rinse sediment off prior to lowering back into water, using experienced environmental dredging operators, silt curtains, etc.

Water quality data collected by the Milwaukee Metropolitan Sewerage District (MMSD) for the Kinnickinnic River were used in conjunction with resuspension performance standards for the Fox River, as described in the *Final Basis of Design Report for the Lower Fox River and Green Bay Site* (Shaw, 2006), to develop a proposed dredging resuspension performance standard for the

Kinnickinnic River. Total suspended solids (TSS) and turbidity will be used as monitoring indicators for sediment resuspension during dredging. TSS and turbidity data (as well as other conventional parameters) are collected biweekly by the Milwaukee Metropolitan Sewerage District (MMSD) at three monitoring stations (RI-13, RI-14 and RI-18 – see Figure 2 for locations) in and near the project area. Historical data from these monitoring stations were used to evaluate the correlation between TSS and turbidity in and near the project area, since the correlation is site specific (USACE, 1987). The data collected at these monitoring stations are summarized in Table 1 and Figures 3 through 5.

Prior to dredging and construction operations, new performance monitoring stations will be installed upstream and downstream of the project area. The proposed locations for the performance monitoring stations (Stations 1 and 2) are shown in Figure 2. Data will be collected continuously at these locations on an hourly basis to assess background TSS and turbidity prior to and during dredging and construction operations in the project area. MMSD monitoring Station RI-14 is located within the project area at the First Street Bridge. The MMSD collects data continuously (at five minute intervals) at RI-14, which includes: river level (stage), dissolved oxygen, temperature, pH, specific conductance, and turbidity (starting in 2008). This station activates the Kinnickinnic River flushing tunnel (at Chase Avenue) when dissolved oxygen concentrations are less than 3 mg/L. During dredging and construction operations, MMSD monitoring stations RI13 and RI-18 will be operated as usual, operation of monitoring station RI-14 will be suspended and the Kinnickinnic River flushing tunnel (at Chase Avenue) will not be in operation.

During dredging and construction operations, the assessment of sediment resuspension will consider the effects of non-dredging/construction related activities, such as discharges from combined sewer outfalls (CSO), storm sewers, and sediment disturbed by propeller wash. This is described further in Section 3.2.

2.1.2 Dredging Residuals - PCBs

Inherent to dredging, residuals will be observed after dredging is completed. A general guideline for estimating environmental dredging residuals is that one-half to nine percent of the dredging production cut will deposit back into the dredged area (USEPA, 2005). Therefore, dredging residuals need to be addressed as part of the performance monitoring to identify when dredging is complete. A performance standard should address dredging residuals and limit the amount of re-dredging in the project area while still being protective of human health and the environment. As described in the *Summary of Data Sets and Data Quality Evaluation* (WDNR, 2007), the project area is an urban river

with non-point sources that have contributed to the impacts observed in the river sediment. For this project, PCBs will be used as a deterministic parameter to derive management actions, performance standards, and the proposed dredging configuration. More information regarding cleanup goals and allowable dredging residuals are provided in Section 3.2.3

2.1.3 Dredging Production

The dredging production rate considers the time for the project to be completed and the resources required to meet schedules established for the project. The primary uncontrollable factor that will likely affect dredging production rates are when the project area is frozen over. Therefore, dredging operations will be constrained to the open water season, starting approximately late March until early December. Based on this information and WDNR guidance, the required dredging production rate is based on one dredging season (approximately 8-months). This is roughly equivalent to the time when the average temperatures are above freezing and the project area free of ice, which may vary from year to year.

2.2 Project Area Background Information

2.2.1 Sediment

Significant sediment deposition occurs within the project area because it was historically dredged so that the river becomes wider, and deeper. In addition, there is a 90 degree bend in the river resulting in a decreased stream velocity compared to the upstream stretch of the Kinnickinnic River. The accumulation of sediment in the project area is well recorded in the historical nautical charts and sediment cores collected in Phase I of the project. Based on sediment sampling logs, sediment thickness ranges from approximately 10 to 24 feet, with the average particle size distribution being 48% silt, 27% clay, and 28% sand (Coleman, 2002; WDNR, 2007). Sediment upstream of the project area contains significantly more coarse-grained material, over 95% sand in surficial sediment samples (Barr, 2004 and WDNR, 2007).

Data from the 2002 sediment assessment are summarized elsewhere (Coleman, 2002; Alltech, 2003; Barr, 2004; and WDNR, 2007). PCB concentrations in sediment ranged from non-detect to 35.5 mg/kg and PAH concentrations ranged from non-detect to 243.5 mg/kg. Elevated PCB concentrations tended to correlate with elevated PAH concentrations. TCLP results indicated that dredged material from the project area is not considered hazardous waste according to the Federal Rules for Protection of the Environment (40 Code of Federal Regulations 261.24). Based on the above data and communications with the USACE, the sediment from the project area does not differ greatly from what is in the USACE confined disposal facility (CDF) at Jones Island. Placement of

sediment from the project area into the CDF will be allowed when the USACE's conditions are met for usage authorization.

2.2.2 Debris

Defined and undefined debris are located throughout the project area. The only defined debris in this phase of the project is a sunken tugboat located at the river bend area as indicated in Figure 6. Photographs of the sunken tugboat are located on the WDNR project website (http://dnr.wi.gov/org/water/wm/sms/kkriver/). The WDNR has conducted a review of the potential significance of the sunken boat (WDNR, 2008b) and has submitted a recommendation to the Wisconsin Historic Preservation Office of the Wisconsin Historical Society (WHS) that the boat be removed as part of the sediment remediation project. This recommendation is currently under review by WHS. If the recommendation is adopted, the boat will be removed prior to dredging the area adjacent to the boat. Removal of the boat using equipment located on either the shore or river is possible. If the boat is removed using equipment from the shore, permission will be required from the property owners to stage equipment and debris in that area. In addition, shoreline and MMSD structures should be protected during removal of the tugboat, so no damage occurs. Access agreements between the contractor and property owners, with assistance from the WDNR, will need to be made prior to on-shore work and/or staging activities.

Additional undefined debris is likely located within the project area, such as wood, trash, boulders, etc. and may not be easily removed by the mechanical dredging bucket. Therefore, a rake or grapple may be necessary to remove debris from the river so dredging can be completed in a timely manner.

2.2.3 Bathymetry

The bathymetry of the current channel (2005-2006 soundings) is superimposed over the 1940s channel as shown in Figure 6. The 2005-2006 soundings are a combination of the top of sediment data collected adjacent to seawalls by Bloom Consultants in August 2005 and soundings collected from the river channel by the USACE in 2006. The 1940 and 2005-2006 bathymetric data in Figure 6 shows that a significant volume of sediment has deposited in the project area since maintenance dredging was discontinued.

2.2.4 Hydraulics

The Kinnickinnic River generally flows from the Becher Street Bridge to the Kinnickinnic Avenue Bridge. The flow direction of the river reverses frequently due to seiche effect in Lake Michigan or boat traffic in the harbor. The hydraulic data available for the project area was from a bridge scour

analysis of the Becher Street Bridge (Ayres, 1997a) and the First Street Bridge (Ayres, 1997b). The information included in the bridge scour report included the estimated 100 year flood event flow of 7,000 cfs. Stream flow data between 1982 and 2006 was available from the United States Geological Survey (USGS) gauging station (04087159) located near the MMSD gauging station RI-13, upstream of the project area. During the 1982 to 2006 time period the average flow at the USGS gauging station was 25 cfs, ranging from 2 cfs to 1,630 cfs. Flow from storm sewer outfalls (SSOs) and combined sewer outfalls (CSOs) were not considered in the evaluation of hydraulic conditions of the project area. In the event that the SSOs and/or CSOs discharge into the project area, additional flow would be present. However, since the construction of the "deep tunnel" and "First Street Siphon" to manage storm water runoff, the frequency of discharge from CSOs into the river has been reduced significantly.

The primary use of this data was to determine whether barges would remain moored to shore and if silt curtains would be effective at controlling resuspension in the project area. Based on the flow data, range of hydrographic cross-sectional areas in the project area, and discussions with the local property owners and dredging companies in the area, the hydraulics of the river in the project area would generally not limit the use of barges or silt curtains. If a large storm event occurred, barges and silt curtains (if necessary) may need to be temporarily removed from the project area until flows dissipate.

2.2.5 Utilities

The approximate location of known roads, bridges, submerged pipelines and cables, shoreline discharge or intake pipes, overhead cables, pilings, docks, mooring posts, sunken boat, property parcels, buildings, seawalls, and other utilities are shown on Figure 6. These locations were based on information gathered during a site background information search, which included: 1) contacting the Wisconsin utility one-call center (Diggers Hotline) for a planning utility locate, which provided utility maps from utility owners in the project area; and 2) reviewing detailed plans from the City of Milwaukee, MMSD, and the Wisconsin Department of Transportation for the major MMSD utilities and bridges in the project area. These locations were not field located. Therefore, **prior to dredging activities, the dredging contractor shall confirm the exact location of utilities.**

Several utilities cross beneath the sediment surface in the river, the approximate elevations of these utilities were included in some drawings provided by the utility owners. Based on this information, the following utilities are below the base of the proposed channel design: 1) MMSD siphons that cross beneath the river near the First Street Bridge; and 2) the telephone conduit between the

Canadian Pacific Railway (CPR) Bridge and Kinnickinnic Avenue Bridge. It should also be noted that on some utility drawings, utilities were noted as “to be abandoned”, but no additional documentation was provided to confirm how or if these utilities were abandoned. Therefore, the dredging contractor should be aware that abandoned utilities may exist in the project area and may be encountered during dredging activities.

Prior to dredging and construction activities in the project area, a field utility investigation and locate will be completed by others as part of the supplemental design phase of the project (Phase IV) to identify utilities that may need to be relocated.

2.2.5.1 MMSD Requirements

In addition to the summary above, the Milwaukee Metropolitan Sewerage District (MMSD) has the following requirements for work that is completed on or near MMSD facilities. These requirements have been considered as part of the proposed channel design included in this report. These requirements will also be considered for the supplemental design, shoreline stabilization work, and other construction activities in the project area completed by others. The MMSD requirements are summarized below, and include:

- A minimum of three feet of sediment shall remain on top of the MMSD facilities (Included as part of the proposed channel design);
- Plans showing the work that will be completed in the vicinity of MMSD facilities (Included as part of the proposed channel design);
- Information on the equipment and methodology being utilized for dredging and if any loads would be placed on MMSD facilities (Equipment and methodology are included as part of the proposed channel design. No loads will be placed on top of MMSD facilities within the river channel during dredging.);
- If seawalls are constructed/repaired, MMSD would require plans and specifications and identify/mitigate potential impacts to MMSD facilities (Seawall construction/repair is part of the supplemental design and is not part of the proposed channel design. WDNR is in communication with MMSD for the supplemental design work.);
- MMSD will require access be maintained for its facilities during construction. Access requirements need to insure that MMSD can get necessary equipment to facilities for both

operation and maintenance and in case of repair/replacement (Included as part of the proposed channel design);

- Calculations for any loads that may be placed on MMSD facilities, both during construction and as a result of anything constructed (No loads will be placed on top of MMSD facilities as part of the proposed channel design);

- MMSD review and approval of plans and specifications prior to construction (MMSD has reviewed and commented on the Draft – Final Design Report submitted November 2007 – MMSD comments are incorporated into this Final Design Report);

- MMSD will need to be notified of structural issues or problems encountered at any points of MMSD infrastructure in the project area; and

- CSO outfalls are located in the project area **and can be active** during heavy precipitation. MMSD has a list of contacts that are notified via e-mail when a CSO event is occurring, this list includes WDNR personnel – additional personnel can be added to the list as needed.

2.2.6 Fish

Based on an evaluation by the WDNR, only tolerant fish species are located in the project area. Therefore, no significant fish populations of sport fish or spawning areas are located in the project area.

2.3 Construction/Operation Limitations

Variables that may impact dredging operations may include, but are not limited to:

- Severe weather and flooding
- Traffic in the project area
- Performance criteria
- Debris
- Bridge crossings
- Bridge abutment stability

- Utilities

A variance to the Milwaukee City Ordinance may be required for construction operations between the hours of 9:00 PM and 7:00 AM. A procedure for variance application is detailed in Chapter 80, Subchapter 2 of the Milwaukee City Ordinance.

2.4 Real Estate Requirements

2.4.1 Project Area

Dredging activities will be confined primarily to within the river portion of the project area. However, silt curtains (if necessary) or barges may need to be moored to shore during dredging activities. Permission should be obtained from the property owners prior to mooring to shore. If dredging, staging of debris, or removal of the sunken tugboat were to occur from shore, permission would be required from the property owner. As a result of preliminary discussions, individual members of the Kinnickinnic River Business Improvement District Number 35 (BID#35), may offer either office space or a portion of the parking lot area at Parcels 427 and 428 (Appendix A) for staging and removal of the sunken boat throughout the project duration. However, an access agreement between the Contractor and the BID #35 members (with assistance from WDNR) is needed prior to beginning any of the activities described above.

2.4.2 Jones Island CDF

Dredged material from the Kinnickinnic River Project Area will be transported by barge to the Jones Island CDF for disposal. The location of the Jones Island CDF is shown on Figure 8. The dredging contractor is responsible for the transport, offloading, and placement of the material. The plans and specifications for off-loading at the Jones Island CDF are included in Appendix A. A summary of logistics for off-loading at the Jones Island CDF is included as Appendix B. The CDF is operated by the USACE's Lake Michigan Area Office located in Kewaunee, Wisconsin. The WDNR and USEPA GLNPO will secure use of the local CDF for disposal of dredged material. The conditions for use of the CDF for staging and disposal of dredged material will be documented in the agreement between the USACE and the WDNR and USEPA GLNPO before dredging begins. Currently, a final design for the Kinnickinnic River sediment disposal cell within the Jones Island CDF is being prepared by the USACE. Material within the Jones Island CDF will need to be relocated by either the dredging company or by a separate firm to make room for the Kinnickinnic River sediment (this will be defined prior to dredging). The Kinnickinnic River sediment disposal cell will need to be completed by others before dredging activities can begin within the project area. This may be further modified prior to dredging, if necessary.

3.0 Dredging Design

This section describes the basis for the sediment remediation dredging design and summarizes the design approach and considerations for the remediation alternative selected from the CDDR (Barr, 2004) by the KK Team. The selected alternative included mechanical dredging and transportation of dredged material by barge to the Jones Island CDF. Currently, approval for use of the CDF for disposal of the Kinnickinnic River dredged materials has not been finalized. For the purpose of this report, it is assumed that dredged materials from the project area will be disposed of at the Jones Island CDF. The WDNR and USEPA GLNPO will secure use of the local CDF for disposal of dredged material. The conditions for use of the CDF for staging and disposal of dredged material will be documented in the agreement between the WDNR, USEPA GLNPO, and USACE, before dredging begins.

The stability of unprotected shoreline, seawalls, and bridge abutments were evaluated (Barr, 2004 and 2008) for the alternative selected from the CDDR (Phase II). Results from the evaluation indicated that the majority of the shoreline in the project area would not provide an acceptable factor of safety (potential instability of shoreline). Therefore, shoreline stabilization design is currently under way as part of the supplemental design phase of the project (Phase IV). Because shoreline stabilization design was not completed prior to this phase of the project (Phase III), the dredging plans and specifications included in this report were completed without consideration of the current shoreline stability. The proposed dredging configuration described in this report assumes that the shoreline stabilization design, completed as part of the supplemental design (Phase IV), will account for the proposed dredging configuration depths and that additional shoreline stabilization will be completed prior to dredging.

The proposed dredging configuration described in this report has been modified slightly from what was selected by the KK Team during an earlier phase of the project (Phase II). The proposed dredging configuration considers additional design information that was provided after completing Phase II of the project in 2004. This information includes the detailed 1940 sounding map and bridge record drawings. The dredging configuration modifications were necessary to reduce the potential for over-dredging and to ensure that dredging did not occur beneath the base of existing bridge abutments in the project area. Supporting information that summarizes the process for making these channel modifications are described elsewhere (Coleman, 2002; Barr, 2004 and 2008; and WDNR 2007, 2008a and 2008b).

The USEPA GLNPO contractor that is completing the supplemental design (Phase IV) will use the proposed dredging configuration documented here and provide modifications (if necessary) to this design based on results from the supplemental design. Once the supplemental design is completed, the USEPA GLNPO contractor will prepare final bid documents for obtaining contractor bids.

3.1 Basis of Design for Dredging

The project area channel was created in the early 1900s and was maintained by large scale dredging operations until sometime between 1936 and 1944 when the boundaries of the federal navigation channel were established downstream of Kinnickinnic Avenue (Barr, 2004 and WDNR 2007). Since large scale dredging operations have been discontinued, a significant quantity of sediment has accumulated in the project area as shown in Figure 6. The deepest channel in the project area was observed in 1936 as shown on historical nautical charts. The historical nautical charts do not provide detailed sounding information in the project area, so a detailed sounding map from 1940 was used to aid in the proposed dredging configuration because it was the most detailed record available in close temporal proximity to the 1936 nautical chart. The 1936 channel also roughly coincides with the start of commercial manufacturing of PCBs in 1929 and is before the widespread use of PCBs from the early 1960s through the early 1970s (WDNR, 2007). Therefore, the likely start of PCB accumulation in the project area was sometime after 1936, when the deepest channel was observed and use of PCBs in the watershed was prevalent.

3.1.1 Estimated Historical Sedimentation Rate

The historical sedimentation rate was estimated using radionuclide dating and the change in sediment thickness using historical nautical charts for the project area. Both methods resulted in similar estimated sedimentation rates and provided further justification for the proposed dredging configuration described in this report. A summary of the two methods and results obtained from each method are summarized below.

Radionuclide dating of sediment cores (Li *et al,*1995 and Christensen *et al,* 1997*)* indicates that sediment deposition within the project area occurs at an average rate of 2 to 10 cm/year. Coarser-grained sediment has accumulated upstream as compared to the finer-grained sediment (soft sediment) that has accumulated in the project area. Soft sediment thicknesses in the project area were approximately 10 to 24 feet thick in 2002, based on sediment core logs (Coleman, 2002). Assuming that routine large scale dredging stopped sometime between 1936 and 1944 and that all soft sediment observed in 2002 had been deposited since 1944, the average deposition rate would be

approximately 5 to 13 cm/year, which is similar to the average deposition rate determined by radionuclide dating.

One of the primary design components used to modify the proposed dredging configuration during this final design phase was the 1940 detailed sounding map, which is four years after the deepest recorded channel in the project area (1936). The sediment thickness that may have accumulated in the project area from 1936 to 1940 was calculated using available consecutive nautical charts (1936 and 1944). The approximate sedimentation rate observed in the project area during this time period was 7 to 12 cm/yr (0.23 to 0.39 ft/yr), which is similar to the average deposition rate for the project area (2 to 13 cm/yr). Therefore, the estimated sediment thickness that accumulated in the project area between 1936 and 1940 was approximately 28 to 48 cm (0.9 to 1.6 ft). Using this information and the average sedimentation rate for the project area, the majority of soft sediments observed were deposited sometime after 1936 and 1944 when the last large scale dredging of the channel was completed and PCBs were not widely used (WDNR, 2007).

3.1.2 Dredging Configuration

The proposed dredging configuration is based on the project goals described in Section 1, analytical data collected during the 2002 sediment assessment, investigation of local site background, potential historical and present contamination sources, historical changes of river morphology (river depth), bridge record drawings, historical land uses, historical records of sales and usage of PCBs, the urbanization trend in the Kinnickinnic River watershed, public input and acceptance, engineering feasibility and constructability (Altech, 2003; Barr, 2004; WDNR 2007; WDNR 2008a).

The primary parameter used for the proposed dredging configuration was the distribution of PCB concentrations, vertically and horizontally. Coupling the sediment analytical data with the site information discussed previously, it is reasonable to assume that if sediment deposited since the last large scaled dredging event were removed, the majority of impacted sediment in the project area would also be removed. For design purposes, the best available starting point for developing the proposed dredging configuration was the distribution of contaminants in sediment and the detailed 1940 sounding map (Figure 7). Additional design parameters were then incorporated, such as a minimum navigation depth of 10-feet below low water datum (Barr, 2004), maintaining an appropriate sediment depth next to bridge abutments, and channel constructability. This resulted in the proposed dredging configuration shown in Figure 7 and Drawings C-02 and C-03 of Appendix A.

The proposed dredging configuration is 11 feet below the low water datum next to shore (566.5 ft IGLD85), with an 80-ft wide center channel dredged to a depth of 20 feet below the low water datum (557.5 ft IGLD85) for most of the project area. East of the First Street Bridge, the channel transitions to a depth of 17 feet below the low water datum (560.5 ft IGLD 85) to maintain a sufficient sediment depth next to the base of the CPR Railroad Bridge abutments and Kinnickinnic Avenue Bridge abutments. This dredge elevation also accounts for the one foot of over-dredge allowed beneath the dredge neat line. The exception to this is located at the CPR Railroad Bridge center pivot pier, where significant undermining of this abutment was noted during an underwater bridge inspection (Brennan, 2003). Reinforcement of this bridge abutment is not part of this design (Phase III) or the supplemental design (Phase IV) and will be the responsibility of the bridge owner.

As discussed in Section 3.0, the existing shoreline should not be assumed stable using the proposed dredging configuration. Shoreline conditions have changed since 1940 and new bridges have been constructed in the project area since then (Becher Street Bridge, First Street Bridge, and Kinnickinnic Avenue Bridge). Additional shoreline stabilization design and shoreline stabilization will be completed by others as part of the supplemental design prior to dredging.

The estimated volume of in-place sediment to be removed is approximately 170,000 CY, which includes one foot of allowable over-dredge beneath the dredge neat line. The total in-place volume was calculated in CAD using the land development desktop (LDD) software package by subtracting the design channel top of sediment surface (plus one foot beneath the design channel) from the 2005-2006 top of sediment surface (Drawings C-02 and C-03 of Appendix A). The estimated in-place volume of sediment to be dredged is equivalent to that estimated in the CDDR (Barr, 2004).

If sediment is removed according the proposed dredging configuration, some impacted sediment may still remain in the project area. To address these potential dredging residuals, confirmation sampling and additional dredging and/or a residual cover layer have been proposed as part of the sediment management performance standards described in Section 3.2.

3.2 Proposed Performance Standards

3.2.1 Total Suspended Solids (TSS)

Total suspended solids (TSS) are the water quality performance standard for this project. Two monitoring stations will be established immediately upstream (south) of the Becher Street Bridge (Station 1) and approximately 1,000 feet downstream (east) of the Kinnickinnic Avenue Bridge (Station 2) as shown in Figure 2. Turbidity and TSS measurements from MMSD monitoring

locations are used as reference concentrations for this design report as previously described in Section 2.1.1. If turbidity readings from the performance monitoring location downstream of the project area (Station 2) indicate an increase of 80 mg/L in TSS above the upstream monitoring location (Station 1) as a result of dredging activities, BMPs would be modified to reduce resuspension. If the elevated turbidity was from activities not associated with dredging, then dredging would continue. The process for assessing the effectiveness of BMPs during dredging is summarized in Figure 9.

3.2.2 Dredging Production Rates

The estimated in-place volume of sediment to be removed from the project area using the proposed dredge neat line is 150,000 cubic yards (CY) and the estimated maximum volume (including one foot of allowable over-dredge beneath the dredge neat line) that may be removed from the project area is approximately 170,000 CY. The estimated average daily production rates required to remove 170,000 CY of sediment from the project area is summarized in Table 2 and ranges from 800 CY/d to 1,300 CY/d. These average daily production rates assume a 3-minute cycle time at 80 percent dredging efficiency using a 4 CY or 8 CY dredging bucket and five to six dredging days per week, with a dredging season of six to eight months. This corresponds to daily dredging operations of seven to twenty hours per day, which is dependant upon the size of the dredge bucket and the length of the dredging season. The range of average daily production rates is on the high end of rates typically observed for one environmental mechanical dredging barge. Therefore, in order to complete the dredging of the project area in one dredging season, multiple mechanical dredges operating at the same time may be necessary. Maneuvering multiple dredges within the project area and amongst material barges will require coordination with the dredging contractor and will require general boat traffic restrictions within the project area.

Dredging production rates can be affected by many things, which include: size of dredge bucket, weather, debris in the river, river hydraulics, equipment failure, performance standards, river traffic, etc. One of the primary factors that can negatively affect the production rate is unknown debris in the river. Therefore a rake or grapple will be available during dredging to remove large debris that can not be removed by the mechanical dredge bucket. In addition, sediment located beneath bridges or areas with exposed sediment may require an articulated arm dredge to remove sediment from these areas since the height beneath the bridges would be limited and the exposed sediment may be more compacted and difficult to dredge than the submerged sediment.

The size of the dredge bucket also plays a significant role in production rates and project costs. The larger the dredge bucket the greater the average daily production rate and the lower the dredging cost, but also the greater potential for exceeding the resuspension performance criteria. With the converse being the case for a smaller dredge bucket. The size of dredge bucket will be specified by the dredging contractor. The dredging contractor will be responsible for meeting the specified performance standards summarized in Section 3.2.

3.2.3 Post Remediation PCB Residuals

The cleanup goals for the project area are 1 mg/kg average total PCBs in surficial sediment and a maximum surficial sediment concentration of 2 mg/kg total PCBs from an individual sample (WDNR, 2007). Here, surficial sediment refers to the top 6-inches of sediment in the project area after dredging is completed and the average concentration refers to the average concentration of total PCBs from sediment samples within a defined portion of the project area (Sections 1 through 3, Drawing C-01 of Appendix A). Post remediation sampling will occur within 6-months after the proposed dredging configuration has been completed. The cleanup goals were selected based on consideration of ecological impact by PCBs in conjunction with local background concentrations and engineering feasibility (WDNR, 2007). The project area cleanup goals are comparable to local background PCB concentrations (WDNR, 2007).

A sediment remediation tree (Figure 10) was developed for defining when dredging was complete in the project area and provides a sediment management framework for areas that may exceed project cleanup goals, while avoiding ineffective and expensive "do-loop" dredging (dredging that never stops because project cleanup goals are never met because of dredging residuals). Proposed PCB performance standards were developed using the project cleanup goals and the inherent variability observed from sample heterogeneity and laboratory analyses in field duplicate and replicate samples from the 2002 sediment sampling event (Altech, 2003). The relative errors ranged from 6% to 133% with an average of 50% for total PCBs (WDNR, 2007). Using the average relative error of 50% and adding that to the cleanup goal (1 mg/kg total PCBs + 50% x 1 mg/kg total PCBs = 1.5 mg/kg total PCBs) a surficial sediment performance standard of 1.5 mg/kg total PCBs is proposed. Using that same logic and applying the upper range of the relative error observed (100% relative error) to the maximum allowable concentration cleanup goal for an individual sample, a maximum allowable concentration of 4 mg/kg total PCBs (2 mg/kg total PCBs + 100% x 2 mg/kg total PCBs = 4 mg/kg total PCBs) is proposed. Other sediment management approaches have been considered for this project. The performance standards proposed by the WDNR for this project apply the relative errors observed in field duplicate and replicate samples.

The sediment remediation decision tree shown in Figure 10 is proposed for evaluating and managing sediment remediation within the project area. The decision tree utilizes the proposed performance standards described above and considers site specific characteristics of the project area. After the proposed dredging configuration is completed, confirmation samples will be collected from surficial sediment within the immediate vicinity of the 2002 sediment coring locations shown on Figure 7, using the coordinates listed in Section 01460 of Appendix A (it should be noted that post-dredging sample locations may be further modified during Phase IV of the project). Total PCB concentrations will be compared to the proposed PCB performance standards of 1.5 mg/kg average for a defined area, with a 4 mg/kg maximum concentration allowed. If all samples are less than 1.5 mg/kg total PCBs, dredging is complete and no further action is required. If the performance standards are not met, then the following evaluation process will be used to guide sediment remediation management decisions for the project area.

- Has native material been reached in the area that exceeds the proposed performance standards? If native material has been encountered, no further dredging is required, install a residual cover layer in that area. If native material has not been encountered go to the next evaluation step;

- Is the dredged elevation below the proposed dredging configuration and the 1940 channel in the area that exceeds the proposed performance standards? If the dredged elevation is below both the proposed dredging configuration and the 1940 channel, no further dredging is required, install a residual cover layer in that area. If not, go to the next evaluation step;

- Is the dredged elevation above the 1940 channel in the area that exceeds the proposed performance standards? If, so redredge the area to the 1940 channel elevation and install a residual cover layer.

The horizontal extent for redredging (if necessary) will be defined after the post remediation sediment samples have been analyzed. The actual redredging area will be defined using: 1) the distribution of contaminants horizontally and vertically prior to dredging; 2) post-dredging channel bathymetry; and 3) post-dredging analytical results from sediment samples adjacent to the sample that indicates redredging is necessary. Once this evaluation process has been completed and appropriate actions implemented, sediment remediation will be considered complete. The basis for

this sediment management framework has been discussed earlier and elsewhere (Barr, 2004, WDNR 2007).

3.3 Dredging Approach

3.3.1 Sequence of Dredging

As discussed earlier, the proposed dredging configuration is shown in Figure 7 and drawings of C-02 and C-03 of Appendix A. To achieve this proposed dredging configuration and meet the performance standards, given the site specific conditions, dredging needs to be conducted in a planned sequence. A phased dredging approach is recommended as follows:

- **Phase 1** will include dredging to the final design elevation from the project downstream end (east side of the Kinnickinnic Avenue Bridge) to the abandoned railroad bridge abutments.

- **Phase 2** will include dredging to a depth sufficient to allow passage of fully loaded barges, but not deeper than 566.5 feet IGLD85 to avoid exposing sediment with high PCB concentrations. The channel dredged during this phase will conform to the final channel design shown in Figure 7 and drawings C-02 and C-03 of Appendix A. Dredging for this phase will be from the downstream end (east side of the Kinnickinnic Avenue Bridge) to the upstream end of the project area (north side of the Becher Street Bridge) for the entire width of the channel in each zone prior to commencement of dredging in the upstream zone. The sunken tug boat will be removed prior to dredging the area adjacent to it.

- **Phase 3** will include dredging to the design dredge elevations shown in Figure 7 and drawings C-02 and C-03 of Appendix A. Dredging will occur from the upstream end (north side of the Becher Street Bridge) to the downstream end (east side of the Kinnickinnic Avenue Bridge) of the project area, completing the dredge to the entire width of the channel in each zone prior to commencement of dredging in the downstream zone.

- **Phase 4** will include dredging residuals from the area dredged in Phase 1 (if sediment has accumulated in this area) to the design elevations shown in Figure 7 and drawings C-02 and C-03 of Appendix A.

- **Phase 5**, if necessary, will include dredging impacted sediment to a maximum elevation of the 1940 channel or to native sediment (whichever is shallower) in discrete areas, which will be based on the results of confirmation sediment sampling (this will be completed at a later

date determined by KK Team). If the design dredging elevation is deeper than the 1940 channel, no further dredging is required.

- **Phase 6**, if necessary, will include placement of a residuals cover over the Phase 5 area that does not meet acceptable residual total PCB concentrations in surficial sediment (this will be completed at a later date determined by the KK Team).

In addition, the phased dredging approach has the following conditions:

- The dredging configuration shown in this report was established assuming that shoreline protection measures will be designed as part of supplemental design by others and installed prior to dredging.

- The specifications for a residual cover (if needed) will be completed by others as part of the supplemental design.

- The stability of docks and dock piers were not considered as part of the dredging design. If unstable, replacement of the docks and dock piers would be the responsibility of the owner. Shoreline protection measures have to be in place before dredging starts at the vicinity area.

- Special management and disposal of dredged material for an isolated area west of the First Street Bridge is necessary and is discussed in Section 6.0.

3.3.2 Dredging Logistics

The logistics of dredging the project area were considered for the dredging design. As stated previously, sediment will be dredged mechanically and loaded onto a barge for disposal at the Jones Island CDF. Local dredging contractors were contacted to get the typical dimensions of barges located near the project area that could be used for dredged material transport to the Jones Island CDF, the dimensions are summarized below.

Standard Barge Dimensions in Milwaukee Harbor:

- 50 to 54 ft wide by 160 to 180 ft long

- Unloaded barge draft - 2 ft

- Fully loaded barge draft - 9 ft

- Estimated dredged material capacity – 600 to 800 CY

Based on the standard barge dimensions summarized above, barges would be able to navigate within the project area when unloaded, but would require additional dredging for fully loaded barges to navigate through the project area. The conceptual plan for dredging would be to have multiple dredge barges (barge with dredge) kept stationary within dredging area and a material barge loaded with dredged material by the dredge barge and possibly another working barge with a rake/grapple to remove debris prior to dredging. Up to three material barges could be staged within dredging area at a time. Silt curtains (if necessary) will need to be moved when the material barge is moved to the CDF for off-loading and for recreational traffic at times agreed to by the contractor and local marinas. In addition, sediment located beneath bridges or areas with exposed sediment may require an articulated arm dredge to remove sediment from these areas since the height beneath the bridges would be limited and the exposed sediment may be more compacted and difficult to dredge than the submerged sediment.

3.3.2.1 Project Area Navigation

Barges will need to be moored to shore or anchored in the river channel during dredging operations. This may affect river traffic or areas that use docks/piers in the project area. Navigation within the project area will be restricted to dredging related navigation only for the majority of the working day, with a half-hour window in the morning and afternoon where boat traffic can navigate through the silt curtain (if necessary) at the north end of the Kinnickinnic Avenue Bridge. The navigational restrictions will need to be agreed upon by the KK Team and dredging contractor before dredging begins.

Navigation under the Kinnickinnic Avenue Bridge and First Street Bridge is suitable for the barge dimensions described above; both of these bridges are lift bridges. The CPR Railroad Bridge between Kinnickinnic Avenue Bridge and First Street Bridge is a swing bridge, which will also allow dredging equipment into and out of the project area. The drawbridge operation regulations (33CFR117.1093) summarize the signaling instructions and hours of operation for the drawbridges in the project area and the federal navigation channel (Appendix C). The Becher Street Bridge is a fixed bridge with inadequate width and limited vertical height for the working barges described above to fit beneath. Therefore, dredging will not be completed beneath the Becher Street Bridge. The area downstream of the project area to the Jones Island CDF is located primarily within the federal navigation channel.

3.3.2.2 High Water and Storm Events

Based on local dredging contractor's knowledge of the flow conditions in the Kinnickinnic River during storm events, high water conditions and using the available hydraulic data, barges should be able to remain within the project area during storm events and high water, with the barges being tied to shore. The flow rates for the project area are summarized in Section 2.2.4. If a flood is anticipated (riverbanks overtopped) the barges would need to be moved out of the project area.

3.3.2.3 Environmental and Human Health Evaluation

The WDNR and USEPA GLNPO will evaluate pre- and post-remediation conditions to assess environmental and human health conditions within the project area. The dredging contractor will be responsible for preparing project health and safety plans, sampling plans, and air monitoring plans. Based on the low volatility of PCBs and PAHs and the industrial/commercial nature of the project area, air monitoring will be limited to worker exposure only for VOCs and noise (WDNR 2008a). Air monitoring stations will be on dredge barges and material transport barges when off-loading at the Jones Island CDF if necessary. If air monitoring data does not exceed regulatory standards for two consecutive weeks, then the air monitoring may be discontinued after approval by the WDNR and USEPA GLNPO.

4.0 Resuspension Control

Performance standards developed for sediment resuspension will in part determine the type of resuspension control system(s) that may be needed during dredging operations. The performance standard for resuspension is described in Section 3.2.1. This section summarizes the basis of design for potential resuspension control options for the project area.

4.1 Basis of Design for Suspended Sediment Control

Resuspension control options were evaluated by considering the following design elements:

- Is the resuspension control system able to meet the performance standards for resuspension?
- Is the average velocity in the project area slow enough to support the use of the resuspension control system?
- Is the river shallow enough for the resuspension control system to work effectively?
- What affect will the resuspension control system have on traffic in the dredging area and production rate?
- Is the river bed suitable for anchoring the resuspension control system?
- What logistics are necessary for operation of the resuspension control system?

Three general resuspension control options were considered for the project area and include: 1) BMPs only; 2) air bubble curtains; and 3) silt curtains. These options are evaluated in the following sections.

4.1.1 BMPs

Best management practices (BMPs) should be implemented to minimize resuspension during dredging operations. Recommended resuspension control BMPs include, but are not limited to:

- Barges shall be water-tight and inspected to confirm water-tightness prior to dredging operations and dredged material transport;
- Uncovered storage or transport barges will not be allowed;

- Dredge all sediment from within the dredge prism without excavating beyond the over-dredge limit;
- Work on slopes proceeding from top of slope to toe of slope;
- Utilize underwater cameras or positioning devices (e.g. GPS) on the dredge bucket to make the operator aware of the location of the dredge bucket in relation to the top of sediment to limit resuspension;
- Using an environmental bucket to limit resuspension caused by the dredge bucket going through the water column (vents) or dredged material falling out of the dredge bucket (gaskets);
- Using an experienced environmental dredging operator that is capable of implementing BMPs to limit resuspension;
- Minimizing the overfill of dredge bucket;
- Reducing the rate of bucket descent and retrieval;
- Perform single bites with the bucket; each bucket shall be brought to the surface and emptied between bites;
- Using a wash bucket to rinse dredged material from the dredge prior to lowering into the water;
- No “sweeping” of the bottom to contour channel;
- No bottom stockpiling;
- Slow release of excess water at surface;
- Do not over-fill barges with dredged material;
- Oil booms should be available for emergency use; and
- Separating dredged material from barge return water.

The effectiveness of BMPs varies based on the characteristics of the project area and the skills of the dredging operator. The effectiveness of the BMPs can not be fully validated until implemented in the field and confirmed during performance monitoring. While these BMPs may or may not be capable of meeting all the performance criteria, they should be considered for reducing the resuspension rate in the project area. The degrees to which BMPs are implemented at the site are dependant upon the final performance standards.

4.1.2 Air Bubble Curtain

An air bubble curtain was considered as a resuspension control system for the project area. The air bubble curtain would consist of an air compressor and a header pipe with air holes, anchored at the base of the river. The advantage of using an air bubble curtain over silt curtains, is that river traffic can pass through the project area with little disturbance to dredging operations. Whereas silt curtains would require river traffic to navigate around the silt curtains or that silt curtains would have to be moved to allow river traffic to navigate through the project area. Very little information was available for the use of air bubble curtains as a resuspension control system in environmental dredging. The only environmental dredging project found that mentioned the use of an air bubble curtain was at the Alcoa Site in Massena, New York. No information was given on the effectiveness of the air bubble curtain at controlling resuspended sediment.

Air bubble curtains are typically used to: deter fish near pile driving projects (reduces the strength of pressure waves), disperse and contain floating spills on water, add dissolved oxygen to water, and for reducing sediment deposition in ocean harbors at docking slips (creates turbulence that keeps sediments in suspension). The air bubble curtains that have been used in the past for other project types were generally located in shallow and relatively low velocity water (e.g. bays, harbors, etc.). The air bubble curtain may be useful as a component of the resuspension control system for the project area, but will not be considered as one of the resuspension control system options since the effectiveness of the air bubble curtain has not been proven for environmental dredging. However, if other resuspension control systems prove ineffective at meeting the resuspension performance standard or if other resuspension control systems require significant resources to maintain and do not meet the dredging production rate performance standard, the air bubble curtain may be considered.

4.1.3 Silt Curtain

Silt curtains are common resuspension control systems used in navigation and environmental dredging projects. They are used to reduce the quantity of suspended solids that could potentially migrate outside of the project area during dredging operations. Silt curtains are typically defined as a

device for control of suspended solids and turbidity in the water column generated by dredging and dredged material disposal operations. Recently, the term “silt curtain” has been used to describe floating vertical barriers fabricated from either solid or permeable materials.

The USACE Dredging Operations and Environmental Research program discusses the *Use of Silt Curtains as a Dredging Project Management Practice* (USACE, 2005). Another device similar to the silt curtain is the silt screen, which consists of a permeable fabric in place of the impermeable material used in a silt screen. The silt screen allows some water to pass through the screen, thereby reducing some of the pressure created by flowing water that is more pronounced with silt curtains. Below is a summary of the general design criteria for silt curtain use (USACE, 2005).

General Design Criteria for Silt Curtains (USACE, 2005):

- The curtains should not be deployed in a manner that promotes scour of the bed;
- Flows greater than 1 to 1.5 knots (1.7 to 2.5 ft/sec) and/or depths greater than 10 to 15 feet are problematic and generally require special silt curtain design;
- Silt curtains are typically deployed to a vertical depth of one to two feet above the top of sediment to allow mudflow to pass beneath and reduce pressures created by river flow;
- Extra width (10 to 15 percent) of silt curtain should be included in design to account for flow;
- The number of joints in a silt curtain should be minimized, typically less than 50 foot span between joints; and

To evaluate potential changes of river flow velocity, the downstream edge of the project area near the Kinnickinnic Avenue Bridge was selected because this section is the narrowest in the project area and therefore the most conservative estimate of river flow velocities. The existing top of sediment (2005-2006 soundings) near the Kinnickinnic Avenue Bridge is approximately 8 feet below the IGLD85 low water datum spanning across a river width of approximately 90 feet, giving a pre-dredging cross-sectional area of 720 ft^2 (Note: the actual cross-section will vary depending on the river flow, water level, and cross-sectional area at the time). Using the flow data summarized in Section 2.2.4 and the approximate existing cross-sectional area at the downstream portion of the project area, the average river velocity in this area would be 0.03 ft/sec, with velocities ranging from 0.003 ft/sec to 2.3 ft/sec assuming the cross section area is constant. Based on the proposed design

channel shown in Figure 7 and Appendix A, water depths in this area would go as deep as 20 feet below the IGLD85 low water datum spanning across a river width of approximately 90 feet, giving a post-dredging cross-sectional area of 1,800 ft^2. This would correlate to a post-dredging average river velocity of 0.01 ft/sec, with velocities ranging from 0.001 ft/sec to 0.9 ft/sec assuming the cross section area is constant. Velocities upstream of this area will be lower.

Silt curtains (if necessary) will either need to be anchored or moored to shore. The river sediment in the project area is predominantly silt and may result in sediment resuspension when the silt curtains are anchored or when the silt curtains are moved. If the silt curtains were anchored to shore, permission to anchor to shore will be needed from the property owners.

The use of silt curtains may be required for resuspension control. More detailed information regarding silt curtain operation and maintenance is included in Appendix B.

The primary drawback to using silt curtains as a resuspension control device in the project area is that it will affect river traffic through the project area. Because the silt curtains physically block a portion of the river for navigation, traffic will need to be routed around the silt curtains or the silt curtains moved to allow river traffic through the project area, depending upon the silt curtain configuration. Silt curtains may significantly affect dredging production rates if they need to be moved frequently to allow river traffic through the project area. Therefore, if silt curtains are necessary to meet performance standards, traffic through the project area will be restricted to a 30-minute window in the morning and afternoon.

5.0 Dredged Material Transport

Barge transport of dredged material to the Jones Island CDF was evaluated in the CDDR (Barr, 2004) and determined to be the most cost effective method for transporting material to the Jones Island CDF. The location of the Jones Island CDF and soundings within the federal navigation channel are shown on Figure 8. The drawbridge operation regulations (33CFR117.1093) summarize the signaling instructions and hours of operation for the drawbridges in the project area and the federal navigation channel (Appendix C). The material barges will be moored at the Jones Island CDF for off-loading and disposal. The proposed location of the off-loading area is shown in Drawing C-01 of Appendix A. The USACE and US Coast Guard need to be notified by the dredging contractor prior to beginning dredging activities. The US Coast Guard will issue a Notice to Mariners (Appendix D) that alerts the river traffic of the navigation constraints in the project area due to dredging activities.

6.0 Staging and Disposal of Dredged Material

The WDNR and USEPA GLNPO will secure use of the local CDF for disposal of dredged material and the USACE will provide the operational and maintenance requirements for use of the CDF. Permission to use the CDF for staging and disposal of dredged material needs to be finalized accordingly. It is proposed that a special cell will be constructed for the Kinnickinnic River dredged material by moving the sediment existing in the Jones Island CDF. The cell construction will be completed prior to dredging by either the USACE or a contractor under the Great Lakes Legacy Act. Currently, a final design for the Kinnickinnic River dredged material disposal cell within the Jones Island CDF is being prepared by the USACE. The final CDF design and management of the sediment at the CDF are subject to change pending the final design completed by the USACE.

The dredged material from the Kinnickinnic River would be off-loaded by a mechanical bucket into off-road dump trucks and transported to locations within the CDF, as recommended by the USACE. For final placement, bull-dozers would be used to spread dredged material within the Kinnickinnic cell. Hydraulic off-loading of dredged material from the material barges would not be allowed since there is insufficient room within the Jones Island CDF for the volume of water required for hydraulic off-loading. The operation and maintenance requirements for off-loading at the Jones Island CDF are included in Appendix B.

Results from the 2002 sediment investigation showed that sediment in the area close to sampling location KK0209 contains the highest PCB concentrations in the project area. Dredged sediment from this area, particularly sediment dredged from approximately 558-566 feet IGLD85, will be managed in such a way that it will be placed at the deeper layer of the Kinnickinnic River sediment disposal cell located within the Jones Island CDF and covered by relatively cleaner dredged materials from the project area. The approximate area that will require special management and disposal at the Jones Island CDF is shown in Drawing C-02 of Appendix A. Prior to dredging the project area; the USACE will provide additional disposal and placement requirements and final plans for the Kinnickinnic River disposal cell.

7.0 Construction Schedule and Specifications

7.1 Construction Schedule

The draft construction schedule is summarized in Figure 11. The schedule estimates the milestone dates necessary for dredging activities to occur by the beginning of the dredging season and considers the constraints described previously by the KK Team. The actual construction schedule is subject to change based on the actual project start date and other project variables.

7.2 Construction Plans and Specifications

Draft construction plans and specifications are included in Appendix A.

8.0 Construction Cost Estimate

The cost estimate for the Kinnickinnic River Environmental Improvement Project is summarized on Table 3 and includes the following assumptions:

- The US Army Corps of Engineers or a construction contractor will design and build a barge offloading facility at the Jones Island CDF.
- Wastewater treatment and permitting for the Jones Island CDF will be coordinated by WDNR, Port of Milwaukee, and USACE GLNPO.
- Seawall repair/installation costs will be estimated by contractors hired by USEPA GLNPO and property owners based on their investigations and design.
- Additional utility investigations and utility relocation costs will be estimated by USEPA GLNPO contractors, based on their investigations and design.
- The quantity of debris in the project area is unknown; it is assumed that the cost to remove debris will be 10% of the overall dredging costs.
- CDF disposal costs were provided by the USACE as $11.94/cyd and rounded to $12.00/cyd.
- Other sources for the dredging cost estimate included, local dredging contractors (Kadinger and Luedtke), R.S. Means, and contractor bids for other recent environmental dredging projects in the great lakes region.

9.0 Activities Completed by Others

This section summarizes activities that are pertinent to the sediment dredging design that will be completed by others. It is not intended to be all inclusive, but to summarize other activities pertinent to the dredging design that will need to be completed.

- **Permitting –** This task will be completed by the WDNR for dredging activities includes the following permits: WDNR Chapter 30 Permit, Federal Section 401 Clean Water Act, USACE Section 10 River and Harbor Act Dredging Permit, and Shoreline Protection Permit. Other permits required for the supplemental design or by contractor are not included here.

- **CDF Authorization –** This task will be completed by the WDNR, USEPA GLNPO, and USACE.

- **Shoreline Stabilization Design –** This task will likely be completed by USEPA GLNPO contractors and/or the Kinnickinnic River Business Improvement District #35 and will be incorporated by others into the final specifications. Table 4 summarizes the approximate shoreline lengths by parcel, adjacent to the proposed dredging configuration.

- **Residual Cover Layer –** This task will be completed by USEPA GLNPO contractors (if necessary) and will be incorporated by others into the final specifications.

- **Final Bid Package –** This task will be completed by the USEPA GLNPO or USEPA GLNPO contractor.

- **Shoreline Stabilization –** This work will be completed by USEPA GLNPO contractors and/or the Kinnickinnic River Business Improvement District #35 prior to dredging.

- **Utility Field Survey -** This work will be completed by USEPA GLNPO contractors prior to dredging of the project area.

- **Utility Relocation –** It is likely that some utilities may need to be relocated prior to dredging. This work will be completed by USEPA GLNPO contractors prior to dredging of the project area.

10.0 References

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Tables

Table 1
Summary of Total Suspended Solids and Turbidity Measurements
Milwaukee Metropolitan Sewerage District Monitoring Sites
Final Design
Kinnickinnic River
Milwaukee, Wisconsin

Parameter	**R13 (upstream)**	**R14 (project area)**	**R18 (downstream)**
Average TSS (mg/L)	19	35	14
Min – Max TSS (mg/L)	0.80 – 190	2.0 – 390	1.0 – 84
Standard Deviation TSS (mg/L)	34	47	13
No. Measurements	61	310	171
Average TSS + 80 (mg/L)	99	115	94
Average Turbidity (NTU)	16	28	12
Turbidity corresponding to an 80 mg/L increase over average TSS* (NTU)	87	116	84
Estimate of Δturbidity that corresponds to an 80 mg/L increase in TSS above average TSS concentrations (NTU)	71	88	72

* calculated from individual regressions of NTU vs. TSS at each monitoring location (http://waterbase.glwi.uwm.edu/mmsd/sites_table.html). Regressions at R13, R14, R18: r^2 = 0.96, 0.81, 0.70, respectively (see Figures 3-5).

Table 2
Average Daily Dredging Production Rates to Complete Dredging in One Season
Final Design
Kinnickinnic River Sediment Remediation
Milwaukee, Wisconsin

			Dredging Production Rate to Complete Dredging in One Season				Average Dredging Hours Per Day & Dredge Size			
		Months	Dredging Days per Week	Total Dredging Days	Volume (CY)	Average Daily Dredging Production Rate (CY/d)	4 CY Bucket (CY/hr)[1]	4 CY Bucket (hrs/day)	8 CY Bucket (CY/hr)[1]	8 CY Bucket (hrs/day)
1-May	31-Oct	6	5 days/wk	130	170,000	**1,308**	64	20	128	10
1-May	31-Oct	6	6 days/wk	156	170,000	**1,090**	64	17	128	9
1-Apr	30-Nov	8	5 days/wk	170	170,000	**1,000**	64	16	128	8
1-Apr	30-Nov	8	6 days/wk	204	170,000	**833**	64	13	128	7

1 Assumes 3 minute cycle time and 80% dredging efficiency

Table 3
Construction Cost Estimate - Final Design
Mechanical Dredging and Disposal of Sediment at Jones Island CDF
Kinnickinnic River
Milwaukee, Wisconsin

Item	Unit	Estimated Unit Cost	Estimated Quantity	Present Worth
Capital Costs				
Mobilization/Demobilization	LS	$100,000	1	$100,000
Sunken Boat Removal	LS	$100,000	1	$100,000
Seawall Repair/Installation-SSP	LF	*	*	*
Seawall Repair/Installation-Baseline	LF	*	*	*
Utility Investigation, Relocation, & Shoring	LS	*	*	*
Residual Cover Layer	CYD	*	*	*
Waste Water Treatment	LS	#	#	#
Sediment Resuspension Control	LS	$100,000	1	$100,000
Mechanical Dredging	CYD	$30	170,000	$5,100,000
Barge Transport to CDF	CYD	$8	170,000	$1,360,000
Jones Island CDF Disposal Costs	CYD	$12	170,000	$2,040,000
Mechanical Unloading of Barge at CDF	CYD	$5	170,000	$850,000
Placement and Grading of Sediment in CDF	CYD	$4	170,000	$680,000
Debris Removal	10% of Dredge Cost	$5,100,000	10%	$510,000
Decontamination	LS	$50,000	1	$50,000
Sub-total: Full Scale Capital Costs				**$10,890,000**
Engineering & Administration				
Construction Management/Oversight	7% of Capital			$762,300
Construction Quality Assurance & Monitoring	6% of Capital			$653,400
Permitting for River Dredging & Access Agreements	Completed by WDNR			-
Sub-total: Engineering & Administration				**$1,415,700**
TOTAL: Capital, Engineering & Administraton				**$12,305,700**
Operation & Maintenance				
None Anticipated				$0
TOTAL: Annual Costs (Net Present Value, I = 7%)				**$0**
SUBTOTAL:				**$12,305,700**
CONTINGENCY (5%) [1]				**$615,285**
TOTAL COST [2]				**$12,900,000**

NOTES:
1 Contingency represents the cost of items not estimated in detail.
2 Total cost was rounded to nearest hundred thousand dollars.
* To be completed by others as part of supplemental design.
# WDNR, Port of Milwaukee, USEPA GLNPO, and USACE to complete any permitting for wastewater from the CDF that may require treatment

Barr has no control over the cost of labor, materials, equipment, services furnished by others, the contractor(s)' methods of determining prices, or competitive bidding or market conditions. The engineer's opinions of probable total project costs and construction costs provided are made on the basis of our experience and qualifications. These opinions of total project and construction costs represent our best judgment as an experienced and qualified professional engineer, familiar with the construction industry. However, we cannot and do not guarantee that proposals, bids, or actual total project or construction costs will not vary from the opinions of probable cost prepared by Barr.

Table 4
Approximate Shoreline Lengths by Parcel Using Proposed Dredging Configuration
Final Design
Kinnickinnic River
Milwaukee, Wisconsin

Tax ID	Parcel	Approximate Shoreline Length (ft)
4661159100	424	53
4679990110	425	574
4679992220	426A	395
4679992230	426B	298
4679983100	427	227
4679981100	428	87
4679982100	429	376
4670005000	432	74
4670006100	433	575
4670008111	436	226
4670001100	437	156
4670101100	439	231
4670104110	440	151
4670103100	441	173
4661155000	443	81

Notes:

1. Approximate shoreline length is based on the length of shoreline at the edge of the proposed dredging configuration shown in Appendix A, Drawing C-02.
2. Parcel locations shown in Appendix A, Drawing C-02 are approximate (not legal descriptions).
3. Parcels 439, 440, 441, and 443 were not immediately adjacent to the shoreline of the proposed dredging configuration shown in Appendix A, Drawing C-02. The approximate shoreline length was estimated by projecting a line from the parcel toward the proposed shoreline.
4. Bridge abutment lengths are not shown here since no additional reinforcement is currently planned for bridge abutments.
5. Parcels 441and 443 include the timber pile fence in the approximate shoreline length.

Additional References:

County of Milwaukee Tax Parcel Maps
Kinnickinnic River Seawall Survey - Bloom Consultants (Aug, 2005)
Kinnickinnic River Dockline Survey - Land Information Services, Inc. (Dec. 2007 & Jan. 2008)

Figures

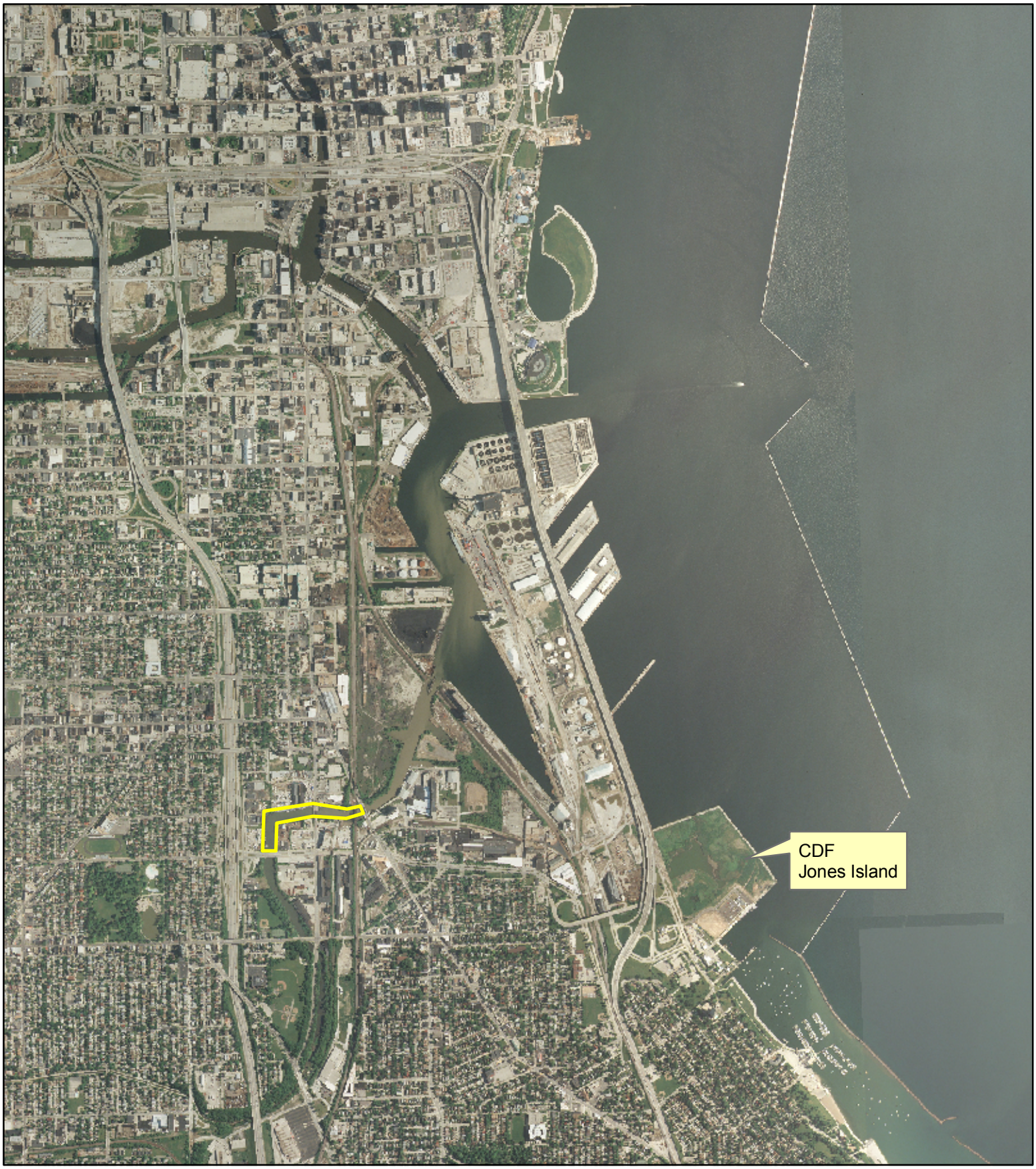


Figure 1

Legend

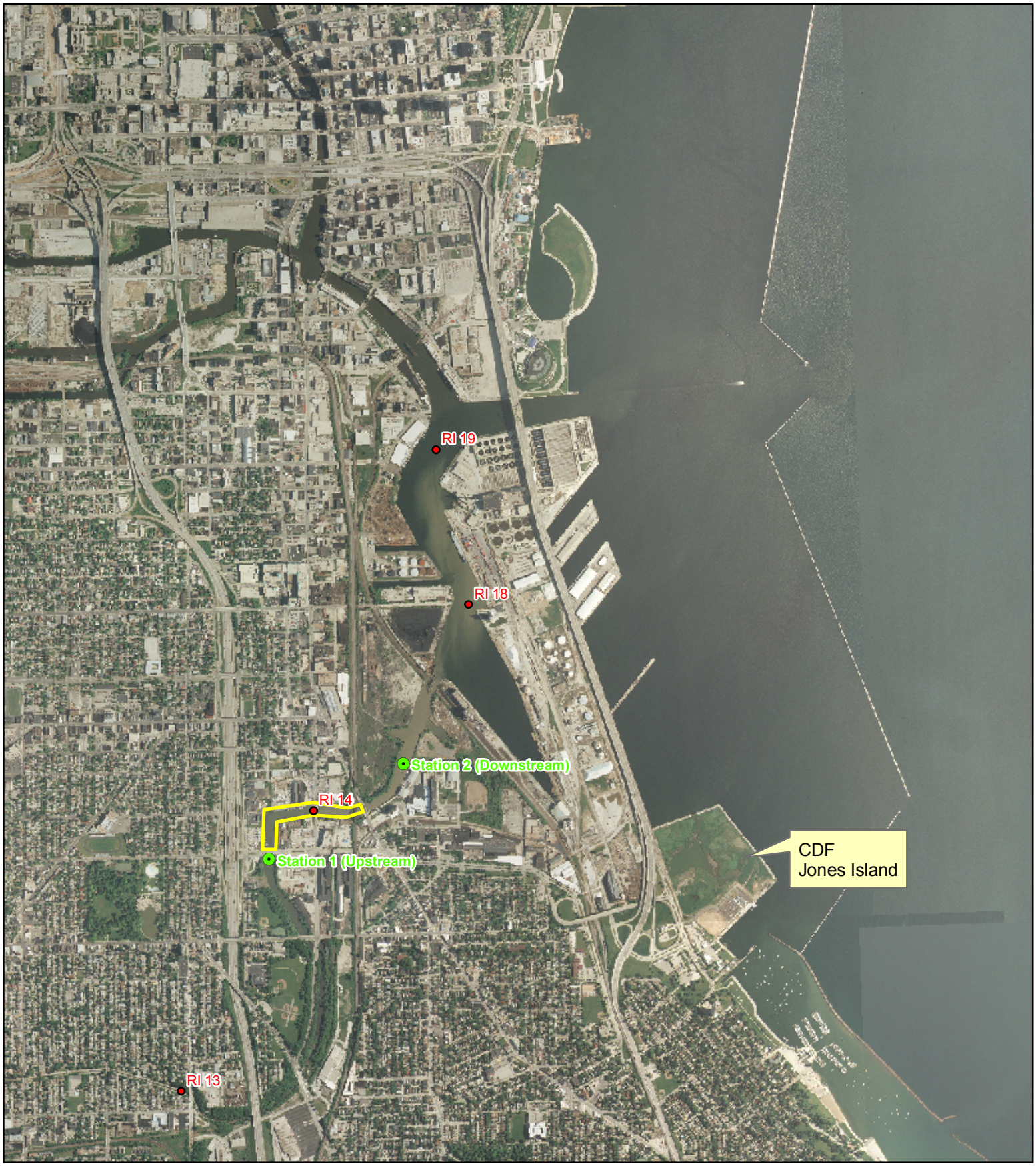
Project Area

N

2,000 1,000 0 2,000

Feet

SITE LOCATION
Kinnickinnic River
Sediment Remediation
Final Design
Milwaukee, WI



Legend

- Proposed Performance Monitoring Stations
- Existing MMSD Monitoring Stations
- Project Area

N

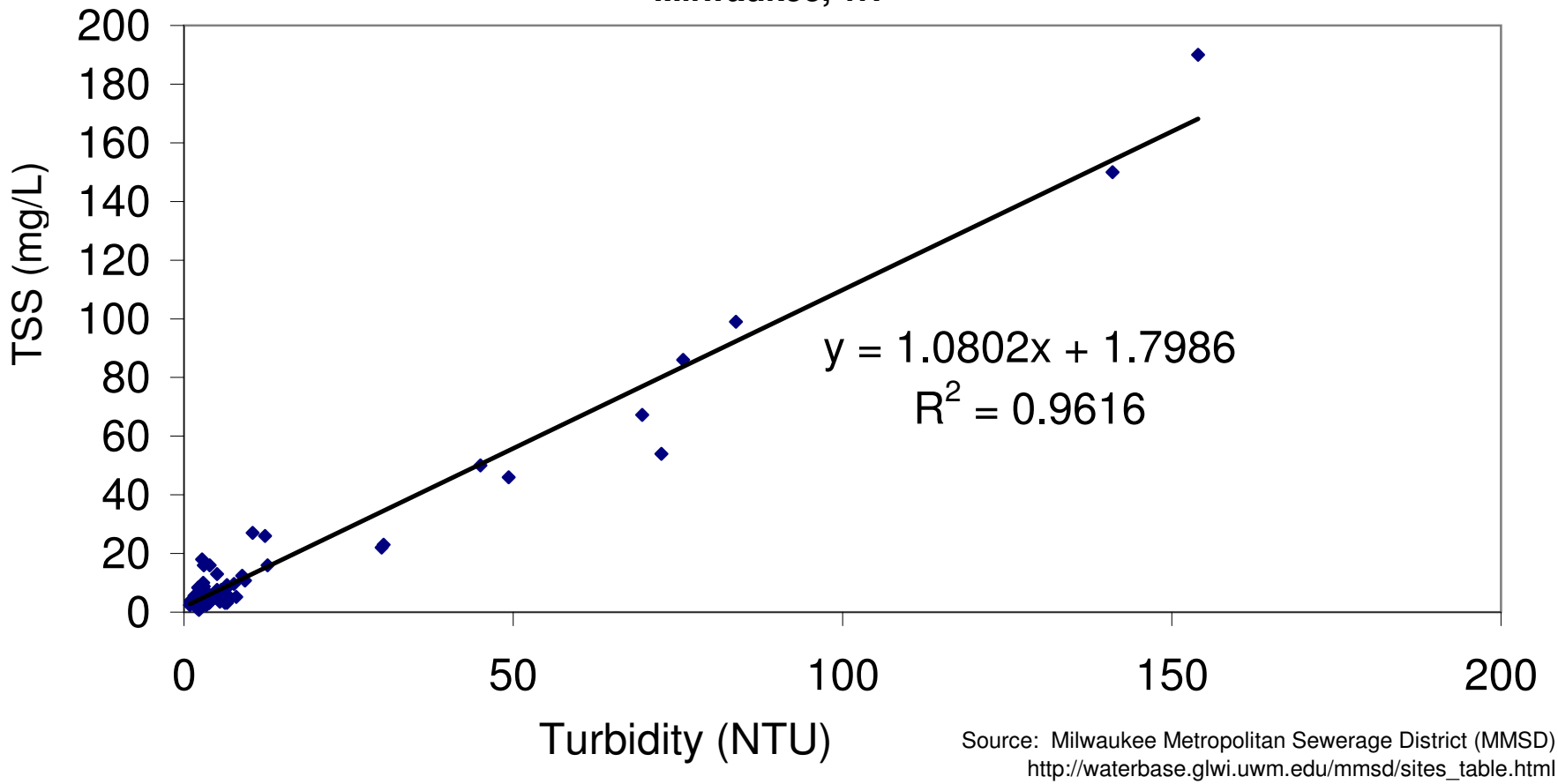
2,000 1,000 0 2,000

Feet

Figure 2

TURBIDITY MONITORING LOCATIONS
Kinnickinnic River
Sediment Remediation
Final Design
Milwaukee, WI

Figure 3
TSS vs. Turbidity, RI13
Kinnickinnic River Sediment Remediation
Final Design
Milwaukee, WI



Source: Milwaukee Metropolitan Sewerage District (MMSD)
http://waterbase.glwi.uwm.edu/mmsd/sites_table.html

period of record: 3/16/98 - 11/27/01

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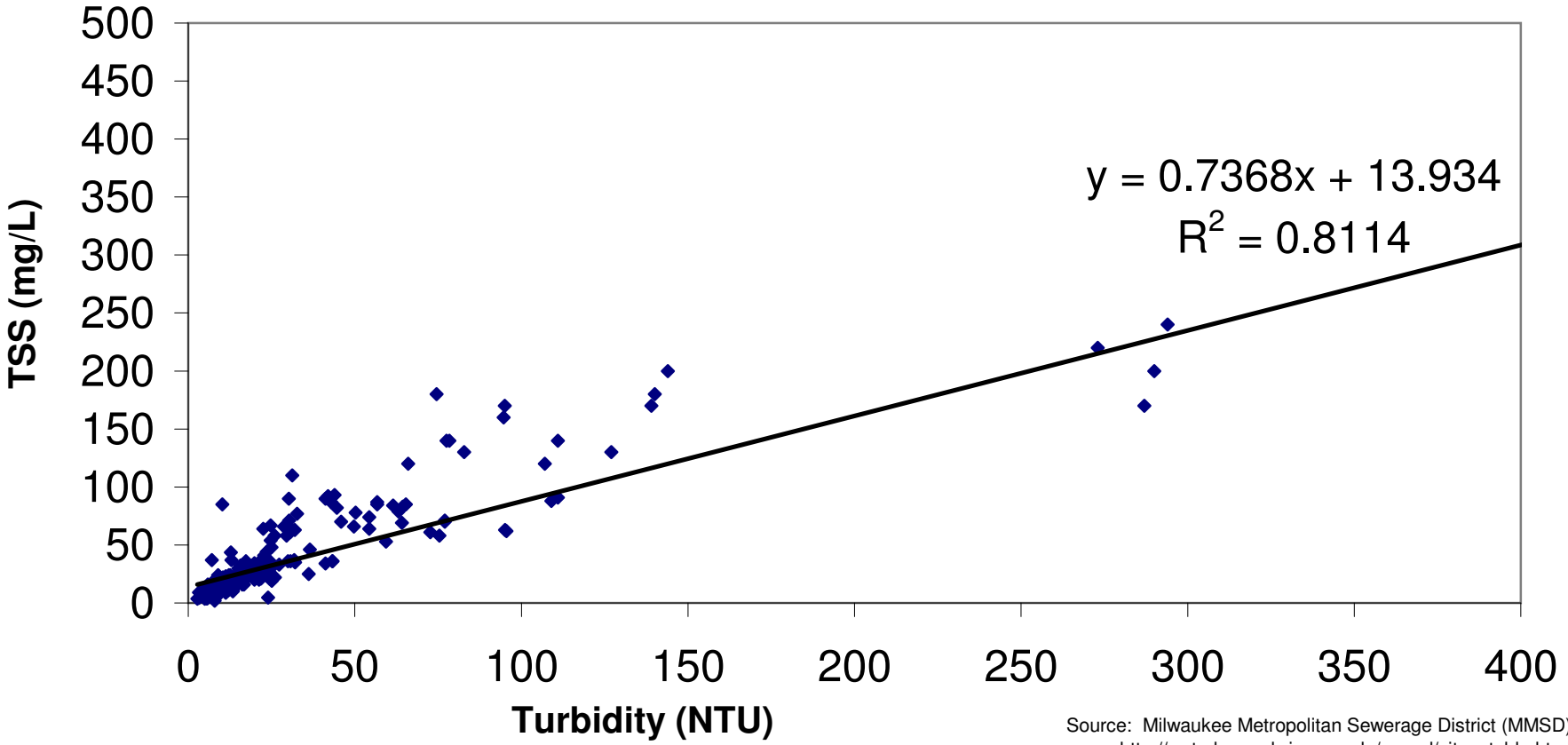
Figure 4
TSS vs. Turbidity, RI14
Kinnickinnic River Dredging
Final Design
Milwaukee, WI



Source: Milwaukee Metropolitan Sewerage District (MMSD)
http://waterbase.glwi.uwm.edu/mmsd/sites_table.html
period of record: 3/16/98 - 12/6/06

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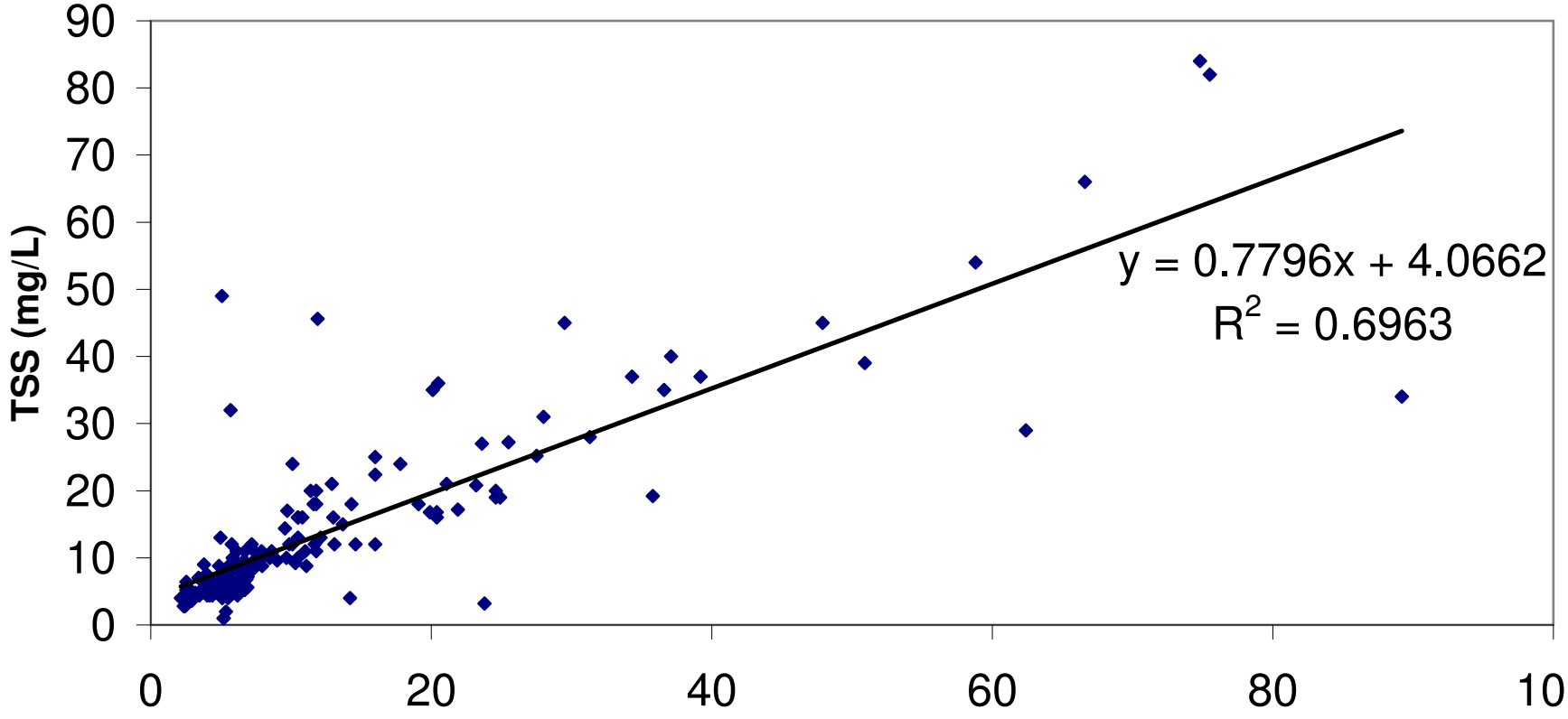
Figure 5
TSS vs. Turbidity, RI18
Kinnickinnic River Dredging
Final Design
Milwaukee, WI



Source: Milwaukee Metropolitan Sewerage District (MMSD)
http://waterbase.glwi.uwm.edu/mmsd/sites_table.html
period of record: 3/16/98 - 11/14/01

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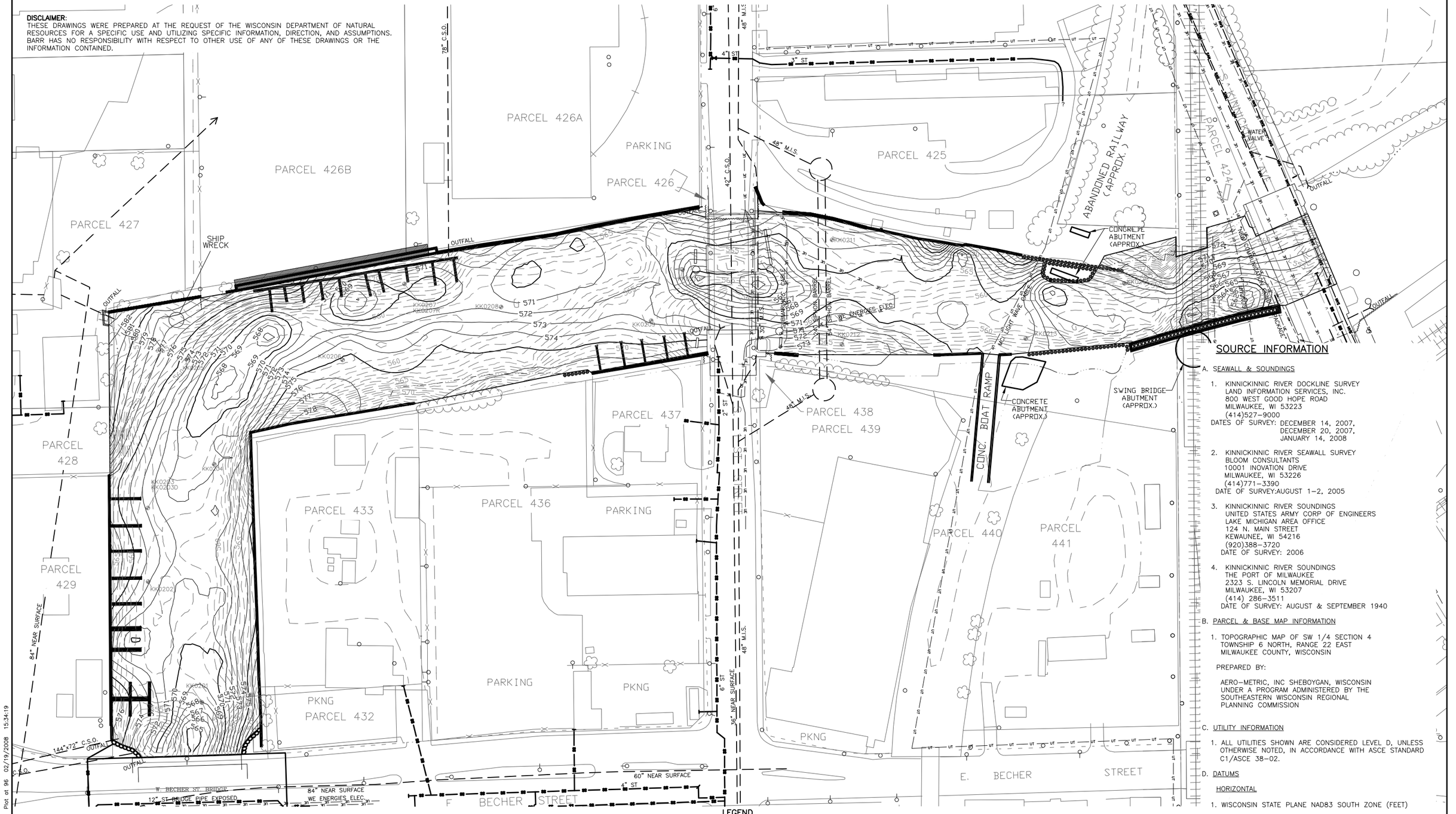

SOURCE INFORMATION

A. SEAWALL & SOUNDINGS

1. KINNICKINNIC RIVER DOCKLINE SURVEY
   LAND INFORMATION SERVICES, INC.
   800 WEST GOOD HOPE ROAD
   MILWAUKEE, WI 53223
   (414)527–9000
   DATES OF SURVEY: DECEMBER 14, 2007,
   DECEMBER 20, 2007,
   JANUARY 14, 2008

2. KINNICKINNIC RIVER SEAWALL SURVEY
   BLOOM CONSULTANTS
   10001 INOVATION DRIVE
   MILWAUKEE, WI 53226
   (414)771–3390
   DATE OF SURVEY:AUGUST 1–2, 2005

3. KINNICKINNIC RIVER SOUNDINGS
   UNITED STATES ARMY CORP OF ENGINEERS
   LAKE MICHIGAN AREA OFFICE
   124 N. MAIN STREET
   KEWAUNEE, WI 54216
   (920)388–3720
   DATE OF SURVEY: 2006

4. KINNICKINNIC RIVER SOUNDINGS
   THE PORT OF MILWAUKEE
   2323 S. LINCOLN MEMORIAL DRIVE
   MILWAUKEE, WI 53207
   (414) 286–3511
   DATE OF SURVEY: AUGUST & SEPTEMBER 1940

B. PARCEL & BASE MAP INFORMATION

1. TOPOGRAPHIC MAP OF SW 1/4 SECTION 4
   TOWNSHIP 6 NORTH, RANGE 22 EAST
   MILWAUKEE COUNTY, WISCONSIN

   PREPARED BY:

   AERO–METRIC, INC SHEBOYGAN, WISCONSIN
   UNDER A PROGRAM ADMINISTERED BY THE
   SOUTHEASTERN WISCONSIN REGIONAL
   PLANNING COMMISSION

C. UTILITY INFORMATION

1. ALL UTILITIES SHOWN ARE CONSIDERED LEVEL D, UNLESS OTHERWISE NOTED, IN ACCORDANCE WITH ASCE STANDARD C1/ASCE 38–02.

D. DATUMS

HORIZONTAL

1. WISCONSIN STATE PLANE NAD83 SOUTH ZONE (FEET)

VERTICAL

1. INTERNATIONAL GREAT LAKES DATUM 1985 (IGLD 85, FEET)
   ORDINARY HIGH WATER LEVEL (OHWL)= 581.5ft IGLD 85
   ORDINARY LOW WATER LEVEL (OLWL)= 577.5ft IGLD 85

LEGEND

- 2002 SEDIMENT CORING LOCATION
- 1940 CONTOUR MAJOR (FT, IGLD85)
- 1940 CONTOUR MINOR (FT, IGLD85)
- 2005–2006 BATHYMERY CONTOUR MAJOR (FT, IGLD85)
- 2005–2006 BATHYMETRY CONTOUR MINOR (FT, IGLD85)
- EXISTING COMBINED UTILITIES
- EXISTING WATER
- EXISTING GAS
- EXISTING STORM SEWER
- EXISTING UNDERGROUND ELECTRIC
- EXISTING UNDERGROUND TELEPHONE

0 60 120
SCALE IN FEET

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WISCONSIN.

SIGNATURE _____

PRINTED NAME _____

DATE _____ REG. NO. _____

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CLIENT							
BID							
CONSTRUCTION							
RELEASED TO/FOR	DATE RELEASED						

BARR
Corporate Headquarters:
Minneapolis, Minnesota
Ph: 1–800–632–2277

Project Office:
BARR ENGINEERING CO.
4700 WEST 77TH STREET
MINNEAPOLIS, MN.
55435–4803
Ph: 1–800–632–2277
Fax: (952) 832–2601
www.barr.com

Scale	AS SHOWN
Date	02/22/08
Drawn	JMM2
Checked	JLB2
Designed	JMM2/JLB2
Approved	JLB2

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
MADISON, WISCONSIN

KINNICKINNIC RIVER SEDIMENT REMEDIATION–FINAL DESIGN
MILWAUKEE, WI

FIGURE 6
UTILITIES & HISTORIC CHANNEL

BARR PROJECT No. 4941022
CLIENT PROJECT No.
DWG. No.
REV. No. 0

Xrefs in Drawing – M:\cad\4941023\Utility_Base.dwg
jmm2 M:\cad\4941022\27791_2.DWG Plot at 96 02/19/2008 15:34:19

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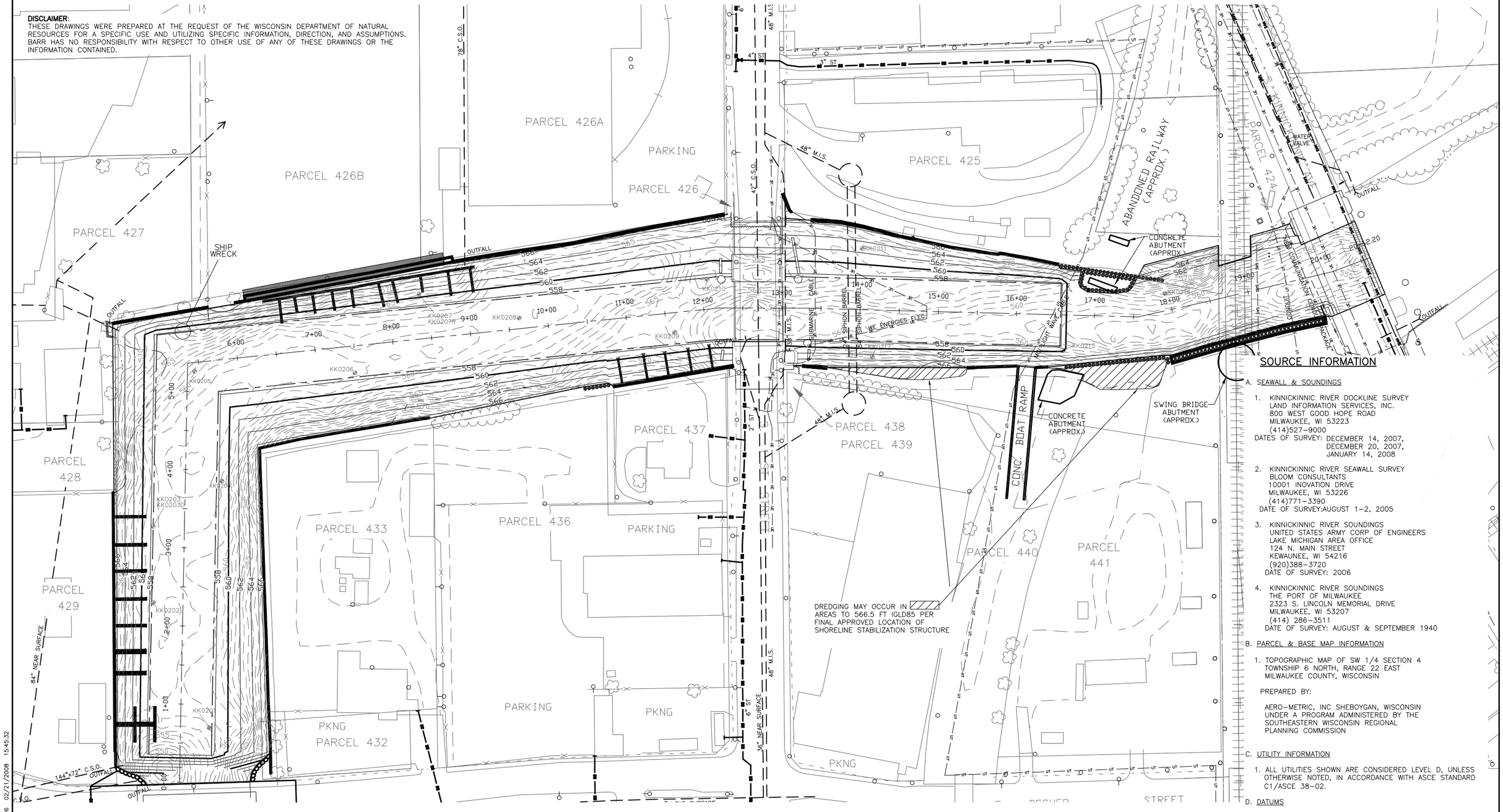

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   ORDINARY LOW WATER LEVEL (OLWL)= 577.5ft IGLD 85

LEGEND

- 2002 SEDIMENT CORING LOCATION
- 1940 CONTOUR MAJOR (FT, IGLD85) — 500
- 1940 CONTOUR MINOR (FT, IGLD85)
- 80 FT DESIGN CHANNEL LIMITS
- DESIGN CHANNEL CONTOUR MAJOR (FT, IGLD85) — 500
- DESIGN CHANNEL CONTOUR MINOR (FT, IGLD85)
- DESIGN CHANNEL CENTERLINE
- EXISTING COMBINED UTILITIES
- EXISTING WATER
- EXISTING GAS
- EXISTING STORM SEWER
- EXISTING UNDERGROUND ELECTRIC
- EXISTING UNDERGROUND TELEPHONE

0 60 120
SCALE IN FEET

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION

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Date	02/22/08
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Checked	JLB2
Designed	JMM2/JLB2
Approved	JLB2

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
MADISON, WISCONSIN

KINNICKINNIC RIVER SEDIMENT REMEDIATION–FINAL DESIGN
MILWAUKEE, WI

FIGURE 7
1940 & DESIGN CHANNEL

BARR PROJECT No. 4941022
CLIENT PROJECT No.
DWG. No.
REV. No. 0

Xrefs in Drawing – M:\cad\4941022\Utility_Base_2.dwg
jmm2 M:\cad\4941022\27791_2.DWG Plot at 96 02/21/2008 15:45:32

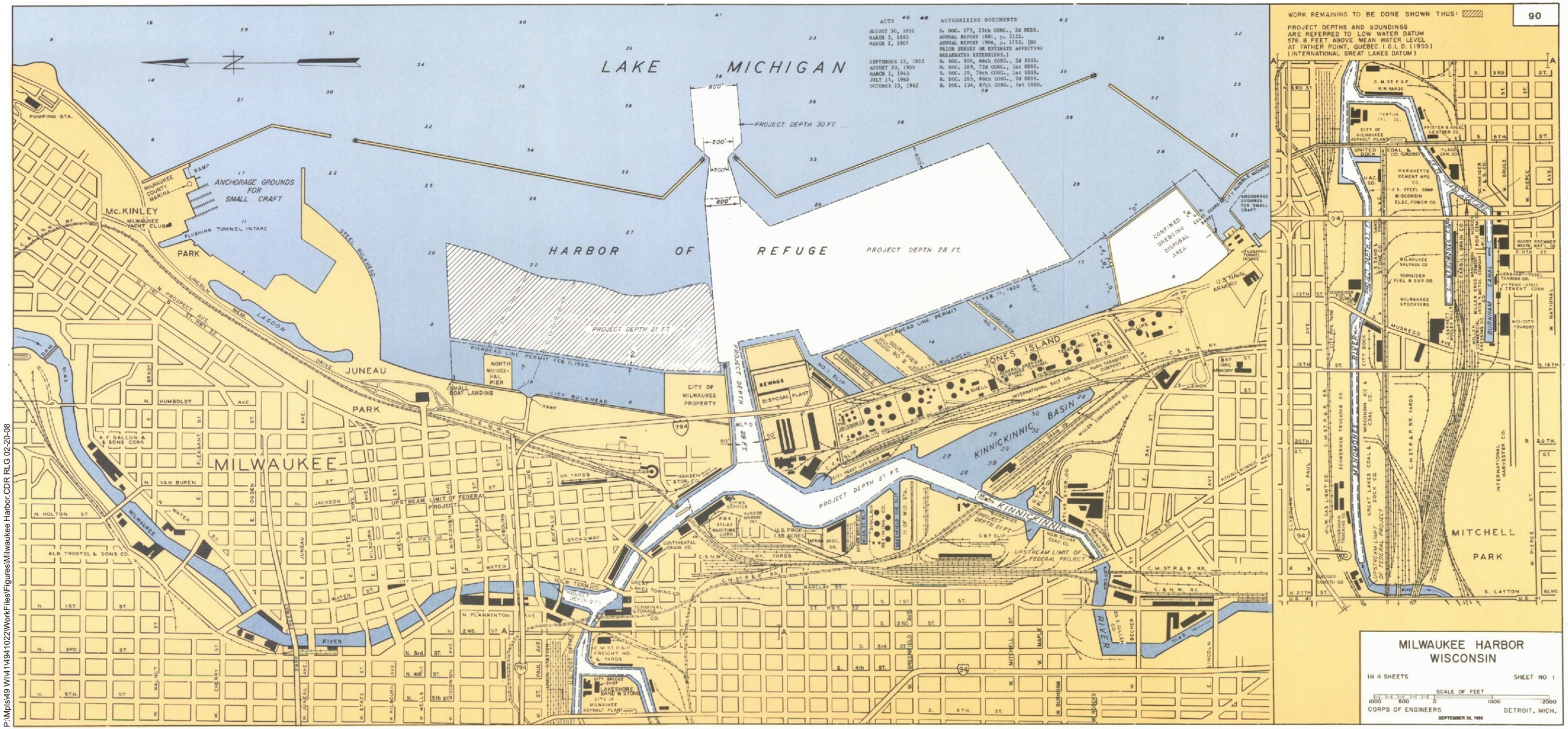

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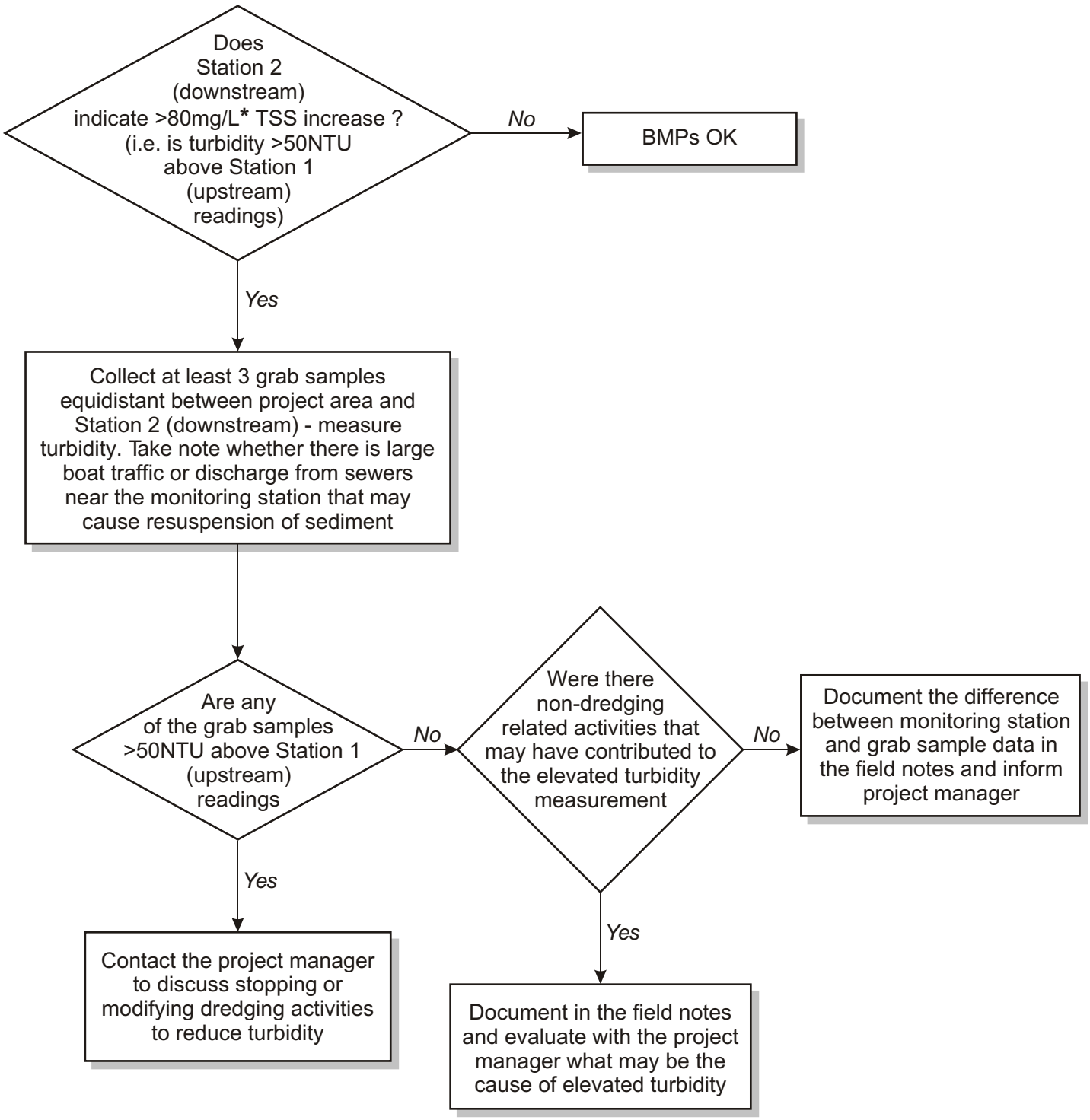
Figure 8

MILWAUKEE HARBOR
Kinnickinnic River Sediment Remediation
Final Design
Milwaukee, Wisconsin



* Final Basis of Design Report for the Lower Fox River and Green Bay Site (Shaw Environmental, 2006).

Figure 9

RESUSPENSION MONITORING
DECISION TREE
Kinnickinnic River Sediment Remediation
Final Design
Milwaukee, Wisconsin

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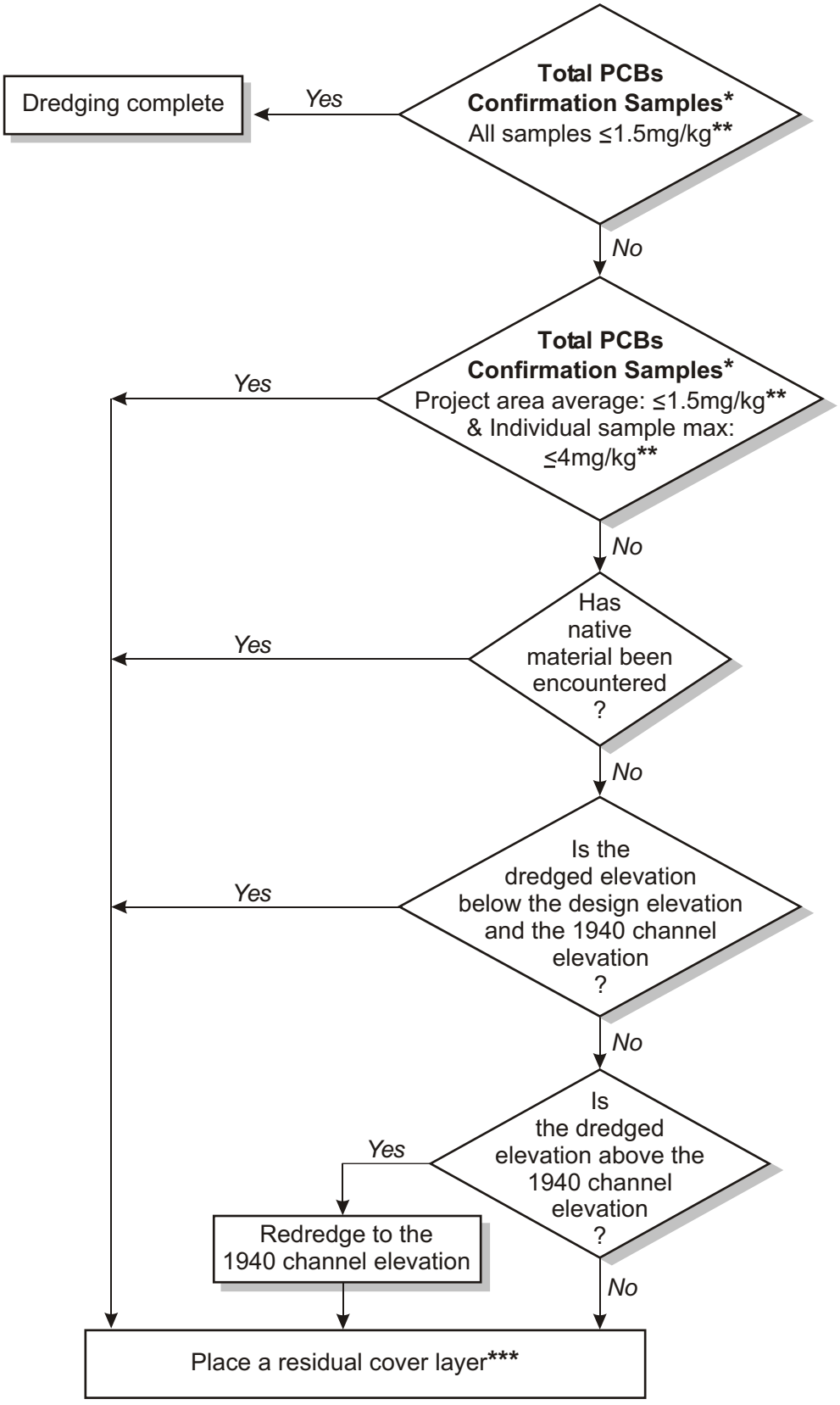


***** Decision tree is only applicable after proposed dredging configuration has been achieved. Confirmation samples will be collected from the top six inches at 2002 sediment sampling locations and analyzed for PCBs. Confirmation sample thickness and locations may be subject to change.

****** These values were proposed by WDNR and will be further evaluated during the supplemental design (Phase IV).

******* A residual cover layer will be deployed to cover potential dredging resdiuals and meet the project area average cleanup goal of 1 mg/kg total PCBs. The residual cover will be designed during the supplemental design (Phase IV).

Figure 10

SEDIMENT REMEDIATION DECISION TREE
TOTAL PCBs
Kinnickinnic River Sediment Remediation
Final Design
Milwaukee, Wisconsin

P:\Mpls\49 WI\41\49410222\WorkFiles\Figures\Sediment Remediation Decision Tree Final R1.CDR RLG 03-13-08

ID	Task Name
1	Completion of Shoreline Stabilization Design and Dredging Design
2	Bid Package Sent to Contractors
3	Receive Contractor Bids
4	Selection of Contractor and Contract Negotiations
5	Contractor Preparation of Required Plans
6	Contractor Mobilization and Site Preparation
7	Shoreline Stabilization and Dredging (may require multiple seasons)
8	Permitting by WDNR

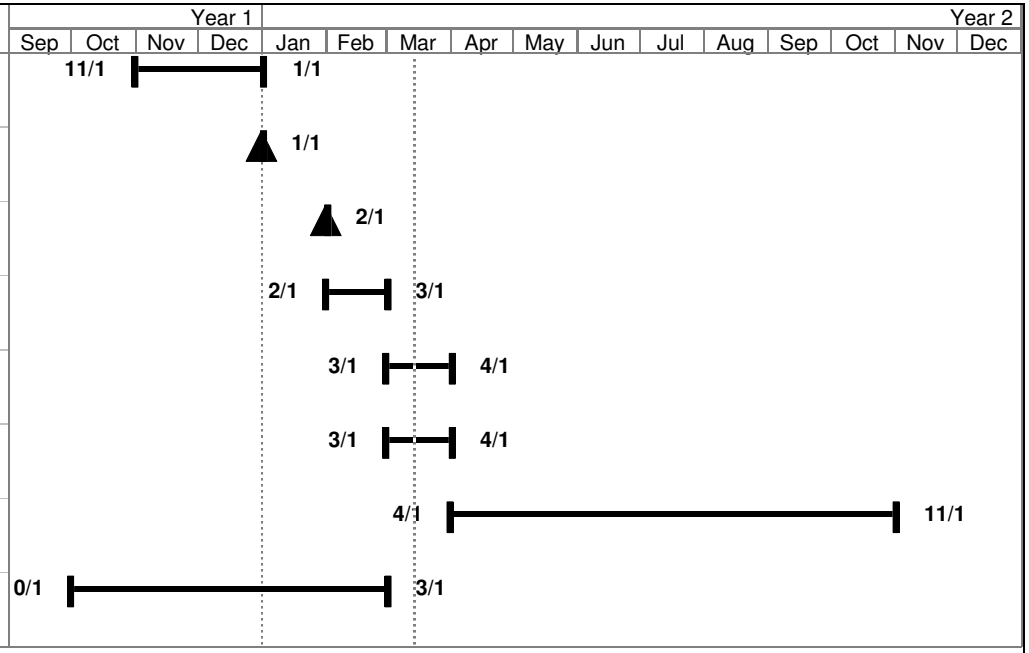
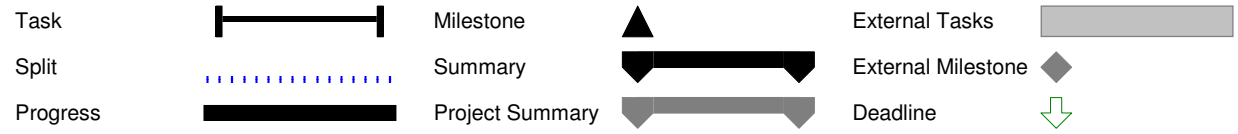


Figure 11: Schedule
Kinnickinnic River Dredging
Milwaukee, Wisconsin



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Appendix A
Plans and Specifications

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SECTION 01000

GENERAL SITE WORK REQUIREMENTS

PART 1: GENERAL

OWNER, ENGINEER, and CONTRACTOR shall be defined in the standard general conditions included as part of the final bid document

1.01 CONTRACT DOCUMENTS

A. The Contract Documents are as defined in the Agreement. The terms of the Contract Documents apply to these Specifications as fully as though repeated herein.

B. The format of these Specifications is based upon the CSI MASTERFORMAT; however differences in format and subject matter location do exist. It is the CONTRACTOR's sole responsibility to thoroughly read and understand these Specifications and request written clarification of those portions which are unclear.

C. Division of the Work as made in these Contract Documents is for the purpose of specifying and describing work which is to be completed. There has been no attempt to make a classification according to trade or agreements which may exist between CONTRACTOR, Subcontractors, or trade unions or other organizations. Such division and classification of the Work shall be the CONTRACTOR's sole responsibility.

1.02 WORK COVERAGE

A. It is the intent of the Contract Documents to cover all aspects of the Work. Should there be some item or items not described in these Specifications or in the Drawings which are required for the Work, those items and the furnishing of all labor, materials, and equipment shall be considered incidental to the Work and no additional compensation will be provided.

B. The Work includes the furnishing of all labor, equipment, tools, machinery, materials, and other items, except that provided by OWNER, required for the construction of the Work as specified. Equipment furnished shall be in safe operating condition and of adequate size, capacity, and condition for the performance of the Work. CONTRACTOR shall obtain all measurements necessary for the Work and shall be responsible for establishing all dimensions, levels, and layout of the Work.

1.03 FEDERAL, STATE AND MUNICIPAL REQUIREMENTS

A. The Work shall comply with all applicable regulations, rules and codes, including, but not limited to, the Federal Occupational Safety and Health Administration (OSHA) Regulations for Construction; Wisconsin Department of Natural Resources (WDNR); United States Army Corps of Engineers (USACE), Milwaukee Port Authority, Wisconsin Department of Transportation (WDOT), United States Coast Guard (USCG); and any local requirements of the City of Milwaukee that apply to the Work.

1.04 LICENSES & PERMITS

A. OWNER shall acquire the following permits for execution of the Work within the Kinnickinnic River:
   - WDNR Chapter 30 Permit
   - Section 401 - Water Quality Certification
   - Section 10 – USACE River and Harbor Act Dredging Permit
   - Shoreline Protection Permit

B. All other licenses and permits necessary for the execution of the Work shall be secured by CONTRACTOR.

C. All permits shall be executed and implemented by CONTRACTOR as part of the Work.

1.05 WORK COORDINATION

A. CONTRACTOR shall be solely responsible for the coordination of its activities with regard to the Work and the activities of SUBCONTRACTORs, ENGINEER, and OWNER.

1.06 WORK BY OWNER

A. OWNER will provide general Project Area coordination and will assist the CONTRACTOR in acquiring access to private property within the construction limits for the purpose of constructing the Work.

B. OWNER will provide benchmark and Project Area coordinate information necessary for construction of the Work. Once provided, it is the CONTRACTOR's responsibility to protect the information in accordance with paragraph 1.07 of this Section. CONTRACTOR shall request such information from OWNER a minimum of five days prior to the time when such information is needed.

C. OWNER or ENGINEER will provide construction quality control and construction observation.

1.07 CONTRACTOR USE OF PREMISES

A. Definition of Project Area: The Project Area is defined by the work areas shown on the Drawings. CONTRACTOR shall limit operations, including material and equipment storage, to within the Project Area and shall not block, obstruct or otherwise encumber the designated Project Area access roads. CONTRACTOR shall maintain Project Area access roads in a condition equal to or better than condition prior to start of the Work.

B. Hours of Operation: CONTRACTOR may perform work operations 24 hours per day, 7 days per week in accordance with the Milwaukee Code of Ordinances or other applicable standards, for the duration of the CONTRACT unless otherwise specified by OWNER.

C. Unfavorable Construction Conditions: When unfavorable weather, river levels, river flows, or other unsuitable construction conditions exist, CONTRACTOR shall confine operations to work which will not be adversely affected by such conditions. No portion of the Work shall be constructed under conditions which would adversely affect the quality of the Work, unless special means or precautions are taken to perform the Work in a proper and satisfactory manner.

D. Survey Markers: CONTRACTOR shall conduct operations so as to preserve benchmarks, survey reference points, and stakes existing or established by OWNER or ENGINEER for the work.

CONTRACTOR will be charged the expense of repairing or replacing survey markers and shall be responsible for mistakes or lost time that result due to damage or destruction of survey markers due to CONTRACTOR's operations.

E. Noise: CONTRACTOR shall make all reasonable efforts to minimize the intensity and duration of noise resulting from construction activities so as to minimize impacts on the surrounding area, and meet all requirements put forth in the Milwaukee City Ordinance Chapter 80 Subchapter 2 - Noise Control. Such efforts shall include, but not be limited to, maintaining mufflers and other noise reducing parts in good condition, using contemporary equipment designed for low noise output, locating equipment so as to screen potential noise receptors, sequencing operations so as to combine and complete noisy operations as quickly as possible, and other similar actions as ENGINEER or OWNER reasonably request of CONTRACTOR to comply with this requirement. CONTRACTOR shall also obtain all appropriate variances from the City of Milwaukee that are required for the scheduled work.

F. Project Area Security: The Project Area is not secure. The river within the construction limits will be used by others throughout the progression of the work. CONTRACTOR shall be responsible for the security of its personnel, material, and equipment for the work described herein.

1.08 SEQUENCE OF OPERATIONS

A. Proper sequencing is critical for this Work. CONTRACTOR shall provide a Schedule of Operations as detailed in Section 01270.

B. CONTRACTOR shall sequence all dredging operations according to the sequence specified in Section 02300.

C. CONTRACTOR shall schedule its operations so as to assure that previously completed portions of the Work are not adversely affected by CONTRACTOR'S subsequent operations. CONTRACTOR's Schedule of Operations shall include sufficient detail to demonstrate how CONTRACTOR intends to meet this requirement. Alternatively, CONTRACTOR shall identify specific methods that will prevent damage caused by subsequent Work.

D. CONTRACTOR shall schedule its operations to meet time deadlines established in the Contract, taking into consideration all job conditions that may affect the performance of the Work.

E. An emergency route shall be provided at all times.

1.09 CONTRACTOR UTILITIES & FACILITIES

A. Water: Potable water service is not available at the Project Area. CONTRACTOR shall make all arrangements necessary to provide, during construction, water for potable consumption and construction purposes. The KK River Business Improvement District #35 can be contacted and may be able to provide assistance locating potable water service, see Drawings for contact information.

B. Sanitary Facilities: Sanitary facilities are not available at the Project Area. CONTRACTOR shall provide sanitary facilities for use by CONTRACTOR's employees, subcontractors, suppliers, ENGINEER, OWNER, and all other persons working on the Project Area. Sanitary facilities shall be provided with lockable doors when in use, shall include a hand-wash station, shall be routinely emptied and sanitized frequently, and shall at all times be maintained in a clean and usable condition. Sanitary facilities shall be maintained until project completion. The KK River Business Improvement District #35 can be contacted and may be able to provide assistance locating sanitary service, see Drawings for contact information.

C. Electricity: Electricity is not available at the Project Area. CONTRACTOR shall supply all electricity as necessary for construction of the Work. CONTRACTOR shall coordinate with local electric utility for the installation of temporary electric services as necessary. The KK River Business Improvement District #35 can be contacted and may be able to provide assistance locating electrical service, see Drawings for contact information.

D. Telephone: Telephone service is not available at the Project Area. CONTRACTOR shall arrange for and furnish any telephone service, including cellular telephones, CONTRACTOR deems necessary for construction of the work. The KK River Business Improvement District #35 can be contacted and may be able to provide assistance locating telephone, see Drawings for contact information.

E. Storage: CONTRACTOR shall provide a safe place in Project Area for storage of record documents and shall provide access to safe storage to OWNER and ENGINEER for storage of items that need to remain at the Project Area. The KK River Business Improvement District #35 can be contacted and may be able to provide assistance locating storage service, see Drawings for contact information.

1.10 TRAFFIC CONTROL

A. CONTRACTOR shall furnish and maintain all warning lights, barricades, informational signs, and watchmen as needed for the execution of the Work as required by Laws and Regulations, for the protection of persons and property, and control of traffic.

B. Barricades, warning lights, and traffic control signage within public streets and roadways shall, at a minimum, meet the technical requirements of the Institute of Transportation Engineers or similar publication. CONTRACTOR shall coordinate all use of barricades, warning lights, and traffic control signage within public streets and coordinate with the unit of government responsible for the public street or roadway, and shall comply with the unit of government's rules, policies, and requirements.

1.11 PROTECTION & CONTINUITY OF EXISTING UTILITIES & FACILITIES

A. Locations of Underground Facilities at or contiguous to the Project Area is based on information and data furnished to OWNER or ENGINEER by the Underground Facility Owners as follows:

- Milwaukee Metropolitan Sewer District
- First Street Siphon Improvement Plans and Drawings
- Storm sewer outfall Plans
- MCI Telecommunications Facilities Drawings
- WE Energies Drawings and Requestors – Planning Ticket #20050401895
- AT&T Facilities Drawings
- Canadian Pacific Railway Railroad Bridge Plans and Drawings
- City of Milwaukee – Bridge Plans and Drawings for Kinnnickinnic Avenue, First Street, and Becher Street Bridges
- City of Milwaukee – Chicago Northwestern Railroad Bridge Plans and Drawings

B. CONTRACTOR shall field verify the location of Underground Facilities prior to construction. Utility locates shall be coordinated through the Wisconsin Digger's Hotline one-call system.

C. Obstructions not shown on the Drawings may exist and shall be exposed by CONTRACTOR without damage. CONTRACTOR shall be responsible for damage to existing structures, Underground Facilities, and Utilities resulting from CONTRACTOR's operations, and shall repair or replace damaged items to Utility Owner's and OWNER's satisfaction.

D. CONTRACTOR shall perform operations carefully and in such a manner as to protect and maintain use without interruption of existing structures, underground facilities, and utilities. If interruption of a utility or service is required for performance of the Work, CONTRACTOR shall notify the OWNER a minimum of 48 hours in advance and coordinate the interruption with the Utility Owner and/or Operator. Interruptions shall be scheduled to minimize disruption and shall be performed during normal working hours (8 a.m. to 5 p.m. CST).

1.12 PROJECT AREA ACCESS

A. Access to the Project Area for dredging operations is the responsibility of the CONTRACTOR. Individual members of the Kinnickinnic River BID#35 may offer either office space or staging area for the work. An access agreement between the CONTRACTOR and the Kinnickinnic River BID #35 member (with assistance from OWNER) is needed prior to the start of work.

B. CONTRACTOR shall control access to the Project Area and coordinate work and deliveries through designated areas in the Support Zone.

C. The entire Project Area shall be available at all times (24 hours per day) for access by ENGINEER, OWNER, and any other persons designated by OWNER.

D. All persons entering the Project Area shall meet the requirements of CONTRACTOR's Health and Safety Plan, including compliance with all training requirements for admittance or work at the Project Area.

1.13 NAVIGATIONAL CHANNEL

A. CONTRACTOR shall meet all requirements set forth by the Port of Milwaukee, United States Coast Guard, and USACE while using the Federal Navigational Channel to transport the dredged material to the Jones Island CDF.

B. The CONTRACTOR shall coordinate all transits through the Federal Channel with local businesses, to minimize delays to both parties. Of particular note is St. Mary's Cement Company, located adjacent to the downstream end of the Project Area, which utilizes lake freighters and offloads at their facility. When a freighter is offloading, access to the Federal Navigational Channel is limited.

1.14 FIELD OFFICES

A. CONTRACTOR shall provide a furnished, all-weather field office trailer for use by CONTRACTOR. An additional furnished, all-weather field office trailer shall be furnished by the CONTRACTOR for use by the OWNER and ENGINEER. CONTRACTOR shall maintain field office until the project is complete. CONTRACTOR field office shall be kept locked and secure at all times. CONTRACTOR shall provide trash facilities and regular trash removal for all field offices.

1.15 FIELD STORAGE

A. Field storage space shall be equipped to meet the needs of the CONTRACTOR.

1.16 CLEANING

A. CONTRACTOR shall clean the working area each day and shall remove all trash and waste materials, and shall maintain the Project Area in a neat and orderly condition throughout the construction period.

B. CONTRACTOR shall daily, or more often as it becomes apparent, pick up all garbage, litter, debris, and other materials attributable to the Work or the activities of CONTRACTOR's employees, Subcontractors, and suppliers that accumulates on property in the vicinity of the Project Area.

1.17 BASIS FOR COMPENSATION

A. The CONTRACTOR's cost for complying with the requirements of this Section of these Specifications shall be included under the Contract Unit Prices and no additional compensation will be provided.

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION (NOT USED)

END OF SECTION 01000

SECTION 01010

REAL ESTATE

PART 1: GENERAL

1.01 DESCRIPTION

A. Access and Staging Area

Staging of debris and removal of a sunken tug boat may require access to the shoreline property. Access agreements for the staging area will be obtained by the CONTRACTOR, with assistance from the OWNER.

Silt curtains and barges may need to be moored to shore during dredging activities. Permission from the property owner will be required for this work and will be obtained by the CONTRACTOR, with assistance from the OWNER.

B. Jones Island CDF

Rights for the use of the government-furnished disposal area at the Jones Island confined disposal facility (CDF) will be obtained by the OWNER and the general limits of the area are shown on the Drawings.

C. Additional Real Estate Rights

Any additional real estate rights desired by the CONTRACTOR shall be obtained by the CONTRACTOR at its own expense. Such agreements shall clearly relieve the OWNER of any responsibility resulting from the CONTRACTOR's use of the grounds.

1.02 BASIS FOR COMPENSATION

A. The CONTRACTOR's cost for complying with the requirements of this Section of these Specifications shall be included under the Contract Unit Prices and no additional compensation will be provided.

PART 2: PRODUCTS [NOT USED]

PART 3: EXECUTION [NOT USED]

END OF SECTION 01010

SECTION 01020

PROJECT SUMMARY

PART 1: GENERAL

1.01 PROJECT DESCRIPTION

A. The Kinnickinnic River discharges into Lake Michigan via the Federal navigation harbor at Milwaukee, Wisconsin. The Project Area, a portion of the Kinnickinnic River, is an approximately 2000-foot long and 200-foot wide section of the lower Kinnickinnic River located between Kinnickinnic Avenue and Becher Street as shown in the Drawings.

Sediment contaminated with polychlorinated biphenyls (PCBs) and polynuclear aromatic hydrocarbons (PAHs) will be dredged mechanically and transported by barge to the United States Army Corps of Engineers (USACE) administered Jones Island Confined Disposal Facility (CDF) where it will be disposed of. The WDNR and USEPA GLNPO will secure use of the Jones Island CDF for disposal of dredged material.

The estimated in-place volume of sediment to be removed from the Project Area using the proposed dredge neat line is 150,000 cubic yards (CY) and the estimated maximum volume (including one foot of allowable over-dredge beneath the dredge neat line) that may be removed from the Project Area is approximately 170,000 CY.

B. This work is being performed as a remedial action under the Great Lakes Legacy Act for removing contaminated sediment within the Area of Concern (AOC) as documented in the Milwaukee Estuary Remedial Action Plan (RAP).

1.02 EXISTING PROJECT AREA CONDITIONS

A. The Project Area is an approximately 2000-foot-long and 200-foot-wide section of the lower Kinnickinnic River between Kinnickinnic Avenue and Becher Street located in downtown Milwaukee, Wisconsin as shown on the Drawings.

B. A sunken tug boat is located within the Project Area limits and will need to be removed prior to dredging operations adjacent to it as shown on Drawings.

C. Bridges cross over the project area at Kinnickinnic Avenue (downstream limit) and Becher Street (upstream limit). The First Street Bridge and Canadian Pacific Railway (CPR) Railroad Bridge are located within the Project Area as shown on Drawings.

D. Seawalls are located within the Project Area as shown on the Drawings. An evaluation of stability of the known seawalls in the Project Area is summarized in the *Slope and Wall Stability Analysis Report* (Barr, 2008).

E. Above and below ground utilities are located within the Project Area. The approximate location of known, existing utilities are shown on the Drawings. The exact location of utilities shall be verified by CONTRACTOR prior to beginning work.

F. Docks and dock piers are located within the Project Area. Property owners will remove docks prior to dredging operations and are responsible for the stability of dock piers after dredging.

1.03 ENVIRONMENTAL CONTAMINANTS

A. Polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHS) have been identified as the primary contaminants of concern within the Project Area.

B. Laboratory analysis of sediment collected during a 2002 sampling event detected PCB concentrations ranging from non-detect to 35.5 mg/kg.

C. Laboratory analysis of sediment collected during a 2002 sampling event detected PAH concentrations ranging from 0.33 mg/kg to 243.5 mg/kg.

D. Sediment sampling events are summarized in the Kinnickinnic River, Wisconsin, Milwaukee Estuary Area of Concern Deepening /Remediation Concept Design Documentation Report (Barr, 2004), Summary of Data Sets and Data Quality Evaluation (WDNR, 2007) and Draft Environmental Analysis (WDNR, 2008a).

1.04 REFERENCES

A. Altech, 2003. Sediment Sampling From the Kinnickinnic River, Milwaukee, Wisconsin.

B. Ayres, 1997a. Scour Evaluation Report – Bridge No. P-40-794 – W. Becher Street over Kinnickinnic River in Milwaukee, Wisconsin. Prepared for: City of Milwaukee and Wisconsin Department of Transportation.

C. Ayres, 1997b. Scour Evaluation Report – Bridge No. P-40-830 – S. First Street over Kinnickinnic River in Milwaukee, Wisconsin. Prepared for: City of Milwaukee and Wisconsin Department of Transportation.

D. Barr, 2004. Kinnickinnic River, Wisconsin Milwaukee Estuary of Concern Deepenin/Remediation Concept Design Documentation Report. Prepared for the U.S. Army Corps of Engineers, Detroit District and Wisconsin Department of Natural Resources.

E. Barr, 2008a. Kinnickinnic River Dredging Feasibility Study – Slope and Wall Stability Analysis Report. Revision 1 – January, 2008. Prepared for the U.S. Army Corps of Engineers, Detroit District.

F. Barr, 2008b. Final Design Report – Kinnickinnic River Sediment Remediation – Milwaukee, Wisconsin. Prepared for the Wisconsin Department of Natural Resources. March, 2008.

G. Brennan, 2003. Underwater Inspection for CP Rail Systems – Bridge #83.29 C&M Subdivision Over the Kinnickinnic River, Milwaukee, Wisconsin. August 26, 2003.

H. Coleman, 2002. Report of: Subsurface Investigation for Kinnickinnic River, Milwaukee Wisconsin.

I. Collins, 2003a. Underwater Bridge Inspection Report – WisDOT ID No.: P-40-794 – City ID No.: 202 – Becher Street over the Kinnickinnic River. Prepared for the City of Milwaukee.

J. Collins, 2003b. Underwater Bridge Inspection Report – WisDOT ID No.: P-40-830 – City ID No.: 201 – First Street over the Kinnickinnic River. Prepared for the City of Milwaukee.

K. Collins, 2003c. Underwater Bridge Inspection Report – WisDOT ID No.: P-40-591 – City ID No.: 200 – Kinnickinnic Avenue over the Kinnickinnic River. Prepared for the City of Milwaukee.

L. WDNR, 2003. Draft Report - Identification of PCB and PAH Sources to the Sediment in the Kinnickinnic River Between Becher St. and Kinnickinnic Ave.

M. WDNR, 2006. Quality Assurance and Quality Control – Kinnickinnic River Sediment Remediation Engineering Design. October, 2006.

N. WDNR, 2007. Summary of Data Sets and Data Quality Evaluation – Final Engineering Design – Kinnickinnic River Environmental Restoration Project. February, 2007.

O. WDNR, 2008a. Draft - Environmental Analysis - http://dnr.wi.gov/org/water/wm/sms/kkriver/

P. WDNR, 2008b. The tugboat Edward E. Gillen (47-MI-0497): Urban Archaeology and the EPA. By M. J. Dudzik, DNR Archaeologist

1.05 SCOPE OF WORK

A. The purpose of this project is to perform environmental dredging of contaminated sediments and to restore the Project Area river reach to navigational use. The overall Scope of Work for this project, which is more fully described in these Contract Documents and includes, but is not necessarily limited to, furnishing all labor, tools, equipment, and materials necessary to:

1. Comply with substantive provisions of acquired permits for the Project Area. Obtain any other permits necessary to complete the work.
2. Protect all existing Project Area features and utilities during CONTRACTOR'S work on Project Area, specifically including:
    - Overhead utilities
    - Underground utilities
    - Bridges & abutments
    - Sea walls

The CONTRACTOR is responsible for protecting Project Area features and utilities from damage due to impact from dredging equipment and similar negligence. However, the CONTRACTOR is not responsible for damage to sea walls as a result of loss of support from dredged sediment, as long as the dredging limits shown in the Drawings are adhered to and the shoreline reinforcement has been completed prior to dredging.

3. Project Goals:

   - Remove and dispose of sunken tug boat
   - Construct and repair seawalls
   - Relocate utilities within the dredge area, if necessary
   - Dredge sediments to the extent delineated in Drawings
   - Provide controls to minimize the resuspension and off-site loss of sediment, PCBs, PAHs, and other constituents
   - Transport and dispose of dredged sediment at the Jones Island CDF
   - Waste and debris management

B. The Work includes mobilization of all equipment, materials, and labor, as necessary to complete the Project Goals, including, but not limited to, material staging, obtaining applicable permits, underground facility and utility location and protection.

C. Installation of any other temporary facilities not already at the Project Area.

D. It is the intent of the Contract Documents to cover all aspects of the Work. Should there be some item or items not described in these Specifications or in the Drawings which are required for the Work, those items and the furnishing of all labor, materials, and equipment shall be considered incidental to the Work and no additional compensation will be provided.

E. The Work includes the furnishing of all labor, equipment, tools, machinery, materials, and other items, except that provided by OWNER, required for the construction of the Work as specified. Equipment furnished shall be in safe operating condition and of adequate size, capacity, and condition for the performance of the Work. CONTRACTOR shall obtain all measurements necessary for the Work and shall be responsible for establishing all dimensions, levels, and layout of the Work.

F. CONTRACTOR shall be solely responsible for the coordination of its activities with regard to the Work Order and the activities of SUBCONTRACTORs, ENGINEER, and OWNER.

1.06 BASIS FOR COMPENSATION

A. The CONTRACTOR's cost for complying with the requirements of this Section of these Specifications shall be included under the Contract Unit Prices and no additional compensation will be provided.

PART 2: PRODUCTS [NOT USED]

PART 3: EXECUTION [NOT USED]

END OF SECTION 01020

SECTION 01270

MEASUREMENT AND PAYMENT

PART 1: GENERAL

1.01 GENERAL

A. This section of these Specifications describes the measurement and payment for the Work to be completed for each of the lump sum or unit price items which make up the entire Total Contract Price.

B. Each lump sum or unit price shall constitute full compensation as specified herein for each item of work completed in accordance with the Specifications and Drawings, including all clean up and restoration.

C. All costs in connection with the Work, including furnishing all materials, machinery, supplies and appurtenances; providing all construction equipment and tools; and performing all necessary labor, coordination, supervision, and management to fully complete the Work shall be included in the unit or lump sum prices quoted on the Bid Form. All Work not specifically set forth as a separate item shall be considered a subsidiary obligation of the CONTRACTOR and all costs in connection therewith shall be included in the amounts and prices submitted in the Total Contract Price.

1.02 ESTIMATED QUANTITIES

A. All estimated quantities for unit price items in the Bid Form are approximate and are to be used only as a basis for determining the Estimated Contract Price. The actual amount of work to be done or materials to be furnished under the unit price items may differ from the estimated quantities. The basis of payment for work or materials furnished or placed will be the actual amount of work done or material furnished and placed. The CONTRACTOR agrees to make no claim for damages, anticipated profits, or otherwise due to any difference between the amounts of work actually performed or materials furnished and placed and the estimated amounts included in the Bid Form.

1.03 INTENT OF BID FORM ORGANIZATION

A. Payment for all Work shall be in accordance with the terms and conditions set forth elsewhere in the Contract Documents and the CONTRACTOR's Bid prices set forth in CONTRACTOR's conformed Bid Form. The bid items set forth in the Bid Form subdivide the work for purposes of measurement and payment only, and are intended to represent the entirety of the Work as set forth in the Contract Documents. The bid items set forth in the Bid Form shall constitute full compensation to CONTRACTOR for providing all material, equipment, labor, supervision, and supplies to complete the Work in accordance with the Contract Documents.

B. The following paragraphs describe the materials, equipment, labor, supervision and supplies that are included in each of the bid items. Partial progress payment for bid items will be made in accordance with the progress payment procedures set forth by the Contract Documents. The procedures for submitting and processing partial progress payment are set forth elsewhere in the Contract Documents.

1.04 BASIS FOR COMPENSATION

A. The CONTRACTOR's cost for complying with the requirements of this Section of these Specifications shall be included under the Contract Unit Prices and no additional compensation will be provided.

1.05 MOBILIZATION/DEMOBILIZATION

A. Method of Measurement: Mobilization/Demobilization shall be measured on a lump sum basis, all complete, as specified.

B. Basis of Payment: CONTRACTOR shall be paid a lump sum (LS) price for Mobilization/Demobilization. Mobilization/Demobilization shall include all supervision, labor, tools, materials, equipment, and all operations necessary for mobilization and demobilization, complete as specified. Mobilization/Demobilization shall include CONTRACTOR's premium for any special insurance obtained for this Work; equipment mobilization and demobilization; preparing and transmitting the required submittals; providing site safety and complying with applicable portions of the Project Health and Safety Plan (PHASP); obtaining all permits required of CONTRACTOR; identifying and locating utilities as necessary for the work; replacing any fencing existing within the construction limits that is removed or damaged; CONTRACTOR's coordination of the Work and attendance at meetings; as specified in Sections 01501 and 01505 and all incidentals and other items not specifically paid for but included in the total scope of the Work. This cost shall include CONTRACTOR's demobilization cost if Work is discontinued, prior to the completion of the Work, due to any condition which may require discontinuing the Work.

1.06 TEMPORARY FACILITIES

A. Method of Measurement: Temporary Facilities shall be measured on a lump sum basis, all complete, as specified.

B. Basis of Payment: CONTRACTOR shall be paid a lump sum (LS) price for Temporary Facilities. Temporary Facilities shall include all supervision, labor, tools, materials, equipment, and all operations necessary for furnishing, installing and maintaining CONTRACTOR's temporary facilities; providing work area security; providing all electrical, water, and telephone services required or needed by CONTRACTOR to perform the work.

1.07 QUALITY CONTROL

A. Method of Measurement: Quality Control shall be measured on a lump sum basis, all complete, as specified.

B. Basis of Payment: CONTRACTOR shall be paid a lump sum (LS) price for Quality Control. Quality Control shall include all supervision, labor, tools, materials, equipment, and all operations necessary to perform the CONTRACTOR's own internal Construction Quality Assurance (CQA) program, including all material testing, and surveying for construction and Record Drawings, as specified in Sections 01450 and 02300. CQA will also be performed by the ENGINEER or OWNER for verification of CONTRACTOR's Work.

1.08 SEDIMENT RESUSPENSION CONTROLS

A. Method of Measurement: Sediment Resuspension Controls shall be measured on a lump sum basis, all complete, as specified.

B. Basis of Payment: CONTRACTOR shall be paid a lump sum (LS) price for Sediment Resuspension Controls. Sediment Resuspension Controls shall include all supervision, labor, tools, materials, equipment, and all operations necessary for furnishing, installing, and maintaining sediment resuspension control measures necessary for compliance with the Sediment Re-suspension control plan as specified in Sections 02400.

1.09 ABANDONED TUG BOAT REMOVAL

A. Method of Measurement: The removal of the abandoned tug boat shall be measured on a lump sum basis, all complete, as specified.

B. Basis of Payment: CONTRACTOR shall be paid a lump sum (LS) price for the removal and disposal of the abandoned tugboat identified on the Drawings. The removal of the abandoned tugboat shall include all supervision, labor, tools, materials, equipment, and all operations necessary as specified in Sections 02220 and 02230.

1.10 MECHANICAL SEDIMENT DREDGING

A. Method of Measurement: Dredging shall be measured by in-place volume removed, all complete, as specified.

B. Basis of Payment: CONTRACTOR shall be paid a unit price per in-place cubic yard sediment removed. Dredging shall include all supervision, labor, tools, materials, equipment, and all operations necessary to dredge the Kinnickinnic River as specified in Section 02300. The volume dredged will be calculated from pre- and post-dredging surveys completed by a third party surveyor as specified in Section 01450. Raw survey data will be provided to the ENGINEER for calculation of payment volumes.

1.11 BARGE TRANSPORT TO CDF AND OFF-LOADING

A. Method of Measurement: Barge transport to CDF, and offloading of the dredged sediments into the disposal cell at the CDF shall be measured by in-place volume removed, all complete, as specified.

B. Basis of Payment: CONTRACTOR shall be paid a unit price per in-place cubic yard sediment dredged for transport to the CDF, and off-loading. Barge transport to the CDF, off-loading, and placement of the dredged sediment shall include all supervision, labor, tools, materials, equipment, and all operations necessary as specified in Section 02350. The volume dredged will be calculated from pre- and post-dredging surveys completed by a third party surveyor as specified in Section 01450. Raw survey data will be provided to the ENGINEER for calculation of payment volumes.

1.12 DISPOSAL OF DREDGED SEDIMENT AT CDF

A. Method of Measurement: Dredged sediment disposed of at the CDF shall be measured by the unit price in-place volume removed, all complete, as specified.

B. Basis of Payment: The U.S. Army Corps of Engineers (USACE) shall be paid a unit price per in-place cubic yard sediment disposed of at the Jones Island CDF (tipping fee). The disposal volume will be the in-place volume of sediment removed, calculated from pre- and post-dredging surveys completed by a third party surveyor as specified in Section 01450. Raw survey data will be provided to the ENGINEER for calculation of payment volumes.

1.13 NON-CONFORMING WASTE AND DEBRIS MANAGEMENT

A. Method of Measurement: Non-conforming waste and debris encountered during the dredging segregated, loaded, hauled, and disposed of at an approved landfill shall be measured on a lump sum basis, all complete, as specified. The total weight delivered will be based upon weigh tickets from the truck scale at the approved disposal site.

B. Basis of Payment: CONTRACTOR shall be paid a unit weight price for the management and disposal of non-conforming waste and debris. The non-conforming waste and debris management shall include all supervision, labor, tools, materials, equipment, and all operations necessary as specified in Section 02230.

PART 2: PRODUCTS [NOT USED]

PART 3: EXECUTION [NOT USED]

END OF SECTION 01270

SECTION 01300

SUBMITTALS

PART 1: GENERAL

1.01 GENERAL PROCEDURES

A. This Section stipulates the requirements for transmission of submittals from CONTRACTOR to ENGINEER and actions taken by ENGINEER regarding submittals.

B. Submittals shall be identified with the project name, name of submittal, and Section in which the submittal was required.

C. ENGINEER will accept submittals only from CONTRACTOR. Submittals from SUBCONTRACTOR's vendors, suppliers, or others will be returned without review or action.

D. ENGINEER will accept only those submittals required by the Specifications. Unsolicited submittals will be returned without review or action.

E. All engineering data, regardless of origin, shall be stamped with the approval of the CONTRACTOR. The CONTRACTOR 's stamp of approval will be a representation to ENGINEER that the CONTRACTOR has assumed full responsibility for determining and verifying all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data, and that CONTRACTOR has reviewed or coordinated each submittal with the requirements of the Contract Documents.

1.02 CORRESPONDENCE

A. Submittals shall be addressed to ENGINEER in one of the two methods as follows.

1. Kinnickinnic River Environmental Dredge Project
INSERT ENGINEER'S ADDRESS

2. Alternatively, submittals may be sent electronically to ENGINEER at:
INSERT ENGINEER'S E-MAIL

B. A letter of transmittal shall accompany all CONTRACTOR submittals and shall include a list of the information included in the transmittal. Lists shall include manufacturer's drawing numbers identified with the corresponding work order equipment or structure nomenclature, as applicable. The letter shall be identified by the work order name.

1.03 REVIEW OF SUBMITTALS

A. ENGINEER's review of engineering data will cover only general conformity of the data to the Specifications, external connections, and interfaces with equipment and materials furnished under separate specifications. ENGINEER's review does not indicate a thorough review of all dimensions, quantities, and details of the equipment, material, device, or item indicated, or the accuracy of the information or documentation submitted; nor shall review or approval by

OWNER be construed as relieving the CONTRACTOR from any and all responsibility for errors or deviations from the requirements of the Contract Documents.

B. All engineering data submitted, after final processing by ENGINEER and acceptance by OWNER shall become part of the Contract Documents and the work indicated or described thereby shall be performed in conformity therewith unless otherwise required by OWNER.

1.04 SUBMITTAL FOR INFORMATION OR DOCUMENTATION

A. Submit one copy to ENGINEER.

B. Submittal shall be received at least 5 business days before the subject of the submittal is to be incorporated into the Work.

C. Submittal is for the purpose of formal verification that the subject of the submittal conforms to the requirements of the Specifications, for formal documentation of the Work, or both.

D. No action is required by ENGINEER. ENGINEER will generally notify CONTRACTOR if deficiencies are identified; however, CONTRACTOR is solely responsible for ensuring that the subject of the submittal conforms to the requirements of the Specifications.

1.05 SUBMITTAL FOR REVIEW

A. Submit two copies to ENGINEER.

B. Submittal shall be received at least 10 business days before the subject of the submittal is to be incorporated into the Work. ENGINEER will respond within 5 business days from receipt of submittal.

C. Submittal is for the purpose of providing opportunity to ENGINEER for review and comment on the subject of the submittal.

D. ENGINEER will respond to the submittal either with a list of comments or indicating no comments.

E. If ENGINEER comments indicate a deficiency with respect to the requirement of the Specifications, CONTRACTOR shall amend the submittal and resubmit.

F. CONTRACTOR shall remain solely responsible for ensuring that the subject of the submittal conforms to the requirements of the Specifications.

1.06 SUBMITTAL FOR APPROVAL

A. Submit three copies to ENGINEER.

B. Submittal shall be received at least 15 business days before the subject of the submittal is to be incorporated into the Work. ENGINEER will respond within 7 business days from receipt of submittal.

C. Submittals shall be stamped with CONTRACTOR's approval. CONTRACTOR's stamp shall be a representation that CONTRACTOR has assumed full responsibility for determining the

submittal requirements and verifying that the subject of the submittal conforms to the requirements of the Specifications. Submittals not bearing CONTRACTOR's stamp will be returned without review or action.

D. ENGINEER will review, make notations as appropriate, and return submittals to CONTRACTOR. ENGINEER's notations and CONTRACTOR's required action are described below:

1. NO EXCEPTIONS TAKEN. CONTRACTOR may proceed without further action.

2. RECOMMENDED REVISIONS NOTED. CONTRACTOR shall review ENGINEER's notations and revise subject of submittal as required to conform to the requirements of the Drawings and Specifications before proceeding with the Work. Resubmittal is not required.

3. RESUBMIT. CONTRACTOR shall review ENGINEER's notations, revise subject of submittal as required to conform to the requirements of the Drawings and Specifications, and resubmit.

4. REVIEW COMPLETE, FURNISH 3 FILE COPIES. CONTRACTOR shall furnish the requested number of copies and may proceed without further action.

E. No work shall be performed in connection with the fabrication or manufacture of equipment and materials until the data therefore have been reviewed by ENGINEER, except at CONTRACTOR's own risk and responsibility. Work may proceed when submittals have been returned marked RECOMMENDED REVISIONS NOTED, provided the work is performed in accordance with ENGINEER's notations, or NO EXCEPTIONS TAKEN.

F. If changes are made at the work order site to correct manufacturing errors, revised drawings incorporating the changes shall be prepared and submitted to ENGINEER.

G. Drawings shall be in sufficient detail to indicate the kind, size, and arrangement of component materials and devices; the external connections, anchorages, and supports required; the dimensions needed for installation and correlation with the foundations; and other information specifically requested herein.

H. Each drawing submitted shall be black line on white background or blue line on white background. Print size shall not exceed 24 inches by 36 inches.

I. Each drawing submitted shall be clearly marked with the name of the work order, the specification title, the specification number, and the CONTRACTOR 's name. If catalog pages are submitted, the applicable items shall be indicated.

J. The CONTRACTOR submittals shall, at a minimum, include the following list of submittals. CONTRACTOR shall be responsible for any submittal not specifically identified in the following table.

1.07 REQUIRED SUBMITTALS

Submittal No.	Description	Section	Type
1	Point Grid that CONTRACTOR's independent surveyor will use to complete the record survey for the work.	01450	Electronic (AutoCAD)
2	Record Drawing	01450	Paper and Electronic
3	Project Health And Safety Plan (PHASP)	01501	Paper and Electronic
4	Identify landfill for disposal and documentation of any waste profiling necessary	02230	Paper
5	All load/weigh tickets for disposal of debris.	02230	Paper
6	Work plan for demobilization	02220	Paper and Electronic
7	Legible weigh tickets of all debris from demolition that was disposed of or recycled	02220	Paper
8	Dredge work plan	02300	Paper and Electronic
9	Dredge permits and notices	02300	Paper and Electronic
10	Offloading work plan	02350	Paper and Electronic
11	Alternative ground route for transport to CDF, for approval	02350	Paper and Electronic
12	All water quality data	02400	Paper and Electronic

1.08 RECORD DOCUMENTS

A. Submit record documents prior to Substantial Completion, consisting of Drawings, Specifications, Addenda, Change Orders, and Shop Drawings legibly annotated to reflect all changes made during construction, and final Project Area survey information in electronic and hard-copy format.

B. Record documents shall accurately reflect the as-constructed condition.

1.09 WARRANTY AND GUARANTEE CERTIFICATES

A. Submit warranty and guarantee certificates prior to Substantial Completion.

B. Warrantee and guarantee certificates shall be signed by CONTRACTOR, Installer, Manufacturer, and others as required by the Specifications.

1.10 BASIS FOR COMPENSATION

A. The CONTRACTOR's cost for complying with the requirements of this Section of these Specifications shall be included under the Contract Unit Prices and no additional compensation will be provided.

PART 2: PRODUCTS [NOT USED]

PART 3: EXECUTION [NOT USED]

END OF SECTION 01300

SECTION 01450

QUALITY CONTROL

PART 1: GENERAL

1.01 QUALITY CONTROL, GENERAL

A. CONTRACTOR shall:

1. Retain an independent surveyor to perform bathymetric survey for sediment removal volume computations and record drawings.

2. Maintain quality control over suppliers, manufacturers, products, services, Project Area conditions, and workmanship to produce Work of the specified quality. Maintain records of CONTRACTOR's tests and results for reference by ENGINEER at any time and furnish copies of all test results and quality control procedures.

3. Comply fully with manufacturer's instructions, including each step in sequence. Request clarification from OWNER or ENGINEER before proceeding, should manufacturer's instructions conflict with Contract Documents.

4. Obtain copies of, and meet the requirements of, reference specifications. Should specified reference standards conflict with Contract Documents, request clarification from ENGINEER before proceeding.

5. Comply with specified reference standards as a minimum quality for the Work, except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

6. Perform work by persons qualified to produce workmanship of specified quality. Use persons licensed to perform Work where required by these Specifications or Laws and Regulations. Submit documentation of appropriate licensure or training of persons performing Work.

7. Secure products and Work in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement, inherent in specified Work application.

B. Materials furnished for finished or intermediate stages of the Work shall be sampled, tested and inspected as specified in the individual sections of these Specifications and as required by reference specifications.

C. Performance of tests or observations by ENGINEER are for the sole benefit of ENGINEER and OWNER, and are not intended to replace CONTRACTOR's Quality Control program. CONTRACTOR is solely responsible for establishing and implementing a quality control program to ensure that the Work is completed in accordance with the Contract Documents.

D. It is CONTRACTOR's responsibility to notify ENGINEER when CONTRACTOR believes Work (or intermediate stages or parts of Work) is of specified quality and to permit ENGINEER and/or OWNER to perform independent tests or analyses.

E. If CONTRACTOR covers any Work before the necessary Quality Control has been performed, CONTRACTOR, at request of ENGINEER, shall uncover, expose, or otherwise make available for observation, inspection, surveying, or testing as ENGINEER may require, that portion of the Work in question, furnishing all necessary supervision, labor, material and equipment. Unless CONTRACTOR has given timely notice to ENGINEER of intent to cover Work and ENGINEER fails to act within a reasonable time, CONTRACTOR shall bear all direct, indirect and consequential costs of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction.

F. The contractual relationship of the parties to the Agreement shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.02 LABORATORY TESTS

A. Laboratory tests shall be conducted, and test results, certificates, and/or affidavits shall be submitted, as required in the individual sections of these Specifications. Submit in the quantity and in accordance with the requirements of Section 01300. Laboratory tests refer to those tests made by manufacturers, fabricators, suppliers, or CONTRACTOR specifically for this Project and conducted by an independent testing laboratory.

B. All laboratory tests shall be made by an independent testing laboratory approved by the ENGINEER. These tests shall be performed in accordance with the specified procedures or in accordance with ASTM procedures if no reference is included.

C. Laboratory tests may be witnessed by the ENGINEER. CONTRACTOR shall notify ENGINEER in advance of testing to allow ENGINEER opportunity to witness. Failure of CONTRACTOR to notify will be grounds for rejection of the test results and may require CONTRACTOR to repeat testing and/or replace affected work.

D. CONTRACTOR shall conduct routine testing of materials used in the Work to satisfy itself that the quality of the Work meets the requirements of the Contract Documents. ENGINEER may also conduct routine sampling and analysis to ascertain same. Where laboratory testing or material specifications or quality control requirements are specified in the individual sections of these Specifications, CONTRACTOR shall not proceed with phases of the Work until ENGINEER has had opportunity to collect samples or conduct testing necessary to establish the specified quality of the Work. Such instances may include, but are not limited to, soil/sediment contaminant testing, soil/sediment gradation testing, moisture content testing, testing of finishes, soil/sediment organic content, or any other specified tests.

1. This requirement shall apply even where CONTRACTOR is responsible for performing and documenting the performance and results of specific testing requirements by the individual sections of these Specifications. ENGINEER shall still be provided the opportunity to collect additional samples or conduct such additional testing as in their opinion may be needed.

E. CONTRACTOR shall pay for all laboratory testing CONTRACTOR desires. OWNER shall pay for initial testing OWNER desires. If testing by ENGINEER identifies defective Work, CONTRACTOR shall pay for all subsequent sample collection and testing costs required to convince ENGINEER that the defective Work has been repaired or replaced.

F. CONTRACTOR shall coordinate with ENGINEER during construction material testing, in order to provide ENGINEER sufficient notice to observe said testing and/or perform confirmatory testing.

1.03 FIELD TESTS

A. Field tests shall be conducted and test results, certificates and/or affidavits shall be submitted as required in the individual sections of these Specifications. Submit in the quantity and in accordance with the requirements of Section 01300.

B. Field tests shall be conducted in accordance with the individual sections to establish the quality and final locations of complete systems or individual components of the Work.

C. Field tests shall be set up and conducted by CONTRACTOR, who shall provide all tools, equipment, instruments, personnel and other facilities required for the satisfactory completion of each test.

D. Field tests shall be witnessed by the ENGINEER. CONTRACTOR shall notify ENGINEER in advance of testing to allow ENGINEER to witness. Failure of CONTRACTOR to notify will be grounds for rejection of test results and CONTRACTOR may be required to repeat testing and/or replace affected Work, at CONTRACTOR's expense.

1.04 SURVEY BY ENGINEER

A. ENGINEER will provide to CONTRACTOR survey control for the Project Area.

B. ENGINEER will provide to CONTRACTOR, at CONTRACTOR's request, results from ENGINEER-performed survey(s).

1.05 SURVEY BY CONTRACTOR

A. Pre-Dredge, Interim-, and Post-Bathymetric Survey. The CONTRACTOR shall employ, at CONTRACTOR's expense, an independent, registered surveyor in hydrographic surveys to take "pre-dredge", "interim-dredge", and "post-dredge" bathymetric surveys. The survey area includes the Project Area and the off-loading facility in the vicinity of the Jones Island CDF. The USACE hydrographic surveying requirements referenced in EM 1110-2-1003 Engineering and Design- Hydrographic Surveying shall be mandatory. The CONTRACTOR shall provide the ENGINEER, for review, specifications and quality assurance/quality control criteria as to how the CONTRACTOR's surveyor will collect bathymetric data and grid spacing.

1. Pre-dredge surveys shall be performed over the Project Area within 14 days prior to commencement of work. Plots of pre-dredge surveys, raw survey data and related

quantities requiring excavation are required to be submitted to ENGINEER within two days of completion of the surveys.

2. Post-dredge surveys shall be performed within 5 days or less of dredging completion. Plots of interim- and post-dredge surveys, raw survey data and related quantities requiring excavation are required to be submitted to ENGINEER within two days of completion of the surveys in order to release the dredge to other work.

3. The horizontal datum used for the dredging work in the river should be in Wisconsin State Plane Coordinates North American Datum 1983, south zone (feet).

4. The vertical datum used for the dredging work in the river should be in International Great Lakes Datum 1985 (feet).

5. Surveys shall be made along lines perpendicular to the channel alignment taken on maximum 50-ft spacings.

6. The CONTRACTOR shall provide the ENGINEER the raw survey data in electronic and paper format for computing the volume of dredged material removed.

7. The ENGINEER shall be responsible for computing the volume of material dredged in cubic yards, for payment purposes based on "before and after dredge" surveys. In the event that the "after" dredge survey discloses that the dredge is not satisfactorily completed, the CONTRACTOR shall resume dredging within 5 days until the work is completed to achieve the required depth(s). In such an event, the CONTRACTOR shall also be responsible for the cost of such additional "after" dredge surveys as may be necessary to verify the satisfactorily completion of the Work.

B. Dredge Operation Survey.

1. The CONTRACTOR shall provide the ENGINEER for review, specifications and quality assurance/quality control criteria as to how the CONTRACTOR will collect and evaluate bathymetric data used to guide dredging operations.

2. The dredge operation survey shall occur throughout dredging operations and be sufficient to estimate the top of sediment in "real-time" to guide dredging operations.

1.06 SUBMITTALS

A. CONTRACTOR shall submit for review the point grid that CONTRACTOR's independent surveyor intends to use to complete the record survey for the Work.

B. CONTRACTOR shall submit a Record Drawing for each independent bathymetric survey containing the unique identification numbers, project coordinates, and elevation. The drawing shall use a scale of 1"=30', shall schematically represent the Project Area similar to the Drawings, and shall be submitted in reproducible paper and electronic (AutoCAD) format. The drawings shall be prepared and signed by the independent surveyor that performed the record bathymetric survey during construction.

C. CONTRACTOR shall submit for review, specifications and quality assurance/quality control criteria for dredge operation survey.

1.07 BASIS FOR COMPENSATION

A. The CONTRACTOR's cost for complying with the requirements of this Section of these Specifications shall be included under the Quality Control item of the Contract Unit Prices and no additional compensation will be provided.

PART 2: PRODUCTS [NOT USED]

PART 3: EXECUTION [NOT USED]

END OF SECTION 01450

SECTION 01460

ENVIRONMENTAL SAMPLING & ANALYSIS

PART 1: GENERAL

1.01 DESCRIPTION

A. Work covered under this Section includes providing all materials, equipment, labor, and performing all operations necessary to:

1. Confirm completion of sediment dredging by confirmation sediment sampling of surficial sediment (0 to 6-inches post-dredge).

B. Related Work

1. Resuspension performance monitoring per Section 02400.

2. Sediment resuspension control per Section 02400.

3. Dredging per Section 02300

1.02 REFERENCES

A. USACE, 2002. Quality Assurance Project Plan – Kinnickinnic River Sediment Sampling in 2002. USACE Omaha District. April, 2002.

B. WDNR, 2006. Quality Assurance and Quality Control – Kinnickinnic River Sediment Remediation Engineering Design. October, 2006.

1.03 SEDIMENT CONFIRMATION SAMPLING

A. ENGINEER shall collect surficial sediment samples (top 6-inches of sediment after the specified dredge line shown on Drawings is met) by gravity coring after CONTRACTOR has indicated Phase 4 of dredging has been completed per Section 02300.

B. Sediment confirmation sample locations shall be collected in the immediate vicinity of the coordinates provided in Part 3.01.

C. Sediment confirmation samples shall be analyzed for total PCBs in accordance with the Quality Assurance Project Plan – Kinnickinnic River Sediment Sampling in 2002 prepared by the USACE Omaha District dated April, 2002 (QAPP).

1.04 SUBMITTALS

A. Sediment Confirmation Monitoring Report

1. ENGINEER shall provide OWNER and CONTRACTOR a sediment confirmation monitoring report that summarizes the results of the sediment confirmation sampling laboratory results and shall include:

    - Figure with sediment sample locations and coordinates;
    - Summary tables with analytical results;
    - Laboratory analytical data reports; and
    - Whether or not sediment remediation goals for Project Area have been met.

1.05 BASIS FOR COMPENSATION

A. The ENGINEER's cost for complying with the requirements of this Section of these Specifications shall be included under the Environmental Sampling and Analysis of the Contract Unit Prices and no additional compensation will be provided.

PART 2: PRODUCTS [NOT USED]

PART 3: EXECUTION

3.01 SEDIMENT CONFIRMATION SAMPLING LOCATIONS

A. Sediment confirmation sampling locations shall be collected per Part 1.03 at the sampling locations provided here and shown on Drawings as historical boring location:

Boring Location	X (ft)*	Y (ft)*
KK0201	2526443	373946
KK0202	2526371	374106
KK0203	2526371	374204
KK0204	2526459	374261
KK0205	2526424	374402
KK0206	2526629	374400
KK0207	2526711	374501
KK0208	2526839	374470
KK0209	2527038	374452
KK0210	2527080	374519
KK0211	2527278	374559
KK0212	2527291	374420
KK0213	2527535	374428
KK0214	2527665	374501

*Wisconsin State Plane, North American Datum 1983, South Zone

END OF SECTION 01460

SECTION 01501

SAFETY

PART 1: GENERAL

1.01 SITE SAFETY

A. In accordance with generally accepted construction practices, the CONTRACTOR shall be solely and completely responsible for job site conditions and safety procedures and programs, including safety and health of all persons and property, on those portions of the Project Area affected by or used by CONTRACTOR, CONTRACTOR's employees, SUBCONTRACTORs, agents, and others during performance of the Work. This requirement will apply continuously and not be limited to normal working hours. Observation of the Work and CONTRACTOR's performance by ENGINEER is not intended to include review of the adequacy of the CONTRACTOR's safety and health procedures and programs on or near the construction Project Area. The CONTRACTOR is solely responsible for the protection of property and the safety and health of its employees, subcontractors, suppliers, agents and others on or near the Project Area.

B. CONTRACTOR shall have authority to temporarily restrict from the work area anyone, including OWNER, ENGINEER and/or OWNER's Representatives, not complying with the Project Health and Safety Plan (PHASP). Any person so restricted from the work area shall be allowed to return to the area after meeting all provisions of the PHASP. Such authority shall extend to the Construction Area.

C. CONTRACTOR shall contact the U.S. Coast Guard to designate a safety zone around the Project Area to keep out recreational boaters and others not associated with the work during designated hours.

1.02 PROJECT HEALTH AND SAFETY PLAN

A. The project is being constructed as part of a response action in cooperation with the Wisconsin Department of Natural Resources (WDNR), U.S. Army Corps of Engineers (USACE), and the U.S. Environmental Protection Agency Great Lakes National Program Office (USEPA GLNPO).

B. CONTRACTOR shall be solely responsible for the health and safety of all persons at the Project Area, specifically including but not limited to, health and safety matters related to the remedial nature of the Work and the potential for encountering hazardous substances in soil and groundwater during the Work.

C. The CONTRACTOR shall prepare a PHASP that shall, at a minimum, meet the regulatory requirements set forth by the Occupational Safety and Health Administration (OSHA), specifically those set forth in the Code of Federal Regulations (CFR) at 29 CFR Parts 1910 and 1926, in particular 1910.120 (Hazardous Waste Operations and Emergency Response), and shall comply with all other appropriate state and federal safety regulations. Specific topics that shall be addressed are those that are required to be addressed by Laws and Regulations including, but not limited to, the following:

1. Worker medical surveillance.

2. Worker training.

3. A detailed description of the planned movement of labor, equipment and materials from and between work areas as work progresses, including measures to be employed to prevent recontamination of previously cleaned areas and contamination of areas that do not now contain hazardous materials.

4. A detailed description of the personnel decontamination facilities to be employed including the planned phasing of decontamination facilities between work areas as the work progresses and the methods to be used to collect, store, treat, and ultimately dispose of personnel protective equipment and decontamination waters and wastes.

5. A detailed description of the washdown area for decontamination of vehicles and equipment and the methods to be used to collect, store, treat and ultimately dispose of washdown decontamination waters and sediments.

6. Personal protective equipment types to be used and conditions for use.

7. Personal hygiene and personnel decontamination procedures.

8. Respirator protection program and procedures.

9. Emergency and first aid equipment and supply.

10. Volatile organic compound (VOC) and polycyclic aromatic hydrocarbon (PAH) emission control.

11. Personnel and ambient air monitoring including action levels for contaminants of concern, specifically VOCs and noise. The PHASP shall include the location and placement of monitors on the dredge barge and transportation barge, at minimum.

12. Noise reduction control and the City of Milwaukee Code of Ordinances Chapter 80, Subchapter 2.

13. Noise monitoring including action levels. The PHASP shall include the location and placement of monitors on the dredge barge and transportation barge, at a minimum.

14. Monitoring and mitigation of worker heat and cold stress.

15. The types of materials and substances likely to be encountered in the course of the work.

16. Site security, Site access, and Site control.

D. In addition, the CONTRACTOR's PHASP shall detail safety procedures appropriate for the Work, including, but not limited to, equipment operation and maintenance, and any other operation and/or process which may relate directly to CONTRACTOR’s performance of the work.

E. CONTRACTOR's PHASP shall designate a qualified individual to act as CONTRACTOR's Site Safety Officer for purposes of assuring compliance by all persons with CONTRACTOR's PHASP. CONTRACTOR's Site Safety Officer shall be present on the Site during all activities that could potentially result in exposure to contaminated soil and/or groundwater, specifically including, but not limited to, dredging, excavation and backfilling, and demolition activities. At other times of routine construction, CONTRACTOR shall determine the need for the presence of the designated Site Safety Officer. However, the Site Safety Officer (or a designated alternate) shall be available by telephone continuously during the Contract Time, and shall be available to respond to the Project Area within two hours at any time following request by CONTRACTOR or ENGINEER.

F. CONTRACTOR shall hold daily safety meetings that shall be attended by CONTRACTOR's Site Safety Officer. That meeting shall also be attended by CONTRACTOR's resident supervisors and Subcontractors involved in the Work during the day. ENGINEER will attend all safety meetings. The topic of the meeting shall specifically be limited to safety and attendees shall, at a minimum, discuss safety problems, potential risk of planned activities, coordination of equipment movement/ work area, and requirements related to upcoming work.

G. CONTRACTOR will not be required to supply personnel protective equipment or monitoring equipment for any persons other than CONTRACTOR's employees. However, CONTRACTOR shall make available CONTRACTOR's decontamination facilities to those persons who reasonably require access to the Work, including OWNER, ENGINEER, and regulatory authorities. CONTRACTOR shall be solely responsible for assuring compliance by all persons with CONTRACTOR's PHASP. CONTRACTOR shall not unreasonably restrict access to the Project Area and shall not proceed with Work that ENGINEER requests to observe during such time as ENGINEER and OWNERS being denied access to the Project Area because of non-compliance with CONTRACTOR's PHASP.

H. The CONTRACTOR's cost for complying with the requirements of this Section of these Specifications shall be included under the Contract Unit Prices and no additional compensation will be provided.

1.03 HAZARD COMMUNICATION PROGRAMS

A. CONTRACTOR shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between employers at the Project Area in accordance with Laws and Regulations and as specified in the General Conditions.

1.04 EMERGENCIES

A. In emergencies affecting the safety or protection of persons in the Project Area, or any property adjacent to the Project Area, the CONTRACTOR, without special instruction from the ENGINEER, is obligated to act to prevent threatened damage, injury, or loss. CONTRACTOR shall give ENGINEER prompt written notice if CONTRACTOR believes that any significant changes in the Work or variations from the Contract Documents have been created by such emergency. If ENGINEER determines that a change in the Contract Documents is required because of the action taken by the

CONTRACTOR in response to such an emergency, a Change Order will be issued to document the consequences of such action.

1.05 BASIS FOR COMPENSATION

A. The CONTRACTOR's cost for complying with the requirements of this Section of these Specifications shall be included under the Contract Unit Prices and no additional compensation will be provided.

PART 2: PRODUCTS [NOT USED]

PART 3: EXECUTION [NOT USED]

END OF SECTION 01501

SECTION 01505

MOBILIZATION

PART 1: GENERAL

1.01 DESCRIPTION

A. All of the work included in this Section shall be completed in accordance with the following paragraphs as well as the Contract Documents.

B. The work covered by this Section of the Specifications consists of, but is not limited to, furnishing all supervision, labor, equipment, and materials and performing all operations necessary to:

1. Move (mobilize) personnel, equipment, supplies, and incidentals to the Project Area.

2. Perform all work that must be performed before beginning Work on the various items described elsewhere in these Specifications.

3. Furnish all submittals described in these Specifications.

4. Furnish all insurance/bonding required specifically for this Work.

5. Obtain all permits required specifically for the Work.

6. Provide project management and perform project coordination, provide updates, and attend project conferences and meetings.

7. Locate underground facilities and utilities, including but not limited to, calling Diggers Hotline.

8. Maintain a clean and orderly work site on a daily basis throughout the duration of the Work.

1.02 SUBMITTALS

A. All submittals described in this Section shall be transmitted in accordance with Section 01300 of these Specifications.

1.03 BASIS FOR COMPENSATION

A. The CONTRACTOR's cost for complying with the requirements of this Section of these Specifications shall be included under the Mobilization/Demobilization item of the Contract Unit Prices and no additional compensation will be provided.

PART 2: PRODUCTS [NOT USED]

PART 3: EXECUTION [NOT USED]

END OF SECTION 01505

SECTION 02220

DEMOLITION

PART 1: GENERAL

1.01 DESCRIPTION

A. All of the Work included in this section shall be completed in accordance with the following paragraphs as well as the General Requirements set forth in Division 1 of these Specifications and in accordance with all of the provisions of the Contract Documents.

B. Work covered by this section includes furnishing all supervision, labor, equipment, materials, and performing all operations necessary to:

1. Remove and demolish the sunken tug boat as shown on the Drawings.
2. Size, handle, and load-out debris generated from tug boat demolition.
3. Transport debris to an approved off-site facility(s) for recycling and/or disposal.

1.02 JOB CONDITIONS

A. CONTRACTOR shall be solely responsible for evaluating existing facilities and Project Area conditions and considering all factors that may affect the progress or performance of the Work.

B. CONTRACTOR shall prepare the staging area for staging, decontamination, and transportation required for tug boat removal. CONTRACTOR, with assistance from OWNER, will secure access agreement for CONTRACTOR use of staging area.

C. CONTRACTOR shall dispose or recycle all of the demolition debris in accordance with all applicable laws and regulations.

D. In the event that fuel storage tanks or containers, or other hazardous materials are encountered during demolition activities, CONTRACTOR shall immediately stop work in that area and notify ENGINEER. CONTRACTOR contingency measures shall contain oil spills or other hazardous material releases.

1.03 SUBMITTALS

A. CONTRACTOR shall submit a work plan prior to beginning Work for review and approval by ENGINEER and OWNER, in accordance with applicable local, state and federal law.

B. CONTRACTOR shall submit to ENGINEER for approval, information on the proposed disposal or recycling facility(s) that will be used for demolition debris.

C. CONTRACTOR shall submit legible copies of all load tickets or receipts, or other acceptable evidence, documenting the weight and acceptance of demolition debris that are taken to each off-site disposal or recycling facility.

D. CONTRACTOR shall conduct any testing necessary in support of obtaining approval from recycling or disposal facilities that are proposed to accept debris from the Project Area.

1.04 BASIS FOR COMPENSATION

A. The CONTRACTOR's cost for complying with the requirements of this Section of these Specifications shall be included under the tug boat removal item of the Contract Unit Prices and no additional compensation will be provided.

PART 2: PRODUCTS [NOT USED]

PART 3: EXECUTION

3.01 PREPARATION

A. CONTRACTOR shall verify that all utilities near the Work have been disconnected, abandoned, or protected prior to commencing with demolition activities.

B. CONTRACTOR shall prepare staging area in accordance with access agreement and shall have processing, containment, transportation, and decontamination facilities required for the Work prepared prior to commencing with demolition activities.

C. CONTRACTOR shall furnish any shoring or bracing required for support of sea walls, utilities, and/or facilities during demolition.

3.02 DEMOLITION

A. CONTRACTOR shall remove and demolish the sunken tug boat as shown on the Drawings. Removal and demolition of the sunken tug boat shall be performed in a manner that maintains the structural stability of the adjacent sea walls, utilities, and/or facilities during demolition.

B. CONTRACTOR shall furnish any shoring or bracing required for support of sea walls, utilities, and/or facilities during demolition.

C. CONTRACTOR's demolition and debris sizing efforts will be dictated by the requirements of the disposal and/or recycling facility(s) accepting the various debris waste streams that may be generated. CONTRACTOR shall coordinate the Work to accommodate the debris size and condition requirements for each facility.

D. The sunken tug boat shall be removed from the river prior to dredging activities that occur adjacent to the area.

E. The CONTRACTOR may use any method for demolition, except blasting, as CONTRACTOR deems most practicable considering all applicable factors and requirements. All Specifications regarding environmental monitoring and sediment re-suspension will be applicable during removal and demolition of the sunken tug boat.

F. CONTRACTOR shall conduct all demolition activities to prevent damage to all adjacent real and personal property.

3.03 SALVAGE

A. CONTRACTOR shall salvage all metal scrap and other salvageable materials from the demolition materials as feasible, and load and transport the salvageable materials to an appropriate off-site facility. Salvageable materials shall include those materials that are recyclable.

3.04 DISPOSAL

A. CONTRACTOR shall load, transport, and dispose of all non-salvageable materials resulting from the demolition.

B. CONTRACTOR shall dispose of clean demolition materials at a State-permitted demolition landfill in good standing.

3.05 RESTORATION

A. CONTRACTOR shall restore on-shore areas to better than or consistent with pre-demolition conditions.

END OF SECTION 02220

SECTION 02230

DEBRIS MANAGEMENT

PART 1: GENERAL

1.01 DESCRIPTION

A. All of the Work included in this section shall be completed in accordance with the following paragraphs as well as the General Requirements set forth in Division 1 of these Specifications and in accordance with all the provisions of the Contract Documents.

B. Work covered by this section includes furnishing all supervision, labor, equipment, materials, and performing all operations necessary to:

1. Segregate non-conforming debris from dredged sediment;

2. Temporarily stockpile and clean non-conforming debris as necessary;

3. Load-out and haul non-conforming debris from the Project Area or CDF; and

4. Dispose/recycle non-conforming debris at an appropriate disposal/recycle facility.

1.02 NON-CONFORMING DEBRIS

A. Non-conforming debris shall include all materials removed from the river during sediment dredging that do not meet disposal requirements for the CDF. Non-conforming debris may include, but is not limited to: sunken tree stumps, large rocks, upland vegetation and any non-native debris. For disposal requirements contact Kerry Williams, Operations Manager of USACE Jones Island CDF, or Tom Johnson, Operations Engineer at USACE Jones Island CDF as shown on Drawings.

1.03 RETRIEVAL & SEGREGATION EQUIPMENT

A. CONTRACTOR shall provide a grapple, rake, or other equipment designed to remove large debris from within the dredge prism that is too large to be removed by the dredge bucket.

B. The sediment barge or unloading dock/receiving facility at the CDF shall be equipped with a screen or other equipment designed to remove non-conforming debris from the sediment stream prior to placement in the disposal cell.

1.04 SUBMITTALS

A. Identify the proposed disposal (landfill) and/or recycling facility the CONTRACTOR intends to haul and dispose/recycle non-conforming debris, for approval by the ENGINEER and OWNER. CONTRACTOR shall perform, and provide documentation of any waste profiling necessary for disposal facility acceptance.

B. Submit for documentation all load/weight tickets for disposal/recycle of non-conforming debris.

1.05 BASIS FOR COMPENSATION

A. The CONTRACTOR's cost for complying with the requirements of this Section of these Specifications shall be included under the Non-Conforming Waste and Debris Management item of the Contract Unit Prices and no additional compensation will be provided.

PART 2: PRODUCTS [NOT USED]

PART 3: EXECUTION

3.01 DEBRIS MANAGEMENT

A. CONTRACTOR shall segregate non-conforming debris from sediment at the Project Area and/or at the CDF. CONTRACTOR may temporarily stockpile non-conforming debris at the Project Area on a barge or within the Kinnickinnic River cell at the CDF.

B. CONTRACTOR shall clean non-conforming debris so that the surfaces are generally free of visual sediment or other obvious contamination in conformance with disposal and transportation requirements**.** CONTRACTOR's debris cleaning efforts will be dictated by the requirements of the disposal/recycling facility(s) accepting the various debris waste streams that may be generated. CONTRACTOR shall coordinate the Work to accommodate the debris cleaning requirements for each facility.

C. CONTRACTOR shall protect cleaned debris from becoming re-contaminated by coming in contact with impacted sediment or other contamination. In the event the surface of any cleaned debris becomes re-contaminated, it shall be re-cleaned in accordance with this section of the Specifications.

D. Wash water generated while cleaning debris, equipment, or other contaminated materials shall be managed in accordance with local, state and federal requirements.

END OF SECTION 02230

SECTION 02300

DREDGING

PART 1: GENERAL

1.01 DESCRIPTION

A. All Work covered under this section shall be performed in accordance with the following paragraphs as well as the General Requirements set forth in Division 1 of these Specifications and the requirements of these Contract Documents.

B. Work covered under this Section includes providing all materials, equipment, labor, and performing all operations necessary to:

1. Remove and compost aquatic and shoreline vegetation from the Project Area.

2. Mechanically dredge impacted sediment from the Project Area.

C. Related Work

1. Management of encountered debris per Section 02230.

2. Performance of bathymetric surveys of the river bottom prior to initiating dredge work and following completion of the dredge work per Section 01450.

3. Performance of air and noise monitoring in accordance with CONTRACTOR's PHASP and per Section 01501.

4. Performance of sediment resuspension monitoring and control per Section 02400.

5. Removal and demolition of sunken tug boat per Section 02220.

1.02 REFERENCES

A. Milwaukee Code of Ordinances

B. Wisconsin Department of Transportation Standard Specifications for Construction, 2008 Edition, hereafter referred to as WisDOT Standard Specifications.

C. American Society for Testing and Materials (ASTM), Current Edition

D. Occupational Safety and Health Administration (OSHA)

1.03 SUBMITTALS

A. Dredge Plan

1. CONTRACTOR shall provide a plan that details CONTRACTOR's proposed approach to performing the dredge work for approval by ENGINEER and OWNER. The dredge plan

shall include a description of the means and methods that will be implemented for the work. Specifically, CONTRACTOR shall specify/detail the following:

- Type of dredge equipment, including bucket size and type;
- Number and types of barges and ancillary equipment; and
- Operational dredge elevation control.

B. Permits & Notices

1. Copies of all permits necessary to complete the Work. Specifically, CONTRACTOR shall submit:

   - Variance to Milwaukee Code of Ordinances Chapter 80, Subchapter 2 if Work occurs at night.

2. Copies of all notices necessary to complete the Work. Specifically, CONTRACTOR shall:

   Notify the United States Coast Guard, District Nine to submit a Notice to Mariners
   Contact: Kyle W. Thompson; District Nine Notice to Mariners and Chart Desk
   Phone: 216-902-6073

   Notify Harbor Master with the Port of Milwaukee
   Contact: Joe DiGiorgio; Harbor Master, Operations Manager & Port Security Officer
   Phone: 414-286-3610

   Notify the WDNR Warden
   Contact: Steve Sanidas; Conservation Warden
   Phone: 414-263-8544

1.04 SEQUENCING AND SCHEDULING

A. CONTRACTOR shall sequence its dredging operations in phases as shown on the Drawings and Specifications. CONTRACTOR shall not proceed with dredging operations until the following conditions are met to the satisfaction of the OWNER:

1. An approved plan that identifies how the CONTRACTOR plans to meet the resuspension performance standards in Section 02400. Prior to dredging the plan must be implemented.

2. Confirm that unloading/docking facilities are suitable for CONTRACTOR operations and that the facilities are ready to receive sediment barges at the CDF per Section 02350.

The following describes the dredging prism, as shown in Drawings, and phases of work:

- **Phase 1** will include dredging to the final design elevation from the project downstream end (east side of the Kinnickinnic Avenue Bridge) to the abandoned railroad bridge abutments.

- **Phase 2** will include dredging to a depth sufficient to allow passage of fully loaded barges, but not deeper than 566.5 feet IGLD85 to avoid exposing sediment with high PCB concentrations. The channel dredged during this phase will conform to the final channel design shown in Drawings. Dredging for this phase will be from the downstream end (east side of the Kinnickinnic Avenue Bridge) to the upstream end of the Project Area (north side of the Becher Street Bridge) for the entire width of the channel in each zone prior to commencement of dredging in the upstream zone. The sunken tug boat will be removed prior to dredging the area adjacent to it.

- **Phase 3** will include dredging to the design dredge elevations shown in Drawings. Dredging will occur from the upstream end (north side of the Becher Street Bridge) to the downstream end (east side of the Kinnickinnic Avenue Bridge) of the Project Area, completing the dredge to the entire width of the channel in each zone prior to commencement of dredging in the downstream zone.

- **Phase 4** will include dredging residuals from the area dredged in Phase 1 (if sediment has accumulated in this area) to the design elevations shown in Drawings.

- **Phase 5**, if necessary, will include dredging impacted sediment to a maximum elevation of the 1940 channel or to native sediment (whichever is shallower) in discrete areas, which will be based on the results of confirmation sediment sampling (this will be completed at a later date determined by KK Team). If the design dredging elevation is deeper than the 1940 channel, no further dredging is required.

- **Phase 6**, if necessary, will include placement of a residuals cover over the Phase 5 area that does not meet acceptable residual total PCB concentrations in surficial sediment (this will be completed at a later date determined by the KK Team).

1.05 JOB CONDITIONS

A. It shall be the CONTRACTOR's sole responsibility to review available surveys, tests, reports, conduct additional tests, and otherwise determine to its own satisfaction the location and nature of all surface and subsurface features and the sediment and water conditions that may be encountered. OWNER's information on Project Area conditions may be reviewed at OWNER's offices as scheduled with OWNER.

B. CONTRACTOR shall suspend dredging operations if resuspension performance standards are not met outside the Project Area.

C. CONTRACTOR shall be solely responsible for determining the means and methods for meeting the dredging extent (horizontal & vertical) requirements unless otherwise specified herein, except that hydraulic dredging will not be permitted.

D. CONTRACTOR shall be solely responsible for utilizing means and methods that protect adjacent structures and utilities from damage resulting from CONTRACTOR's operations, specifically including, but not limited to, settlement, consolidation, displacement, cracking, vibration, undermining, washout, and uplift caused by dredging, or any other operation. CONTRACTOR shall not dredge sediment to a depth below the base of existing bridge

abutments. If requested by CONTRACTOR, OWNER will accompany CONTRACTOR in examination of existing adjacent structures prior to beginning the Work. Examination will be intended to provide CONTRACTOR opportunity to document relevant existing structural damage or problems. The exception to this is located at the CPR Railroad Bridge center pivot pier, where significant undermining of this abutment was noted during an underwater bridge inspection (Brennan, 2003). Reinforcement of this bridge abutment is not part of this work and will be the responsibility of the bridge owner.

E. CONTRACTOR shall provide all anchoring, mooring, spuds, and other measures required to perform all Work in accordance with Laws and Regulations. CONTRACTOR shall not fasten to the protection piers of bridges, bridge approaches, MMSD's facilities, or piles driven for the protection of bridge piers or approaches in the city. CONTRACTOR shall not anchor or drive spuds, over any known utility cable in observance of Milwaukee City Ordinance. Any operations within the vicinity of a city utility require the notification of the City.

F. CONTRACTOR shall comply with the provisions for Vessels Lying in the Harbor in accordance with the Milwaukee Code of Ordinances, U.S. Coast Guard, USACE, and Port Authority. Specifically, CONTRACTOR's vessels shall not be left unattended, shall be lit at night, shall be fastened when not in transport, and shall not obstruct without proper notice to OWNER and authorities.

1.06 BASIS FOR COMPENSATION

A. The CONTRACTOR's cost for complying with the requirements of this Section of these Specifications shall be included under the Dredging item of the Contract Unit Prices and no additional compensation will be provided.

PART 2: PRODUCTS

2.01 GENERAL

A. CONTRACTOR shall obtain all import soil material necessary to complete the Work. Acceptable import soil material shall be free of contamination, debris, waste, frozen materials, or other deleterious material. All import soil material shall be free of crushed concrete or bituminous material. ENGINEER may reject import material delivered to the Project Area, if in the opinion of ENGINEER, CONTRACTOR failed to comply with import material requirements.

B. CONTRACTOR shall submit a list of all off-site and on-site sources of materials specified in this Section to OWNER and ENGINEER at least two weeks prior to delivery of materials to the Project Area.

C. CONTRACTOR shall provide OWNER and ENGINEER with test results from all potential off-site sources of materials a minimum of two weeks prior to their use in construction so that the materials can be evaluated for conformance with specifications.

D. OWNER or ENGINEER may take samples of the materials after they have been furnished to the site for additional testing. OWNER will pay for OWNER or ENGINEER's testing of samples that meet Specifications. CONTRACTOR shall pay for OWNER's or ENGINEER's testing of samples that do not meet Specifications.

E. CONTRACTOR shall provide certificates for materials obtained from off-site sources indicating compliance of materials with Specifications prior to delivery to the site. OWNER or ENGINEER may take random samples of the material to verify compliance with the Specifications.

PART 3: EXECUTION

3.01 EXAMINATION AND PROTECTION

A. CONTRACTOR shall locate and protect overhead and underground utilities, and any other facilities or structures that lie in or adjacent to the Project Area including but not limited to bridges, piers, abutments, and sea walls.

3.02 AQUATIC AND SHORELINE VEGETATION

A. Vegetation, where present, will be mechanically harvested from areas of the Kinnickinnic River Project Area as defined by ENGINEER. Before dredging, vegetation will be cut as close to the sediment surface as possible without disturbing the sediments. Removal of aquatic vegetation will require the use of water quality control structures to contain potential releases. Harvested aquatic vegetation may be staged at the Jones Island CDF until disposal as specified in Section 02230.

3.03 DREDGING

A. CONTRACTOR shall perform dredging operations to the elevations, slopes, and dimensions shown on the Drawings in the sequence and in phases listed in Part 1.04. Dredge tolerances are provided in Part 3.05.

B. CONTRACTOR shall implement best management practices (BMPs) for environmental dredging. Best management practices (BMPs) should be implemented to minimize resuspension during dredging operations. Recommended resuspension control BMPs include, but are not limited to:

1. Barges shall be water-tight and inspected to confirm water-tightness prior to dredging operations and dredged material transport;

2. Uncovered storage or transport barges will not be allowed;

3. Dredge all sediment from within the dredge prism without excavating beyond the over-dredge limit;

4. Work on slopes proceeding from top of slope to toe of slope;

5. Utilize underwater cameras or positioning devices (e.g. GPS) on the dredge bucket to make the operator aware of the location of the dredge bucket in relation to the top of sediment to limit resuspension;

6. Using an environmental bucket to limit resuspension caused by the dredge bucket going through the water column (vents) or dredged material falling out of the dredge bucket (gaskets);

7. Using an experienced environmental dredging operator that is capable of implementing BMPs to limit resuspension;

8. Minimizing the overfill of dredge bucket;

9. Reducing the rate of bucket descent and retrieval;

10. Perform single bites with the bucket; each bucket shall be brought to the surface and emptied between bites;

11. Using a wash bucket to rinse dredged material from the dredge prior to lowering into the water;

12. No "sweeping" of the bottom to contour channel;

13. No bottom stockpiling;

14. Slow release of excess water at surface;

15. Do not over-fill barges with dredged material;

16. Oil booms should be available for emergency use; and

17. Separating dredged material from barge return water.

3.04 DREDGE RESIDUALS

A. Confirmation samples shall be collected from the surficial sediment (top 6-inches of sediment after the specified dredge line shown on Drawings is met) by the ENGINEER at historic sediment coring locations described in Section 01460. Total PCB concentrations will be compared to the PCB performance standards of 1.5 mg/kg average for a defined area, with a 4 mg/kg maximum concentration allowed.

B. If all confirmation samples are less than 1.5 mg/kg total PCBs, dredging is complete and no further action is required.

C. If the performance standards are not met, then the following evaluation process will be used to guide sediment remediation management decisions for the Project Area.

- Has native material been reached in the area that exceeds the proposed performance standards? If native material has been encountered, no further dredging is required, install a residual cover layer in that area. If native material has not been encountered go to the next evaluation step;

- Is the dredged elevation below the proposed dredging configuration and the 1940 channel in the area that exceeds the proposed performance standards? If the dredged elevation is below both the proposed dredging configuration and the 1940 channel, no further dredging is required, install a residual cover layer in that area. If not, go to the next evaluation step;

- Is the dredged elevation above the 1940 channel in the area that exceeds the proposed performance standards? If, so redredge the area to the 1940 channel elevation and install a residual cover layer.

D. The horizontal extent for redredging (if necessary) will be defined by ENGINEER after the post remediation sediment samples have been analyzed. The actual redredging area will be defined by the ENGINEER using: 1) the distribution of contaminants horizontally and vertically prior to dredging; 2) post-dredging channel bathymetry; and 3) post-dredging analytical results from sediment samples adjacent to the sample that indicates redredging is necessary. Once this evaluation process has been completed and appropriate actions implemented as confirmed by ENGINEER, sediment remediation will be considered complete.

3.05 DREDGE TOLERANCES

A. Vertical

1. In order to ensure that all contaminated material above the dredge neat line is removed, and based on survey and dredge accuracy, the allowable overdredge is 1 feet below the dredge neat line as shown in Drawings.

2. In general, under dredging will not be allowed unless approved by ENGINEER or OWNER.

B. Horizontal

1. Actual dredge limits shall meet the maximum and minimum slopes shown on the Drawings. The side slopes of the dredge cut should not exceed a maximum slope of 2H:1V, unless otherwise specified.

3.06 FIELD QUALITY CONTROL

A. CONTRACTOR shall perform field quality control as specified in Section 01450 of these Specifications.

END OF SECTION 02300

SECTION 02350

DREDGED MATERIAL TRANSPORT & DISPOSAL

PART 1: GENERAL

1.01 DESCRIPTION

A. All Work included in this section shall be performed in accordance with the following paragraphs, as well as the general requirements set forth in Division 1 of these Specifications and the requirements of all of these Contract Documents.

B. Work covered by this section includes furnishing all supervision, labor, materials, and equipment required to complete all general or miscellaneous Project Area earth work, sediment transport, disposal and placement of dredged sediment at the Jones Island CDF including, but not limited to the following tasks:

1. Transporting dredged material from the Project Area to the Jones Island CDF.

2. Operating an unloading dock/receiving facility at the Jones Island CDF.

3. Placing dredged material in the designated Kinnickinnic River cell at the Jones Island CDF.

C. Related Work

1. Management of encountered debris per Section 02230.

2. Dredging per Section 02300.

3. Performance of air and noise monitoring in accordance with Contractor's PHASP and per Section 01501.

4. Performance of sediment resuspension monitoring and control per Section 02400.

5. Bathymetric survey of un-loading/dock facility in the vicinity of the Jones Island CDF per Section 01450.

1.02 REFERENCES

A. Milwaukee Code of Ordinances, Volume 1

1.03 JOB CONDITIONS

A. The material dredged from the Project Area shall be disposed of within a designated disposal cell at the Jones Island CDF as shown on Drawings and Specifications.

B. Jones Island CDF Requirements:

1. Hours of Operation: Work operations are 24 hours per day, 7 days per week, unless otherwise specified (a variance to Chapter 80, Subchapter 2 of the Milwaukee City ordinance required for night-time operations).

2. Dredge material transfer will occur at the off-loading facility to be constructed by the USACE or others;

3. Silt curtains may be required around barges when off-loading to prevent spillage from migrating further into the harbor per Section 2400;

4. Pre- and Post-offloading bathymetric survey of off-loading area will be required per Section 01450;

5. The contractor will be responsible for removing spillage after off-loading is completed per Section 02300;

6. The WDNR and USACE will provide any necessary permits and will manage excess water that is generated in the CDF as a result of sediment consolidation and off-loading;

7. Large debris can be staged at the Jones Island CDF per Section 02230, but must be disposed of at an approved off-site landfill;

8. Mechanical and/or pneumatic handling of the dredged sediment from the barge into the Jones Island CDF will be allowed;

9. The CONTRACTOR will be responsible for transportation of the dredge material from the off-loading facility to the disposal cell. Final placement of dredge material will be completed by the CONTRACTOR.

10. Pumping of decant water from the sediment barge into the CDF will be allowed;

11. Hydraulic disposal at the Jones Island CDF will be prohibited and no additional water can be added to the sediment during transport or handling for disposal; and

12. Air monitoring for VOCs and noise in accordance with local, state, and federal requirements will be required on the off-loading barge per Section 01501.

C. Barge traffic transporting Kinnickinnic dredged sediments shall exit the Project Area at the Kinnickinnic Avenue Bridge as shown on Drawings. CONTRACTOR shall use the federal navigation channel, downstream of the Project Area until the transport has reached the Harbor of Refuge within Lake Michigan. The CONTRACTOR shall proceed south to the Jones Island CDF as identified on the Drawings. The approximate distance of travel, from the Project Area to the Jones Island CDF, is four miles.

1. CONTRACTOR shall use designated route shown on Drawing unless otherwise approved by OWNER.

2. Immediately downstream of the Project Area, St. Mary's Cement facility has regular commercial traffic that may affect barge traffic. Contact information is provided on the Drawings.

D. CONTRACTOR shall comply with the provisions for Vessels Lying in the Harbor in accordance with the Milwaukee Code of Ordinances. Specifically, CONTRACTOR's vessels shall not be left unattended, shall be lit at night, shall be fastened when not in transport, and shall not obstruct other vessel passage.

1.04 SUBMITTALS

A CONTRACTOR shall submit to OWNER for approval the CONTRACTOR's work plan for off-loading and placing sediment at the CDF.

B. CONTRACTOR shall submit to OWNER for approval an alternative ground route for transportation of impacted sediment from the Project Area to the CDF if requested by OWNER.

1.05 BASIS FOR COMPENSATION

A. The CONTRACTOR's cost for complying with the requirements of this Section of these Specifications shall be included under the Dredged Material Transport & Disposal item of the Contract Unit Prices and no additional compensation will be provided.

PART 2: PRODUCTS [NOT USED]

PART 3: EXECUTION

3.01 EXAMINATION

A. CONTRACTOR shall examine the area and conditions of the off-loading area for disposal of Kinnickinnic River sediment.

3.02 PREPARATION

A. The CONTRACTOR shall protect structures, utilities, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by barge unloading operations.

B. CONTRACTOR's independent surveyor shall perform a bathymetric survey of the unloading dock/receiving facility vicinity prior to receipt of any sediment from the Project Area per Section 01450.

C. The CONTRACTOR may be required to provide a silt curtain or other sediment resuspension control measure for sediment resuspension control at the off-loading area as specified in Section 02400, before barge off-loading commences, to protect the unloading Jones Island CDF dock/receiving facility vicinity from fugitive sediment during active unloading periods.

3.03 SEDIMENT UNLOADING

A. CONTRACTOR shall unload dredged material in accordance with the requirements specified in Part 1.03 for compliance with the CDF disposal requirements.

B. CONTRACTOR shall perform dredged material unloading in a controlled and organized manner utilizing means and methods to minimize the loss of sediment to the unloading dock/receiving facility vicinity during unloading operations. CONTRACTOR shall be responsible for the

recovery of any lost dredged material to the unloading dock/receiving facility vicinity. The bathymetric survey performed following receipt of all impacted sediment from the Project Area will be the basis of determination for sediment loss to the unloading dock/receiving facility vicinity.

C. Dewatering, wash, or other water generated from the management of impacted dredged material at off-loading facility shall be managed per local, state and federal requirements.

3.04 DREDGED MATERIAL PLACEMENT

A. CONTRACTOR shall place dredged material in the designated cell to the lines and grades provided by OWNER.

B. The placement of the material in the CDF shall not exceed elevations specified by USACE.

C. The approximate size and location of the Kinnickinnic River dredged material disposal cell is shown on the Drawings. The Kinnickinnic River dredged material disposal cell will be constructed by others.

3.05 FIELD QUALITY CONTROL

A. The CONTRACTOR shall utilize equipment, materials, and procedures which are anticipated to meet the quality requirements specified.

3.06 MAINTENANCE

A. The CONTRACTOR shall repair and re-establish grades in settled, eroded, and rutted areas that resulted directly from CONTRACTOR's operations to pre-existing conditions as directed by OWNER.

END OF SECTION 02350

SECTION 02400

SEDIMENT RESUSPENSION CONTROL

PART 1: GENERAL

1.01 DESCRIPTION

A. All work covered under this section shall be performed in accordance with the following paragraphs as well as the General Requirements set forth in Division 1 of these Specifications and the requirements of these Contract Documents.

B. Work covered under this Section includes providing all materials, equipment, labor, and performing all operations necessary to:

1. Monitor water quality outside the Project Area.

2. Furnish, install, and maintain sediment resuspension controls to comply with the resuspension performance standards for the Project Area.

3. Furnish, install, and maintain other sediment resuspension controls to comply with the USACE and resuspension performance standards at the Jones Island CDF off-loading facility.

C. Related Work

1. Dredging per Section 02300.

2. Dredged material transport and disposal per Section 02350.

1.02 REFERENCES

A. Milwaukee Code of Ordinances, Volume 1

B. USACE, 2005. Silt Curtains as a Dredging Project Management Practice. ERDC TN-DOER-E21, September 2005.

1.03 SUBMITTALS

A. Water Quality Data

1. CONTRACTOR shall provide to ENGINEER/OWNER any operational water quality data generated by CONTRACTOR during performance of the work.

2. ENGINEER shall provide to CONTRACTOR/OWNER any operational water quality data generated by ENGINEER during performance of the work.

1.04 RESUSPENSION PERFORMANCE MONITORING STANDARDS

A. Turbidity, as an indicator of total suspended solids (TSS), will be the parameter of interest for resuspension performance monitoring. The action level for the Project Area is an 80-mg/L increase in TSS (equivalent to turbidity of 50 NTU above upstream conditions). Sustained turbidity above the action level for 60 minutes will constitute an exceedence of the action level.

1.05 PERFORMANCE MONITORING STATIONS

A. The planned locations of performance monitoring stations will be located: 1) south of the Becher Street Bridge (to be located by OWNER); and 2) 1,000 ft east of the Kinnickinnic Avenue Bridge (to be located by OWNER). The monitoring stations record turbidity within the river and will be operated and maintained by the CONTRACTOR.

1.06 SEDIMENT RESUSPENSION CONTROL

A. Approved sediment resuspension control measures shall be implemented to meet resuspension performance monitoring standards. Best Management Practices (BMPs) should be implemented to minimize resuspension during dredging operations. Recommended resuspension control BMPs may include, but are not limited to:

- Utilizing underwater cameras or positioning devices (e.g. GPS) on the dredge bucket to make the operator aware of the location of the dredge bucket in relation to the top of sediment to limit resuspension;
- Using an environmental bucket to limit resuspension caused by the dredge bucket going through the water column (vents) or dredged material falling out of the dredge bucket (gaskets);
- Using an experienced environmental dredging operator that is capable of implementing BMPs to limit resuspension;
- Minimizing the overfill of dredge bucket;
- Reducing the rate of bucket descent and retrieval;
- Using a wash bucket to rinse dredged material from the dredge prior to lowering into the water;
- No “sweeping” of the bottom to contour channel;
- No bottom stockpiling;
- Slow release of excess water at surface;
- Do not over-fill barges with dredged material;

- Oil booms should be available for emergency use; and

- Separating dredged material from barge return water;

B. An example of a sediment resuspension control measure is a silt curtain. If necessary, silt curtains may be deployed within the Project Area to reduce the transport of sediment into and out of the Project Area. If silt curtains are deployed, they shall be deployed to a depth in the river channel to allow mudflow beneath the silt curtain and meet resuspension standards for the Project Area. USACE (2005) suggests that extra curtain width (10 to 20 percent) may be necessary to accommodate deflection from current flow. The exact location for the deployment of silt curtains will be at the discretion of the CONTRACTOR, if used as the sediment resuspension control measure.

C. Per Section 2350, silt curtains may be required around barge at the off-loading area located at the Jones Island CDF.

D. Deployment of silt curtains and/or other resuspension control measures that are anchored to shore will require permission from the property owner, with assistance from the OWNER and cooperation between the property owner and CONTRACTOR. The CONTRACTOR will also need to contact St. Mary's Cement (contact info on Drawings) to determine if operations at their terminal, immediately downstream of the Project Area, will affect or be affected by the employment of a silt curtain near the Kinnickinnic Avenue Bridge. Contingency resuspension control measures and an oil boom will be stored on site, for emergency use in the event of resuspension control measures failure, visible sheen, or exceedance of resuspension performance standards. Dredging operations will not be allowed if resuspension control measures are not in place.

E. If resuspension control measures block the flow of traffic in the Project Area, the CONTRACTOR shall make set times available for the resuspension control measures to be opened for public traffic through the Project Area and designate a contact person that will coordinate the opening of the resuspension control measures (emergency use only) within 30 minutes of notification outside of the standard times set for opening the resuspension control measures. The use of the Project Area by public traffic will be restricted during dredging operations to a 30 minute window once each morning and afternoon. The time of this window will be communicated by the CONTRACTOR to the local marinas and the United States Coast Guard Notice to Mariners (contact info on Drawings).

F. The type and configuration of resuspension control measures used during dredging and off-loading operations shall be defined in the CONTRACTOR's work plan and be able to meet the resuspension performance standards for the Project Area and USACE requirements for off-loading at the Jones Island CDF. Within the CONTRACTOR's work plan, contingency measures will be included that describe how the resuspension control measures will be managed during low, average, and high flow conditions and what contingency measures will be implemented in the event resuspension performance standards are not met. The USACE Dredging Operations and Environmental Research (DOER) Program - Silt Curtains as a Dredging Project Management Practice - ERDC TN-DOER-E21 (USACE, 2005), recommends that silt curtains shall only be deployed when river flow velocities are below 1.5 knots (2.5 ft/s). This velocity is deemed the maximum velocity at which the use of silt curtains is considered effective.

1.07 BASIS FOR COMPENSATION

A. The CONTRACTOR's cost for complying with the requirements of this Section of these Specifications shall be included under the Sediment Resuspension Control item of the Contract Unit Prices and no additional compensation will be provided.

PART 2: PRODUCTS

2.01 RESUSPENSION CONTROL MEASURES IN PROJECT AREA

A. Per Part 1.06, resuspension control measures of sufficient size and quantity, suitable for use in the Project Area and off-loading area at Jones Island CDF, shall be available as a contingency in the event sediment resuspension controls fail to meet performance standards.

2.02 OIL BOOMS

A. Per Part 1.06, oil booms of sufficient size and quantity, suitable for use in the Project Area and off-loading area at Jones Island CDF, shall be available as a contingency measure for maintaining environmental quality. The booms shall be stored in such a manner that they may be deployed on a moments notice.

PART 3: EXECUTION

3.01 MONITORING

A. ENGINEER will monitor the water quality data at the MMSD monitoring stations at or near the Project Area that will be used to assess the effectiveness of CONTRACTOR's sediment resuspension controls.

B. Data from the upstream and downstream monitoring stations will be used to evaluate the water quality with respect to the performance monitoring standard.

C. ENGINEER will notify CONTRACTOR if water quality criteria have been exceeded.

3.02 EVALUATION OF EXCEEDENCE

A. If turbidity readings from the performance monitoring location downstream of the project area indicate an increase of 80 mg/L in TSS above the upstream performance monitoring location (> 50 NTU above the upstream performance monitoring location), additional monitoring will be performed to assess the BMPs.

B. Additional monitoring shall include turbidity measurement grab samples between the Project Area and the downstream monitoring location to determine the cause of the increase in turbidity.

C. If the increase was caused from non-dredging activities, the dredging will continue.

D. If the turbidity was elevated due to the dredging activities, the CONTRACTOR will re-assess the effectiveness of the BMPs and take corrective measures to mitigate the exceedance of resuspension performance standards.

E. If the ENGINEER determines that dredging and/or construction activities are responsible for the exceedance of the resuspension standards during dredging, work will stop until the CONTRACTOR can demonstrate that corrective measures have been taken and turbidity levels are below the resuspension performance standards.

3.03 CORRECTIVE MEASURES

A. Corrective measures proposed by CONTRACTOR shall be reviewed by ENGINEER prior to implementation.

3.04 OPERATION

A. Sediment resuspension controls and contingency measures shall be in place per Part 1.06.

B. Sediment resuspension controls and contingency measures shall not alter the regular flow through the river channel that could result in erosion of sea walls/embankments, scour of river bed, scour of bridge abutments, or any other deteriorating effect on structures or facilities in the vicinity of the Project Area or off-loading facility at the Jones Island CDF.

END OF SECTION 02400

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

KINNICKINNIC RIVER SEDIMENT REMEDIATION

MILWAUKEE, WISCONSIN

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LOCATION MAP

VICINITY MAP

LIMITS OF SECTION CUT

SECTION IDENTIFIER — 1 / C-02

SECTION REFERENCES (SHEET SECTION IS LOCATED ON)

SECTION VIEW CALL OUT

SECTION IDENTIFIER — 1 / C-01 — SECTION: TITLE 1"=1'-0"

SECTION REFERENCES (TYP.) (SHEET SECTION IS CALLED OUT ON)

SECTION VIEW TITLE

SOURCE INFORMATION

A. SEAWALL & SOUNDINGS

1. KINNICKINNIC RIVER DOCKLINE SURVEY
   LAND INFORMATION SERVICES, INC.
   800 WEST GOOD HOPE ROAD
   MILWAUKEE, WI 53223
   (414)527-9000
   DATES OF SURVEY: DECEMBER 14, 2007,
   DECEMBER 20, 2007,
   JANUARY 14, 2008

2. KINNICKINNIC RIVER SEAWALL SURVEY
   BLOOM CONSULTANTS
   10001 INOVATION DRIVE
   MILWAUKEE, WI 53226
   (414)771-3390
   DATE OF SURVEY:AUGUST 1-2, 2005

3. KINNICKINNIC RIVER SOUNDINGS
   UNITED STATES ARMY CORP OF ENGINEERS
   LAKE MICHIGAN AREA OFFICE
   124 N. MAIN STREET
   KEWAUNEE, WI 54216
   (920)388-3720
   DATE OF SURVEY: 2006

4. KINNICKINNIC RIVER SOUNDINGS
   THE PORT OF MILWAUKEE
   2323 S. LINCOLN MEMORIAL DRIVE
   MILWAUKEE, WI 53207
   (414) 286-3511
   DATE OF SURVEY: AUGUST & SEPTEMBER 1940

B. PARCEL & BASE MAP INFORMATION

1. TOPOGRAPHIC MAP OF SW 1/4 SECTION 4
   TOWNSHIP 6 NORTH, RANGE 22 EAST
   MILWAUKEE COUNTY, WISCONSIN

   PREPARED BY:

   AERO-METRIC, INC SHEBOYGAN, WISCONSIN
   UNDER A PROGRAM ADMINISTERED BY THE
   SOUTHEASTERN WISCONSIN REGIONAL
   PLANNING COMMISSION

C. UTILITY INFORMATION

1. ALL UTILITIES SHOWN ARE CONSIDERED LEVEL D, UNLESS OTHERWISE NOTED, IN ACCORDANCE WITH ASCE STANDARD C1/ASCE 38-02.

D. DATUMS

HORIZONTAL

1. WISCONSIN STATE PLANE NAD83 SOUTH ZONE (FEET)

VERTICAL

1. INTERNATIONAL GREAT LAKES DATUM 1985 (IGLD 85, FEET)
   ORDINARY HIGH WATER LEVEL (OHWL)= 581.5ft IGLD 85
   ORDINARY LOW WATER LEVEL (OLWL)= 577.5ft IGLD 85

INDEX OF SHEETS

		CURRENT REVISION	BARR PROJECT FILE NUMBER
G-00	COVER SHEET, SHEET INDEX, & SITE LOCATION MAP	0	27708_1.dwg
C-01	SITE PLAN-PROJECT AREA & CDF	0	27738_1.dwg
C-02	DREDGING PLAN	0	26414_1.dwg
C-03	PROFILES & CROSS SECTIONS	0	26376_1.dwg
C-04	JONES ISLAND CDF PLAN	0	27739_1.dwg

DIGGERS HOTLINE
(800) 242-8511 (414) 259-1181

WARNING

UTILITY LOCATIONS ARE NOT CONFIRMED THOSE SHOWN WERE OBTAINED FROM UTILITY OWNERS OR PLANS. THREE FULL WORKING DAYS PRIOR TO BEGINNING WORK THE CONTRACTOR SHALL NOTIFY UTILITY OWNERS TO HAVE WORK AREA STAKED AND SHALL PROTECT OR HAVE RELOCATED, AS NOTED IN THE SPECIFICATIONS, ALL UTILITIES THAT MIGHT INTERFERE WITH CONSTRUCTION.

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Ph: 1-800-632-2277

Project Office:
BARR ENGINEERING CO.
4700 WEST 77TH STREET
MINNEAPOLIS, MN.
55435-4803
Ph: 1-800-632-2277
Fax: (952) 832-2601
www.barr.com

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Date	02/22/08
Drawn	JMM2
Checked	JLB2
Designed	JMM2/JLB2
Approved	JLB2

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
MADISON, WISCONSIN

KINNICKINNIC RIVER SEDIMENT REMEDIATION-FINAL DESIGN
MILWAUKEE, WI

TITLE SHEET, INDEX, AND SITE LOCATION MAP

BARR PROJECT No. 4941022
CLIENT PROJECT No.
DWG. No. G-00
REV. No. 0

Xrefs in Drawing - M:\cad\4941023\Utility_Base.dwg
Images in Drawing - M:\cad\4941023\SiteLocation.tif
jmm2 M:\cad\4941023\27708_1.DWG Plot at 96 11/14/2007 08:58:34

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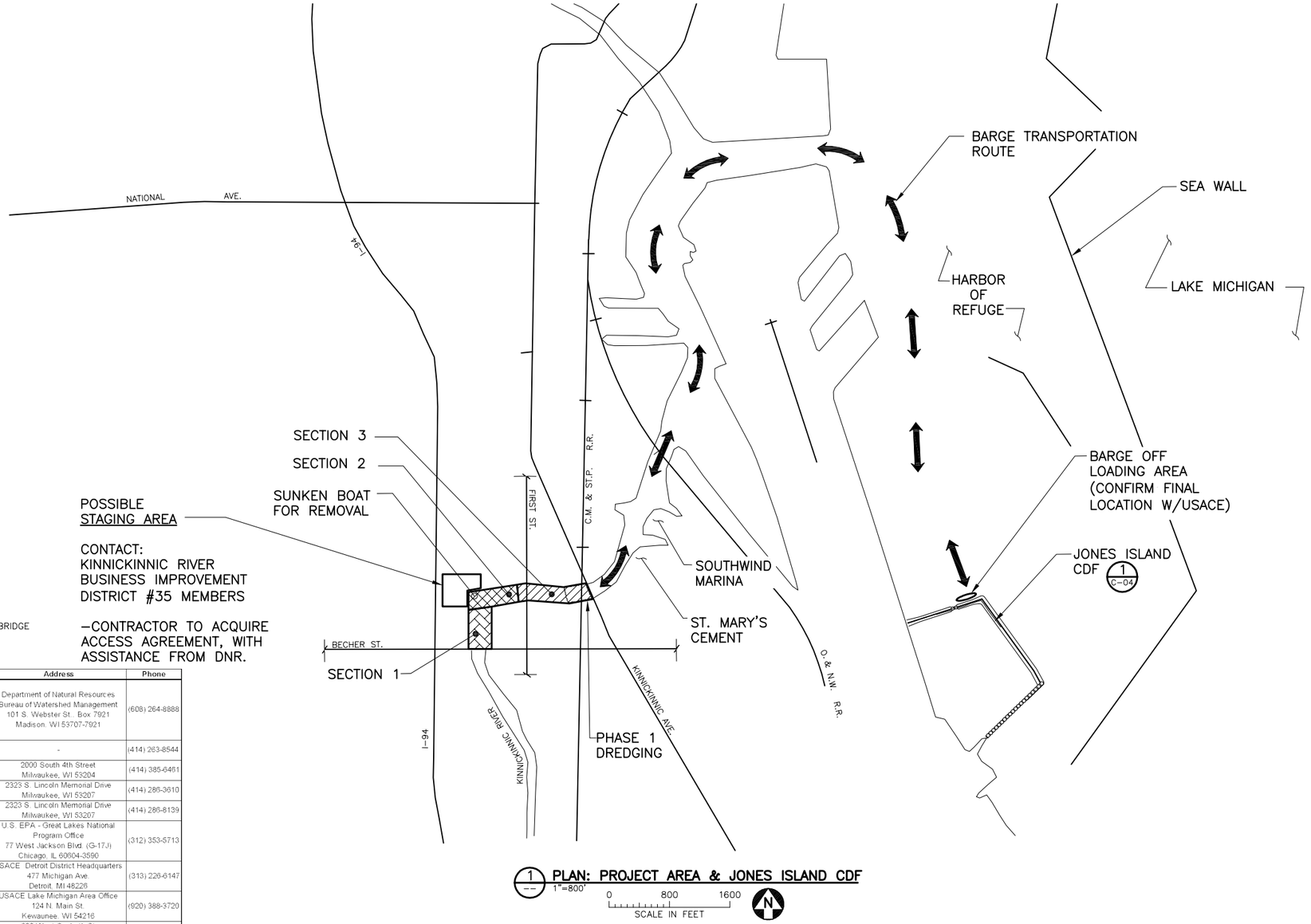

1 PLAN: PROJECT AREA & JONES ISLAND CDF
1"=800'
0 800 1600
SCALE IN FEET

DREDGE SECTIONS

SECTION 1– BECHER STREET TO STATION 4+15

SECTION 2– STATION 4+15 STATION 11+15

SECTION 3– STATION 11+15 TO KINNICKINNIC AVENUE BRIDGE

Project Contacts	Name	Address	Phone
Wisconsin DNR - Project Manager	Xiaochun Zhang	Department of Natural Resources Bureau of Watershed Management 101 S. Webster St., Box 7921 Madison, WI 53707-7921	(608) 264-8888
Wisconsin DNR - Conservation Warden	Steve Sanidas	-	(414) 263-8544
Kinnickinnic River Business Improvement District #35	Dave Ferron	2000 South 4th Street Milwaukee, WI 53204	(414) 385-6461
Port of Milwaukee - Harbor Master	Joe DiGiorgio	2323 S. Lincoln Memorial Drive Milwaukee, WI 53207	(414) 286-3610
Port of Milwaukee - Chief Engineer	Larry Sullivan	2323 S. Lincoln Memorial Drive Milwaukee, WI 53207	(414) 286-8139
USEPA - GLNPO	Ajit Vaidya	U.S. EPA - Great Lakes National Program Office 77 West Jackson Blvd. (G-17J) Chicago, IL 60604-3590	(312) 353-5713
USACE Detroit District - Design Engineer (CDF)	Kerry Williams	USACE, Detroit District Headquarters 477 Michigan Ave. Detroit, MI 48226	(313) 226-6147
USACE-Kewaunee Project Office (CDF Operations)	Tom Johnson	USACE Lake Michigan Area Office 124 N. Main St. Kewaunee, WI 54216	(920) 388-3720
Milwaukee Metropolitan Sewerage District	Debra Jensen Christopher Magruder	260 West Seeboth St. Milwaukee, WI 53204	(414) 225-2143
United States Coast Guard	Officer in Charge	Coast Guard Station Milwaukee, WI	(414) 747-7170
United States Coast Guard - Notice to Mariners	Kyle Thompson	District Nine Notice to Mariners and Chart Desk	(216) 902-6073

Local River Traffic Contacts	Name	Address	Phone
Pier Milwaukee	-	2078 S. 4th Street Milwaukee, WI	(414) 429-7000
Southwind Marina	-	162 E. Lincoln Avenue Milwaukee, WI	(414) 769-0000
Milwaukee Marine	-	1933 S. 1st Street Milwaukee, WI	(414) 384-8300
St. Mary's Cement	-	2006 S. Kinnickinnic Ave. Milwaukee, WI	(414) 481-6777

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MINNEAPOLIS, MN.
55435-4803
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Designed	JMM2/JLB2
Approved	JLB2

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
MADISON, WISCONSIN

KINNICKINNIC RIVER SEDIMENT REMEDIATION–FINAL DESIGN
MILWAUKEE, WI

SITE PLAN
PROJECT AREA & JONES ISLAND CDF

BARR PROJECT No. 4941022
CLIENT PROJECT No.
DWG. No. C–01
REV. No. 0

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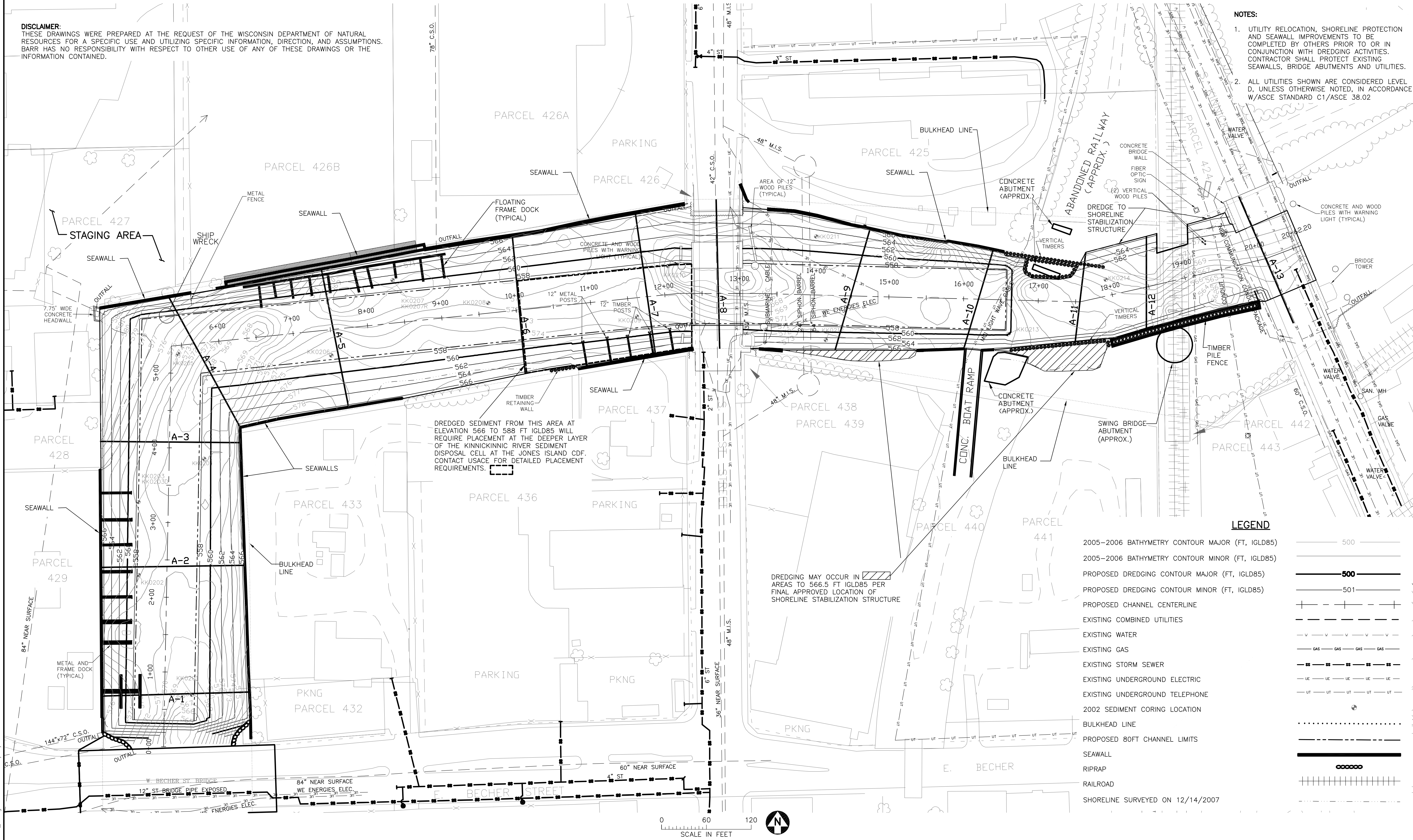
NOTES:

1. UTILITY RELOCATION, SHORELINE PROTECTION AND SEAWALL IMPROVEMENTS TO BE COMPLETED BY OTHERS PRIOR TO OR IN CONJUNCTION WITH DREDGING ACTIVITIES. CONTRACTOR SHALL PROTECT EXISTING SEAWALLS, BRIDGE ABUTMENTS AND UTILITIES.
2. ALL UTILITIES SHOWN ARE CONSIDERED LEVEL D, UNLESS OTHERWISE NOTED, IN ACCORDANCE W/ASCE STANDARD C1/ASCE 38.02



LEGEND

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2005-2006 BATHYMETRY CONTOUR MINOR (FT, IGLD85)	
PROPOSED DREDGING CONTOUR MAJOR (FT, IGLD85)	500
PROPOSED DREDGING CONTOUR MINOR (FT, IGLD85)	501
PROPOSED CHANNEL CENTERLINE	
EXISTING COMBINED UTILITIES	
EXISTING WATER	— V —
EXISTING GAS	— GAS —
EXISTING STORM SEWER	
EXISTING UNDERGROUND ELECTRIC	— UE —
EXISTING UNDERGROUND TELEPHONE	— UT —
2002 SEDIMENT CORING LOCATION	
BULKHEAD LINE	
PROPOSED 80FT CHANNEL LIMITS	
SEAWALL	
RIPRAP	
RAILROAD	
SHORELINE SURVEYED ON 12/14/2017	

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KINNICKINNIC RIVER SEDIMENT REMEDIATION FINAL DESIGN
MILWAUKEE, WI

DREDGING PLAN

BARR PROJECT No. 4941022
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DWG. No. C-02
REV. No. 0

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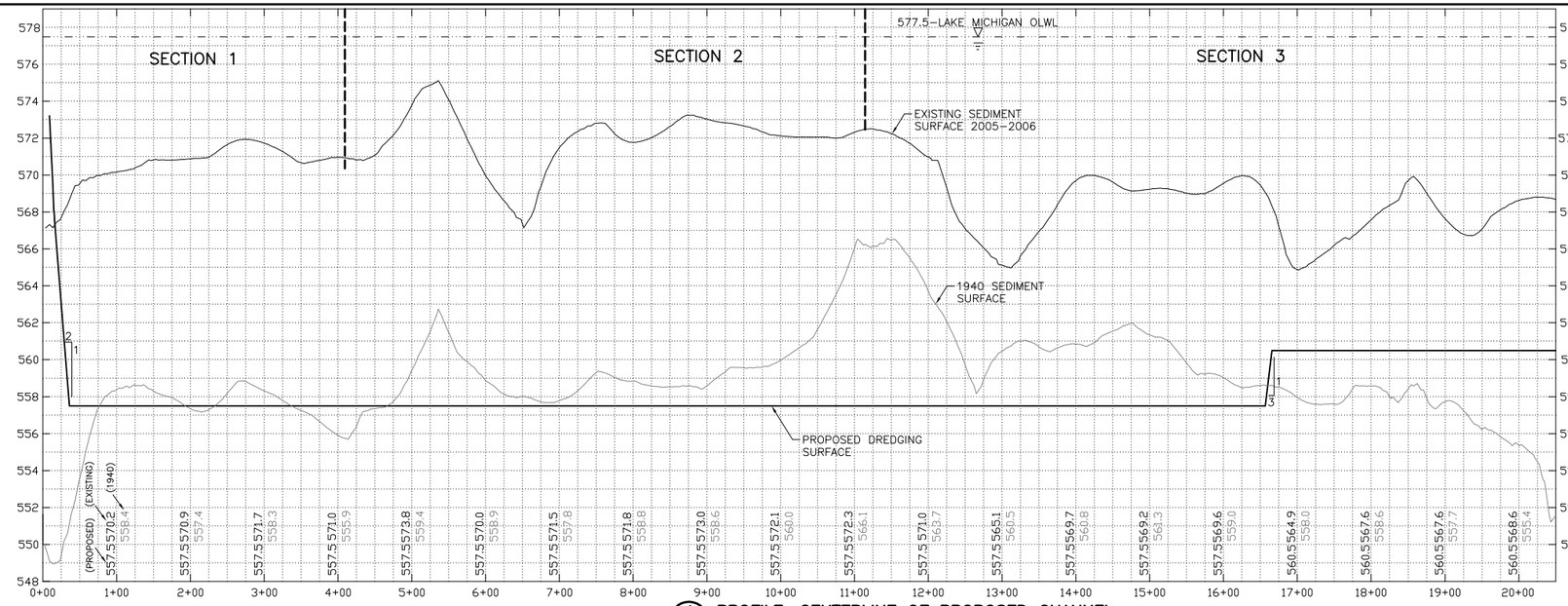
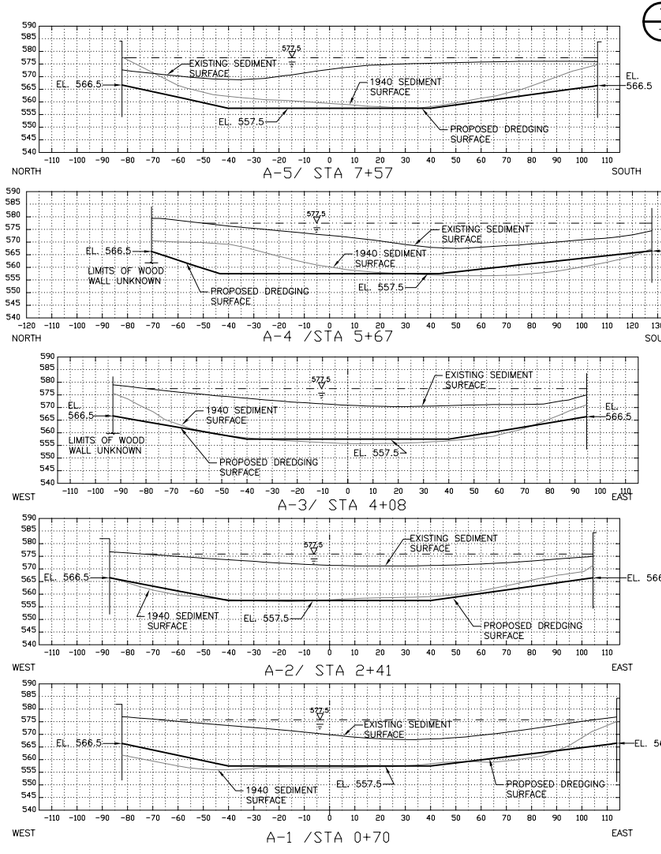
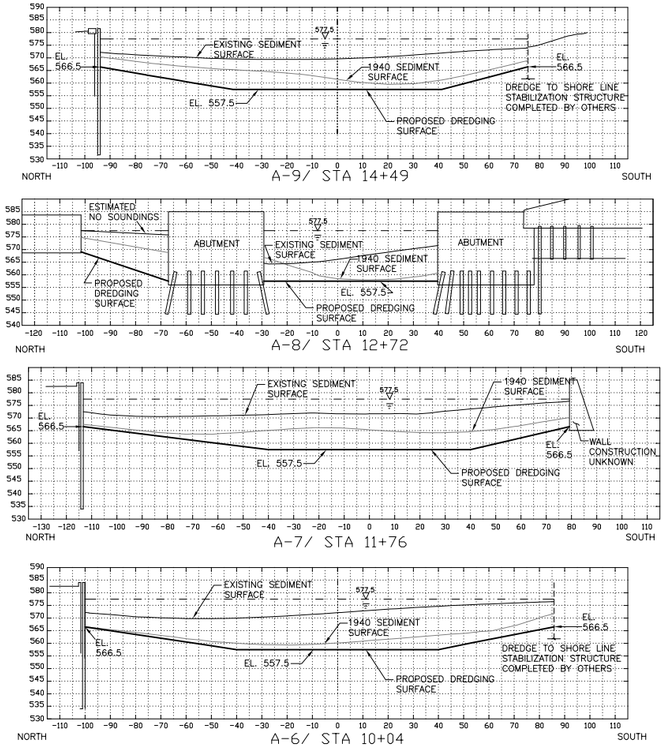
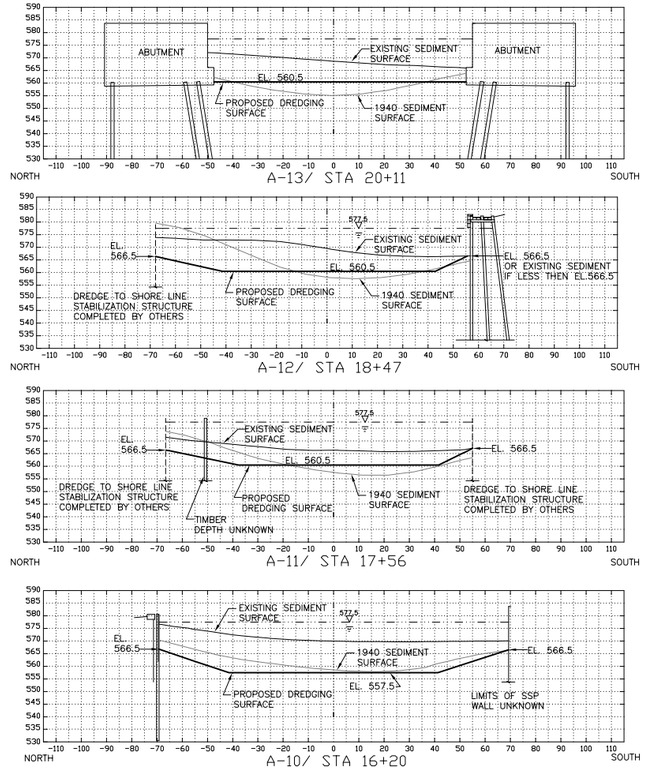


1 – **PROFILE: CENTERLINE OF PROPOSED CHANNEL**







2 – **CROSS SECTIONS: A1–A13**

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MADISON, WISCONSIN

KINNICKINNIC RIVER SEDIMENT REMEDIATION FINAL DESIGN
MILWAUKEE, WI

PROFILES & CROSS SECTIONS

BARR PROJECT No. 4941022
CLIENT PROJECT No.
DWG. No. C-03
REV. No. 1

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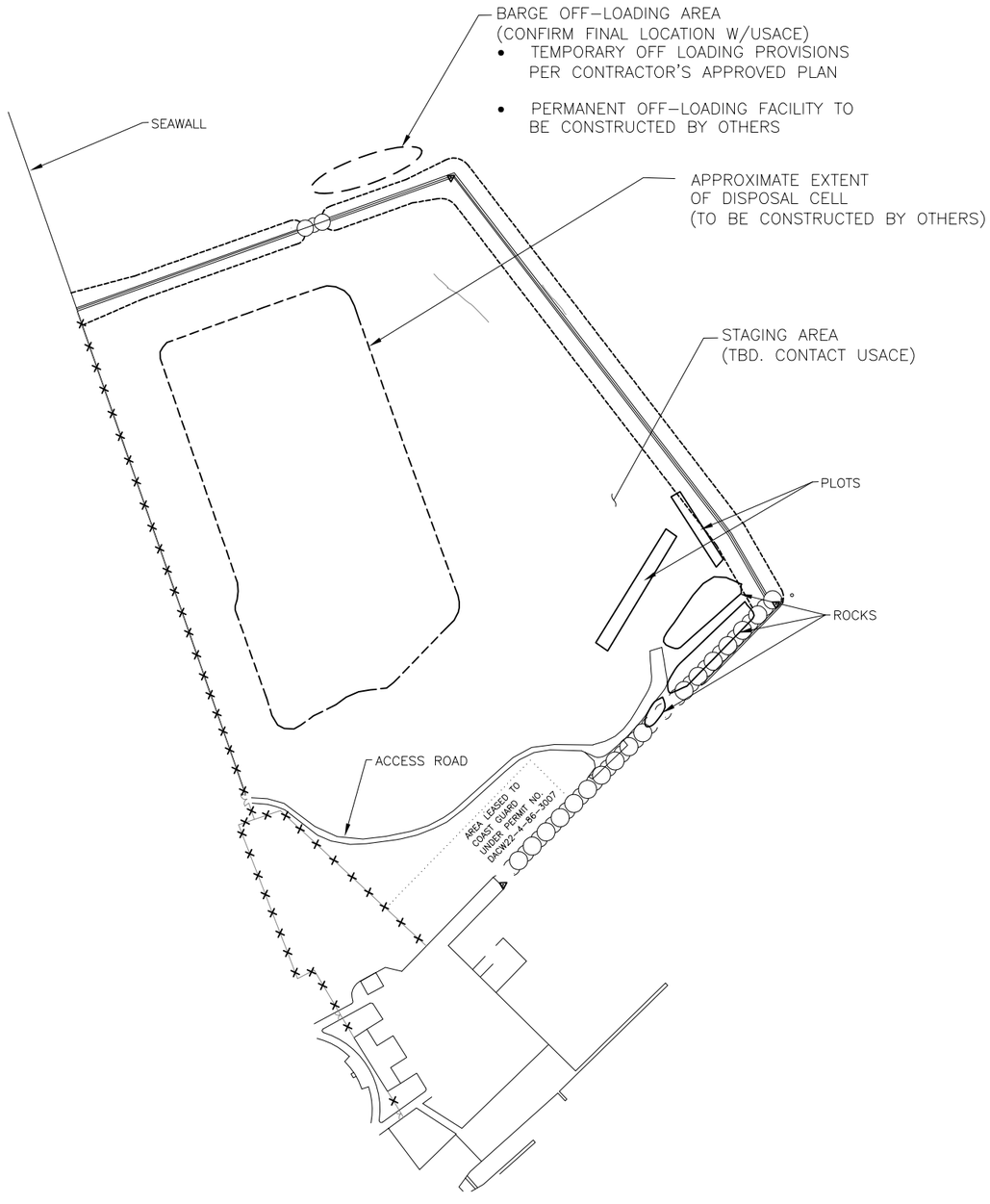
JONES ISLAND CDF
STAGING AND DISPOSAL

JONES ISLAND CDF OPERATIONS & MAINTENANCE REQUIREMENTS

- HOURS OF OPERATION: WORK OPERATIONS ARE 24 HOURS PER DAY, 7 DAYS PER WEEK, UNLESS OTHERWISE SPECIFIED (A VARIANCE TO CHAPTER 80, SUBCHAPTER 2 OF THE MILWAUKEE CITY ORDINANCE REQUIRED FOR NIGHT–TIME OPERATIONS).
- DREDGE MATERIAL TRANSFER WILL OCCUR AT THE OFF–LOADING FACILITY TO BE CONSTRUCTED BY THE USACE OR OTHERS;
- SILT CURTAINS MAY BE REQUIRED AROUND BARGES WHEN OFF–LOADING TO PREVENT SPILLAGE FROM MIGRATING FURTHER INTO THE HARBOR;
- PRE– AND POST–OFFLOADING BATHYMETRIC SURVEY OF OFF–LOADING AREA WILL BE REQUIRED;
- THE CONTRACTOR WILL BE RESPONSIBLE FOR REMOVING SPILLAGE AFTER OFF–LOADING IS COMPLETED;
- THE WDNR AND USACE WILL PROVIDE ANY NECESSARY PERMITS AND WILL MANAGE EXCESS WATER THAT IS GENERATED IN THE CDF AS A RESULT OF SEDIMENT CONSOLIDATION AND OFFLOADING;
- LARGE DEBRIS CAN BE STAGED AT THE JONES ISLAND CDF, BUT MUST BE DISPOSED OF AT AN APPROVED OFF–SITE LANDFILL;
- MECHANICAL AND/OR PNEUMATIC HANDLING OF THE DREDGED SEDIMENT FROM THE BARGE INTO THE JONES ISLAND CDF WILL BE ALLOWED;
- THE CONTRACTOR WILL BE RESPONSIBLE FOR TRANSPORTATION OF THE DREDGE MATERIAL FROM THE OFFLOADING FACILITY TO THE DISPOSAL CELL. FINAL PLACEMENT OF DREDGE MATERIAL WILL BE COMPLETED BY THE CONTRACTOR.
- PUMPING OF DECANT WATER FROM THE SEDIMENT BARGE INTO THE CDF WILL BE ALLOWED;
- HYDRAULIC DISPOSAL AT THE JONES ISLAND CDF WILL BE PROHIBITED AND NO ADDITIONAL WATER CAN BE ADDED TO THE SEDIMENT DURING TRANSPORT OR HANDLING FOR DISPOSAL; AND
- AIR MONITORING FOR VOCS AND NOISE IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS WILL BE REQUIRED ON THE OFF–LOADING BARGE.



1 / C–01 **PLAN: JONES ISLAND CDF**
1"=200'–0"
0 200 400
SCALE IN FEET

JONES ISLAND CDF CONTACT INFORMATION

1. TOM JOHNSON
   CDF OPERATIONS
   USACE LAKE MICHIGAN AREA OFFICE
   124 N. MAIN ST.
   KEWAUNEE, WI 53204
   (920–388–3720)

2. KERRY WILLIAMS
   DESIGN ENGINEER
   USACE DETROIT DISTRICT HEADQUARTERS
   477 MICHIGAN AVE.
   DETROIT, MI 48226
   (313–226–6147)

LEGEND

FENCE

NOTES:

1. SURVEY CONTROL AND BENCH MARK DATA IS AVAILABLE FROM THE DETROIT DISTRICT, ENGINEERING & TECHNICAL SERVICES, OPERATIONS TECHNICAL SUPPORT BRANCH, KEWAUNEE AREA OFFICE–(920) 388–3720

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WISCONSIN DEPARTMENT OF NATURAL RESOURCES
MADISON, WISCONSIN

KINNICKINNIC RIVER SEDIMENT REMEDIATION–FINAL DESIGN
MILWAUKEE, WI

JONES ISLAND CDF PLAN

BARR PROJECT No.	4941022
CLIENT PROJECT No.	
DWG. No.	C–04
REV. No.	0

Appendix B
Operations and Maintenance Plan

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Technical Memorandum

To: Xiaochun Zhang/Wisconsin DNR
From: Dan Umfleet; Jamie Bankston; Jamie Johnson; Timothy Wagner
Subject: Operations and Maintenance Plan
Date: March 12, 2008
Project: Kinnickinnic River Sediment Remediation

This memorandum summarizes the operations and maintenance required as part of the sediment remediation project along the Kinnickinnic River (KK River). The sediment remediation project involves dredging approximately 170,000 cubic yards (in-situ) of PCB and PAH contaminated sediment from the stretch of river located between the Becher Street Bridge and the Kinnickinnic Avenue Bridge. The sediment will be dredged mechanically and transported by barge to the United States Army Corps of Engineer's (USACE) Jones Island Confined Disposal Facility (CDF) where it will be disposed.

Sediment Resuspension Controls

The performance standard associated with sediment resuspension control is total suspended solids (TSS). Two monitoring stations will be established immediately upstream (south) of the Becher Street Bridge (Station 1) and approximately 1,000 feet downstream (east) of the Kinnickinnic Avenue Bridge (Station 2) as shown in Figure 2 of the Final Design Report. If turbidity readings from the performance monitoring location downstream of the project area (Station 2) indicate an increase of 80 mg/L in TSS above the upstream monitoring location (Station 1) as a result of dredging activities, BMPs would be modified to reduce resuspension. If the elevated turbidity was from activities not associated with dredging, then dredging would continue. The process for assessing the effectiveness of BMPs during dredging is summarized in Figure 9 of the Final Design Report. Other performance standards are summarized in Section 3.2 of the Final Design Report.

Sediment resuspension control measures will likely be needed to meet the proposed performance standards in the project area. The example resuspension control measure discussed here is silt curtains. The use of silt curtains may be a minimum Best Management Practices (BMP) requirement for managing the amount of suspended sediment that transports out of the project area.

Silt curtains and/or other resuspension control measures may be necessary to meet the proposed performance standards for the project area. Various silt curtain configurations could be deployed to meet the proposed performance standards. If silt curtains are deployed, they shall be deployed to a depth in the river channel to allow mudflow beneath the silt curtain and meet resuspension standards for the Project Area. The exact location for the deployment of silt curtains will be at the discretion of the dredging contractor, if used as the sediment resuspension control measure.

Deployment of silt curtains and/or other resuspension control measures that are anchored to shore will require permission from the property owner. The dredging contractor will also need to contact St. Mary's Cement to determine if operations at their terminal, immediately downstream of the Project Area, will affect or be affected by the deployment of a silt curtain near the Kinnickinnic Avenue Bridge. Contingency resuspension control measures and an oil boom will be stored on site for emergency use in the event of resuspension control measures failure, visible sheen, or exceedance of resuspension performance standards. Dredging operations will not be allowed if resuspension control measures are not in place.

If resuspension control measures block the flow of traffic in the Project Area, the dredging contractor shall make set times available for the resuspension control measures to be opened for public traffic through the Project Area and designate a contact person that will coordinate the opening of the resuspension control measures (emergency use only) within 30 minutes of notification outside of the standard times set for opening the resuspension control measures. The use of the Project Area by public traffic will be restricted during dredging operations to a 30 minute window once each morning and afternoon. The time of this window will be communicated by the dredging contractor to the local marinas and the United States Coast Guard Notice to Mariners.

The type and configuration of resuspension control measures used during dredging and off-loading operations shall be defined in the dredging contractors work plan and be able to meet the resuspension performance standards for the Project Area and USACE requirements for off-loading at the Jones Island CDF. Within the dredging contractors work plan, contingency measures will be included that describe how the resuspension control measures will be managed during low, average, and high flow conditions and what contingency measures will be implemented in the event resuspension performance standards are

not met. The USACE Dredging Operations and Environmental Research (DOER) Program - Silt Curtains as a Dredging Project Management Practice - ERDC TN-DOER-E21 (USACE, 2005), recommends that silt curtains shall only be deployed when river flow velocities are below 1.5 knots (2.5 ft/s). This velocity is deemed the maximum velocity at which the use of silt curtains is considered effective. Figure B-1 summarizes the average velocities for different river flow rates, for each dredge section (Sections 1 – 3). The river velocities were estimated using the average width and depth before dredging (based on the 2005-2006 soundings). During and after dredging, the cross-sectional areas for each dredge section will increase and thus the velocities will decrease for a given flow rate from what is shown on Figure B-1.

Staging and Disposal of Dredged Material

Dredged material from the Kinnickinnic River Project Area will be transported by barge to the Jones Island CDF for disposal. The dredging contractor is responsible for the transport, off-loading, and placement of the material. The CDF is operated by the Lake Michigan Area of the USACE located in Kewaunee, Wisconsin. The WDNR and USEPA GLNPO will secure use of the local CDF for disposal of dredged material. The conditions for use of the CDF for staging and disposal of dredged material will be documented in the agreement between the USACE and the WDNR and USEPA GLNPO before dredging begins. Currently, a final design for the Kinnickinnic River sediment disposal cell within the Jones Island CDF is being completed by the USACE. The Kinnickinnic River sediment disposal cell will need to be completed by others before dredging activities can begin within the project area.

Off-loading operations will take place on the north side of the CDF. The USACE or others will build an off-loading facility during their expansion of the CDF in preparation for receiving material from the Kinnickinnic River. The most recent bathymetric survey completed around the perimeter of the Jones Island CDF by the USACE was in 1999 and is likely not representative of current conditions. The recent NOAA navigational charts (NOAA, 2007) show an estimated depth of 7 to 20 feet below low water datum (approximately 570.5 ft IGLD85 to 557.5 ft IGLD85) near the Jones Island CDF. Current water levels suggest that dredging will not be required for off-loading operations at the Jones Island CDF. This should be confirmed by the dredging contractor prior to beginning dredging operations.

The off-loading facility will be located outside the containment dikes and thus management of any spilled sediment is necessary. A pre- and post-operations bathymetric survey will be completed by a third party

surveyor hired by the dredging contractor. The bathymetric survey data will be provided to the owner for post-processing and determination of the amount of spillage that occurred. All spillage will be removed by the dredging contractor and placed into the CDF at the expense of the dredging contractor.

Sampling in 2002 showed that sediment in the area close to location KK0209 contains the highest concentration of PCBs in the project area. The sediment dredged in this area, particularly from approximately 558-566 feet IGLD85, shall be managed in such a way that it is placed in the deeper layer of the Kinnickinnic River sediment disposal cell located within the Jones Island CDF. It will then be covered by relatively cleaner dredged materials from the project area. The approximate area that will require special management and disposal at the Jones Island CDF is shown in Drawing C-02 of Appendix A. Prior to dredging the project area; the USACE will provide additional disposal and placement requirements and final plans for the Kinnickinnic River disposal cell.

Anticipated Staging and Disposal Logistics

Sediment dredged from the project area will require multiple handling steps before final placement in the Kinnickinnic River disposal cell. The following staging and disposal logistics are anticipated:

- Hours of Operation: Work operations are 24 hours per day, 7 days per week, unless otherwise specified (a variance to Chapter 80, Subchapter 2 of the Milwaukee City ordinance required for night-time operations);

- Dredge material transfer will occur at the off-loading facility to be constructed by the USACE or others;

- Silt curtains may be required around barges when off-loading to prevent spillage from migrating further into the harbor;

- Pre- and Post-offloading bathymetric survey of off-loading area will be required;

- The dredging contractor will be responsible for removing spillage after off-loading is completed;

- The WDNR and USACE will provide any necessary permits and will manage excess water that is generated in the CDF as a result of sediment consolidation and off-loading;

- Large debris can be staged at the Jones Island CDF, but must be disposed of at an approved off-site landfill;

- Mechanical and/or pneumatic handling of the dredged sediment from the barge into the Jones Island CDF will be allowed;

- The dredging contractor will be responsible for transportation of the dredge material from the off-loading facility to the disposal cell. Final placement of dredge material will be completed by the dredging contractor.

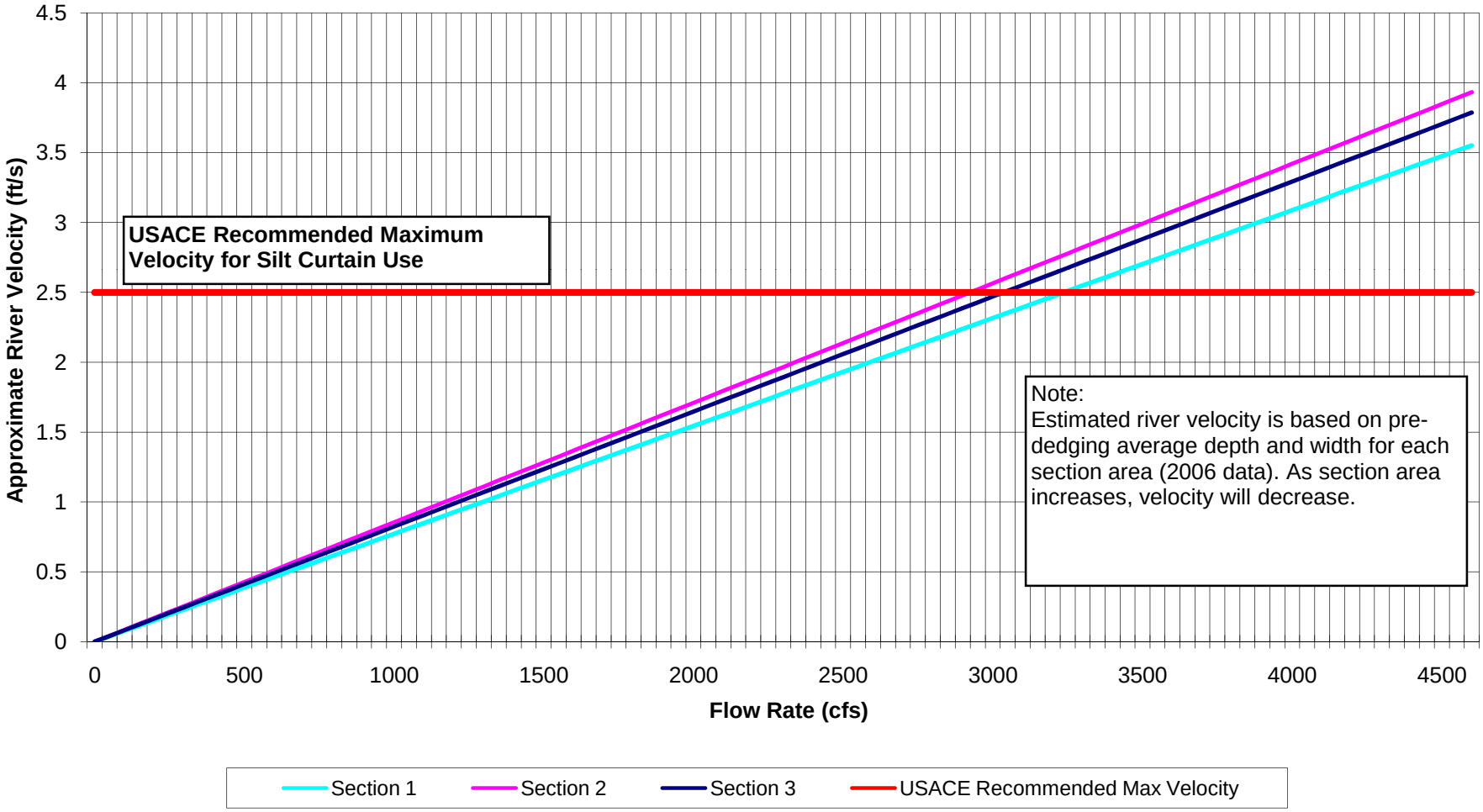
- Pumping of decant water from the sediment barge into the CDF will be allowed;

- Hydraulic disposal at the Jones Island CDF will be prohibited and no additional water can be added to the sediment during transport or handling for disposal; and

- Air monitoring for VOCs and noise in accordance with local, state, and federal requirements will be required on the off-loading barge.

Further details regarding Operations and Maintenance not included in this memorandum will be completed by the USEPA GLNPO contractor as part of the supplemental design for the project.

Figure B-1
Pre-Dredging
Estimated River Velocity vs. Flow Rate
Kinnickinnic River
Milwaukee, Wisconsin



P:\Mpls\49 WI\41\4941022\WorkFiles\Final Design Report\Appendix_B_O&M Plan\FigureB-1_flow velocity comparison.xls

Appendix C
Drawbridge Operation Regulations

[Code of Federal Regulations]
[Title 33, Volume 1]
[Revised as of July 1, 2002]
From the U.S. Government Printing Office via GPO Access
[CITE: 33CFR117.1093]

TITLE 33--NAVIGATION AND NAVIGABLE WATERS

CHAPTER I--COAST GUARD, DEPARTMENT OF TRANSPORTATION

PART 117--DRAWBRIDGE OPERATION REGULATIONS--Table of Contents

Subpart B--Specific Requirements

Sec. 117.1093 Milwaukee, Menomonee, and Kinnickinnic Rivers and South Menomonee and Burnham Canals.

(a) The draws of each bridge listed in this section shall open as soon as possible for the passage of public vessels of the United States, vessels carrying United States mail, vessels licensed to carry 50 or more passengers when on their regular routes, and fireboats of the City of Milwaukee.

(b) For all bridges, the drawtender's acknowledging signal when the draw will open is the same as the opening signal. The acknowledging signal when the draw will not open, or is open and must be closed promptly is four short blasts.

(c) The draws of bridges across the Milwaukee River operate as follows:

(1) The draws of the North Broadway Street bridge, mile 0.5, North Water Street bridge, mile 0.6, and Michigan Street bridge, mile 1.1, all at Milwaukee, shall open on signal; except that, from 7:30 a.m. to 8:30 a.m and 4:30 p.m. to 5:30 p.m. Monday through Saturday except Federal holidays, the draws need not be opened.

(2) The draws of all other bridges across the Milwaukee River shall open on signal if at least two hours notice is given; except that, from 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m., the draws need not be opened.

(3) The opening signals are as follows:

(i) The Chicago and Northwestern bridge, mile 0.3, two prolonged blasts.

(ii) The North Broadway Street bridge, mile 0.5, three prolonged blasts followed by one short blast.

(iii) The North Water Street bridge, mile 0.6, three prolonged blasts followed by two short blasts.

(d) The draws of bridges across the Menomonee River and South Menomonee Canal operate as follows:

(1) The draw of the North Plankinton Avenue bridge across the Menomonee

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River, mile 0.1, shall open on signal; except that, from 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m. Monday through Saturday except Federal holidays, the draws need not be opened.

(2) The draws of all other bridges across the Menomonee River and South Menomonee Canal shall open on signal; except that, from 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m. Monday through Saturday except Federal holidays, the draws need not be opened and, from 11 p.m. to 7 a.m., the draws shall open on signal if at least two hours notice is given.

(3) The opening signal for the Chicago, Milwaukee, St. Paul and Pacific railroad bridge across the Menomonee River, mile 0.1, is two prolonged blasts followed by two short blasts.

(e) The draws of bridges across the Kinnickinnic River operate as follows:

(1) The draw of the Kinnickinnic Avenue bridge, mile 1.5, shall open on signal; except that, from 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m. Monday through Saturday except Federal holidays, the draw need not be opened.

(2) The draws of the Chicago, Milwaukee, St. Paul and Pacific railroad bridge, mile 1.5, and the Chicago and Northwestern Railway bridge, mile 1.52, shall open on signal if at least two hours notice is given.

(3) The draws of all other bridges across the Kinnickinnic River shall open on signal; except that, from 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m. Monday through Saturday except Federal holidays, the draws need not be opened and, from 11 p.m. to 7 a.m., the draws shall open on signal if at least two hours notice is given.

(4) The opening signal for the Chicago and Northwestern bridge, mile 1.0, is two prolonged blasts.

(f) The draws of bridges across the Burnham Canal operate as follows:

(1) The draw of the Chicago, Milwaukee, St. Paul and Pacific railroad bridge, mile 0.8, shall open on signal if at least two hours notice is given.

(2) The draws of all other bridges across the Burnham Canal shall open on signal: except that, from 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m. Monday through Saturday except Federal holidays, the draws need not be opened and, from 11 p.m. to 7 a.m., the draws shall open on signal if at least two hours notice is given.

Appendix D
Notice to Mariners

NINTH DISTRICT LOCAL NOTICE TO MARINERS GENERAL NOTICE ENTRY FORM

1. **NAME OF COMPANY:**_____

2. **TYPE OF OPERATION:**_____

3. **LOCATION:**_____

4. **COMMENCE DATE:**_____**COMPLETE DATE:**_____

5. **HOURS OF OPERATION:**_____**TO**_____

6. **DAYS OF OPERATION:**_____**TO**_____

7. **NAME OF CONTACT VESSEL:**_____

8. **VHF-FM CHANNELS MONITORED:**_____

9. **SPECIAL REQUIREMENTS/REMARKS:**_____

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10 FOR FUTHER INFORMATION, CONTACT:_____

11 TELEPHONE #:_____

12 SIGNATURE:_____**DATE:**_____

" N O T E "

TEMPORARY MOORING BUOYS ARE REQUIRED TO BE WHITE WITH A BLUE HORIZONTAL BAND AROUND THE CIRCUMFERENCE OF THE BUOY CENTERED MIDWAY BETWEEN THE TOP OF THE BUOY AND THE WATERLINE. FOR MORE DETAILS CONCERNING REGULATIONS FOR MOORING BUOYS FERER TO 33 CODE OF FEDERAL REGULATIONS PART 66.10-45. A COLORED DEPICTION OF A MOORING BUOY CAN BE FOUND IN LIGHT LIST VOL VII GREAT LAKES.

The enclosed form is provided for Marine construction operation conducted on the Great lakes that you would like to have published in the Ninth District Local Notice to mariners. We suggest you complete this form and forward it to our office at least two weeks in advance. If you have any questions feel free to contact BM3 Kyle W. Thompson, the Local notice to Mariners Petty Officer at (216) 902-6073. Local reproduction of this from is encouraged.

****U.S. COAST GUARD NINTH DISTRICT (DPW) "LOCAL" FACSIMILE NO. (216) 902-6071****