Jacobs

Final Focused Feasibility Study Report

Milwaukee River Downtown Reach, Milwaukee Estuary AOC
Milwaukee, Wisconsin

EPA GLAES II Contract
Task Order Number 68HE0520F0069, Contract Number 68HE0519D00007

October 2024

Prepared for
U.S. Environmental Protection Agency
Great Lakes National Program Office

Executive Summary

This Focused Feasibility Study (FFS) report develops and presents a recommended remedial alternative for the Milwaukee River Downtown Reach within the Milwaukee Estuary Area of Concern (AOC) in Milwaukee, Wisconsin. The U.S. Environmental Protection Agency (EPA) Great Lakes National Program Office (GLNPO) and project partners (Wisconsin Department of Natural Resources [WDNR], Milwaukee County Parks, City of Milwaukee, Milwaukee Metropolitan Sewerage District, and We Energies) have selected Alternative 3A as the recommended alternative to address contaminated sediment in the Downtown Reach. Alternative 3A addresses sediment with contaminant of concern (COC) concentrations exceeding cleanup goals (CUGs) through dredging, placing a residual sand cover in dredged areas, capping in areas where contaminated sediment cannot be feasibly removed, and capping contaminated sediment below an elevation of 552.5 feet North American Vertical Datum of 1988 (NAVD88). Dredged sediment with polychlorinated biphenyl (PCB) concentrations below the Toxic Substances Control Act (TSCA) threshold of 50 milligrams per kilogram (mg/kg) will be transported to and placed in a dredged material management facility (DMMF) to be constructed in Milwaukee Bay adjacent to the existing confined disposal facility. Dredged sediment with PCB concentrations exceeding the TSCA threshold will be transported to an offsite Subtitle C landfill for disposal. The recommended alternative will achieve the site-specific remedial action objectives (RAOs) by reducing the mass, volume, and concentrations of COCs in sediment, reducing risks to human health and the environment from exposure to COCs in sediment, and maintaining depth requirements within the authorized federal navigation channel (FNC) at the downstream end of the Downtown Reach. It will also maintain depth requirements for recreational vessel use upstream of the FNC.

The purpose of the FFS process is to develop and evaluate remedial alternatives and support selection of a remedy that is protective of human health and the environment. The remedy will contribute to the eventual removal of beneficial use impairment (BUIs) and delisting of the Milwaukee Estuary AOC.

The FFS includes the following:

- A conceptual site model summarizing physical site characteristics, nature and extent of contamination, historical and ongoing sources of contamination, recontamination potential, and exposure pathways and receptors.
- Site-specific RAOs and development of remediation target areas (RTAs).
- Identification and screening of remedial technologies.
- Description of remedial alternatives.
- Comparative analysis of the alternatives against seven evaluation criteria.
- Identification and rationale for a recommended remedial alternative.

The following site-specific RAOs for the Downtown Reach include remedial goals to improve the portion of the AOC where the project is located, and support removing BUIs and delisting the AOC:

- Reduce the mass, volumes, and concentrations of COCs in the sediment. This will be achieved by addressing sediment with COCs exceeding the CUGs, thereby reducing exposure and risk to ecological and human receptors. The remediation of contaminated sediment in the project area will make progress towards eliminating sediment-related BUIs.

- Reduce risks to human health and the environment from exposure to COCs in sediment. This will largely be accomplished by supporting the removal of BUIs through remediation of sediment with COC concentrations above the CUGs.
- Maintain depth requirements within the authorized FNC portion of the Downtown Reach.

RTAs were developed using three different screening level scenarios to provide flexibility in developing remedial alternatives for the Downtown Reach and facilitate sediment disposal planning for the overall Milwaukee Estuary AOC. The three screening level scenarios are based on EPA and project partner agreement as follows:

- Probable Effect Concentrations (PECs) provided in the WDNR's *Wisconsin Consensus-based Sediment Quality Guidelines* (CBSQGs) (WDNR 2003) for polycyclic aromatic hydrocarbons (PAHs) and metals (chromium, lead and mercury) and 1 mg/kg for PCBs
- 3 times the PEC values for PAHs and metals and 1 mg/kg for PCBs
- 3 times PECs for PAHs and metals and 3 mg/kg for PCBs

Representative remedial technologies were identified and screened. Remedial technologies that remained following screening were assembled into the five remedial alternatives summarized in Exhibit ES-1. The conceptual remedial alternatives were developed using a common set of technologies and they primarily differ from each other with respect to the screening levels used to establish the RTAs. Within each RTA, sediment that can be feasibly removed will be dredged, and isolation or stabilization technologies will be applied to the sediment with COC concentrations exceeding CUGs that remains in place. Alternative 3A was developed because of concerns about AOC-wide estimated dredge volumes exceeding the DMMF capacity. Alternative 3A has the same RTA as Alternative 3 but reduces dredge volume by establishing a maximum sediment removal elevation. The reduction in dredge volume for Alternative 3A results in additional areas requiring capping.

Exhibit ES-1. Conceptual Remedial Alternatives for the Milwaukee River Downtown Reach

Alternative	Alternative Description
1	No Action
2	Remediate sediment with COC concentrations greater than the PECs for total PAHs or metals or greater than 1 mg/kg total PCBs: dredge (estimated total dredgeable volume of 524,000 cubic yards [CY]) and cap sediment that cannot be removed (estimated 36 acres).
3	Remediate sediment with COC concentrations greater than 3 times PECs for total PAHs or metals or greater than 1 mg/kg total PCBs: dredge (estimated total dredgeable volume of 472,000 CY) and cap sediment that cannot be removed (estimated 31 acres).
3A	Remediate sediment with the same COC concentrations as Alternative 3 above a maximum dredge elevation of 552.5 feet NAVD88: dredge (estimated total dredgeable volume of 457,000 CY), cap sediment that is not removed (estimated 32 acres).
4	Remediate sediment with COC concentrations greater than 3 times PECs for total PAHs or metals or greater than 3 mg/kg total PCBs: dredge (estimated total dredgeable volume of 415,000 CY) and cap sediment that cannot be removed (estimated 27 acres).

Each remedial alternative, except for Alternative 1 (No Action), meets the threshold criterion (compliance with environmental laws and standards). Alternative 2 has the greatest long-term effectiveness because it is based on the most conservative (lowest) set of CUGs, results in the greatest reduction of mass, volume, and concentration of COCs in sediment, and leaves the least contamination in place. Alternatives 3, 3A,

and 4 have progressively lower reductions in COC mass and volume or smaller cover areas compared to Alternative 2. Alternative 4 has the greatest short-term effectiveness because the remedy would impact the smallest area. Alternative 4 is the most implementable from a technical standpoint because it requires the least amount of DMMF capacity. Alternatives 2 and 3 may not be implementable because of DMMF capacity constraints. Alternative 3A was developed to reduce the dredge volume and improve implementability of an alternative that has the same CUGs as Alternative 3. The other construction, implementation, and administrative challenges are similar for Alternatives 2, 3, 3A, and 4. The restoration time frames are similar for all alternatives. Alternative 4 has the lowest estimated cost ($120.4 million [M]). Alternatives 3A, 3, and 2 are progressively more costly ($129.3M, $130.2M, and $138.9M, respectively).

Alternative 3A was selected as the recommended alternative based on evaluation of dredged material volume estimates for disposal in the DMMF and consideration of project costs on an AOC-wide basis. Dredged material volume estimates for Alternatives 2 and 3 exceed the available DMMF capacity. Alternative 3A provides a similar level of protectiveness to Alternative 3 and reduces dredge volume by establishing a maximum sediment removal elevation throughout the Downtown Reach.

The recommended alternative will be further refined during remedial design. The recommended alternative was the subject of public outreach efforts accomplished during four separate public informational meetings held in 2023 and 2024. This Final FFS Report was prepared in consideration of public comments received.

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Acronyms and Abbreviations

Acronym	Definition
§	Section
1x	one time
3D	three-dimensional
AOC	area of concern
BRRTS	Bureau for Remediation and Redevelopment Tracking System
BUI	beneficial use impairment
CAD	AutoCAD computer software
CBSQG	Consensus-Based Sediment Quality Guideline
the City	City of Milwaukee
COC	contaminant of concern
Cr	chromium
CSM	conceptual site model
CSO	combined sewer overflow
CUG	cleanup goal
CY	cubic yard(s)
DMMF	dredged materials management facility
EPA	U.S. Environmental Protection Agency
ERP	environmental remediation project
EVS	Earth Volumetric Studio
FNC	federal navigation channel
FFS	focused feasibility study
ft^3/s	cubic feet per second

Acronym	Definition
GIS	geographic information system
GLLA	Great Lakes Legacy Act
GLNPO	Great Lakes National Program Office
GLWQA	Great Lakes Water Quality Agreement
Hg	mercury
IGLD	International Great Lakes Datum
ISS	in situ stabilization
LUST	leaking underground storage tank
LWD	low water datum
M	Million(s)
mg/kg	milligram(s) per kilogram
MMSD	Milwaukee Metropolitan Sewerage District
NAVD88	North American Vertical Datum of 1988
PAH	polycyclic aromatic hydrocarbon
Pb	lead
PCB	polychlorinated biphenyl
PEC	probable effect concentration
RAETM	Remedial Alternatives Evaluation Technical Memorandum
RAO	remedial action objective
RAP	remedial action plan
RTA	remediation target area
SCR	Site Characterization Report
SMC	South Menomonee Canal
SSP	steel sheet pile

Acronym	Definition
SWAC	surface weighted average concentration
TSCA	Toxic Substances Control Act
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
WDNR	Wisconsin Department of Natural Resources
WPDES	Wisconsin Pollutant Discharge Elimination System
WWTP	wastewater treatment plant

1. Introduction

This Focused Feasibility Study (FFS) Report summarizes site conditions, remedial action objectives (RAOs), remediation target areas (RTAs), remedial technology screening, and remedial alternatives development and evaluation, and presents a recommended remedial alternative for the Milwaukee River Downtown Reach within the Milwaukee Estuary Area of Concern (AOC) in Milwaukee, Wisconsin. In accordance with Task Order Number 68HE0520F0069 under Contract Number 68HE0519D00007, Jacobs[1] prepared this FFS with the Great Lakes National Program Office (GLNPO) as part of the Great Lakes Legacy Act (GLLA) work. This evaluation also aligns with the process outlined in Wisconsin Administrative Code Section (§)NR 722.07 for the selection of remedial alternatives. The Milwaukee Estuary AOC includes portions of three watersheds along the Milwaukee River, Menomonee River, and Kinnickinnic River, as well as the inner and outer Milwaukee Harbor ("Milwaukee Bay"), two former industrial canals, and the nearshore areas of Lake Michigan (Figure 1-1).

This document consists of the following sections:

- Section 1 provides an introduction and summarizes the regional setting within the Milwaukee Estuary AOC, project background and beneficial use impairments (BUIs), general site and background information for the Downtown Reach, and the most recent site investigations and their associated reports.
- Section 2 presents the conceptual site model (CSM) for the Downtown Reach including descriptions of physical site conditions, the nature and extent of contamination, historical and ongoing sources of contamination, recontamination potential, and potential exposure pathways and receptors.
- Section 3 provides an overview of how RAOs are developed for remedial actions to be conducted in the Milwaukee Estuary AOC for GLNPO in partnership with non-federal sponsors as part of the GLLA work. Site-specific RAOs, threshold screening levels, and development of RTAs for the Downtown Reach are also presented.
- Section 4 summarizes the results of the remedial technology screening for the Downtown Reach to focus remedial alternatives development on only those technologies most applicable to the site, and presents the conceptual remedial alternatives that are further developed in Section 5.
- Section 5 describes five remedial alternatives for the Downtown Reach, including the No Action alternative.
- Section 6 presents the detailed analysis of alternatives. The evaluation criteria are described first, followed by an analysis of the individual alternatives relative to the evaluation criteria and comparative analysis between alternatives.
- Section 7 presents the Recommended Alternative, as discussed with project partners.
- Section 8 presents the reference documents cited in this FFS Report.

1.1 Purpose

The purpose of the FFS process is to develop and evaluate remedial alternatives and support selection of a remedy that is protective of human health and the aquatic environment. The remedy will contribute to the eventual removal of BUIs and delisting of the Milwaukee Estuary AOC.

[1] On December 15, 2017, CH2M HILL Companies Ltd. and its subsidiaries including CH2M HILL, Inc. became part of Jacobs.

The FFS task constitutes the third of three tasks completed for the Downtown Reach. The first task established RAOs and general response actions, identified and screened remedial technologies, and presented the conceptual remedial alternatives. The second task was the remedial alternatives evaluation in which the remedial alternatives were further developed to support cost estimates and alternatives were analyzed individually and against each other. Results were documented in the *Remedial Alternatives Evaluation Technical Memorandum* (RAETM) *for the Downtown Reach* (Jacobs 2022b).

The third task consists of completing this Final FFS Report, which includes the recommended remedial alternative. A Draft Final FFS Report was completed in October 2023 (Jacobs 2023b). This Final FFS Report incorporates information relevant to four public information meetings that were held after completion of the Draft Final FFS Report, review comments received relevant to the Draft Final FFS Report, and changes relevant to compliance with Section 508 of the 1973 Rehabilitation Act (29 United States Code [U.S.C.] 794d).

The FFS for the Downtown Reach was developed during the same timeframe as FFSs for other project areas within the Milwaukee Estuary AOC including the Milwaukee River Floodplains Reach, the South Menomonee Canal (SMC), the Kinnickinnic River, and Milwaukee Bay. The remediation strategies and approaches for all project areas are being coordinated to the degree possible to achieve overall program objectives.

1.2 Milwaukee Estuary Area of Concern Background

The Milwaukee Estuary was identified as an AOC in 1987, by the International Joint Commission constituted to manage lakes and river systems along the border between Canada and the United States under the Great Lakes Water Quality Agreement (GLWQA) signed by both countries in 1972. The Milwaukee Estuary AOC has a long history of ecological degradation and pollution. Under the GLWQA, the first Milwaukee Estuary Remedial Action Plan (RAP) was completed in 1991 (WDNR 1991). Historical discharges from point and non-point sources near to and/or upstream of the AOC resulted in sediment in the AOC waterways being contaminated with various pollutants, including metals, polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs). The RAP is updated periodically, most recently in June 2022 (WDNR 2022b).

The following 11 BUIs are assigned for the Milwaukee Estuary AOC with 7 (indicated by ***bold italics*** and an asterisk **[*]**) of the BUIs specific to contaminated sediment:

- ***Restrictions on fish and wildlife consumption****
- Eutrophication or undesirable algae
- ***Degradation of fish and wildlife populations****
- Beach closings (recreational restrictions)
- ***Fish tumors or other deformities****
- ***Bird or animal deformities or reproduction problems****
- ***Degradation of benthos****
- Degradation of phytoplankton and zooplankton populations
- ***Restriction on dredging activities****
- ***Loss of fish and wildlife habitat****

- Degradation of aesthetics (U.S. Environmental Protection Agency [EPA] approved removal of this BUI as of September 8, 2021)[2]

Impacted sediment can be toxic to bottom-dwelling benthic organisms as they feed. Fish, piscivorous birds and mammals, and humans may be exposed to bioaccumulative chemicals, such as mercury and PCBs, via diet. Impacted sediment also has the potential to be resuspended and transported downstream by high flow conditions, seiche effects, and vessels.

1.3 Downtown Reach Project Area Features and Background

The Downtown Reach Project Area is approximately 2.4 miles in length with a surface area of about 54 acres. It extends northward from the confluence with the Menomonee River upstream to the location of the former North Avenue Dam (Figure 1-1). The Milwaukee River channel was historically modified to support urban expansion and shoreline development. The Milwaukee River flows primarily southwest and south as it passes through downtown Milwaukee, with shoreline consisting primarily of steel sheet pile (SSP). The project area includes 17 bridge crossings (CH2M 2019b) (Figures 1-2A through 1-2F).

A portion of a federal navigation channel (FNC), authorized by U.S. Army Corps of Engineers (USACE), extends approximately 700 feet into the Downtown Reach from the confluence of the Menomonee River to the E. Buffalo Street Bridge (Figure 1-2F). This portion of the FNC has an authorized depth of -21 feet low water datum (LWD)[3] (USACE 2008). USACE most recently performed maintenance dredging in the FNC at the entrance of the Milwaukee River in 1999 and 2007 (USACE 2022). The Milwaukee River portion of the FNC was originally authorized up to the N. Humboldt Avenue Bridge near the upstream end of the Downtown Reach per the 1945 authorizing legislation. However, USACE never completed construction of the FNC between E. Buffalo Street and N. Humboldt Avenue and this section was deauthorized in 1977 (USACE 2008) and is primarily used by personal recreational vessels and supports several recreational boat rental companies and cruises.

Although a few areas of natural shoreline exist in the Downtown Reach, the riverbanks are mostly urbanized with a mix of commercial and residential properties. The City of Milwaukee (the City) has constructed a river walk that extends 3.1 miles along the river from the former North Avenue Dam to the confluence with the Menomonee River, and then eastward to Lake Michigan (Jacobs 2021a).

Jacobs conducted a shoreline survey of the Downtown Reach in 2020, documenting the visible portions of structures above the water line for shoreline construction type (Figures 1-2A through 1-2F) and structural condition (Jacobs 2021c). The structural condition evaluation did not provide a quantitative assessment of structural stability, particularly with respect to potential removal of sediment at the foot of constructed walls. The general criteria used to classify bulkhead conditions were as follows:

- Excellent – No significant defects – slight imperfections may exist
- Good – Minor deterioration or defects evident
- Fair – Sound structure with clear evidence of deterioration

[2] A letter addressed to Wisconsin Department of Natural Resources (WDNR) from GLNPO dated September 8, 2021, approved WDNR's request to remove the *Degradation of Aesthetics* BUI for the Milwaukee Estuary AOC (EPA 2021). Although various factors historically combined to limit recreational use and diminish the scenic value of the waters within the AOC boundaries (visible debris, trash, floating oil and grease, concrete-lined reaches, and overdevelopment on shorelines), many federal and state water quality regulations, local initiatives, and volunteer programs were implemented to reduce pollution and improve water quality throughout the AOC.

[3] The LWD for Lake Michigan is established at an elevation of 577.5 feet International Great Lakes Datum (IGLD) or 578 feet North American Vertical Datum of 1988 (NAVD88) (USACE 1992). NAVD88 is used as the vertical datum for all the Milwaukee Estuary AOC project areas (including the Downtown Reach). All elevation data reported relative to IGLD 1985 have been converted as follows: NAVD88 = 0.5 feet + IGLD 1985.

- Marginal – Moderate deterioration
- Poor – Serious deterioration in some portions of the structure
- Very Poor – Extensive deterioration

Properties along the eastern shoreline of the Downtown Reach are currently dominated by commercial land use. About 8,160 feet or about 66 percent of the total 12,400 feet of the eastern shoreline consists primarily of SSP walls, which are in excellent or good condition based on above-water observation. The remaining sections consist of concrete walls in excellent to fair condition, and natural shoreline ranging from good to marginal condition (Jacobs 2021c).

The western shoreline also consists mostly of SSP wall. SSP is composed of about 7,830 feet, or 63 percent, of the total 12,420 feet of the western shoreline, which is in excellent or good condition based on above-water observation. Several sections of concrete walls are present with qualitative conditions ranging from fair to excellent along with segments of natural shoreline ranging from fair to good condition (Jacobs 2021c). Additional shoreline features such as floating docks, finger piers, and removable docks and walkways that extend waterward are present along many of the riverfront properties during the recreational summer period and are removed during the winter.

The former presence of two dams on the Milwaukee River (the former Estabrook Dam located upstream of the Downtown Reach and the former North Avenue Dam at the upstream extent of the Downtown Reach) resulted in the accumulation of contaminated sediment in the dam impoundments. Contaminated sediment in the river channel behind the dams was removed before removal of the Estabrook Dam in 2018, and the partial removal of the North Avenue Dam in 1997 (Jacobs 2021a).

The river immediately downstream of the former North Avenue Dam is difficult to access by boat because of shallow water. The soft sediment layer in this area is relatively thin. The North Avenue Reef, a habitat feature constructed of rip rap, is located on the west side of the channel downstream of the former dam (Figure 1-2A).

1.4 Recent Site Investigations and Documents

Recent investigations within the Milwaukee River Downtown Reach that are relevant to the FFS include 2016, 2018, 2020, and 2021 site characterization efforts performed by GLNPO under the GLLA. The 2016 and 2018 investigation activities are summarized in the *Site Characterization Report, Milwaukee River Downstream Sediments Milwaukee Estuary Area of Concern, Milwaukee, Wisconsin* (Downstream SCR) (CH2M 2019b). The 2016 and 2018 work included sampling and analysis of sediment from 63 core locations in Downtown Reach. Samples were analyzed for PCB Aroclors, PAHs, and select metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc). A subset of samples was analyzed for total organic carbon and grain size. Sediment thicknesses observed during coring were noted. A bathymetric survey was completed, and a side-scan sonar survey was performed to identify structures and debris within the riverbed and along the shoreline that may obstruct sediment remediation activities. Initial assessment of shoreline conditions based on above-water observations was also completed and reported in the Downstream SCR.

Additional Downtown Reach shoreline assessment and geotechnical sampling were performed by Jacobs in October 2020, on behalf of GLNPO as reported in *As-built Shoreline Bulkhead Structure and Utility Review for the Downtown and South Menomonee Canal Reaches* (Jacobs 2021c) and *Downtown Reach Geotechnical Sampling Technical Memorandum* (Jacobs 2021b). Individual sediment samples were analyzed for some combination of the following parameters: moisture content, dry density, Atterberg limits, grain size, consolidation, unconfined compression, and specific gravity (Jacobs 2021b). The most

recent bathymetric survey data used in site maps and calculations were obtained in fall 2020 (Seaworks 2020). The Draft *Floodplain and Downtown Reach Conceptual Site Model Memorandum* (Jacobs 2021a) was compiled in April 2021, to summarize various physical and chemical site characteristics for the Downtown Reach.

A fall 2021 sampling event was completed in the Downtown Reach Project Area to further refine the areas and volumes of sediment that may contain Toxic Substances Control Act (TSCA)-level PCB concentrations (greater than 50 milligrams per kilogram [mg/kg]) in areas that may not be accessible for remediation because of proximity to critical structures and/or utilities (shorelines, utility and bridge crossings, and in-water structures such as docks, piers, and walkways). A total of 101 sediment samples (not including quality assurance and quality control samples) was collected from 20 core locations and submitted for analysis of PCB Aroclors (Jacobs 2022a).

2. Conceptual Site Model

The CSM summarizes the physical characteristics of the Downtown Reach, describes the nature and extent of contamination, and identifies potential sources of contamination, migration pathways, and potential receptors. The CSM is visually depicted on Figure 2-1, which shows spatial relationships between potential sources, contaminant transport pathways, receiving waters, and potential receptors.

2.1 Hydrology and Bathymetry

The southern portion of the Milwaukee River drains a watershed area of 168 square miles with land use composed of 33 percent urban, 25 percent agricultural, 21 percent grasslands, 12 percent forests, and 6 percent wetlands (WDNR 2001). Within the Milwaukee River Floodplains and Downtown Reach project areas, the Milwaukee River flows southeast from the former Estabrook Dam to Capitol Drive, south from Capitol Drive to the former North Avenue Dam, and then southwest and south to the Menomonee River confluence.

The Milwaukee River discharge varies seasonally. Exhibit 2-1 summarizes monthly discharges at United States Geological Survey (USGS) stream gauge station (USGS 04087000) located immediately downstream of the former Estabrook Dam (approximately 3.3 miles upstream of the northern limit of the Downtown Reach). Stream gauge data downloaded from the USGS database for the period from January 2010 (following the former Estabrook Dam drawdown) to December 2020, show that the highest monthly average flow typically occurs in April and the lowest occurs in August (Exhibit 2-1).

Exhibit 2-1. Average Monthly Discharge Rates for USGS 04087000 from January 2010 through December 2020

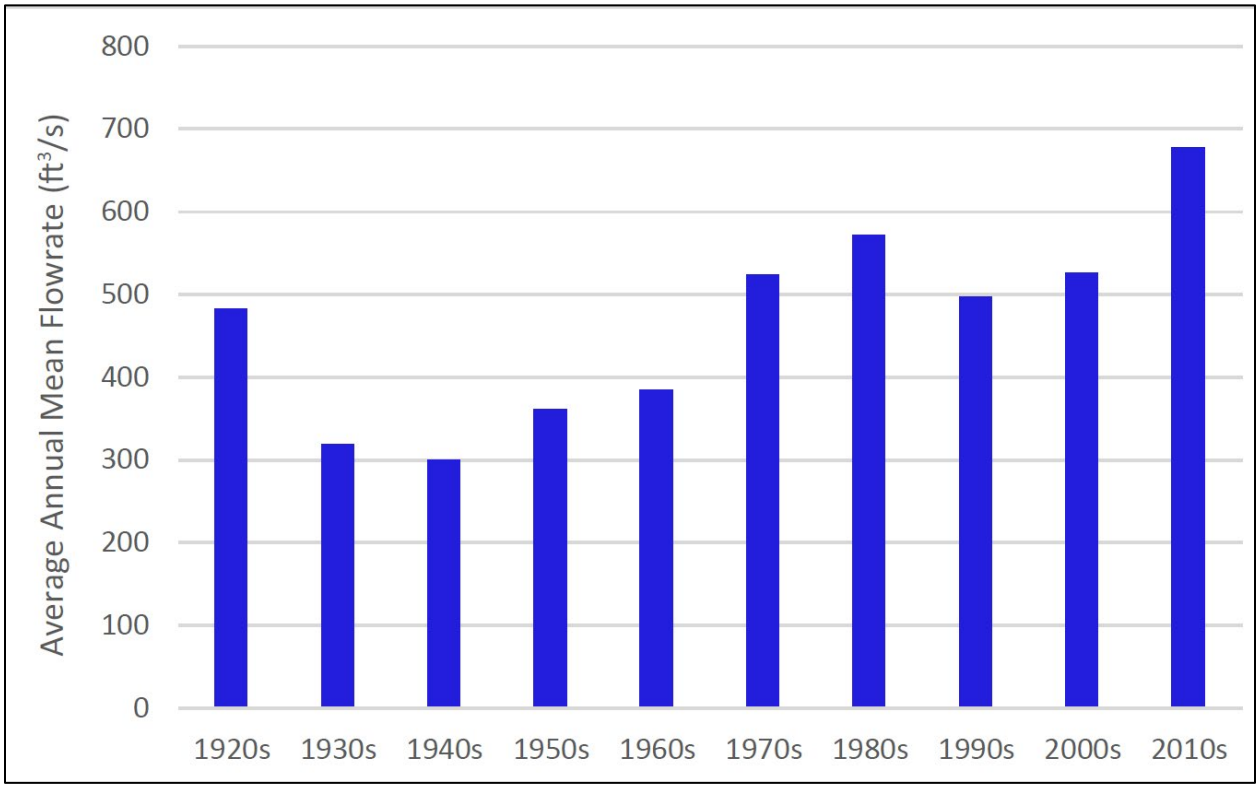
Discharge Rate (ft^3/s)	January	February	March	April	May	June	July	August	September	October	November	December
Overall Monthly Average (2010 to 2020)	529	561	1201	1460	1035	694	522	394	512	653	557	557
Monthly Average Maximum	1021	997	1778	2979	1746	1596	1254	1062	1627	2411	1256	1126
Monthly Average Minimum	213	231	470	801	441	144	106	135	75	186	166	257

Note: Data available (USGS 2022) through October 2021; period from January 2010 to December 2020 selected to represent a full 10 years of data.

ft^3/s = cubic feet per second

River flow has been recorded at USGS stream gauge station 04087000 since 1914. The annual mean flow rate averaged by decade increased approximately 4 percent per decade from the 1920s to the 2010s as shown in Exhibit 2-2 (WDNR 2021b). Further, the data suggest that the rate of increase is accelerating, with the 2010s having the largest increase (29 percent) in the average annual mean flow rate compared to the prior decade.

Exhibit 2-2. Annual Mean Flow Rates Averaged by Decade for USGS 04087000 from the 1920s through the 2010s

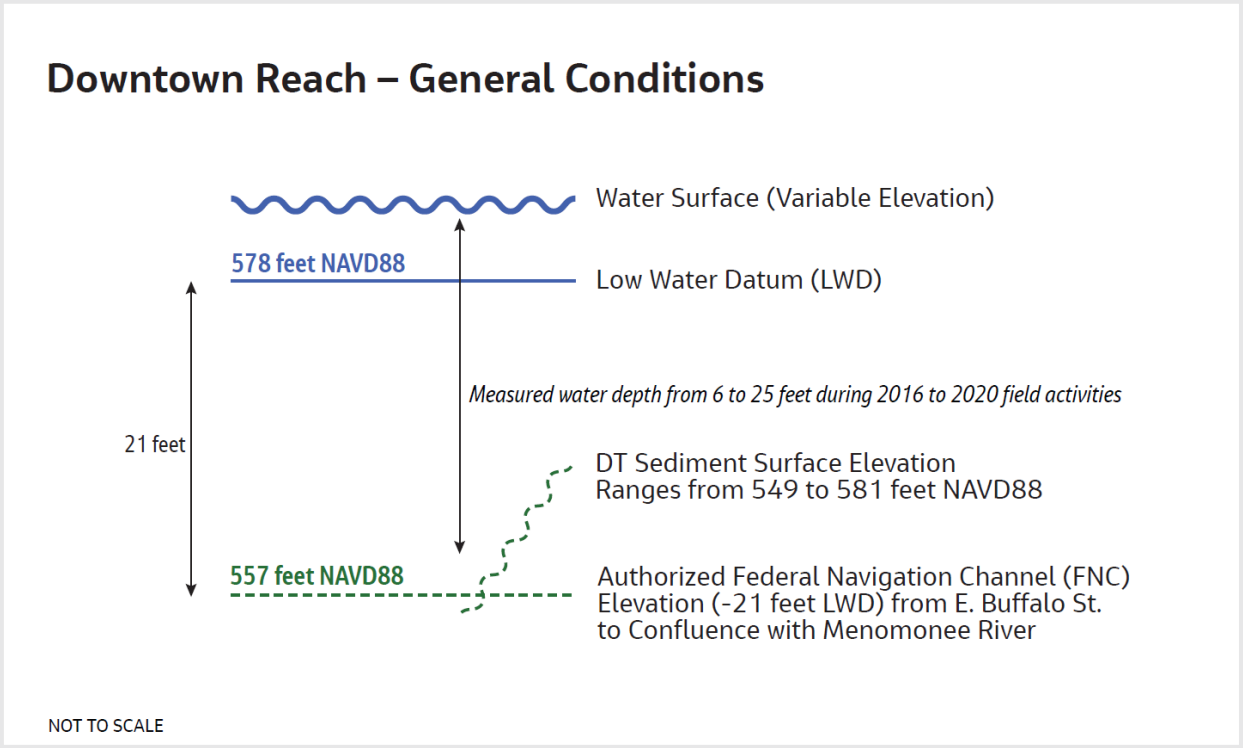


Source: WDNR 2021b

The Milwaukee Estuary also receives water from Lake Michigan during periodic seiche events within the lake. Lake Michigan oscillates between its western and eastern shores as a result of strong winds or atmospheric pressure changes because it is essentially an enclosed system. Because wind and/or atmospheric conditions are almost never static, seiche events are almost always occurring on Lake Michigan. When water is pushed toward the western shore of Lake Michigan, it flows upstream into the Milwaukee River, as was directly observed by Jacobs during the 2020 geotechnical investigation at the furthest upstream areas of the Downtown Reach near the former North Avenue Dam: as much as 1 foot of water elevation change was observed over a few hours.

Bathymetric and hydrologic features specific to the Downtown Reach are summarized in Exhibit 2-3.

Exhibit 2-3. Downtown Reach Project Area Established Elevations (NAVD88)



Note: Water surface elevations measured at staff gauges at the upstream and downstream ends of the Downtown Reach were approximately 580 feet and 581 feet NAVD88 during 2016 and 2018 sampling events, respectively. During the 2020 and 2021 investigations, the water surface elevation ranged from 582.7 to 581.4 feet NAVD88.

Riverbed elevations within the Downtown Reach range from 549 to 581 feet NAVD88 (Figures 1-2 A through F). Field-measured water depths ranged from 6 to 25 feet during Jacobs' 2016 through 2020 field activities (Exhibit 2-3). In general, riverbed elevations upstream of Cherry Street are greater than 568 feet NAVD88 (that is, the river is shallower). Downstream of Cherry Street and upstream of the FNC, the riverbed elevations are as low as 548 feet NAVD88 and the river is generally deeper. The downstream end of the Milwaukee River that is within the FNC is shallower and the riverbed elevation ranges between approximately 565 feet and 570 feet NAVD88. The greatest water depths and lowest riverbed elevations are located near bridges because of scour effects.

2.2 Sediment Characteristics

Jacobs investigated and described physical and chemical characteristics of both the loose sediment and underlying native material during data collection events for the Downtown Reach in 2016, 2018, and 2020. In general, the term "native material" is used to represent the relatively firm, relatively compacted glacial material in place before more recent deposition of loose sediment, generally referred to herein as "soft sediment". Geotechnical samples of both the soft sediment and native material were collected throughout the project area. The uppermost portion of the soft sediment is generally composed of very low density silt and clay with trace fine sand and a relatively high organic content (roots, wood, detritus) – it represents the most recently deposited material in the system. Deeper soft sediment components transition to denser and lower organic content alluvial material also composed of silt and clay, with gravel present in some areas. Native material that underlies the soft sediment is of glacial origin and is composed

of much denser silt or clay with low-to-no organic content and trace coarse material. Bedrock was not encountered during sediment sampling investigations in the Downtown Reach; regional information indicates that depth-to-bedrock in this region can range from less than 50 feet to 200 feet (Evans 2004).

In general, the soft sediment is thickest near the downstream end of the Downtown Reach (the confluence with the Menomonee River) and thins progressively toward the upstream end of the reach (the location of the former North Avenue Dam) (Figure 1-1). Estimated soft sediment thickness, based on measurements taken during sediment coring, ranges from approximately 2 feet to 30 feet along the reach with an average thickness of 14.5 feet.

Anthropogenic materials were commonly encountered during sediment sampling, including glass, brick, wood, and other construction materials. Some animal fur or hide was observed in soft sediment at nearly half the locations sampled during 2016 and 2018. Animal fur and/or hide appeared decayed and well-integrated into the sediment and was generally observed within dark brown to black silt and sand (CH2M 2019b).

Native material was encountered in the Downtown Reach at increasing depths closer to the confluence with the Menomonee River. The native material observed in the Downtown Reach consisted predominantly of lean clay (CL) and silty clay (CL-ML), with an increased amount of the coarser sand and gravel (SM, SP, SP-SM, GW) upstream. In some locations, sand and gravel zones were found on the upper surface of the native material, clearly denoting the base of soft sediment. The lean clay that was encountered was typically soft to very stiff, with varying percentages of gravel and/or sand. Native material was not encountered at all locations, but where encountered the estimated elevation of the top of native material ranges from approximately 538 to 565 feet NAVD88.

2.3 Habitat

Approximately 50 different species of fish have been documented in the Milwaukee River and any of those species could potentially be using habitat within the Downtown Reach (with seasonal variability) (WDNR 2017; Dow 2018). The most common are Lake Michigan salmonids, Largemouth Bass, Smallmouth Bass, Rock Bass, Bluegill (and several other Lepomis species), Yellow Perch, Northern Pike, Freshwater Drum, White Sucker (and potentially other Catostomidae species), several species of minnows (Cyprinidae), and many other fish forage species (for example, Alewife, Round Goby [invasive, non-native], and Rainbow Smelt).

During sampling of 308 points using a variety of equipment between 2016 and 2019, the U.S. Fish and Wildlife Service Aquatic Invasive Species Early Detection Team captured 58 species of fish in the lower Milwaukee Estuary AOC (WDNR 2020b). There were 26 different species captured between E. Cherry Street and Humboldt Avenue (roughly covering the upstream 1/3 portion of the Downtown Reach). The dominant species captured in that portion of the Downtown Reach were common shiner (28.2 percent), smallmouth bass (26.5 percent), golden redhorse (6.6 percent), white sucker (5.9 percent), sand shiner (4.7 percent), gizzard shad (3.5 percent), largemouth bass (3.2 percent), emerald shiner (2.9 percent), bluntnose minnow (2.7 percent), and shorthead redhorse (2.3 percent).

Downtown Reach data from bathymetric mapping, geotechnical studies, and sediment sampling and characterization were reviewed to assess likely habitat conditions. Physical conditions for both aquatic and terrestrial habitats along the Downstream Reach are considered to be of poor quality because most of the reach has constructed, vertical shorelines (sheet piles and other manmade structures) rather than natural, vegetated shorelines; a lack of shallow water habitat and vegetation; and a lack of coarse substrates within the river channel itself.

Grain size data for riverbed sediment collected in the Downtown Reach during 2016 and 2018 sampling events indicate that coarse substrates are only present in isolated locations, with sand and silt/clay being the dominant components. The presence of contaminants of concern (COCs) within the sediment may limit benthic community productivity and diversity.

Water depths are generally shallower upstream of Cherry Street and increase downstream until reaching the FNC near the confluence with the Menomonee River. Water depths greater than 10 feet are mainly associated with scour under bridges and other instream structures. However, from a habitat perspective, these deeper water in-bed scour areas provide more diverse aquatic habitat. A range of water depths typically supports diverse habitat; shallow water habitat along the shoreline of natural rivers can provide nursery habitat and cover for fish, but such habitat is lacking in the Downtown Reach. The Healing Our Waters Coalition specifically noted lack of shallow water habitat, lack of cover for migrating fish, and lack of nursery habitat that would provide cover and food for juvenile fish (Healing Our Waters 2022). Therefore, the current nearshore features support minimal vegetation or animal life.

As detailed in the *Remedial Action Plan Update for the Milwaukee Estuary Area of Concern* (WDNR 2020b), a restoration project is proposed to improve fish habitat between E. Cherry Street and N. Humboldt Avenue to address the ***Degradation of Fish and Wildlife Populations*** BUI. This project would be completed after sediment in the Downtown Reach has been remediated, although the cost has not been determined and is not included in the remedial alternative cost estimates provided in Section 6. Possible features include construction of a meandering bottom morphology, submerged sand/gravel bars, establishment of native rooted submergent vegetation, and other habitat enhancement elements.

2.4 Nature and Extent of Contamination

Investigations from 2016 through 2021 within the Downtown Reach included characterization of the following COCs: PCBs, PAHs, and select metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc). The total PAHs and metals concentrations in sediment were compared to the Probable Effect Concentrations (PECs), which are the recommended thresholds for evaluating sediment COC concentrations as discussed in the WDNR's *Wisconsin Consensus-based Sediment Quality Guidelines* (CBSQGs) (WDNR 2003). Detected concentrations were also compared to values corresponding to 3 times and 5 times the PECs to identify more highly impacted locations. PCB concentrations were compared to 1 mg/kg, 3 mg/kg, and 5 mg/kg threshold levels. PCB concentrations were also compared to the 50 mg/kg TSCA threshold. The complete data set is provided in Appendix A, which includes color coding to denote whether results exceed the threshold levels. The comparisons indicate that sediment in the Downtown Reach contains elevated concentrations of PCBs[4], metals, and PAHs[5].

Several metals exceed the PEC-based threshold levels, including chromium, mercury, lead, nickel, arsenic, cadmium, copper, and zinc. Chromium, mercury, and lead exhibit the greatest magnitude and frequency of PEC exceedances (Appendix A), which confirms the findings of the Downtown Reach SCR (CH2M 2019b). The other metals, where concentrations are detected that exceed the PEC, are typically less than the 3 times PEC threshold level. Appendix B provides an analysis confirming that PEC exceedances of other metals in the Downtown Reach are co-located with elevated concentrations of chromium, mercury, lead, total PCBs or total PAHs. Therefore, the FFS uses the exceedance extent of the following constituents as the basis for developing RTAs: total PCBs, total PAHs, chromium, lead, and mercury.

[4] Total PCBs are calculated as the sum of detected Aroclors. Nondetected results are reported as the maximum reporting limit for the individual Aroclors.

[5] Total PAHs are calculated as the sum of 18 PAH compounds. Nondetected results are included in sums as 1/2 of the reporting limit. Where all PAH compounds are nondetected, the sum is reported as the maximum reporting limit for the individual PAHs included in the sum.

The surface[6] sediment in the Downtown Reach is less contaminated than the subsurface sediment. Subsurface sediment has larger-magnitude threshold level or TSCA exceedances extending from the N. Humboldt Avenue Bridge downstream to the confluence with the Menomonee River. Figure 2-2A identifies surface and subsurface locations with exceedances of the threshold levels for total PAHs, total PCBs, chromium, lead, or mercury. The left panel illustrates the surface results, and the right panel presents the maximum subsurface result at each location.

The distribution of PCBs in surface and subsurface sediment is illustrated on Figure 2-2B. PCB concentrations in surface sediment are lower than the 1 mg/kg threshold level in most locations. The locations with concentrations exceeding the 1, 3, and 5 mg/kg threshold levels are scattered throughout the reach. Two locations upstream of the E. Juneau Avenue Bridge have PCB concentrations in the surface sediment that exceed the 50 mg/kg TSCA threshold. In subsurface sediment, PCB concentrations exceeding the 3 mg/kg threshold level are present between the N. Humboldt Avenue Bridge downstream to the confluence with the Menomonee River. Subsurface sediment with PCB concentrations exceeding the 50 mg/kg TSCA threshold are present from the upstream extent of the Downtown Reach downstream to the State Street Bridge crossing.

Figure 2-2C presents the distribution of total PAHs in surface and subsurface sediment. The surface sediment total PAH concentrations are predominantly below the PEC (22.8 mg/kg) throughout this reach. There are scattered locations that exceed the PEC, and only three locations where the surface sediment total PAH concentration exceeds the 3 times PEC or 5 times PEC thresholds. The highest total PAH concentrations in the subsurface sediment (that is, those exceeding the 3 times PEC or greater) are generally observed from the N. Humboldt Avenue Bridge downstream to the Cherry Street Bridge. Total PAH concentrations in subsurface sediment downstream of Cherry Street often exceed the PEC; however, total PAH concentrations exceed the 3 times PEC threshold level at only two locations.

The surface and subsurface distributions of chromium, lead, and mercury (the maximum observed detected value for the subsurface samples) are presented on Figures 2-2D, 2-2E, and 2-2F, respectively. Similar to the organic contaminants, the surface sediment metals concentrations are frequently below the PECs. Locations where one or more metals exceed the PEC in the surface sediment are generally downstream of E. Knapp Street. Subsurface PEC exceedances for metals are present throughout the entire Downtown Reach, with chromium and lead exhibiting a greater frequency and magnitude of exceedance (Figures 2-2D and 2-2E) relative to mercury (Figure 2-2F).

Figures 2-3A through 2-3F present more detailed surface and subsurface sediment COC information relative to the one time (1x), 3 times, and 5 times threshold levels, as well as to the TSCA threshold for PCBs. The concentration and elevation information presented in the Figure 2-3 set was incorporated into computer modeling that was used to develop RTAs and the associated volumes (see Section 3.2).

Samples were collected from the underlying native material at two locations in the Downtown Reach: SD-40 (located in approximate mid-channel, just south of the intersection with Wells Street) and SD-43 (located in the eastern portion of the sampled channel approximately coincident with the intersection with Buffalo Street). PCBs were not detected in either native material sample. Total PAH concentrations in both native material samples were below the PEC, ranging from 0.095 to 1.4 mg/kg. All detected metals concentrations in the two native material samples were below their respective PECs.

[6] The surface interval is 0 to 0.5 foot in most samples but ranges from the top 0.4 to 2.1 feet to include a small number of samples with top intervals varying from 0 to 0.5 foot (Appendix A).

2.5 Historical and Potential Ongoing Sources

Potential contaminant sources to the Milwaukee River Downtown Reach are presented here as a component of the CSM, with a general depiction of potential source types shown on Figure 2-1. Review of historical data in the WDNR's Bureau for Remediation and Redevelopment Tracking System (BRRTS) revealed more specific potential sources on sites adjacent to the river. In addition, Jacobs reviewed current industrial, stormwater, and construction discharge permits in the public record. Figure 2-4 indicates the locations of potential sources of contamination to the Downtown Reach.

The following subsections note potential sources of contaminants to the Downtown Reach using several categories:

- Potential Point Sources
- Potential Non-Point Sources
- WDNR Remediation and Redevelopment Sites
- Upstream Sites

Additional detail is provided in the *Evaluation of Potential for Recontamination of Sediment Report* (Recontamination Report) (WNDR 2022a), which was prepared by WDNR and the other non-federal sponsors to support the Milwaukee Estuary AOC remediation planning activities.

2.5.1 Potential Point Sources

Both shorelines of the Milwaukee River were historically developed to support industrial, commercial, and municipal uses. Many of the facilities that once operated with discharges to the river either ceased operations or were demolished. Few of the facilities remain, and much of the land has been redeveloped for commercial, residential, or recreational use (public walkways, piers, and parks). However, the historical point source discharges (mostly via permitted or nonpermitted industrial sewers) resulted in sediment being contaminated with various pollutants including metals, PCBs, PAHs, chlorinated solvent compounds, and petroleum-related compounds (for example, gasoline, diesel, or fuel oil).

Point sources of pollution have discrete discharges, usually from a pipe or outfall. Major reductions in point source activity were accomplished with the advent of the Clean Water Act and the subsequent regulation and permitting of all outfalls. Discharges from pipes or outfalls are regulated under the Wisconsin Pollutant Discharge Elimination System (WPDES) permitting program. As of spring 2021, two WPDES permits were active within the Downtown Reach (Table 2-1). Modernized operations, monitoring, and control of discharged water quality reduce the potential contaminant load at currently active industrial and municipal outfalls.

The Milwaukee Metropolitan Sewerage District (MMSD) holds the municipal WPDES permit for combined sewer discharge to the Milwaukee River. In the Downtown Reach, the storm sewer and sanitary sewer systems are commonly combined, with the resultant flow being conveyed in a set of combined sewers to an MMSD wastewater treatment plant (WWTP). However, during periods of heavy rain, the capacity of the WWTP is sometimes exceeded and the combined sewer overflows (CSOs) may enter the river, but usually in only very limited locations. CSOs contain common urban pollutants from stormwater runoff as well as from residential, commercial, and industrial users of the WWTP. Figure 2-4 shows the locations of numerous CSO outfalls along the Downtown Reach.

The number and volume of CSOs that negatively impact the water quality in the estuary has decreased significantly with the completion of the "deep tunnel" project in 1994 (MMSD 2022a). Between 1994 and 2021, MMSD has captured and treated more than 98.5 percent of the stormwater and wastewater that has

entered the regional sewer system totaling over two trillion gallons (MMSD 2022a). Over that same period, the annual overflow of untreated stormwater and wastewater released through the CSOs to area waterways during periods of heavy precipitation ranged between 1,500 gallons and 4.4 billion gallons (MMSD 2022a). Furthermore, CSO discharges are 90 to 95 percent stormwater and groundwater (MMSD 2022a).

2.5.2 Potential Non-Point Sources

Most of the land adjacent to the Downtown Reach is currently occupied by buildings, parking lots or structures, and other paved areas typical of an urban environment. During precipitation events, the majority of stormwater is conveyed into the combined sewer system with a limited amount flowing over land and entering surface water as a non-point source.

Areas with surface or subsurface soil contamination, or contaminated buildings or infrastructure, are potential non-point sources of contaminant loads during and after precipitation events until such time that those sites are remediated. Releases to the watershed and sediment environments that are associated with urban runoff may include PCBs, PAHs, or metals. Potential sources of contamination include:

- Construction or environmentally contaminated sites
- Paved or other impermeable surfaces
- Bulk soil or materials storage piles
- Bank soil erosion
- Surface spills
- Atmospheric deposition of airborne contaminants

A previous study conducted in the Milwaukee area concluded that the primary source of PAHs to sediment in urban area waterways are worn particles of coal-tar-based pavement sealants that are transported by stormwater runoff from parking lots (Baldwin et al. 2016). A recent research study to determine "the distribution and potential health effects of aerially deposited PAHs in soil within the urban core of metropolitan Milwaukee" suggests that aerial deposition is another source of PAHs to urban waterway sediment. The research was conducted at 27 areas in Milwaukee parks that were evaluated as being undisturbed for at least 80 years. The study concluded that "diffuse multiple point source [air] emissions contribute equally to PAH deposition throughout the area" (Siemering and Thiboldeaux 2020). Surface soil (0 to 7 centimeters) sampling locations were chosen specifically to only represent aerial deposition; concentrations of several individual PAHs in the sampled areas exceed their respective WDNR residual contaminant limits per Wisconsin Administrative Code §NR720 for soil cleanup standards. According to the Recontamination Report, the City banned coal-tar sealants using a substitute ordinance in 2017, at least in part because of the research study (WDNR 2022a).

The potential for unpermitted discharges or spills exists in urban waterways, especially those that are transportation hubs like the Milwaukee River and receiving waters where significant waste hauling and management activities occur. Potential non-point sources of contamination associated with remediation and/or redevelopment near the Downtown Reach are addressed through applicable stormwater and erosion control requirements.

2.5.3 Wisconsin Department of Natural Resources Remediation and Redevelopment Sites

Jacobs used publicly available data from WDNR to identify several types of historical and current industrial facilities. A review of remediation sites adjacent to the Downtown Reach on the WDNR BRRTS sites map (WDNR 2021a) identified the presence of multiple historical and current potential sources of metals (for

example, arsenic, chromium, lead, and mercury), chlorinated solvents, and petroleum compounds contamination (Figure 2-4).

Table 2-2 lists WDNR BRRTS sites near the Downtown Reach. The BRRTS sites are classified as either open or closed environmental remediation project (ERP) or closed leaking underground storage tank (LUST) sites adjacent to the Milwaukee River. The potential discharge of contaminated groundwater from nearby sites or from hazardous material spills can represent an additional potential source to the surface water. Impacted media at each of these sites may include soil, groundwater, and/or vapor. WDNR regulates remedial actions and monitoring at ERP and LUST sites. Because of the proximity of the sites to the river, each could have contributed historically to the contamination of the river sediment.

2.5.4 Upstream Sites

Agricultural pollutants from rural areas, contaminated sediment being washed downstream, and point and non-point pollution from upstream regions of the Milwaukee River have historically contributed to the pollution found in the Downtown Reach. In addition, historical and current potential pollution sources impacting the Floodplains Reach, located upstream of the Downtown Reach, are described in *the Draft Final Focused Feasibility Study Report – Milwaukee River Floodplains Reach, Milwaukee Estuary Area of Concern* (Jacobs 2023a). WDNR's Recontamination Report also summarizes completed or planned remedial activities for several known sites upstream of the Milwaukee River Downtown Reach (WDNR 2022a), either adjacent to or upstream of the Milwaukee River Floodplains Reach.

2.6 Contaminant Release Mechanisms and Potential Transport Pathways

Figure 2-1 shows a general depiction of contaminant release mechanisms for the Downtown Reach. Permitted and historically unpermitted discharges and overland flow transport particulate and dissolved contaminants directly to surface water. CSOs may occur during large precipitation events. Groundwater impacted by contaminants may upwell through the sediment and discharge to surface water. PCBs, PAHs and metals in these releases tend to adsorb to fine-grained sediment and organic material and may be incorporated into the sediment. Deposition and accumulation of relatively cleaner sediment over time results in the gradual burial of historical contamination.

The contaminated sediment in the riverbed can be resuspended by currents under high flow conditions, or by propeller wash, keel drag (friction between the keel of a vessel and the sediment surface) or in-water construction activities. Resuspended sediment can be transported and redeposited in downstream areas. Seiche effects may also play a minor role in resuspending contaminated solid particles and redepositing them some distance upstream. Impacted riverbed sediment may also release dissolved-phase chemicals into the surface water that is then transported within the project area or from one river to another (for example, from the Milwaukee River to the Menomonee River and then to the outer Milwaukee Harbor/Milwaukee Bay).

2.7 Recontamination Potential

The potential for recontamination of the Downtown Reach by upstream industrial sources and outfalls is low. The Recontamination Report (WDNR 2022a) concludes that there is a low potential for recontamination of sediment from the potential sources evaluated therein. Recontamination potential because of bank erosion within the Downtown Reach is minimal, as 84 percent of the shorelines are composed of SSP or concrete bulkhead walls (CH2M 2019b). Erosion of contaminated bank soils in the Floodplains Reach (upstream of the Downtown Reach) would pose a potential recontamination risk to the Downtown Reach if not addressed. However, previous remediation projects at the Lincoln Creek Site and

the Lincoln Park/Milwaukee River Sediment Site and planned remedial activities for the Milwaukee River Floodplains Reach (Jacobs 2023a) will mitigate this potential ongoing source of contamination.

Information shown on Figures 2-2A-F and 2-3A-F indicates that surface sediment in the Downtown Reach is comparatively less contaminated than the subsurface sediment. The presence of comparatively cleaner sediment at the surface indicates that the contaminant sources have diminished over time. As discussed in Section 2.5, major reductions in point source activity were achieved by the Clean Water Act and the associated regulation and permitting of outfalls under WPDES. Many of the facilities that once operated with discharges to the river have either ceased operations or have been demolished. Further, the number and volume of sanitary sewage and CSOs that negatively impact the water quality in the estuary has decreased significantly since 1994; between 1994 and 2021, MMSD has captured and treated more than 98 percent of the stormwater and wastewater entering regional sewer system (MMSD 2022a). MMSD also cleans and inspects MMSD outfalls in the Downtown Reach.

2.8 Potential Receptors

As previously stated, 7 of the 11 BUIs in the Milwaukee Estuary AOC are related to contaminated sediment. The main receptors include benthic invertebrates and higher trophic-level organisms, including fish, some wildlife (piscivorous mammals and birds), and humans (Figure 2-1).

Benthic invertebrates live and feed in direct contact with sediment, pore water, and surface water, and the contaminants present in these environmental media. Bottom-dwelling organisms form the base of the aquatic food web and are exposed to impacted sediment through the direct contact and ingestion pathways.

Fish serve as prey to piscivorous birds, mammals, and humans. Fish are exposed to contaminants in surface water via gill exchange and diets that include benthic organisms and smaller fish that feed on benthic organisms. This results in bioaccumulation in fish: fish tissue concentrations increase as smaller species are eaten by larger predatory species over time. Piscivorous birds and mammals are primarily exposed to bioaccumulative chemicals, such as mercury and PCBs in surface water and sediment, via diet when they consume prey (invertebrates and fish) that is in direct contact with such chemicals. Humans are also potential receptors of the contaminants through the consumption of fish or when exposed to contaminants in the water and sediment of the Downtown Reach during recreational activities.

3. Remedial Action Objectives and Remediation Target Areas

RAOs are statements that describe the overall goals that remedial action should achieve to provide adequate protection of human health and the environment while meeting regulatory requirements. GLNPO applies the following general RAOs to the remedial actions conducted as part of the GLLA:

- Reduction of exposure to COCs in sediment and pore water
- Reduction of COCs in biota
- Reduction of sediment-related toxicity
- Improvement of biota and biological communities
- Improvement in habitat quality
- Remediation of sediment contamination based on volume, area, and/or mass basis

Screening levels are COC concentrations that are used to develop RTAs that include areas and volumes of media (sediment) targeted for active remediation. After a preferred alternative is recommended, quantitative cleanup goals (CUGs) will be established for the project using site-specific screening levels as a starting point.

3.1 Site-specific Remedial Action Objectives

The site-specific RAOs for the Downtown Reach include remedial goals to improve environmental quality in the portion of the AOC where the project is located, and to support removing BUIs and delisting the AOC. The following site-specific RAOs have been established for the Downtown Reach:

- Support removal of BUIs within the Milwaukee Estuary AOC by reducing the mass, volumes, and concentrations of COCs in the sediment. This will be achieved by addressing sediment with COCs exceeding the CUGs, thereby reducing exposure and risk to ecological and human receptors. The remediation of contaminated sediment in the project area will make progress towards eliminating the following sediment-related BUIs:
  - Restrictions on fish and wildlife consumption
  - Degradation of fish and wildlife populations
  - Fish tumors or other deformities
  - Bird or animal deformities or reproduction problems
  - Degradation of benthos
  - Restrictions on dredging activities
  - Loss of fish and wildlife habitat

  Evaluation of the pre- and post-remediation status for these listed BUIs will be included in RAP updates for the Milwaukee Estuary AOC completed outside of this project.
- Reduce risks to human health and the environment from exposure to COCs in sediment. This will largely be accomplished by supporting the removal of BUIs through remediation of sediment with COC concentrations above the CUGs.
- Maintain depth requirements within the authorized FNC at the downstream end of the Downtown Reach.

3.2 Screening Levels and Remediation Target Areas

Sediment screening levels were selected in consultation with EPA and WDNR with the goal of consistent application across the various sediment project areas within the Milwaukee Estuary AOC (Menomonee River, Milwaukee River Downtown Reach, SMC, Kinnickinnic River, and Milwaukee Bay). Screening levels for

total PAHs and metals (chromium, lead, and mercury) are based on PECs defined in the WDNR's CBSQG (WDNR 2003), as well as values based on 3 times the PECs. Screening levels for total PCBs are 1 mg/kg and 3 mg/kg.

RTAs were developed using three different screening level scenarios to provide flexibility in developing remedial alternatives for the Downtown Reach and to facilitate planning for the overall Milwaukee Estuary AOC. The three screening level scenarios are based on EPA and project partner agreement as follows:

- PECs for PAHs and metals and 1 mg/kg PCBs
- 3 times PECs for PAHs and metals and 1 mg/kg PCBs
- 3 times PECs for PAHs and metals and 3 mg/kg PCBs

The RTAs for the three screening level scenarios are presented on Figures 3-1 through 3-3. The RTAs for each scenario were developed using the computer application Earth Volumetric Studio (EVS) v2021.12.2 by CTech. The software uses advanced volumetric gridding, geostatistical analysis, and visualization tools with integrated graphical user interfaces and modular analysis to model and visualize chemical, geological, and physical data. EVS integrated geostatistical tools provide quantitative evaluation of input data and allow for model outputs to be used in other programs such as geographic information systems (GIS) or AutoCAD (CAD) for data presentation and estimation of quantities for remedial action.

Sediment sample data sets used for the EVS modeling include:

- 2016 and 2018 Milwaukee River Downtown and Floodplains Reach samples collected by CH2M HILL on behalf of GLNPO (CH2M 2019b)
- 2021 FFS Data Gap Sampling (TSCA sediment sampling) performed by Jacobs on behalf of GLNPO (Jacobs 2022a)

Physical data including river boundary, sediment surface elevation, and interpolated native material surface elevation were used to define the lateral and vertical extents of the model domain. The lateral extents of the model represent the project area extent as digitized from aerial imagery. The most recent (2020) bathymetric survey was used to represent the top model surface. Native material elevations were obtained from sediment boring logs, input into GIS, and kriged using the "Topo to Raster" tool to develop the bottom model surface representative of native material.

The horizontal and vertical distribution of COC concentrations was evaluated by interpolating analytical data using geostatistical three-dimensional (3D) kriging in EVS. The model analyzes the spatial distribution and number of field data points, constructs a multidimensional variogram which is a best fit to the data set being analyzed, and then performs kriging in the model domain.

An iterative process was used to calibrate the model results to ensure that each model honored the input data set used to generate the model. Each COC data set was kriged at each of the respective screening levels. The kriging for each COC was performed individually and then the model results were combined in EVS to produce a 3D model shape with screening level exceedances for each of the three screening level scenarios. Each of the 3D model shape outputs for each COC at each respective screening level was reviewed visually to verify appropriate inclusion of sample points within the 3D model output. Each 3D model shape output was then reviewed to confirm whether it accurately interpolated between sample points and sufficiently extended horizontally and vertically. If these conditions were not met, this process was repeated for several iterations using different grid, data processing, and kriging settings to select the optimal model settings to best fit the analytical data.

Additional analysis was required to create the greater than (>) 50 mg/kg 3D model shape representative of TSCA-level sediment for the Downtown Reach Project Area. The initial model calibration process performed for PCB concentrations >1 mg/kg and >3 mg/kg resulted in a TSCA-level 3D shape with multiple, isolated >50 mg/kg areas across adjacent sample locations of PCB concentrations >50 mg/kg. Therefore, additional model calibrations were performed specific to PCB concentrations >50 mg/kg. Despite efforts to minimize discontinuity in the TSCA model shape, several noncontiguous TSCA zones were still evident. Based on review of the concentration values and geospatial distribution of the sample data, the discontinuity is because of the prevalence of relatively thin (1 foot thick) intervals of TSCA-level sediment that occur at highly variable elevations between adjacent boring locations. The exceptions to this are two adjacent, relatively contiguous zones located between N. Holton Street and N. Pierce Street. The areas identified as "TSCA-dredge areas" are identical on each of the three figures (Figures 3-1, 3-2, 3-3) because the TSCA threshold (> 50 mg/kg PCBs) is the same for all screening level scenarios.

Following the development of the 3D model shape outputs for each COC, the applicable outputs were then merged to create a combined COC 3D model shape (PCBs, metals, and PAHs) representing each remedial alternative that was then imported into Microstation V8i PowerGEOPAK Select Series10 CAD software for further processing. The additional processing performed within CAD included accounting for the effects of dredge offsets adjacent to the shoreline and bridge piers (assumed to be 10 feet) and utility crossings (assumed to be 15 feet[7]). A typical side slope of 3:1 was also applied to all dredging areas from the top of sediment elevation at the offset to the target dredge elevation. Following implementation of dredge offsets and side slopes, an overdredge allowance of 0.5 foot was implemented to accommodate for variability in sediment removal by dredging. The CAD-modified 3D shapefile with offsets, side slopes, and overdredge allowance accounted for was then used to estimate the volume of sediment that would require dredging, and to identify contaminated sediment areas that may require in-place management because of requisite shoreline offsets and side slopes.

The estimated contaminated sediment volumes associated with each modeled scenario are summarized in Table 3-1. Note that the remediation removal volume estimated quantities are based on modeled results of screening level exceedances with modifications as previously described; however, actual dredge volumes may change during the remedial design phase of the project because of additional information and engineering considerations pertaining to shorelines, in-water structures, and utilities. In addition, the International Great Lakes Datum (IGLD) 1985 is in the process of being revised and will be replaced by IGLD 2020 (NOAA 2022). As part of this process, the LWD and authorized elevation for the FNC may also be revised, with current proposals indicating a lowering by 1 foot (NOAA 2022). The changes to the IGLD and the LWD are anticipated to be implemented by 2027. Any changes to the dredging elevations and volumes for FNC in the Downtown Reach in response to the IGLD update will be incorporated during the remedial design.

It should be noted that Table 3-1 quantities were updated after the RAETM for the Downtown Reach (Jacobs 2022b) for the following reasons:

1. A fiber optic utility line previously reported as being underground upstream of the Holton Street Bridge was determined to be attached to the underside of the bridge based on field data collected by the Department of Transportation. Therefore, the dredge extent was updated, resulting in an estimated 5,000 cubic yards (CY) of additional non-TSCA sediment that can be accessed for removal.

[7] The use of 15-foot setbacks for utilities is a standard industry practice for this stage in a project. The setback requirements will be further refined during remedial design.

2. An additional remedial alternative (Alternative 3A) has been evaluated as described in Sections 4 and 5, resulting in an additional set of associated remedial quantities.

4. Remedial Technology Screening and Conceptual Alternatives Development

This section describes the identification and screening of potentially applicable remedial technologies and process options based on the RAOs and RTAs for the Downtown Reach Project Area, and introduces the concepts used for identifying conceptual remedial alternatives.

4.1 Remedial Technology Screening

The technologies and process options identified for screening are presented in Table 4-1. The objective of technology screening is to retain the best technology types and process options and streamline the development and evaluation of remedial alternatives. There are multiple process options associated with some of the technologies included in the table. The remedial technologies were evaluated using the qualitative screening criteria of effectiveness, implementability, and relative cost.[8] The last column in Table 4-1 provides a summary screening comment for each remedial technology and process option.

Each technology screening criterion considered the following:

- **Effectiveness:** Key considerations include:
  - The extent the technology and/or process option would be protective of human health and the environment and meet the RAOs
  - The level of treatment and removal that could be achieved
  - The extent to which the technology and process option has been demonstrated at similar sites.

  Protection of human health and the environment refers to the effectiveness of the technology in reducing the toxicity and mobility of contaminants in the sediment or in meeting RAOs. Level of treatment and removal refers to the degree to which the technology reduces contaminant mass.
- **Implementability:** Refers to the feasibility and/or availability of a given process option for this project area. Feasibility is further assessed based on technical and/or administrative considerations. Technical feasibility refers to the ability to adequately treat and remove the COCs given site-specific conditions. Certain options may be able to address the COCs but cannot be implemented because of factors like space limitations or unacceptable subsurface conditions. Administrative feasibility refers to the ability to meet factors such as local and state permitting requirements or regulatory reviews for approval. Potential permit requirements are listed in Appendix C of this document. Availability refers to factors such as the geographic location of the site and the extent to which the remedial option is commercially available.
- **Relative Costs:** Table 4-1 presents relative differences in cost magnitude (low, moderate, or high) taking into consideration anticipated capital and operations and maintenance costs. As such, cost considerations are provided for general assessment and were not used singly for technology screening decisions unless substantial cost differences are identified that would immediately preclude further consideration.

[8] These evaluation criteria are used for the technology screen only; additional evaluation criteria are used in Section 6 to evaluate the conceptual remedial alternatives.

Based on the evaluations performed for the Downtown Reach and WDNR's disposal alternatives evaluation (WDNR 2020a), the following technologies were retained for further evaluation as components of remedial alternatives as summarized in Table 4-1:

- No Action (required and retained for comparison to other technologies)
- Sediment Removal
- Residuals Management
- Sediment Disposal
- Sediment Dewatering
- Sediment Containment
- In Situ Treatment
- Ex Situ Treatment

4.2 Conceptual Remedial Alternatives

The conceptual remedial alternatives were developed using a common set of technologies, and they primarily differ from each other with respect to the screening levels used to establish the RTAs. Within each RTA, sediment that can be feasibly removed will be dredged, and isolation or stabilization technologies will be applied to the sediment with COC concentrations exceeding CUGs that remain in place. The extent and characteristics of the material that remains in place after dredging is different for each screening level scenario.

Alternative 3A was subsequently developed based on discussions with project partners because of concerns about AOC-wide estimated dredge volumes exceeding the dredged materials management facility (DMMF) capacity. Alternative 3A was developed to provide a sub-alternative that reduces dredge volume by establishing a maximum sediment removal elevation throughout the project area. Similar sub-alternatives were not developed for Alternatives 2 or 4 because the sediment removal volume associated with Alternative 2 exceeds DMMF capacity when factoring in the removal quantities for the remaining AOC project areas, and the PCB screening level for Alternative 4 exceeded an acceptable level of protectiveness.

Exhibit 4-1 provides alternatives that were further developed and evaluated.

Exhibit 4-1. Conceptual Remedial Alternatives for the Milwaukee River Downtown Reach

Alternative	Alternative Description
1	No Action
2	Remediate sediment with COC concentrations greater than the PECs for total PAHs or metals or greater than 1 mg/kg total PCBs: dredge (estimated total dredgeable volume of 524,000 CY) and cap sediment that cannot be removed (estimated 36 acres).
3	Remediate sediment with COC concentrations greater than 3 times PECs for total PAHs or metals or greater than 1 mg/kg total PCBs: dredge (estimated total dredgeable volume of 472,000 CY) and cap sediment that cannot be removed (estimated 31 acres).
3A	Remediate sediment with the same COC concentrations as Alternative 3 above a maximum dredge elevation of 552.5 feet NAVD88: dredge (estimated total dredgeable volume of 457,000 CY), cap sediment that is not removed (estimated 32 acres).
4	Remediate sediment with COC concentrations greater than 3 times PECs for total PAHs or metals or greater than 3 mg/kg total PCBs: dredge (estimated total dredgeable volume of 415,000 CY) and cap sediment that cannot be removed (estimated 27 acres).

Two-dimensional representations of the RTAs for each of these alternatives (except for No Action) are presented on Figures 3-1 through 3-3, respectively. Details regarding the associated RTA volumes and the estimated volumes that are accessible are provided in Table 3-1. The estimated removal volumes and areas account for areas where dredging extent will be limited by setback and side slope requirements. Additional aspects of the remediation that were addressed during alternatives development and evaluation are:

- Considerations for sediment with COC concentrations above screening levels remaining within the area of the shoreline offsets and side slopes that cannot be removed without additional analysis of structural stability or installation of additional supporting structure(s) to assure the remedy is protective and safe to implement.
- The remedy for the FNC downstream of Buffalo Street (approximately 700 lineal feet) cannot interfere with navigation; it is assumed that USACE will require at least 3 feet of clearance below the authorized FNC elevation to the final remediation surface based on previous communications during development of alternatives for the Menomonee River (CH2M 2019a). To achieve the USACE-required 3 feet of clearance, it is assumed that sediment removal will be required to 3.5 to 4.5 feet below the FNC elevation for the application of sand cover (3.5 feet) or cap (4.5 feet) based on the following:
  - 1 foot of overdredge allowance beyond the authorized depth
  - 2 feet of clearance from the final remediation surface per USACE recommendations for navigation channels
  - 0.5 to 1.5 foot of depth for the application of the residual sand cover or cap, respectively

Additional detail regarding the remedial alternatives is provided in Section 5.

5. Remedial Alternatives Description

The remedial technologies and process options that remain after screening (see Table 4-1) are incorporated into the following remedial alternatives: Alternative 1 (No Action) and Alternatives 2, 3, 3A, and 4, which are shown in map view on Figures 5-1 through 5-4, respectively. The figures include the locations of bridges and utility corridors, areas identified for shoreline stabilization, dredging extents (including analytical results for locations with TSCA-level PCB concentrations), and the cap extents for Alternatives 2 through 4. Figures 5-5 and 5-6 show example profiles for sediment removal and sediment cap and cover placement, respectively.

Dredging in the Downtown Reach is constrained by various site conditions, including the bulkhead walls, bridges, utility crossings, and other infrastructure elements. Remedial design for removal of contaminated sediment adjacent to these in-water structures and utilities will require additional information and engineering considerations to address structural stability during and following the remedial action. Other technologies (for example, capping) likely will be needed to manage the material remaining in place in these areas.

Shoreline information for the Downtown Reach was reviewed as described in the *Downtown Reach Geotechnical Sampling Technical Memorandum* (Jacobs 2021b). The shoreline assessment included visual observation of above-water natural or constructed shoreline materials, and qualitative notation of structural conditions, critical structures, utility crossings, and sewer outfalls; however, it does not provide structural evaluations related to performing construction activities adjacent to the existing bulkhead system or in-water structures. Available records associated with constructed bulkhead details (such as construction material types and specifications, construction dates, and an assigned "condition" on the observation date) were provided by the City with a list of the various permits issued by the Port of Milwaukee. Information was received for only 54 percent of the parcels (60 out of 110) along the Downtown Reach covering approximately 29 percent of the alignment. Only six of the parcels with relatively detailed plans contained adequate subsurface information. Some of the geotechnical data were more than 40 years old, making the information of limited value. The overall scarcity of data on the Downtown Reach shoreline limits the understanding of current bulkhead conditions. With most of the bulkhead alignment unaccounted for in the data, it is not known whether bulkheads have been altered or replaced.

The lack of high-quality bulkhead data is a limiting factor for optimizing sediment removal design, resulting in an assumption at the FFS stage for extensive capping of offsets from bulkheaded shorelines (10 feet), utilities (15 feet) and associated side slopes to the depth of removal. Capping will be required unless engineering evaluations can be performed as part of the remedial design. Guidance on post-capping best practices will be developed as part of the remedial design. Preventing bulkhead movement during proposed sediment removal is a critical factor for the success of the project and should be continually discussed with all stakeholders during each phase of the project. These discussions should consider the impact of bulkhead movement on existing facilities, methods of mitigating the anticipated bulkhead movement during construction, sequencing of dredging operations, and imposing limits on the vertical and horizontal extent of sediment removal and possible replacement of dredged material with aggregate.

Capping could be employed in non-navigational areas where sediment cannot be removed because of existing structures, within the FNC (south of Buffalo Street) if deauthorized, or below the required clearance depth in the authorized FNC. Capping is effective in rapidly decreasing COC concentrations in the surface sediment. In situ stabilization could be considered for treating sediment adjacent to bulkheads

where shoreline stability is a concern and additional structural stability of the shoreline is desired. Natural recovery processes such as sediment deposition and accumulation may continue to reduce surface sediment COC concentrations in areas not targeted for active remediation.

WDNR's cost analysis of dredging and disposal of dredged material into the planned DMMF indicated preferred technologies for various sediment removal and disposal projects within the Milwaukee Estuary AOC (WDNR 2020a). The analysis indicated hydraulic dredging with DMMF disposal is the most cost-effective alternative. WDNR performed an alternatives analysis to evaluate costs associated with the disposal of impacted sediment from the Milwaukee Estuary AOC at an existing landfill versus disposal at the DMMF (WDNR 2020a). The analysis showed that construction and operation of the DMMF is the most cost-effective disposal alternative compared to landfill disposal. The planned DMMF is located in the Milwaukee Bay Project Area, approximately 1.9 miles from the downstream end of the Downtown Reach (Figure 1-1). Design, permitting, and construction of the DMMF is ongoing by project partners including the MMSD, City of Milwaukee, Port of Milwaukee, WDNR, and We Energies with anticipated DMMF construction starting in late 2023 or early 2024 (MMSD 2022b). The DMMF is anticipated to be owned and operated by the Port of Milwaukee (Foth 2018).

Table 5-1 summarizes the estimated quantities for sediment removal, residual cover, capping, shoreline and utility reinforcement, and water treatment for the alternatives described in the sections that follow. The details and assumptions for each alternative are the basis for the cost estimates that are provided in Appendix D. Additional specificity for each element (for example, means and methods, equipment sizes and numbers, and production rates) will be developed during the remedial design. Additional process options may be evaluated during remedial design.

5.1 Alternative 1: No Action

The No Action alternative is included in the alternatives for comparison purposes. Under Alternative 1, no remedial actions are conducted to control exposure to contaminated sediment. Existing fish consumption advisories likely remain in place and BUIs are not addressed through sediment remediation. Natural degradation of contaminants is not likely to occur at a measurable rate or within a reasonable time period, although contaminated sediment may be gradually buried over time by deposition of sediment at urban background concentrations from upstream.

5.2 Alternative 2

Alternative 2 addresses sediment with COC concentrations greater than the PECs for total PAHs or metals (chromium, lead, mercury) or greater than 1 mg/kg for total PCBs. Alternative 2 assumes the lowest cleanup concentrations of the four alternatives and therefore has the largest removal area, removal volume, and capped area (Figure 5-1 and Table 5-1). Alternative 2 has an RTA of 53 acres with a sediment removal area of approximately 36 acres resulting in an estimated volume of 524,000 CY, of which 510,000 CY is non-TSCA-level sediment and 14,000 CY is TSCA-level sediment. An estimated 474,400 CY of sediment with COC concentrations exceeding the CUGs across approximately 36 acres will be capped near bridges, utility crossings, and shoreline structures. Approximately 2.7 acres of the removal area is located within the FNC south of the Buffalo Street Bridge. The in-water work during remedial action is estimated to take approximately 8 months.

5.2.1 Shoreline and Utility Corridor Stabilization

Removal of sediment near bulkheaded shorelines or utility crossings may not be safe or practical to accomplish without stabilization or reinforcement. In the portions of the RTA without TSCA-level

sediment, dredge extents have been offset by 10 feet near shoreline structures and by 15 feet near utility crossings, and the conceptual design assumes dredging at 3:1 side slopes to prevent slope failure (Figure 5-5, Profile C-C'). Contaminated sediment left in place in the offset areas or beneath the side slopes will be covered with a cap as shown in plan view on Figure 5-1.

It is assumed that shorelines and utility corridors adjacent to TSCA-level sediment will be stabilized or reinforced before dredging to maximize the amount of TSCA sediment that can be removed without undermining stability. Approximately 3,600 lineal feet of shoreline stabilization may be required at the approximate locations shown on Figure 5-1. The potential stabilization technologies include the following options:

1. Installation of an additional, permanent SSP bulkhead offset from the existing bulkhead or utility corridor (Figure 5-5, Profile A-A'). Sediment is excavated to the outer edge of the new bulkhead and a cap is placed over the gap between the original shoreline or utility corridor and the new bulkhead. The new sheetpile is then cut off at the cap surface.
2. Installation of an additional, temporary SSP bulkhead offset from the existing bulkhead or utility corridor (Figure 5-5, Profile A-A'). Sediment is dredged to the outer edge of the new bulkhead and a cap is placed over the gap between the original shoreline or utility corridor and the temporary bulkhead. Backfill material is placed adjacent to the temporary sheetpile wall to provide a stable slope. The temporary sheetpile is then extracted.
3. In situ stabilization (ISS) of the sediment along the existing shoreline or utility crossing to increase bearing capacity and shear strength of the sediment. Stabilizing agents are mixed into the sediment using augers to create a series of stabilized columns adjacent to the shoreline or utility crossing that provide necessary structural elements to reduce the risk of slope failure. Dredging is then performed immediately adjacent to the columns with a lower risk of undermining the shoreline or other feature. Contaminants are bound up within the stabilized matrix to reduce leaching of contaminants. The columns closest to the center of the channel are potentially reshaped after dredging to provide a suitable final slope.

The cost estimates for Alternative 2 assume stabilization and reinforcement using permanent SSP bulkhead (Option Number 1) because:

- Installation of temporary SSP bulkhead would require a substantial amount of backfill to be imported and placed to reinforce the shoreline for maintaining stability during removal of the temporary sheetpile.
- Elevated pH of the river is created during the ISS mixing process and requires pH control using carbon dioxide.
- During the ISS mixing process, swell is generated as a result of the injection of the reagents. The percentage of swell is dependent on the mix design but can lead to a 20 to 30 percent volume increase. Swell material is typically removed, solidified and disposed of resulting in increased cost due to the additional waste transportation and disposal.
- Removal of obstructions while implementing ISS is not feasible given the depth of water and thickness of sediment, potentially leading to a larger area requiring stabilization in locations where the target mixing depth cannot be reached.

5.2.2 Sediment Removal

Sediment with COC concentrations that exceed CUGs will be removed wherever possible. Sediment removal will be accomplished using both hydraulic and mechanical methods. The staging area(s) to be used for processing debris and staging cap and cover material will be identified during remedial design, with the goal of locating the staging area as near as possible to the work area(s). Figure 5-5 shows conceptual dredge plans for two profiles across the channel (A-A' and C-C') and one profile along the approximate center line of the channel (B-B'). Scour protection may be required upstream of the RTA to mitigate potential head cut that may occur. Scour protection downstream of the RTA may be required to maintain sediment stability to prevent damage to the cap. The need for scour protection will be determined during remedial design and is not included in the cost.

5.2.2.1 Hydraulic Dredging

It is assumed that hydraulic dredging will be used wherever possible to remove non-TSCA level sediment because it is expected to:

- Be more efficient and cost effective in the Downtown Reach than mechanical dredging,
- Minimize turbidity during the dredging process
- Reduce impacts to dredging operations because of bridge openings, and
- Reduce impacts to commercial and recreational vessel traffic.

Sediment is loosened by a hydraulic cutter and removed by suction along with adjacent water into a leak-tight, high-density polyethylene pipeline; the sediment slurry is then pumped through the pipeline directly to the DMMF. Sediment removal using hydraulic dredging methods at sites with similar physical characteristics is typically conducted using an 8- to 14-inch swinging ladder cutter suction dredge to remove the sediment to the specified depths. However, additional specialty hydraulic dredge options are available without cutterheads such as plain suction, pneumatic submersible pumps, and diver-assisted hand-held hydraulic suction, which may be used in more sensitive areas near critical structures like utilities.

The depth attainable with the hydraulic dredge depends on several factors including the size of the ladder, lift cylinder, width of the hull, and length of the hull. An operational evaluation was completed to determine the optimal cutter suction dredge or combination thereof. The evaluation considered depth of water within the Downtown Reach, depth of sediment removal, production rates, and the volume of water generated. A 12-inch and 14-inch diameter cutter suction dredge is deemed to be most cost effective for this project area.

Approximately 21,000 lineal feet of pipeline for each dredge will be required for Alternative 2 hydraulic pumping operations, starting at the upstream extent of removal in the Downtown Reach and ending at the DMMF, including an estimated six pumping booster stations. As the work progresses from upstream to downstream, the pipeline will be shortened and booster pump stations relocated as required.

Turbidity control, such as a silt or bubble curtain, may be implemented to prevent migration of suspended sediment. Continuous upstream and downstream turbidity monitoring may be required during dredging.

5.2.2.1 Mechanical Dredging

For mechanical dredging, a crane or excavator is placed on a floating barge. An environmental bucket that minimizes the loss of sediment and entrained water is used to remove sediment to the specified dredge cut elevation. The dredged material is placed in a scow for transport to the upland staging area. Turbidity

controls and turbidity monitoring are used to minimize transport of resuspended sediment away from the project area.

TSCA-level sediment will be removed using mechanical dredging methods because it will be segregated from non-TSCA sediment and processed for offsite landfill disposal. The dredged TSCA material is dewatered and stabilized in the upland staging area before truck transport and disposal at a selected upland disposal facility.

Mechanical dredging will also be used to remove non-TSCA sediment that cannot be readily accessed with the hydraulic dredge due to the depth limitations of the hydraulic dredge relative to the surface water elevation at the time of dredging. The FFS assumes a hydraulic dredge depth of 30 feet below the surface water elevation will be attainable. Approximately 61,400 CY of sediment is deeper than -30 feet LWD and is assumed to require mechanical dredge removal. Non-TSCA level sediment removed by mechanical dredging can be transported to the upland staging or screened, slurried and pumped to the DMMF.

5.2.3 Residuals Management - Sand Cover

In areas where the full vertical extent of contamination above the CUGs is removed, a 0.5-foot thick residual sand cover is placed on the post-dredge surface (Figure 5-6). Clean sand is used to reduce the mobility of dredging residuals and lower residual COC concentrations in post-dredge surface sediment. The sand cover may also accelerate re-establishment of benthic communities disrupted during the dredging activities. Sand placement methods will be selected to provide a controlled application by either casting or directly placing the sand to avoid displacement or significant penetration into the underlying sediment. Means to verify the final thickness of the residual sand cover will be specified in the remedial design documents. The project area is primarily net depositional, and additional upstream sediment is expected to accumulate across the project area following completion of remediation activities.

Approximately 21,000 CY of sand (assuming an average placement thickness of 0.75 feet) will be needed to provide residual cover over the post-dredge surface of approximately 17 acres. It is assumed that the sand will be obtained at an offsite source, but particle size segregation and washing, if determined to be feasible from treatability study results, may also provide an opportunity for beneficially reusing the coarse fraction of dredged material for residual cover.

The final elevation of the cover will not exceed the USACE requirements for working in the FNC or the pre-dredge sediment elevations, so there will be no net decrease in the cross-sectional flow area of the river. Therefore, cover placement will not negatively impact susceptibility to flooding or reduce conveyance within the river.

5.2.4 Sediment Transport, Dewatering, and Disposal

All hydraulically- and mechanically dredged, non-TSCA sediment will be pumped downstream in a pipeline for management and disposal at the DMMF. The pipeline will be submerged in the water in some areas to minimize navigational disruption to the waterways. The hydraulic pipeline will be monitored during pumping to assure rapid and appropriate repairs of leaks or other malfunctions. The pipeline will surface at booster pumps located on barges and at the DMMF.

The hydraulically dredged sediment, which typically contains up to 90 percent water by weight, will be passively dewatered by settling and evaporation within the DMMF. The sediment may be treated with an appropriate dose of coagulant, flocculant, or combination thereof to aid suspended sediment sedimentation rates. Chemical dosing will be determined based on the results of a sediment treatability study.

A temporary water treatment system will be constructed near the DMMF for the treatment of supernatant water from the DMMF before discharge to Lake Michigan under a WPDES permit. The treatment process required to meet the WPDES permit requirements will be developed during the treatability study and remedial design but are expected to consist of an ultra-high capacity clarifier, metals precipitation, sand filters, bag filters, and granular activated carbon treatment system.

It is assumed that the DMMF will be designed to provide sufficient settling time for hydraulically pumped sediment. The minimum residence time required will be finalized based on the results of the treatability study.

Mechanically dredged TSCA sediment will be placed in scows and transported to an upland staging area for dewatering and solidification before transfer into trucks and transport to an offsite disposal facility. The location of the upland staging area will be identified during remedial design. The sediment and associated debris removed from TSCA areas will be handled, staged, and disposed of as TSCA material in a Subtitle C landfill. TSCA- and non-TSCA level material (if any) will be managed as separate waste streams in the upland staging area. Dredged TSCA sediment transferred to the upland staging area from scows will be passively dewatered through gravity drainage. Stabilization or solidification agents such as fly ash, Portland cement, quicklime, or similar materials may be added to the sediment to meet requirements for transport to and disposal at an offsite landfill. Results from the treatability study initiated in 2023 will assist in selecting the most suitable stabilization/solidification amendment material(s) and dose rate percentage(s). Stabilized sediment and debris may be stockpiled and continue to solidify until ready for loading into a truck. Stabilized sediment and debris will then be directly loaded into trucks for transport to an approved Subtitle C landfill.

Excess free water generated from mechanical dredging will be pumped from the scows to temporary storage tanks. Free water from gravity drainage, decontamination activities, and storm events at the upland staging area also will be collected and pumped to the temporary storage tanks. A temporary water treatment system will be located at the staging area to treat collected water and discharge back to the river under a WPDES permit.

Dredging will progress from upstream to downstream, removing non-TSCA sediment that is above TSCA sediment layers. As TSCA sediment areas are made available for removal by mechanical dredging, non-TSCA sediment removal will continue downstream. Upon completion of removal of TSCA sediment within an area, non-TSCA sediment that remains below the TSCA layer will be removed. The final pass of dredging will occur upstream to downstream to minimize risk of recontamination.

5.2.5 Particle Size Segregation and Washing

If feasible, particle size segregation for the non-TSCA sediment removed during dredging operations may be considered for the Downtown Reach sediment. Grain size data indicate that sediment in the Downtown Reach Project Area contains a significant amount of sand (average of 42 percent sand by weight for all samples collected in the Downtown Reach) that may be suitable for beneficial reuse as sand cover within the Milwaukee Estuary AOC or for other purposes. Vibrating screens, hydrocyclones, and wash bars would be used to separate sand from the fine-grained fraction, allowing disposal of only fine-grained material with higher COC concentrations in the DMMF.

Particle size segregation and washing would require water as part of the process. Reusing the treated water for washing purposes reduces the need for handling and treatment of additional water at the DMMF. The benefits of reusing sand as cover material may outweigh the disadvantages of acquiring and transporting large volumes of sand. An additional benefit of reusing the coarser fraction of dredged sediment is a

reduction in the amount of material that requires DMMF disposal, thereby reducing DMMF capacity requirements.

The feasibility and cost effectiveness of particle size segregation will be further investigated as part of the 2023 treatability study and during the remedial design. Washing and testing will be performed to confirm that chemical concentrations of the segregated sand meet project requirements for reuse. For the purposes of the FFS, it is conservatively assumed that particle size segregation will not be feasible, and all hydraulically pumped sediment will be placed in the DMMF.

5.2.6 Sediment Containment - Cap

Sediment capping will be implemented in areas where contaminated sediment cannot be feasibly dredged (see Section 5.2.1). Caps will be designed to isolate the underlying contaminated sediment and resist erosion from river flows and propeller wash. Conceptual cap profiles are shown on Figure 5-6. The location of profile A-A' (Figure 5-6, top panel) is indicated on Figure 5-1B. This profile represents an area where the shoreline would be stabilized to maximize removal of TSCA-level sediment. The west side of the profile shows cap placement for a temporary SSP bulkhead stabilization approach, and the east side shows cap placement for a permanent SSP bulkhead stabilization approach. Profile C-C' (Figure 5-6, bottom panel) represents an area with no TSCA-level sediment, and the shoreline would not be stabilized with SSP. The dredging extents are offset 10 feet from the shoreline and dredging at 3:1 side slopes. Caps would be placed in the 10-foot offset zones and on the side slopes to isolate contaminated sediment that cannot be feasibly dredged.

Institutional controls may be employed in conjunction with caps; these may include navigational, anchoring or future dredging restrictions. Such controls minimize the potential for cap disturbance and exposure of underlying sediment contamination. The material specifications, thicknesses, and placement methods will be determined during the remedial design. All TSCA-level sediment will be removed by dredging if possible; however, in areas where dredging is not feasible, a cap may be required to achieve the RAOs. It is estimated that 102,000 CY of cap (18 inches of thickness assumed) across 36 acres will be required to cover sediment left in place adjacent to bulkheaded shorelines and utility corridors, in stabilized or reinforced shoreline areas, and beneath dredged side slopes. Institutional controls and long-term monitoring and maintenance requirements for caps will be discussed further with project partners during remedial design.

5.2.7 Confirmation Sampling and Other Verification Activities

Post-dredge sediment confirmation sampling is anticipated to be required in TSCA sediment removal areas, as well as for non-TSCA areas that are not designated for capping. Results of confirmation sampling will be used to assess the success of dredging in reducing COC concentrations below CUGs in accordance with the post-dredge management plan developed during design. The final thicknesses of the residual sand cover and caps will be verified using sampling methods such as coring or collection pan testing. A post-remediation bathymetric survey also will be performed to confirm final post-remediation elevations. The specific confirmation sampling and verification approaches will be documented in the appropriate remedial design document, such as a Construction Quality Assurance/Construction Quality Control plan and the associated field sampling plans.

5.2.8 Debris Removal and Disposal

The types and amount of debris in the Downtown Reach have not been quantified; however, a significant amount of debris may be present upstream of the FNC (upstream of Buffalo Street) because of historical

waterfront uses and the urban setting. Side-scan sonar and magnetometer surveys will be conducted during remedial design to quantify and locate large debris that will require removal. Debris will be removed using mechanical means. The size of debris that can be removed will be limited by the lift capacity of the mechanical equipment that the contractor has onsite. Additional costs to the project will be incurred if the contractor is required to mobilize additional, larger equipment or perform diver-assisted removal.

Debris removed from TSCA areas will be handled, staged, and disposed of as TSCA-level material in a Subtitle C landfill. For the purposes of estimating disposal volumes and costs, it is assumed that debris removed from non-TSCA areas will be transported to and disposed of in the DMMF. Debris management and disposal, including identification of potential recycling opportunities, will be addressed further in remedial design.

5.3 Alternative 3

Alternative 3 addresses sediment with COC concentrations greater than 3 times the PECs for total PAHs or metals (chromium, lead, mercury) or greater than 1 mg/kg for total PCBs. Alternative 3 (Figure 5-2) has the midsized RTA of 49 acres as compared to Alternatives 2 and 4. Remedial activities for Alternative 3, including dredge offsets and 3:1 side slopes, are identical to those described for Alternative 2, except the quantities are different as summarized in Table 5-1. The sediment removal area for Alternative 3 covers 34 acres with a removal volume of 472,000 CY. Approximately 56,000 CY of non-TSCA sediment is located deeper than -30 feet LWD and is assumed to require mechanical dredge removal. Approximately 379,400 CY of sediment with COC concentrations exceeding the CUGs across approximately 31 acres will be capped near bridges, utility crossings, and shoreline structures. In-water remedial action work is assumed to take approximately 1 to 2 weeks less than Alternative 2 (7.5 months).

5.4 Alternative 3A

Alternative 3A addresses sediment as described in Alternative 3, with the addition of implementing a maximum sediment removal elevation of 552.5 feet NAVD88 (4.5 feet below the authorized FNC elevation). The deeper sediment with COC concentrations exceeding CUGs will be capped. The Alternative 3A RTA (Figure 5-3) is identical to Alternative 3 RTA (Figure 5-2); however, the removal volume is lower. Remedial activities for Alternative 3A are identical to those described for the other alternatives, except for implementation of the maximum removal elevation. The RTA for Alternative 3A covers 49 acres with a removal volume of 457,000 CY (15,000 CY lower compared to Alternative 3). An estimated 394,400 CY of sediment across approximately 32 acres will be capped near bridges, utility crossings and shoreline structures (15,000 CY more and 1 acre more than Alternative 3). Sediment removal deeper than -30 feet LWD (which would require mechanical dredging instead of hydraulic dredging) is not included in Alternative 3A. As noted in Table 5-1, all sediment will be removed using hydraulic methods. In-water remedial action work is assumed to take approximately 7.5 months.

As noted in Section 3.2, the IGLD is in the process of being revised, likely resulting in the LWD and FNC being lowered by 1 foot, but not until 2027 (USACE 2022). A lowering of the FNC by 1 foot would potentially result in additional volume to be removed for Alternative 3A; changes to the dredging elevations and volumes in response to the IGLD update will be incorporated during the remedial design.

5.5 Alternative 4

Alternative 4 addresses sediment with COC concentrations greater than 3 times the PECs for total PAHs or metals (chromium, lead, mercury) or greater than 3 mg/kg for total PCBs. Alternative 4 has the smallest

RTA of 43 acres (Figure 5-4) compared to Alternatives 2 and 3. Remedial activities for Alternative 4 are identical to those described for Alternative 2, except the quantities are different as summarized in Table 5-1. The sediment removal area for Alternative 4 covers 31 acres with a removal volume of 415,000 CY. Approximately 53,300 CY of sediment is located deeper than -30 feet LWD and is assumed to require mechanical dredge removal. Approximately 337,400 CY of sediment with COC concentrations exceeding the CUGs and located across approximately 27 acres will be capped near bridges, utility crossings and shoreline structures. The timeframe for Alternative 4's in-water remedial action is assumed to be similar to Alternative 3.

6. Detailed Analysis of Alternatives

6.1 Evaluation Criteria

The remedial alternatives developed in Section 5 were evaluated using the criteria described herein to support selection of a recommended remedy. The criteria provide the basis for comparing expected alternative performance and are used to identify the advantages and disadvantages of each alternative and trade-offs between alternatives. The evaluation criteria consider both EPA's nine criteria for evaluating remedial alternatives in feasibility studies[9] and WDNR's evaluation criteria for selecting remedial actions.[10] The criteria are divided into three groups: threshold, balancing, and modifying criteria, summarized as follows:

- **Threshold Criteria**
  - Compliance with environmental laws and standards
- **Balancing Criteria**
  - Long-term effectiveness
  - Short-term effectiveness
  - Implementability
  - Restoration time frame
  - Cost
- **Modifying Criteria**
  - Project partner acceptance

6.1.1 Threshold Criteria

Threshold criteria must be met by an alternative for it to be eligible for selection as a remedial action. The single threshold criterion is compliance with environmental laws and standards. To be eligible for selection, an alternative must meet applicable federal, state, and local regulations, or justification must be provided that a waiver is appropriate.

Compliance with applicable federal, state, and local regulations is one of the statutory requirements of remedy selection. Applicable regulations are cleanup standards, standards of control, and other substantive environmental statutes or regulations. Applicable requirements address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstances at a site. The assessment of this criterion describes how the alternative complies with applicable federal, state, and local regulations or presents the rationale for waiving an applicable requirement. The identification of potentially applicable regulations and associated permits relative to the remedial alternatives is summarized in Appendix C.

6.1.2 Balancing Criteria

Unlike the threshold criteria, the balancing criteria weigh the trade-offs between alternatives. A low rating for one balancing criterion can be compensated for by a high rating for another criterion. The five

[9] 40 Code of Federal Regulation § 300.430 (e)(9)(iii)
[10] WDNR Chapter NR 722.07(4) and NR 722.09 (2)

balancing criteria described in the following subsections are used to identify the advantages and disadvantages of each alternative and weigh the trade-offs between alternatives.

6.1.2.1 Long-term Effectiveness

This criterion considers the degree to which an alternative will protect human health and the environment over time. Long-term effectiveness considers the ability of the alternative to achieve RAOs and contribute to BUI removal. It includes evaluation of the amount of residual contamination anticipated to be left in place, the adequacy and reliability of long-term controls in preventing exposure to any residual contamination that is left in place, and the potential for recontamination following the remedial action. Long-term effectiveness also evaluates the expected performance of the alternative in response to extreme storm events and climate change.

6.1.2.2 Short-term Effectiveness

The short-term effectiveness criterion assesses potential adverse impacts on public health, safety, welfare, and the environment during the construction and implementation of the alternative. It considers protection of workers during the remedial action, protection of community during the remedial action, and environmental impacts of the remedial action. It also considers the time until the RAOs are achieved.

6.1.2.3 Implementability

This criterion considers both technical and administrative feasibility of the alternative. The technical feasibility evaluation considers the ease of implementation, reliability, constructability, availability of goods and services needed for its implementation materials, and identifies potential difficulties and constraints associated with onsite construction or offsite disposal and treatment. The administrative feasibility evaluation considers the activities and time needed to obtain necessary licenses, permits or approvals, the need for institutional controls, and degree of coordination with other agencies.

6.1.2.4 Restoration Time Frame

The restoration time frame criterion considers the time required to restore trees, vegetation and habitat that was cleared or disturbed to access work areas and conduct the remedial action.

6.1.2.5 Cost

Cost encompasses the design, engineering, construction, and operations and maintenance costs incurred over the life of the project. The assessment of this criterion is based on the estimated capital costs, annual operations and maintenance costs, and total present worth of the costs for each alternative. Present worth is a method of evaluating expenditures that occur over different lengths of time. This allows costs for remedial alternatives to be compared by discounting the costs to the year in which the alternative is implemented. The present worth of a project represents the amount of money, which if invested in the initial year of the remedy and disbursed as needed, would be sufficient to cover the costs associated with the remedial action. These estimated costs are expected to provide an accuracy of plus 50 percent to minus 30 percent. Appendix D provides a breakdown of the cost estimate for each alternative that is described in Section 5.

The cost range applies only to the alternatives as they are described and does not account for changes in the scope of the alternatives. Selection of specific technologies or processes to configure remedial alternatives is intended not to limit flexibility during remedial design but to provide a basis for preparing cost estimates. The specific details of the remedial actions and cost estimates are refined during the remedial design.

6.1.3 Modifying Criteria

The modifying criterion is project partner acceptance. This criterion will be evaluated after the project partners have reviewed and provided comments on the remedial alternatives and associated individual and comparative alternative analyses. Project partner acceptance will be considered when selecting the recommended alternative, which will be presented in the FFS Report.

6.2 Alternatives Analysis

Alternatives 1 through 4 were evaluated using the threshold and balancing evaluation criteria. Evaluation results for each criterion are summarized in Table 6-1. The differences in alternatives arise from differences in the CUGs and associated areas and volumes of each RTA, rather than from different remediation approaches. Key findings of the alternatives analysis are as follows:

- The estimated cost for shoreline reinforcement ($12.9M, see Appendix D) is the same for Alternatives 2, 3, 3A, and 4 because the estimated TSCA removal area and volume receiving reinforcement prior to dredging is identical for each alternative.
- Alternatives 2, 3, 3A, and 4 can be designed to comply with applicable federal, state, and local regulations, and therefore meet the threshold criterion.
- Alternative 2 has the greatest long-term effectiveness because it is based on the most conservative (lowest) set of CUGs. It results in the greatest reduction of mass, volume, and concentration of COCs in sediment and leaves the least contamination in place compared to Alternatives 3, 3A, and 4.
- Alternative 4 has the greatest short-term effectiveness because the remedy would impact the smallest area. However, because identical remedial action elements must be completed for Alternatives 2, 3, 3A, and 4, remedy implementation timeframe does not vary by much; it is estimated that Alternative 2 will only require several additional weeks to complete compared to Alternatives 3, 3A, or 4. Short-term effectiveness does not apply to Alternative 1.
- Alternative 4 is the most implementable from a technical standpoint because it requires the least amount of DMMF capacity. Alternatives 2 and 3 may not be implementable because of DMMF capacity constraints. Alternative 3A was developed to reduce the dredge volume and improve implementability of an alternative that has the same CUGs as Alternative 3. All of the alternatives (except Alternative 1) include capping and therefore will require agency coordination and approval; Alternative 4 has the smallest cap area (27 acres) and Alternative 2 has the greatest cap area (36 acres). The other construction, implementation, and administrative challenges are similar for Alternatives 2, 3, 3A, and 4.
- The restoration time frames are similar for Alternatives 2, 3, 3A, and 4.
- Alternative 4 has the lowest estimated cost ($120.4M). Alternatives 3A, 3, and 2 are progressively more costly ($129.3M, $130.2M and $138.9M, respectively).

7. Recommended Alternative

The project partners have identified Alternative 3A as the recommended alternative for the Milwaukee River Downtown Reach. Alternative 3A addresses sediment with COC concentrations exceeding CUGs (3 times PECs for PAHs and metals and 1 mg/kg for PCBs) through dredging, placing residual sand cover in dredged areas, capping in areas where contaminated sediment cannot be feasibly removed, and capping contaminated sediment below a maximum dredge elevation of 552.5 feet NAVD88. The dredging and capping components of Alternative 3A are shown on Figures 7-1A through 7-1F. The recommended alternative will achieve the site-specific RAOs by reducing the mass, volume, and concentrations of COCs in sediment, reducing risks to human health and the environment from exposure to COCs in sediment, and maintaining depth requirements within the authorized FNC at the downstream end of the Downtown Reach. It will also maintain depth requirements for recreational vessel use upstream of the FNC. The remedy will contribute to the eventual removal of BUIs and delisting of the Milwaukee Estuary AOC.

The CUGs for Alternative 3 are recommended for application in all AOC project areas (except the Floodplains Reach). Alternative 3A was selected for the Downtown Reach based on evaluation of dredged material volume estimates for disposal within the DMMF and consideration of project costs on an AOC-wide basis. Alternative 3A provides a similar level of protectiveness and has a similar cost as Alternative 3 but reduces dredge volume by establishing a maximum sediment removal elevation throughout the Downtown Reach, which helps the dredge volume for the overall AOC-project fit within available DMMF capacity. The maximum dredge elevation of 552.5 feet NAVD88 is 4.5 feet below the authorized FNC elevation, and was selected to achieve the USACE required 3 feet of clearance from the surface of the installed cap. The estimated cost of recommended Alternative 3A is $129.3M.

The recommended alternative will be further refined during remedial design. Additional testing may be completed during remedial design to further delineate COC concentrations in sediment below the maximum dredge elevation and refine where capping is needed. A decision framework will be developed to identify and prioritize areas for additional sediment removal if sufficient DMMF capacity and project resources are available. Areas where maintaining a cap is expected to be challenging will be identified, and institutional controls and long-term monitoring and maintenance requirements for caps will be discussed further with project partners.

Existing and projected post-remedy surface-weighted average concentrations (SWACs) for COCs in surface sediment were calculated for Alternative 3A to confirm its protectiveness. The SWAC methodology and results are further described in Appendix E. The SWACs are summarized in Exhibit 7-1. The calculations indicate that post-remediation SWACs (after residual sand cover placement and cap construction) are lower than existing conditions, Alternative 3 CUGs, and PECs for each COC.

Exhibit 7-1. Milwaukee River Downtown Reach - Surface Weighted Average Concentrations (mg/kg) for Pre- and Post-Remediation Scenarios – Alternative 3A

Surface Weighted Average Concentration Projections (mg/kg)	PCB	PAH	Chromium	Lead	Mercury
PEC	0.67	22.8	110	130	1.1
Alternative 3 CUGs	1	68.4	330	390	3.3
Existing	1.2	19	126	117	0.42
Post-Remedy	0.23	2	21	26	0.17

The recommended alternative was the subject of public outreach efforts accomplished during four public informational meetings held on the following dates: November 02, 2023; February 15, 2024; April 25, 2024; and June 14, 2024. These meetings were conducted to share information regarding the FFS recommended alternatives and to answer questions regarding the reports and the AOC-wide project. Questions posed at the meetings or posted to an online website were summarized into a Frequently Asked Questions document included as Appendix F to this Final FFS Report.

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Tables

Table 2-1. Summary of Permitted Discharges - Milwaukee River Downtown Reach

Milwaukee Estuary Area of Concern, Milwaukee, Wisconsin

Site Name	Site Address	Permit Type	Permit Identification	Permittee	Permit Status
Milwaukee Metro Sewerage District Combined	Multiple discharge points	Municipal Separate Storm Sewer System	0036820	Milwaukee Metro Sewerage District Combined	6 - Permit Coverage Granted
East-West Bus Rapid Transit	Multiple station locations along the East-West Bus Rapid Transit corridor	Municipal Separate Storm Sewer System Construction	S067831	Milwaukee Transport Services	6 - Permit Coverage Granted

Sources:

Wisconsin Pollutant Discharge Elimination System main page - download Municipal and Industrial Permittees (accessed April 2021)

Search Construction

Search Industrial

Search Municipal

Table 2-2. Summary of Bureau of Remediation and Redevelopment Tracking System Sites - Milwaukee River Downtown Reach

Milwaukee Estuary Area of Concern, Milwaukee, Wisconsin

Figure Identification	Wisconsin Department of Natural Resources Bureau for Remediation and Redevelopment Tracking System Number	Site Location	Site Address	Bureau for Remediation and Redevelopment Tracking Site Status and Type	Impacted Material	Substance Type	Contamination Type
01	341003706	Milwaukee City Riverview Facility	1300 East Kane Place	Closed LUST	Soil	Petroleum	Fuel Oil
02	241562564	Lazenby Property Former	2114-2134 North Riverboat Road	Open ERP	GW, Soil	VOC, Petroleum, Metals, Other	VOC, PAH, Pb, Other
03	241543384	John Chowanec Property	2060 North Humboldt Avenue	Closed ERP	GW, Soil	Petroleum, VOC	PAH, Chlorinated Solvents
04	241548533	Walkers Landing Apartments	2056-2070 North Riverboat Road	Closed ERP	Soil	Petroleum, VOC	PAH, VOC
05	341003768	National Building Maintenance Inc.	2062-2072 North Commerce Street	Closed LUST	Soil	Gasoline	Petroleum
06	241182535	Weiss Property	926 East Kane Place	Closed ERP	GW, Soil	VOC, Petroleum, Solid Waste	VOC, PAH, Solid Waste (Miscellaneous Fill)
07	241556910	Eighteen87 On Water	1887 North Water Street	Closed ERP	Soil, Vapor	Petroleum, VOC, PCB	PAH, PCB, VOC, Petroleum (unknown)
08	341001535	Gallun Site (Project Management Office project)	1759-1881 North Water Street	Closed LUST	Soil	Petroleum	Gasoline
09	241449296	A.F. Gallun	1801 North Water Street	Open ERP	Soil, GW, Vapor	Cr, As, Pb, PCB, PAH, Chlorinated Solvents, Petroleum, TCE	Metals, PCB, Petroleum, VOC
10	241548432	The Edge	1902 North Commerce Street	Closed ERP	GW, Soil	Petroleum, Metals	Gas, As
11	241556607	1890 North Commerce Undeveloped Parcel	1890 North Commerce Street	Closed ERP	GW, Soil	Petroleum, Metals	PAH, As
12	341115331	Forestry Northeast Headquarters	1872 North Commerce Street	Closed LUST	GW, Soil	Petroleum, Gas	Petroleum(unknown) - 10,000 gallons, Gasoline - 6,000 gallons
13	241260085	Trostel Parcels 1, 2, and 3	1776 North Commerce Street	Closed ERP	GW, Soil	Metals, Petroleum, Unknown	Petroleum(unknown), Sulfates, Cr
14	241555851	Beerline B Apartments	306 East Pleasant Street	Closed ERP	Soil, GW (potential), Direct contact (potential)	Petroleum, VOC, Metals	PAH, VOC, Pb
15	241559293	Habhegger Auto Repair (Former)	1693-1729 North Water Street	Open ERP	GW, Soil	VOC, Petroleum, Metals	VOC, PAH, As, Pb
16	341002694	Northern Lights Industries	1661 North Water Street	Closed LUST	Soil	Not applicable	Not applicable
17	341305397	U.S. Leather Properties - Site A	1635 North Water Street	Closed LUST	Soil, GW, SW, Direct Contact	Petroleum	Gas
18	241001193	Pfister and Vogel Tannery (Northwest Lot)	1551 North Water Street	Closed LUST	Soil, GW, Direct Contact	Petroleum, VOC, Metals	PAH, Chlorinated Solvents, Cr, As, Pb
19	241562945	Pfister and Vogel Former Site E	1531 North Water Street	Closed ERP	Soil, GW	Petroleum, Chlorinated Solvents	Petroleum, VOC
20	341563943	Laacke and Joys (Former)	1433-1475 North Water Street	Closed LUST	Soil, GW (potential)	Petroleum, Metals	Gas, Pb
21	341563942	Office Building	1421 North Water Street	Closed LUST	Soil, GW	Petroleum, Metals	PAH, Petroleum(unknown), Pb
22	341002036	Fire Boat Station - abandoned	101 West Cherry Street	Closed LUST	Soil	Petroleum	Petroleum(unknown)
23	241001124	Brewery Work Dev-Parcel 3A	North Commerce at West Cherry Street	Closed ERP	GW, Soil	Petroleum, Metals	Petroleum(unknown), Metals
24	241001126	Wepco/Brewery Works Dev-Parcel 2A	1434 North Commerce Street	Closed ERP	GW, Soil	Petroleum	PAH, Petroleum(unknown)
25	241001127	Wepco/Brewery Works Dev-Parcel 2B	1338 North Commerce Street	Closed ERP	GW, Soil	PAH, Diesel Fuel	Petroleum

Figure Identification	Wisconsin Department of Natural Resources Bureau for Remediation and Redevelopment Tracking System Number	Site Location	Site Address	Bureau for Remediation and Redevelopment Tracking Site Status and Type	Impacted Material	Substance Type	Contamination Type
26	241550990	Aloft	1230 North Old World 3rd Street	Closed ERP	Soil, GW, Direct Contact, SW (potential)	Petroleum, Metals	PAH, Pb, Hg, As
27	341113103	Allright Parking	1201 North Edison Street	Closed LUST	Soil, GW (above ES), Offsite, Free Product, Direct Contact	Petroleum	Gas, Diesel
28	241556655	1027 North Edison Street	1027 North Edison Street	Closed ERP	GW, Soil, Direct Contact	Petroleum, Metals	PAH, Pb
29	241559609	City Hall Square Property	123-137 East Wells	Closed ERP	Soil, Direct Contact, GW (potential)	VOC, Petroleum, Metals	VOC, PAH, Pb, As, Metals
30	341183710	Towne Reality Inc./Former Shell Station	508 North Plankinton Avenue	Closed LUST	Soil	Petroleum	Gas
31	341000539	Banc One Plaza Pavilion	501 North Water Street	Closed LUST	GW, Soil, Free Product	Petroleum	Gas
32	241270022	Walkers Landing Asssociation	412 North Plankinton Avenue	Open ERP	Soil	Petroleum, Metals	PAH, Metals
33	341003893	Minellis Brake Service Downtown	350 North Plankinton Avenue	Closed LUST	GW, Soil	Petroleum	Gas, Diesel, Fuel oil
34	341561733	Sidney and Harry Hack and Julius Bernstein Trust	324 North Plankinton Avenue	Open LUST	Soil	Metals	Pb and PAH
35	241583110	217-221 North Water Street	217-221 North Water Street	Open ERP	GW (potential), Soil	VOC, TCE, PAH, Pb, Hg	VOC, Petroleum, Metals
36	341186428	Historic River Walk Plaza	201 North Water Street	Closed LUST	Soil	Petroleum	Unknown Type
37	241583020	Harri Hoffman Company	125 North Water Street	Open ERP	GW (potential), Soil	PAH, Pb	Petroleum, Metals

Source: Wisconsin Department of Natural Resources (WDNR). 2021. Brownfields: Redevelopment Opportunities. RR Site Maps. Accessed April 2021. https://dnr.wi.gov/topic/Brownfields/rrsm.html

As = arsenic

Cr = chromium

ERP = environmental remediation project

ES = State of Wisconsin NR 140 Groundwater Enforcement Standard

GW = groundwater

Hg = mercury

LUST = leaking underground storage tank

PAH = polycyclic aromatic hydrocarbon

Pb = lead

PCB = polychlorinated biphenyl

SW = surface water

TCE = trichloroethylene

(unknown) = Unknown Type

VOC = volatile organic compound

Table 3-1. Estimated Remedial Alternative Quantities - Milwaukee River Downtown Reach

Milwaukee Estuary Area of Concern, Milwaukee, Wisconsin

Remedial Alternative	Quantity Sub-categories	Modeled Volume[a] (cubic yards)	Removal Volume[b] (cubic yards)	Non-Removal Volume[c] (cubic yards)
Alternative 2	non TSCA	984,000	510,000	474,000
PCBs >1 mg/kg, or Metals	TSCA[d]	14,400	14,000	400
(Cr, Pb, Hg), or PAHs >PEC	**Alternative 2 Total**	**998,400**	**524,000**	**474,400**
Alternative 3	non TSCA	837,000	458,000	379,000
PCBs >1 mg/kg, or Metals	TSCA[d]	14,400	14,000	400
(Cr, Pb, Hg) or PAHs >3xPEC	**Alternative 3 Total**	**851,400**	**472,000**	**379,400**
Alternative 3A	non TSCA	837,000	443,000	394,000
PCBs >1 mg/kg, or Metals	TSCA[d]	14,400	14,000	400
(Cr, Pb, Hg) or PAHs >3xPEC	**Alternative 3A Total**	**851,400**	**457,000**	**394,400**
Alternative 4	non TSCA	738,000	401,000	337,000
PCBs >3 mg/kg, or Metals	TSCA[d]	14,400	14,000	400
(Cr, Pb, Hg) or PAHs >3xPEC	**Alternative 4 Total**	**752,400**	**415,000**	**337,400**

Source:

Wisconsin Department of Natural Resources (WDNR). 2003. *Wisconsin Consensus-based Sediment Quality Guidelines. Recommendations for Use and Application, Interim Guidance RR-088*. December.

[a] Environmental Visualization System modeled volume greater than remedial action level concentrations including overburden and 0.5 foot of overdredge allowance.

[b] Estimated quantity of target remediation volume accessible for removal through dredging and/or excavation.

[c] Estimated quantity of target remediation volume not readily accessible for removal due to shoreline and utility offsets and associated 3:1 sideslope.

[d] The volume reported for TSCA-impacted sediment represents removal of TSCA material through the implementation of temporary shoreline stabilization during removal.

> = greater than

3x = 3 times

Cr = chromium

Hg = mercury

mg/kg = milligram(s) per kilogram

PAH = polycyclic aromatic hydrocarbon

Pb = lead

PCB = polychlorinated biphenyl

PEC = Probable Effect Concentration for Cr, Hg, PAHs, and Pb from WDNR 2003

TSCA = Toxic Substance Control Act

Table 4-1. Remedial Technologies Screening Summary – Milwaukee River Downtown Reach

Milwaukee Estuary Area of Concern, Milwaukee, Wisconsin

Remedial Technologies	Process Options	Description	Screening Criterion Effectiveness	Screening Criterion Implementability	Screening Criterion Relative Cost	Screening Comment
No Action	None	No further actions to address contaminated sediment.	Some natural recovery may occur as contaminants of concern (COCs) slowly biodegrade over time and/or are covered by clean sediment; however, no monitoring would be performed to assess these changes. If implemented alone does not meet the remedial action objectives (RAOs) for the project.	Not applicable.	None	Required for comparison.
Natural Recovery	Monitored Natural Recovery	Allow naturally occurring physical, chemical, and biological processes to reduce the bioavailability and/or toxicity of COCs to acceptable levels. Burial of contaminated sediment by cleaner sediment is occurring given the lower surface and near surface COC concentrations compared to concentrations in subsurface sediment and quiescent conditions conducive to deposition of suspended sediment.	Some natural recovery may occur as COCs slowly biodegrade over time. The Downtown Reach appears to be a net depositional area, where contaminated subsurface sediment is buried by cleaner sediment. The conceptual site model indicates that recontamination potential is low.	Easily implementable if monitoring is administratively feasible. Requires additional data collection and interpretation to estimate net sedimentation rates within the Downtown Reach. Analytical data indicate that surface and near surface COC concentrations are lower than subsurface concentrations and that the quality of newly deposited sediment is comparable to urban background conditions within the project area. May also require institutional controls.	Low	Not retained for further evaluation because there is currently no mechanism for funding the monitoring component.
Sediment Removal	Dredging	Dredging removes sediment either through hydraulic or mechanical methods. The dredge location and elevation are controlled by global positioning system-integrated software for real-time positioning. Hydraulic dredging removes sediment with hydraulic suction to a specified dredge-cut elevation. Common hydraulic dredges include cutterhead, plain suction, pneumatic submersible pumps, and diver-assisted hand-held hydraulic suctions. Sediment is then pumped through a pipeline to a staging area or disposal site for dewatering and processing. Mechanical dredging uses a clamshell bucket operated from a crane or excavator on a floating barge or the shoreline to remove the sediment to a specified dredge-cut elevation. Dredged sediment is typically placed in barges for transport to a staging area or disposal site.	Effective. Contaminated sediment is removed from the river, eliminating the direct contact human exposure and the fish/benthic community exposure pathways. Suspended solids that are released during the dredging activities can be minimized using engineering controls. May disrupt the fish/benthic community initially but provides a cleaner sediment surface for recolonization.	Implementable. Requires permits. Limitations may include removal of sediment adjacent to shorelines and other in-water structures, which may require the addition of shoreline stabilization or reinforcement before, during, or following dredging activities, and low clearance for bridge crossings. For hydraulic dredging, constant monitoring of the pipeline for leaks and water treatment for a relatively large volume of water from the dredged sediment are needed. The dredged sediment can be readily transported through a pipeline to the dredged materials management facility (DMMF) with limited impacts to waterway traffic and therefore requires less coordination with waterway users. This option typically generates fewer sediment residuals than mechanical dredge methods and may not require active turbidity control (e.g., silt curtains). The presence of debris can severely reduce production rate. The depth of water influences the size of hydraulic dredge and its efficiency during dredging operations. For mechanical dredging, barge transport of dredged sediment is limited by various obstructions around bridges and would affect waterway traffic and require more coordination with the waterway users. Debris has a relatively smaller impact on production rate for mechanical dredging than for hydraulic dredging. It typically generates more sediment residuals than hydraulic dredging and requires implementation of mechanical dredge best management practices (BMPs) and active turbidity control (e.g., silt curtains). Generates a relatively small volume of water to be treated.	Moderate to High	Dredging is retained for further evaluation in conjunction with sediment disposal technologies. Hydraulic dredging is expected to be more efficient and cost effective than mechanical dredging in the Downtown Reach because of the complexities associated with barge transport under numerous bridge crossings with low clearances in waterways with multiple users, leading to longer project duration and higher costs. Mechanical dredging may be used in some circumstances such as removal of Toxic Substance Control Act (TSCA)-level sediment, debris, or sediment that cannot be accessed with a hydraulic dredge.

Remedial Technologies	Process Options	Description	Screening Criterion Effectiveness	Screening Criterion Implementability	Screening Criterion Relative Cost	Screening Comment
Residuals Management	Residual Management Cover	After sediment removal, a 6-inch cover layer of clean sand is placed over the residual material to reduce the COC concentrations to which biota are exposed. This clean cover layer is not a cap because it is expected to mix with the dredge residuals rather than to isolate the underlying sediment. Placement of a cover layer can effectively reduce the residual COC concentrations in areas where sufficient COC mass has been removed.	Can effectively reduce the residual COC concentrations in areas where sediment has been removed. However, may require additional dredging to enable clean layer placement to be below the authorized depth of the federal navigational channel (FNC). Provides cleaner surface for the biota, facilitating replenishment of the benthic community.	Easily implementable. Needs verification to confirm that the required thickness of clean cover material is placed. Insufficient material may be ineffective.	Low to Moderate	Retained for further evaluation in conjunction with sediment removal technologies.
Sediment Disposal	Offsite Disposal – DMMF	The DMMF planned for the Milwaukee Estuary Area of Concern (AOC) is an in-water facility designed for containment of contaminated dredged sediment that provides control of potential releases of COCs to the environment. Dredged sediment is placed directly into the DMMF for disposal prior to dewatering.	Effective. The engineering controls implemented in the DMMF provide control of potential releases of COCs to the environment. Verification of engineering controls may be required to confirm containment of COCs.	Implementable, but requires permitting through the U.S. Army Corps of Engineers (USACE). It is assumed that TSCA-level or non-aqueous phase liquid (NAPL)-impacted sediment will not be allowed for disposal in the DMMF. Available capacity in the proposed DMMF and removal volumes from multiple project areas within the AOC need further evaluation.	Low to Moderate. Expected to be less expensive than offsite disposal, due to savings on stabilization, transportation and disposal fees.	Currently retained for further evaluation. The proposed DMMF is currently in the design phase. Requires close coordination with the United States Environmental Protection Agency, Wisconsin Department of Natural Resources (WDNR), USACE, and Port of Milwaukee and requires federal and non-federal sponsors. Volume of sediment to be removed from the AOC collectively is currently being evaluated.
Sediment Disposal	Offsite Disposal - Subtitle C or Subtitle D Landfill	Disposal of dewatered sediment at an offsite facility. Characterization data collected to date demonstrates that sediment is non-hazardous under the Resource Conservation and Recovery Act (RCRA). Some of the sediment within the Downtown Reach has polychlorinated biphenyl (PCB) concentrations greater than the 50 mg/kg TSCA threshold, which would require disposal in a Subtitle C landfill. Sediment with PCB concentrations less than 50 mg/kg could be permanently disposed in a non-TSCA and non-Subtitle C landfill approved for special waste disposal.	Effective. Would permanently remove COC mass from the project site.	Local landfills within the project vicinity are approved for special waste disposal of sediment with less than 50 mg/kg PCBs and non-hazardous waste levels of other COCs. The acceptability of the sediment by the offsite disposal facility would need to be evaluated in greater detail during remedial design; disposal requirements for emerging contaminants are uncertain. Sediment with concentrations greater than 50 mg/kg PCBs are expected to be disposed in a Subtitle C landfill or equivalent. The exact disposal facility and requirements would need to be evaluated in greater detail during remedial design.	Moderate	Retained for further evaluation specific to handling TSCA-level sediment, which would be removed to an upland dewatering area for eventual offsite disposal in an approved landfill.
Sediment Dewatering	Dewatering: DMMF Disposal	Pumping of dredged sediment at a low solids concentration directly to the DMMF. The sediment is passively dewatered by settling of solids and evaporation of overlying water. Remaining free water on top is treated and discharged to Lake Michigan under a Wisconsin Pollutant Discharge Elimination System permit. Requires an onsite wastewater plant of sufficient capacity to allow for continuous dredging operations and prevent accumulation of large quantities of water in the DMMF.	Sediment slurry is pumped as a controlled flow from the hydraulic dredge to the DMMF facility through submerged pipes that do not interfere with waterway traffic. Dependent on the discharge criteria and the efficiency of the treatment processes. Removes COCs and turbidity before discharging into Lake Michigan. An effluent monitoring system is required to monitor the discharge concentrations.	Easily implementable and cost effective. Extended dewatering duration and effective water treatment system are essential for uninterrupted dredging operations. Water treatment for a relatively large volume of water from the dredged sediment needed. Typically requires treatability testing to select reagent and mix to improve sediment dewatering and for design of water treatment system.	Moderate to High	Retained for further evaluation as hydraulic dredging and pipeline transport to the DMMF is the likely to be used on an AOC-wide basis.
Sediment Dewatering	Dewatering: Upland Management and Disposal	Excess free water generated from mechanical removal of sediment is pumped from watertight scow barges to a storage tank, then treated and discharged. Dredged sediment is then offloaded to a staging pad where it dewaters by gravity drainage and stabilized as needed for transport and upland disposal. Water is then physically and chemically treated to remove suspended solids and COCs before being discharged back into the river or to the publicly owned treatment works (dependent on permitting).	Dependent on the discharge criteria and the efficiency of the water treatment processes. An effluent monitoring system is required to monitor the discharge concentrations.	Limited by availability of upland staging areas for equipment and drying and transloading of sediment.	Moderate to High	Retained for further evaluation as offsite landfill disposal may be used in some circumstances such as removal of TSCA-level sediment.

Remedial Technologies	Process Options	Description	Screening Criterion Effectiveness	Screening Criterion Implementability	Screening Criterion Relative Cost	Screening Comment
Sediment Containment	Cap	Place one or more layers of clean material over the surface of contaminated sediment to isolate the sediment left in place and reduce COC flux to the environment. A cap could be constructed in areas along the shoreline where sediment cannot be removed due to stability concerns, or in other areas that cannot be accessed for dredging. Amendments that enhance sequestration or degradation of COCs could be added to the cap if needed to inhibit COC migration. Provides long-term risk reduction to human and ecological receptors.	Can be effective if cap remains in place. Isolates the COCs from human and ecological receptors and prevents resuspension of contaminated sediment. Regular cap inspection and maintenance are required to address eroded or disturbed areas. The cap dimensions and materials need to be carefully designed to avoid head cutting and scouring effects. May provide habitat for benthic organisms and fish species pending cap materials used. Treatability testing may be needed to support design of an active (amended) cap, which would reduce contaminant flux by increasing sorptive capacity and/or by enhancing degradation. Long-term effectiveness is dependent on cap thickness, material selection, and maintenance.	Installation implementable for areas with PCB concentrations below TSCA levels. Installation within the FNC requires the cap surface to be 3 feet below the authorized FNC elevation. Requires permits. May disrupt the existing dock areas and waterway users. Will require long-term monitoring and institutional controls. Requires staging areas for cap material close to the remediation location. Cap extents must be mapped and reported in applicable WDNR databases. Most materials and equipment are readily available. Slower construction may be necessary for active caps to reduce placement variability of layers containing reactive materials.	Low to Moderate. Long-term costs include periodic monitoring of the cap and cap maintenance as required. Costs for active capping would be moderate to high.	Retained for further evaluation for areas where dredging is not implementable and PCB concentrations are below TSCA levels. There may be challenges to implementability due to low clearance near bridges, preventing use of mechanical equipment needed for the installation.
In Situ Treatment	Activated Carbon	This technology involves mixing activated carbon (e.g., granular activated carbon, SediMite, or other amendment) into surficial sediment to adsorb hydrophobic organic contaminants and reduce contaminant bioavailability. Carbon amendments can be mixed into the sediment using mechanical methods or natural biological activity (bioturbation).	Effective for reducing bioavailability of hydrophobic organic contaminants but may not be effective for metals. Long-term effectiveness and permanence are uncertain.	Implementable in areas with PCB concentrations below TSCA levels outside of the FNC or if the FNC is deauthorized. Amendments can be placed using conventional equipment. Can be used to treat areas under bridges or against bulkheads where other technologies would be difficult to implement. Would require staging areas for stockpiling materials. May require additional institutional controls and long-term monitoring.	Moderate to high depending on area to be treated.	Not retained for further evaluation. Long-term effectiveness and permanence are uncertain and long-term monitoring and maintenance would be needed.
In Situ Treatment	Fixation/ Stabilization	Involves applying or mixing of an amendment into sediment through mechanical means (using augers, for instance) to immobilize COCs by physically binding or enclosing the sediment within a stabilized mass or chemically treating these to become immobile.	In situ treatment technologies can achieve immediate risk reduction by reducing the bioavailability and mobility of a range of organic and metal COCs in environmentally sensitive environments or in areas where sediment removal or capping are not implementable.	Implementable with limitations. Requires permits. Can be implemented at discrete depth intervals to target a specific layer of impacted sediment. May allow for management of contaminated sediment adjacent to retaining and support structures, which are often aged and require structural analysis and support prior to dredging or removal activities. Requires bench-scale testing for selecting the suitable stabilization/ solidification amendment. May require a protective surface structure (such as rip rap or articulated mat) depending on the strength of treated sediment and erosional forces present. Requires staging area for the storage and preparation of stabilization/solidification amendment.	Moderate to High	Retained for further evaluation. Implementing in situ stabilization measures in areas with low clearance may be complex. Stabilization measures require erosion protection, long term monitoring and cannot be implemented if the FNC is not deauthorized. May be considered for application near bulkheads to protect shoreline stability.
Ex Situ Treatment	Sediment Stabilization/ Solidification	Dewatered sediment is mixed with an additive (fly ash, Portland cement) to decrease the leachability of COCs and meet transportation and disposal requirements.	Effective as a secondary dewatering technology for sediment following passive dewatering techniques. Can improve the chemical and physical properties of the sediment for disposal.	Requires mixing amendments into the sediment following excavation and passive dewatering prior to disposal. Typically requires pilot testing for selecting the suitable stabilization/solidification amendment. After stabilization/solidification, sediment will be loaded into trucks for offsite disposal.	Moderate	Retained for further consideration for dredged material to be transported to an upland disposal facility (including TSCA-level sediment).
Ex Situ Treatment	Particle Size Segregation and Washing	Vibrating or fixed screens, hydrocyclones, or gravity separation used to segregate particle sizes in sediment allowing separate disposal of fine-grained material with higher COC concentrations.	Effective. Can be a good source of fill materials for beneficial reuse if sufficient quantity of sand and/or gravel exists within sediment to be removed.	Easily implemented along with hydraulic dredging. Requires staging area for implementation. The quantity of sand and/or gravel that exists within the dredged sediment to be evaluated for cost effectiveness. Pilot/bench-scale testing is required.	Moderate	Retained for further evaluation to reduce the volume of material requiring disposal in DMMF. Minimizing the amount of waste requiring disposal in the DMMF can decrease the amount of space consumed and facilitates the effective management of contaminated sediment from other project areas in AOC.

Remedial Technologies	Process Options	Description	Screening Criterion Effectiveness	Screening Criterion Implementability	Screening Criterion Relative Cost	Screening Comment
Ex Situ Treatment	Sediment Washing	PCBs sorbed onto fine soil particles are separated from bulk soil in an aqueous-based system based on particle size. Wash water may be augmented with a basic leaching agent, surfactant, pH adjustment, or chelating agent to help remove organics.	Considered a transfer technology in that the COCs are not destroyed but transferred to another media. Consequently, the resulting concentrated sediment must be disposed of appropriately. Varying concentrations and mix of COCs at the site create a complex washing solution.	Requires sediment excavation, pilot/bench scale testing. Equipment and utility requirements are substantial.	High	Not retained for further evaluation due to implementability and cost concerns.

AOC = area of concern

BMP = best management practice

COC = contaminant of concern

DMMF = dredged materials management facility

FNC = federal navigation channel

mg/kg = milligram(s) per kilogram

NAPL = non-aqueous phase liquid

PCB = polychlorinated biphenyl

RAO = Remedial Action Objective

RCRA = Resource Conservation and Recovery Act

TSCA = Toxic Substance Control Act

USACE = U.S. Army Corps of Engineers

WDNR = Wisconsin Department of Natural Resources

Table 5-1. Conceptual Alternatives Summary - Milwaukee River Downtown Reach

Milwaukee Estuary Area of Concern, Milwaukee, Wisconsin

Element Number	Conceptual Alternative Element	Alternative 1 No Action	Alternative 2 Total PCBs >1 mg/kg, or metals (Cr, Pb, Hg) or Total PAHs >PEC	Alternative 3 Total PCBs >1 mg/kg, or metals (Cr, Pb, Hg) or Total PAHs >3xPEC	Alternative 3A Total PCBs >1 mg/kg, or Metals (Cr, Pb, Hg) or Total PAHs >3xPEC	Alternative 4 Total PCBs >3 mg/kg, or metals (Cr, Pb, Hg) or Total PAHs >3xPEC
1	**Remedial Target Area** - Area (acres)	Not applicable	53	49	49	43
	Remedial Target Area - Removal Volume (cubic yards)[a]	Not applicable	524,000	472,000	457,000	415,000
2	**Non-TSCA Sediment Removal** - Non-TSCA Removal Area (acres)	Not applicable	36	34	34	31
	Non-TSCA Sediment Removal - Portion of hydraulic removal volume (cubic yards)	Not applicable	448,600	402,000	443,000	347,700
	Non-TSCA Sediment Removal - Portion of mechanical removal volume (cubic yard)	Not applicable	61,400	56,000	0	53,300
	Non-TSCA Sediment Removal - Estimated dewatered (supernatant) volume for treatment[b] (gallons)	Not applicable	930,000,000	835,000,000	810,000,000	730,000,000
3	**TSCA Sediment Removal**[c] - TSCA Removal Area (acres)	Not applicable	3.7	3.7	3.7	3.7
	TSCA Sediment Removal[c] - Portion of mechanical removal volume (cubic yards)	Not applicable	14,000	14,000	14,000	14,000
	TSCA Sediment Removal[c] - Shoreline and utility corridor reinforcement (linear feet)	Not applicable	3,600	3,600	3,600	3,600
	TSCA Sediment Removal[c] - Estimated dewatered (supernatant) volume for treatment[d] (gallons)	Not applicable	720,000	720,000	720,000	720,000
4	**Cap** - Area (acres)	Not applicable	36	31	32	27
	Cap - Capping Material Volume (cubic yards)	Not applicable	102,000	88,000	90,000	76,000
5	**Residual Management Cover** - Area (acres)	Not applicable	17	18	17	16
	Residual Management Cover - Residual Cover Material Volume (cubic yards)	Not applicable	21,000	22,000	21,000	19,000

Source: Wisconsin Department of Natural Resources (WDNR). 2003. Wisconsin Consensus-based Sediment Quality Guidelines. Recommendations for Use and Application, Interim Guidance RR-088. December.

[a] Estimated quantity of target remediation volume accessible for removal through dredging and/or excavation.

[b] Includes pipeline transport to dredged materials management facility with dewatering and supernatant treatment at dredged materials management facility location, treated with temporary onsite water treatment plant and discharged to the river under Wisconsin Pollutant Discharge Elimination System discharge permit.

[c] The volume reported for TSCA-impacted sediment represents full removal of TSCA material through the implementation of shoreline stabilization during removal.

[d] Includes staging, dewatering, solidification at upland staging area with offsite transport of sediment to Subtitle C or D landfill; excess water collected, treated with temporary onsite water treatment plant and discharged to the river under Wisconsin Pollutant Discharge Elimination System discharge permit

> = greater than

3x = 3 times

Cr = chromium

Hg = mercury

mg/kg = milligram(s) per kilogram

PAH = polycyclic aromatic hydrocarbon

Pb = lead

PCB = polychlorinated biphenyl

PEC = Probable Effect Concentration (per WDNR 2003)

TSCA = Toxic Substance Control Act

Table 6-1. Remedial Alternative Evaluation Summary – Milwaukee River Downtown Reach

Milwaukee Estuary Area of Concern, Milwaukee, Wisconsin

Criterion	Alternative 1 No Action	Alternative 2	Alternative 3	Alternative 3A	Alternative 4
1. Threshold Criterion Compliance with applicable federal, state, and local regulations	No remedial action; therefore, not applicable.	Multiple permits would be required (see Appendix C). Alternative can be designed to comply with applicable regulations.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
2(a). Balancing Criterion: Long Term Effectiveness Ability to achieve remedial action objectives (RAOs) and contribute to beneficial use impairment (BUI) removal; amount of residual contamination[a] anticipated to be left in place; adequacy and reliability of long-term controls; potential for recontamination; expected performance in response to extreme storm events and climate change.	RAOs not likely to be met within a reasonable timeframe. Would not contribute to removal of BUIs.	Sediment removal and the residual cover layer reliably and permanently reduce the mass, volume, and concentrations of contaminants of concern (COCs) in sediment, thereby reducing exposure and risk to ecological and human receptors and contributing to the removal of BUIs. Capping contaminated sediments that cannot be cost-effectively removed eliminates exposure and risk by isolating contaminants in the undredged inventory. Disposal of contaminated sediment in the dredged materials management facility (DMMF) or in a permitted offsite landfill eliminates all exposure pathways. Alternative 2 would be implemented to maintain depth requirements in the federal navigation channel (FNC) at the downstream end of the Downtown Reach. Alternative 2 has the greatest long-term effectiveness because the largest area (53 acres) is covered with a cap or residual cover layer compared to Alternatives 3 and 4 and the lowest concentrations of COCs remain in place. As discussed in Section 2.7, recontamination potential from other sources is also low. Alternative 2 can be designed to withstand extreme storm events and be resilient in response to climate change.	Alternative 3 uses the same approaches to achieve RAOs and contribute to BUI removal as Alternative 2. However, Alternative 3 has less long-term effectiveness than Alternative 2 because a smaller area (49 acres) would be covered with a cap or residual cover layer following dredging and sediment with higher metals (chromium, lead and mercury) and polycyclic aromatic hydrocarbon (PAH) concentrations would remain in place compared to Alternative 2. The long-term impact of removing less sediment on BUIs compared to Alternative 2 is uncertain because a combination of actions (including sediment remediation) will contribute to BUI removal, and natural deposition of relatively cleaner sediment is expected to occur after the sediment remedial action is complete.	Alternative 3A uses the same approaches to achieve RAOs and contribute to BUI removal as Alternatives 2 and 3. Although the remediation target areas (RTAs) for Alternatives 3 and 3A are identical (49 acres), a maximum dredge elevation of 552.5 North American Vertical Datum of 1988 (NAVD88) would be utilized and deeper sediment with COC concentrations exceeding cleanup goals (CUGs) would remain in place beneath a cap. The long-term impact of removing less sediment on BUIs compared to Alternative 2 is uncertain because a combination of actions (including sediment remediation) will contribute to BUI removal, and natural deposition of relatively cleaner sediment is expected to occur after the sediment remedial action is complete.	Alternative 4 uses the same approaches to achieve RAOs and contribute to BUI removal as Alternatives 2 and 3. However, Alternative 4 has less long-term effectiveness than Alternatives 2 and 3 because a smaller area (43 acres) would be covered with a cap or residual cover layer, sediment with higher polychlorinated biphenyl (PCB) concentrations would remain in place compared to Alternative 3, and sediment with higher metals (chromium, lead and mercury), PAH and PCB concentrations would remain in place compared to Alternative 2. The long-term impact of removing less sediment on BUIs compared to Alternatives 2 and 3 is uncertain because a combination of actions (including sediment remediation) will contribute to BUI removal, and natural deposition of relatively cleaner sediment is expected to occur after the sediment remedial action is complete.

Criterion	Alternative 1 No Action	Alternative 2	Alternative 3	Alternative 3A	Alternative 4
2(b). Balancing Criterion: Short-Term Effectiveness Potential adverse impacts on public health, safety, welfare and the environment during construction and implementation; protection of the community during remedial action, environmental impacts of the remedial action, and time until RAOs are achieved.	No remedial action; therefore, not applicable.	(Estimated in-water remedial action time = 8 months) Potential adverse impacts on public health, safety, welfare and the environment during construction and implementation include the following: • Reduced public access to the river and shoreline • Increased vessel and vehicular traffic • Increased emissions from vehicles and other construction equipment • Increased noise • Odors and dust from the upland staging area where mechanically dredged sediments are stockpiled and processed for offsite disposal. • Potential risk to workers from accidents or exposure to COCs • Temporary destruction of the benthic community in dredged and capped areas • Potential environmental impacts from suspended sediment during dredging • Potential environmental impacts from leaks in the pipeline transporting hydraulically dredged sediment to the DMMF Engineering and operational controls will be used to reduce and manage impacts during remedy construction and implementation. Plans will be developed during remedial design to establish requirements for air quality monitoring, noise monitoring, health and safety, waste management, traffic safety, and other activities. Turbidity monitoring and controls will be used to manage potential environmental impacts from sediment resuspension during dredging. The magnitude of the impacts is related to the duration of the remedial action. RAOs will be achieved when remedy construction is complete.	(Estimated in-water remedial action time = 7.5 months) Potential adverse impacts are the same as those for Alternative 2; however, the duration of the remedial action will likely be a few weeks shorter because less sediment would be dredged and capped. The benthic community would be temporarily destroyed over a slightly smaller area for Alternative 3 compared to Alternative 2. RAOs will be achieved when remedy construction is complete, which will be sooner than for Alternative 2.	(Estimated in-water remedial action time = 7.5 months). Same as Alternative 3.	(Estimated in-water remedial action time = 7.5 months) Potential adverse impacts are the same as those for Alternative 2; however, the benthic community would be temporarily destroyed over a smaller area for Alternative 4 compared to Alternatives 2 and 3 because less sediment will be dredged and capped. RAOs will be achieved when remedy construction is complete, which is estimated to be during the same timeframe as for Alternative 3.

Criterion	Alternative 1 No Action	Alternative 2	Alternative 3	Alternative 3A	Alternative 4
2(c). Balancing Criterion: Implementability Technical feasibility, including ease of implementation, reliability, constructability, availability of goods and services, and potential difficulties or constraint associated with construction or disposal; and administrative feasibility, including activities and time needed to obtain permits and approvals, the need for institutional controls, and degree of coordination with other agencies.	Easily implementable because no remedial action would be taken.	The remediation methods associated with this alternative (except in situ stabilization) have been implemented at numerous other sites and have been proven to be constructible and reliable. In situ stabilization to increase sediment strength and bearing capacity is more challenging to implement. All goods and services are expected to be readily available. Potential difficulties and constraints associated with this alternative include: • Limitations on DMMF capacity for disposal of dredged sediment • Limited access for construction equipment near and under bridges • Protection of utility corridors that cross the river • Bulkhead stability • Limited availability of upland staging areas for processing mechanically dredged sediments • Segregation and management of sediments with Toxic Substance Control Act (TSCA)-level PCB concentrations A range of permits and approvals are required for implementing this alternative as detailed in Appendix C. This alternative requires extensive coordination with other agencies and parties including the project partners (U.S. Environmental Protection Agency, WDNR, the City of Milwaukee, Milwaukee County, Milwaukee Metropolitan Sewerage District), the Port of Milwaukee, U.S. Army Corps of Engineers, and affected property owners and businesses. Institutional controls will be discussed further with project partners during remedial design.	Same considerations as Alternative 2, but more implementable than Alternative 2 because the volume of dredged sediment is lower and therefore disposal requires less DMMF capacity. In addition, dredging and capping are required around fewer bridges compared to Alternative 2 (e.g., Juneau Avenue, Wisconsin Avenue, Michigan Street, Clybourn Street, and I-794). Cap area requiring agency coordination and approval is less than Alternative 2.	Same considerations as Alternative 2, but more implementable than Alternatives 2 or 3 because the volume of dredged sediment is lower and therefore disposal requires less DMMF capacity. Cap area requiring agency coordination and approval is greater than Alternative 3 and less than Alternative 2.	Same considerations as Alternative 2, but more implementable than Alternative 2, 3, or 3A because the volume of dredged sediment is lower than for Alternatives 2 and 3 and therefore disposal requires less DMMF capacity. In addition, dredging and capping is required around fewer bridges compared to Alternatives 2 or 3 (e.g., Kilbourne Avenue and the bridges listed for Alternative 3). Cap area requiring agency coordination and approval is less than Alternatives 2, 3 and 3A.
2(d). Balancing Criterion: Restoration Time Frame	No remedial action; therefore, not applicable.	The benthic community is expected to naturally recolonize the dredged and capped surface within several months after the remedy has been completed. Upland staging and laydown areas will be restored to the pre-remedy condition during demobilization.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
2(e). Balancing Criterion: Total Cost[b] (As Estimated)	$0	$138,850,000	$130,151,000	$129,283,000	$120,425,000
3. Modifying Criterion: Project Partner Acceptance [c]	[c]	[c]	[c]	[c]	[c]

Source: Wisconsin Department of Natural Resources (WDNR). 2003. *Wisconsin Consensus-based Sediment Quality Guidelines. Recommendations for Use and Application, Interim Guidance RR-088.* December.

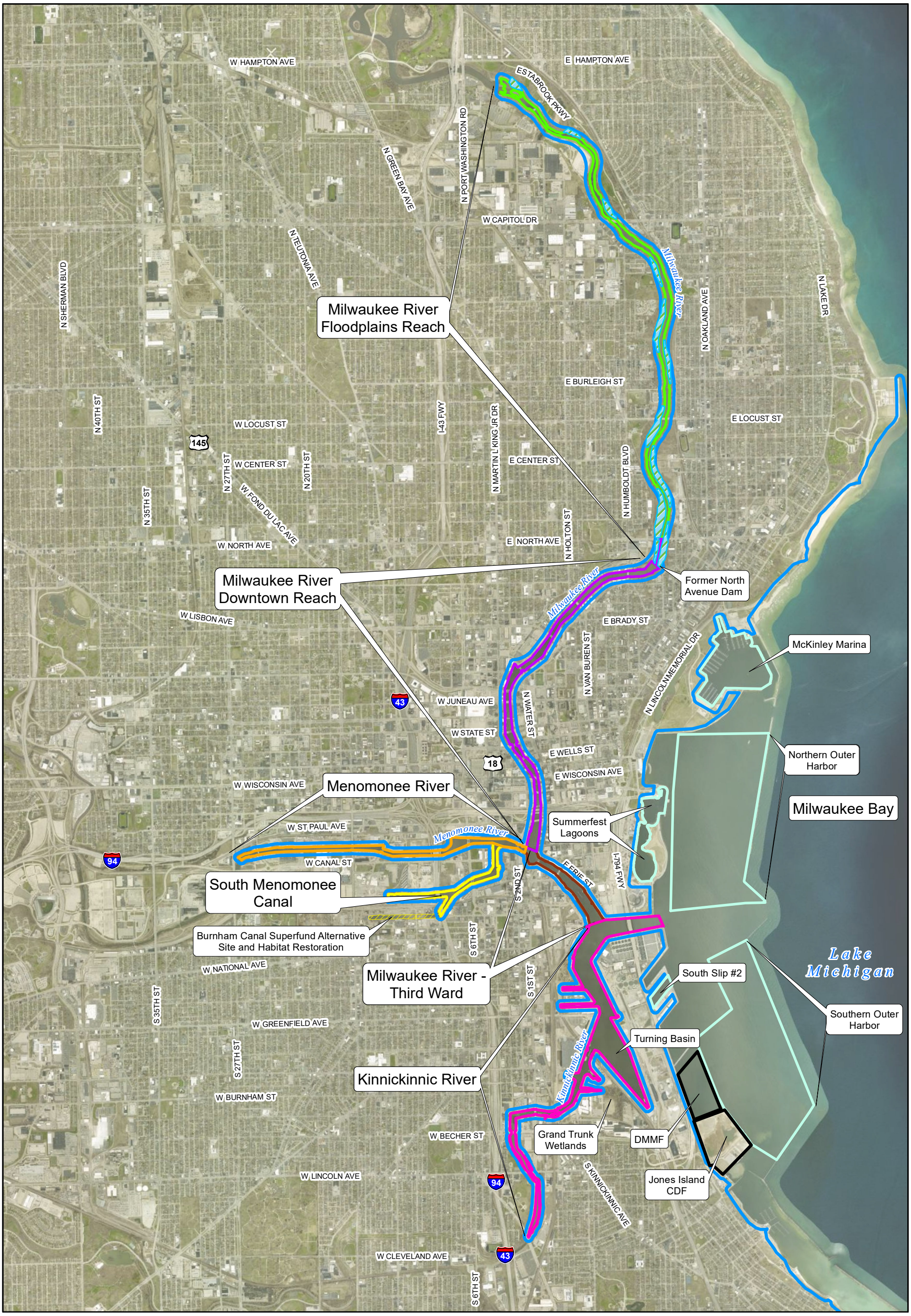
[a] "Residual contamination" and "contaminated sediment" for each alternative is defined as sediment with COC concentrations above the screening levels for that alternative.

[b] Total cost is detailed in Appendix D to this document.

[c] Evaluated after the project partners reviewed and provided comments on the remedial alternatives and associated individual and comparative alternative analyses. Project partner acceptance was considered when selecting the recommended alternative.

BUI = beneficial use impairment
COC = contaminant of concern
CUGs = clean up goals
DMMF = dredged materials management facility
FNC = Federal Navigation Channel
NAVD88 = North American Vertical Datum of 1988
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
RAO = Remedial Action Objective
RTA = remedial target area
TSCA = Toxic Substance Control Act
WDNR = Wisconsin Department of Natural Resources

Figures



LEGEND

- Floodplain Area Boundary
- Milwaukee Bay
- Menomonee River
- Kinnickinnic River
- Milwaukee River Downtown
- Milwaukee River Floodplain
- Milwaukee River - Third Ward
- South Menomonee Canal
- Greater Milwaukee GLLA Project Agreement boundary

N

0 1500 3000

Feet

Notes:
1. CDF = confined disposal facility; DMMF = dredged materials management facility; GLLA = Great Lakes Legacy Act
2. 2022 Aerial Photography provided by Esri ArcGIS Online World Imagery.

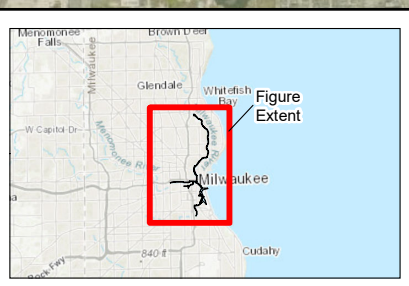


Figure 1-1 Regional Features
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Jacobs

Start of Downtown Reach Project Area – Location of Former North Avenue Dam

E GARFIELD AVE
N DOUSMAN ST
N COMMERCE ST
N RIVERBOAT RD
N WARREN AVE
E KANE PL
N PULASKI ST
N HUMBOLDT AVE
N WEIL ST
E RESERVOIR AVE
N WATER ST
N ASTOR ST
E LAND PL
E HAMILTON ST
N FRATNEY ST
N PIERCE ST

LEGEND

- North Avenue Reef

Shoreline Type
- Concrete
- Drystack Wall
- Natural Shoreline
- Steel H Pile
- Steel Sheet Pile

Condition Level
- Excellent
- Good
- Fair
- Marginal
- Poor
- Very Poor
- Not Evaluated

Utilities
- Electric
- Fiber Optic
- Gas
- Sanitary Sewer
- Storm Sewer
- Water Line

Bathymetry (feet)
- Bathymetric Contour

Elevation (Feet)
- 535 - 540
- 540 - 545
- 545 - 550
- 550 - 555
- 555 - 560

0 75 150
Approximate scale in feet

Notes:
1. Basemap source: Esri ArcGIS Online Light Gray Base Map
2. Horizontal Datum: North American Datum 1983 (NAD83)
3. Vertical Datum: North American Vertical Datum of 1988 (NAVD88)
4. Bathymetric contour and shading were generated from hydrographic survey data collected by Seaworks reported in *Final Report for Milwaukee, WI Area of Concern, Bathymetric Investigation (2020).*

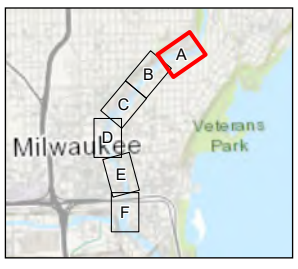


Figure 1-2A
Site Features
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

LEGEND

Shoreline Type
- Concrete
- Natural Shoreline
- Steel Sheet Pile

Condition Level
- Excellent
- Good
- Fair
- Marginal
- Poor
- Very Poor
- Not Evaluated

Utilities
- Gas
- Storm Sewer

Bathymetry (feet)
- Bathymetric Contour

Elevation (Feet)
- 535 - 540
- 540 - 545
- 545 - 550
- 550 - 555
- 555 - 560

N

0 75 150

Approximate scale in feet

Notes:
1. Basemap source: Esri ArcGIS Online Light Gray Base Map
2. Horizontal Datum: North American Datum 1983 (NAD83)
3. Vertical Datum: North American Vertical Datum of 1988 (NAVD88)
4. Bathymetric contour and shading were generated from hydrographic survey data collected by Seaworks reported in *Final Report for Milwaukee, WI Area of Concern, Bathymetric Investigation (2020)*.

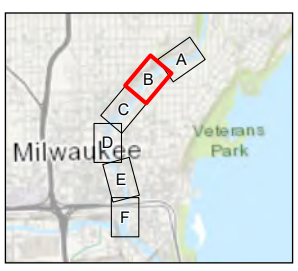


Figure 1-2B
Site Features
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Figure 1-2C
Site Features
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

LEGEND

Shoreline Type
- Concrete
- Decorative Concrete
- Steel Sheet Pile

Condition Level
- Excellent
- Good
- Fair
- Marginal
- Poor
- Very Poor
- Not Evaluated

Utilities
- Electric
- Gas
- Sanitary Sewer
- Storm Sewer
- Telephone
- Water Line
- Unknown

Bathymetry (feet)
- Bathymetric Contour

Elevation (Feet)
- 535 - 540
- 540 - 545
- 545 - 550
- 550 - 555
- 555 - 560
- 560 - 565

N

0 75 150

Approximate scale in feet

Notes:
1. Basemap source: Esri ArcGIS Online Light Gray Base Map
2. Horizontal Datum: North American Datum 1983 (NAD83)
3. Vertical Datum: North American Vertical Datum of 1988 (NAVD88)
4. Bathymetric contour and shading were generated from hydrographic survey data collected by Seaworks reported in *Final Report for Milwaukee, WI Area of Concern, Bathymetric Investigation (2020).*

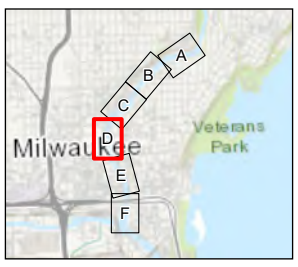


Figure 1-2D
Site Features
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

W KILBOURN AVE
E KILBOURN AVE
N MARKET ST
E WELLS ST
W WELLS ST
N FRONT ST
N PLANKINTON AVE
E MASON ST
W WISCONSIN AVE
E WISCONSIN AVE
N 2ND ST
N WATER ST
W MICHIGAN ST
E MICHIGAN ST
N BROADWAY

LEGEND

Shoreline Type
- Concrete
- Decorative Concrete
- Steel Sheet Pile

Condition Level
- Excellent
- Good
- Fair
- Marginal
- Poor
- Very Poor
- Not Evaluated

Utilities
- Cable TV
- Electric
- Fiber Optic
- Gas
- Storm Sewer

Bathymetry (feet)
- Bathymetric Contour

Elevation (Feet)
- 535 - 540
- 540 - 545
- 545 - 550
- 550 - 555
- 555 - 560
- 560 - 565
- 565 - 570

N

0 75 150

Approximate scale in feet

Notes:
1. Basemap source: Esri ArcGIS Online Light Gray Base Map
2. Horizontal Datum: North American Datum 1983 (NAD83)
3. Vertical Datum: North American Vertical Datum of 1988 (NAVD88)
4. Bathymetric contour and shading were generated from hydrographic survey data collected by Seaworks reported in *Final Report for Milwaukee, WI Area of Concern, Bathymetric Investigation (2020).*

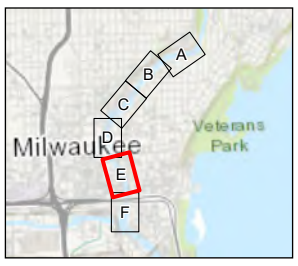
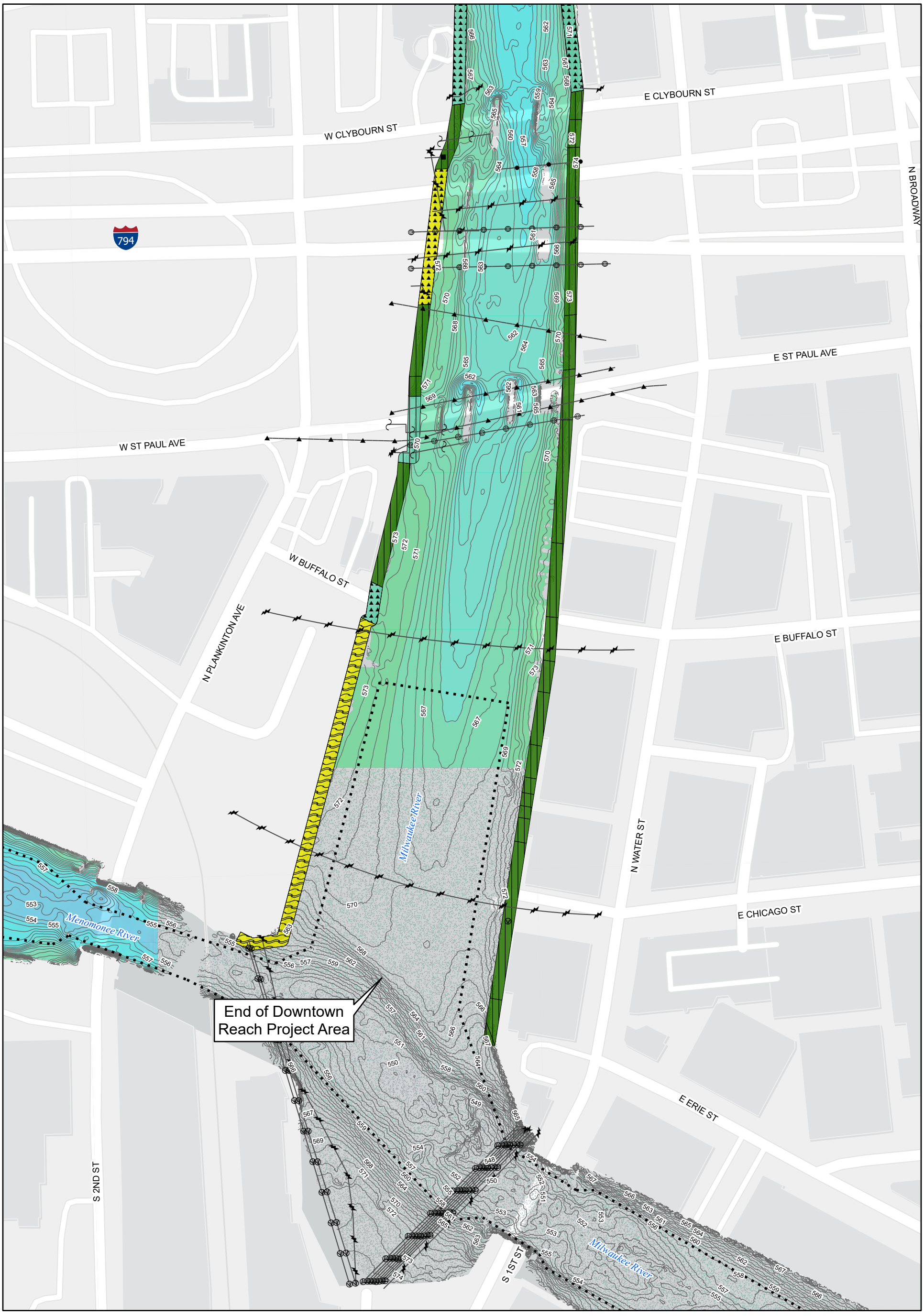


Figure 1-2E
Site Features
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin



LEGEND

Shoreline Type
- Concrete
- Natural Shoreline
- Steel Sheet Pile

Condition Level
- Excellent
- Good
- Fair
- Marginal
- Poor
- Very Poor
- Not Evaluated

- Federal Navigation Channel (Source: United States Army Corps of Engineers)

Utilities
- Electric
- Fiber Optic
- Gas
- Sanitary Sewer
- Storm Sewer
- Utility Identified during Menomonee and Milwaukee River FFS
- Water Line

Bathymetry (feet)
- Bathymetric Contour

Elevation (Feet)
- 535 - 540
- 540 - 545
- 545 - 550
- 550 - 555
- 555 - 560
- 560 - 565
- 565 - 570

N

0 75 150

Approximate scale in feet

Notes:
1. Basemap source: Esri ArcGIS Online Light Gray Base Map
2. Horizontal Datum: North American Datum 1983 (NAD83)
3. Vertical Datum: North American Vertical Datum of 1988 (NAVD88)
4. Bathymetric contour and shading were generated from hydrographic survey data collected by Seaworks reported in *Final Report for Milwaukee, WI Area of Concern, Bathymetric Investigation (2020)*. Portions of this figure extent contain bathymetric data gaps and therefore the derived color shading is not continuous.

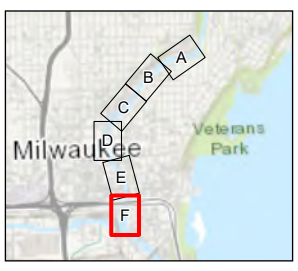
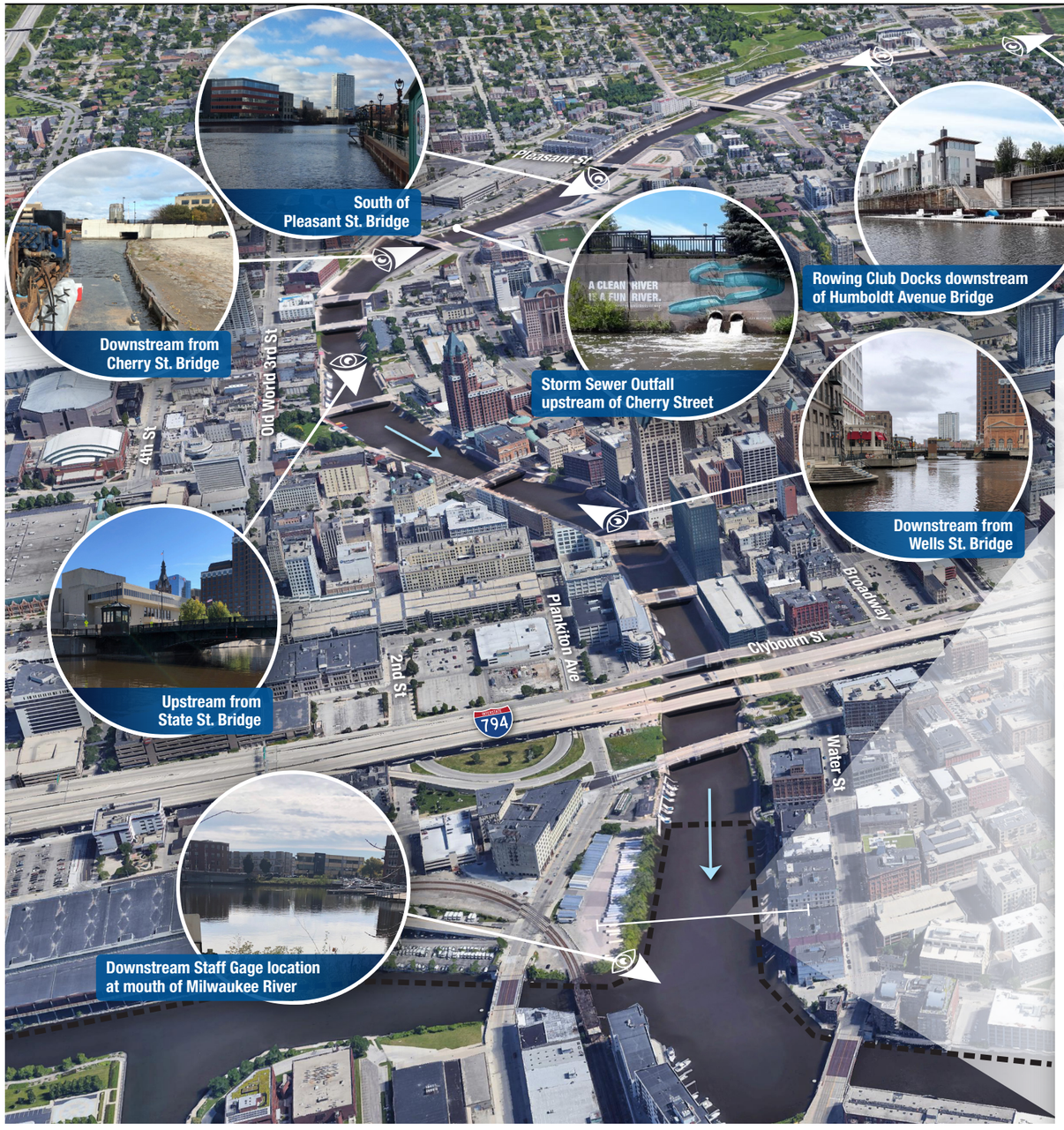


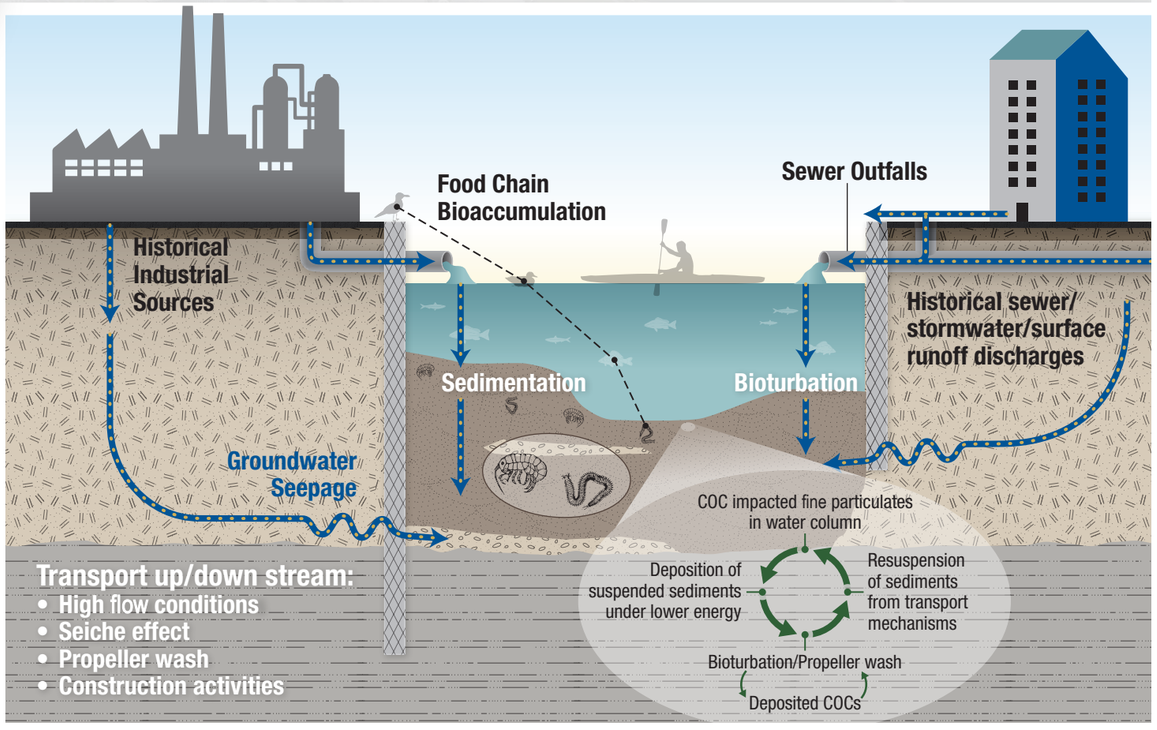
Figure 1-2F
Site Features
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin



Primary COCs:
- Polychlorinated Biphenyls
- Polycyclic Aromatic Hydrocarbons
- Metals

Primary Sources:
- Historical Industry
- Sewer Outfalls
- Non-point Sources (surface runoff, construction activities, etc.)

Receptors:
- Benthic invertebrates
- Aquatic invertebrates
- Fish
- Piscivorous birds and mammals
- Humans



Map Legend

- River Flow direction
- Federal Navigation Channel

Notes:
COC - Contaminant of Concern
FEMA - Federal Emergency Management Agency
NAVD88 - North American Vertical Datum of 1988

Inset Legend

- Sand and Gravel Seams
- Fill and Soil
- Compacted Native Material (Low Permeability, Dense Clays and Silts)
- Potential Pathways for Contaminants of Concern (COCs)
- Soft Sediment (Clays and silts rich in organics)

Figure 2-1
Conceptual Site Model
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Jacobs

Surface Sediment

Subsurface Sediment

N Commerce St
N Holton St
N Humboldt Ave
E Brady St
Walnut St
E Pleasant St
W Cherry St
N Water St
N Van Buren St
McKinley Ave
E Knapp St
W Juneau Ave
E Juneau Ave
E State St
E Kilbourn Ave
E Wells St
N Milwaukee St
Mason St
E Wisconsin Ave
E Michigan St
E Clybourn St
794
Milwaukee River
E St Paul Ave
E Buffalo St
N Water St
E Chicago St
Menomonee River
Lake Michigan

LEGEND

- Federal Navigation Channel (Source: United States Army Corps of Engineers)
- Milwaukee River Downtown Reach Project Area

Threshold Concentrations (mg/kg)

Cr	Pb	Hg	PAH			PCB
110	130	1.1	22.8	<PEC	○	<1
110	130	1.1	22.8	>PEC	⬡	>1
330	390	3.3	68.4	3x PEC	□	>3
550	650	5.5	114	5x PEC	△	>5
					◇	>50 (TSCA)

Notes:
1. PEC = Probable Effect Concentration; established for Cr, Pb, Hg, and PAHs from Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
2. The color represents the maximum concentration of any individual contaminant at that location.
3. Cr = chromium; Hg = mercury; Pb = lead; mg/kg = milligram(s) per kilogram; PAH = polycyclic aromatic hydrocarbons; PCB = polychlorinated biphenyls; TSCA = Toxic Controls Substance Act
4. The surface interval in the Downtown Reach is 0 to 0.5 foot in most samples but ranges from the top 0.4 to 2.1 feet to include a small number of samples with top intervals varying from 0 to 0.5 foot.
5. Basemap source: Esri ArcGIS Online Light Gray Base Map

N

0 475 950

Approximate scale in feet

Figure 2-2A
Summary of PCB, PAH, Chromium, Lead, or Mercury Threshold Level Exceedances
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Jacobs

Surface Sediment

Subsurface Sediment

N Commerce St
N Holton St
N Humboldt Ave
E Brady St
Walnut St
E Pleasant St
W Cherry St
N Water St
N Van Buren St
McKinley Ave
E Knapp St
W Juneau Ave
E Juneau Ave
E State St
E Kilbourn Ave
E Wells St
N Milwaukee St
Mason St
E Wisconsin Ave
E Michigan St
E Clybourn St
794
Milwaukee River
E St Paul Ave
N Water St
E Buffalo St
E Chicago St
Menomonee River
Lake Michigan

Threshold Concentrations (mg/kg)
PCB
<1
>1
>3
>5
>50 (TSCA)

LEGEND

- Federal Navigation Channel (Source: United States Army Corps of Engineers)
- Milwaukee River Downtown Reach Project Area

Notes:
1. The color represents the maximum concentration of any individual contaminant at that location.
2. mg/kg = milligram(s) per kilogram; PCB = polychlorinated biphenyls; TSCA = Toxic Controls Substance Act
3. Subsurface sediment marker denoted by maximum observed detected value in sediment core at each location. The surface interval in the Downtown Reach is 0 to 0.5 foot in most samples but ranges from the top 0.4 to 2.1 feet to include a small number of samples with top intervals varying from 0 to 0.5 foot.
4. Basemap source: Esri ArcGIS Online Light Gray Base Map

N

0 475 950

Approximate scale in feet

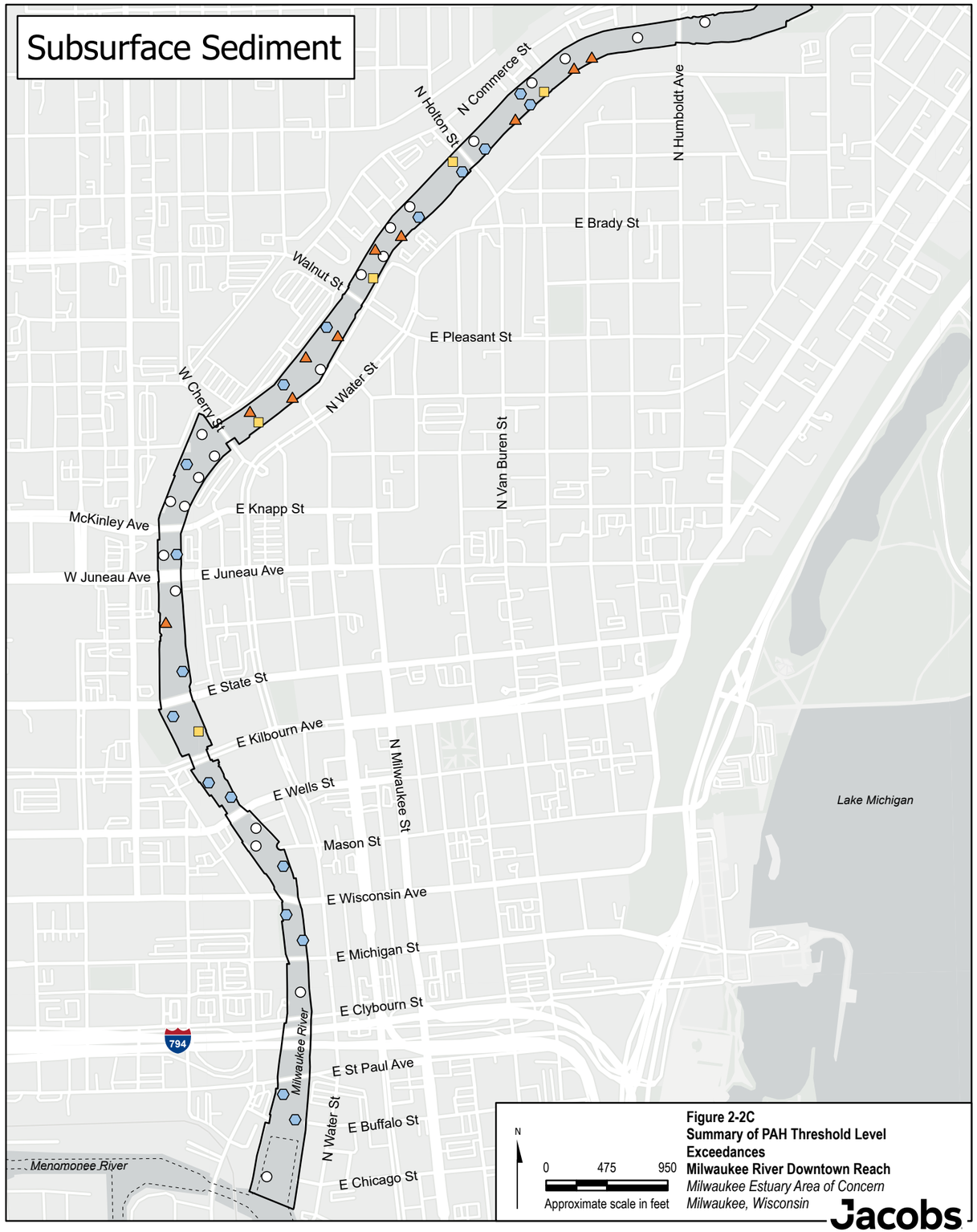
Figure 2-2B
Summary of PCB Threshold Level Exceedances
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Jacobs

\\dc1vs01\GISProj\E\EPA\681867_MKERiverDownstream\ProDocs\2022\Downtown_Summary_Figures\Downtown_Summary_Exceedance_Figures_508.aprx-Figure2-2B_Summary of PCB Threshold Level Exceedances_508 STOLZRC (8/29/2024)

Surface Sediment

Subsurface Sediment



Threshold Concentrations (mg/kg)	
PAH	
22.8	<PEC
22.8	>PEC
68.4	3x PEC
114	5x PEC

LEGEND

- Federal Navigation Channel (Source: United States Army Corps of Engineers)
- Milwaukee River Downtown Reach Project Area

Notes:
1. PEC = Probable Effect Concentration; established for PAHs from Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
2. The color represents the maximum concentration of any individual contaminant at that location.
3. mg/kg = milligram(s) per kilogram; PAH = polycyclic aromatic hydrocarbons
4. Subsurface sediment marker denoted by maximum observed detected value in sediment core at each location. The surface interval in the Downtown Reach is 0 to 0.5 foot in most samples but ranges from the top 0.4 to 2.1 feet to include a small number of samples with top intervals varying from 0 to 0.5 foot.
5. Basemap source: Esri ArcGIS Online Light Gray Base Map

N

0 475 950

Approximate scale in feet

Figure 2-2C
Summary of PAH Threshold Level Exceedances
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Jacobs

\\dc1vs01\GISProj\E\EPA\681867_MKERiverDownstream\ProDocs\2022\Downtown_Summary_Figures\Downtown_Summary_Exceedance_Figures_508.aprx-Figure2-2C_Summary of PAH Threshold Level Exceedances_508 STOLZRC (8/29/2024)

Surface Sediment

Subsurface Sediment

N Commerce St
N Holton St
N Humboldt Ave
E Brady St
Walnut St
E Pleasant St
W Cherry St
N Water St
N Van Buren St
McKinley Ave
E Knapp St
W Juneau Ave
E Juneau Ave
E State St
E Kilbourn Ave
N Milwaukee St
E Wells St
Mason St
E Wisconsin Ave
E Michigan St
E Clybourn St
794
Milwaukee River
E St Paul Ave
N Water St
E Buffalo St
E Chicago St
Menomonee River
Lake Michigan

Threshold Concentrations (mg/kg)

	Cr	
○	110	<PEC
⬡	110	>PEC
□	330	3x PEC
△	550	5x PEC

LEGEND

- Federal Navigation Channel (Source: United States Army Corps of Engineers)
- Milwaukee River Downtown Reach Project Area

Notes:
1. PEC = Probable Effect Concentration; established for Cr from Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
2. The color represents the maximum concentration of any individual contaminant at that location.
3. Cr = chromium; mg/kg = milligram(s) per kilogram
4. Subsurface sediment marker denoted by maximum observed detected value in sediment core at each location. The surface interval in the Downtown Reach is 0 to 0.5 foot in most samples but ranges from the top 0.4 to 2.1 feet to include a small number of samples with top intervals varying from 0 to 0.5 foot.
5. Basemap source: Esri ArcGIS Online Light Gray Base Map

N

0 475 950

Approximate scale in feet

Figure 2-2D
Summary of Chromium Threshold Level Exceedances
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Jacobs

\\dc1vs01\GISProj\E\EPA\681867_MKERiverDownstream\ProDocs\2022\Downtown_Summary_Figures\Downtown_Summary_Exceedance_Figures_508.aprx-Figure2-2D_Summary of Cr Threshold Level Exceedances_508 STOLZRC (8/29/2024)

Surface Sediment

Subsurface Sediment

N Commerce St
N Holton St
N Humboldt Ave
E Brady St
Walnut St
E Pleasant St
W Cherry St
N Water St
N Van Buren St
McKinley Ave
E Knapp St
W Juneau Ave
E Juneau Ave
E State St
E Kilbourn Ave
N Milwaukee St
E Wells St
Mason St
E Wisconsin Ave
E Michigan St
E Clybourn St
794
Milwaukee River
E St Paul Ave
E Buffalo St
E Chicago St
Menomonee River
Lake Michigan

Threshold Concentrations (mg/kg)

	Pb	
○	130	<PEC
⬡	130	>PEC
□	390	3x PEC
△	650	5x PEC

LEGEND

- Federal Navigation Channel (Source: United States Army Corps of Engineers)
- Milwaukee River Downtown Reach Project Area

Notes:
1. PEC = Probable Effect Concentration; established for Pb from Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
2. The color represents the maximum concentration of any individual contaminant at that location.
3. mg/kg = milligram(s) per kilogram; Pb = lead
4. Subsurface sediment marker denoted by maximum observed detected value in sediment core at each location. The surface interval in the Downtown Reach is 0 to 0.5 foot in most samples but ranges from the top 0.4 to 2.1 feet to include a small number of samples with top intervals varying from 0 to 0.5 foot.
5. Basemap source: Esri ArcGIS Online Light Gray Base Map

N

0 475 950

Approximate scale in feet

Figure 2-2E
Summary of Lead Threshold Level Exceedances
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Jacobs

\\dc1vs01\GISProj\E\EPA\681867_MKERiverDownstream\ProDocs\2022\Downtown_Summary_Figures\Downtown_Summary_Exceedance_Figures_508.aprx-Figure2-2E_Summary of Lead Threshold Level Exceedances_508 STOLZRC (8/29/2024)

Surface Sediment

Subsurface Sediment

N Commerce St
N Holton St
N Humboldt Ave
E Brady St
Walnut St
E Pleasant St
W Cherry St
N Water St
N Van Buren St
McKinley Ave
E Knapp St
W Juneau Ave
E Juneau Ave
E State St
E Kilbourn Ave
E Wells St
N Milwaukee St
Mason St
E Wisconsin Ave
E Michigan St
E Clybourn St
794
Milwaukee River
E St Paul Ave
E Buffalo St
E Chicago St
Lake Michigan
Menomonee River

Threshold Concentrations (mg/kg)

Hg	
1.1	<PEC
1.1	>PEC
3.3	3x PEC
5.5	5x PEC

LEGEND

- Federal Navigation Channel (Source: United States Army Corps of Engineers)
- Milwaukee River Downtown Reach Project Area

Notes:
1. PEC = Probable Effect Concentration; established for Hg from Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
2. The color represents the maximum concentration of any individual contaminant at that location.
3. Hg = mercury; mg/kg = milligram(s) per kilogram
4. Subsurface sediment marker denoted by maximum observed detected value in sediment core at each location. The surface interval in the Downtown Reach is 0 to 0.5 foot in most samples but ranges from the top 0.4 to 2.1 feet to include a small number of samples with top intervals varying from 0 to 0.5 foot.
5. Basemap source: Esri ArcGIS Online Light Gray Base Map

N

0 475 950

Approximate scale in feet

Figure 2-2F
Summary of Mercury Threshold Level Exceedances
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Jacobs

\\dc1vs01\GISProj\E\EPA\681867_MKERiverDownstream\ProDocs\2022\Downtown_Summary_Figures\Downtown_Summary_Exceedance_Figures_508.aprx-Figure2-2F_Summary of Mercury Threshold Level Exceedances_508 STOLZRC (8/29/2024)

Former North Avenue Dam

E GARFIELD AVE

N DOUSMAN ST

N WARREN AVE

N RIVERBOAT RD

N HUMBOLDT AVE

N COMMERCE ST

E KANE PL

N PULASKI ST

N WATER ST

N ASTOR ST

E HAMILTON ST

N FRATNEY ST

N PIERCE ST

Milwaukee River

Figure B1/B2

SD-26

	Depth	PCB	Cr	Pb	Hg	PAH
570.7	0 - 0.5	0.6	32.2	53.5	0.11	3.9
NE	0.5 - 1.2	0.64	13.9	28.9	0.067	13.6

SD-27

	Depth	PCB	Cr	Pb	Hg	PAH
568.9	0 - 0.5	1.7	20.9	43.2	0.044	1.8
NE	0.5 - 1.4	0.42	17	31.7	0.3	6

SD-46

	Depth	PCB	Cr	Pb	Hg	PAH
568.9	0 - 0.5	0.61	13.3	33.1	0.0314	16.2
NE	0.5 - 1	0.47	23	50.8	0.0656	8.9
	1 - 2.1	0.5	14.1	33.1	0.0318	-
	6 - 7	1.8	28.6	123	0.176	-
	7 - 8	4.3	53.3	9.07	0.247	-

SD-45

	Depth	PCB	Cr	Pb	Hg	PAH
574.2	0 - 0.5	0.31	25.5	55.6	0.14	20.5
NE	0.5 - 1.5	0.24	41.1	145	0.367	27.6
	1.5 - 2.2	0.011	149	366	0.955	133
	2.2 - 3.2	0.011	78.9	452	1.47	-
	3.2 - 4.2	0.011	127	487	10.2	-
	4.2 - 4.7	0.22	106	601	4.02	-
	7.2 - 8.5	0.22	69.1	281	1.64	-

SD-28

	Depth	PCB	Cr	Pb	Hg	PAH
574.6	0 - 0.5	0.82	23.3	117	0.16	17
NE	0.5 - 1.5	2.2	59	340	0.44	56.6
	1.5 - 2	3.2	80.1	329	0.56	203
	2.5 - 3.5	1.6	104	672	13.2	57.5
	3.5 - 4.5	0.023	126	686	4.9	20.9
	4.5 - 6.5	0.022	101	448	3.4	23.7
	6.5 - 7.3	0.019	65	378	2.1	8.1
	6.8 - 8	0.035	47.4	280	1.63	-

SD-48

	Depth	PCB
575.9	0 - 0.5	0.27
NE	0.5 - 1.5	2.1
	1.5 - 2	0.22
	2.2 - 3.2	54.7
	3.2 - 4.2	0.011
	4.2 - 5.1	0.3
	7.2 - 8.4	0.011

SD-47

	Depth	PCB
568.1	0 - 0.5	0.58
NE	0.5 - 1.8	0.49
	1.8 - 2.8	0.73
	2.8 - 3.8	1.2
	3.8 - 4.8	3.2
	4.8 - 5.3	3.9
	6.8 - 7.8	2.6
	7.8 - 8.4	6.3

MK-SD-89

	Depth	PCB
577.8	0 - 1	0.25
12.2	1 - 2	6.1
	2 - 3	54
	3 - 4	0.39
	4 - 5	0.034
	5 - 6	0.08

LEGEND

- Analytical Sample Location
- Milwaukee River Downtown Reach Project Area

Utilities

- Electric
- Fiber Optic
- Gas
- Sanitary Sewer
- Storm Sewer
- Water Line

Bathymetry (feet)

- Bathymetric Contour

Elevation (feet)

- 575 - 580
- 570 - 575
- 565 - 570
- 560 - 565
- 555 - 560

0 75 150

Approximate scale in feet

Analytical Results Table Format

Location ID

Mudline Elevation

Depth	PCBs (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Native Material Depth	<1	<PEC	<PEC
Sample interval (ft bss)	1 - 3	>PEC	>PEC
	3 - 5	>3xPEC	>3xPEC
	5 - 50	>5xPEC	>5xPEC
	>50		

Bold values represent results above the detection limit

"-" = COC was not sampled/analyzed

NE = Native Material Not Encountered

Notes:

1. Basemap: Milwaukee County 2020 Aerial Orthophotography captured April 2020.
2. Horizontal Datum: North American Datum 1983 (NAD83)
3. Vertical Datum: North American Vertical Datum of 1988 (NAVD88). Bathymetric contour and shading were generated from hydrographic survey data collected by Seaworks (2020).
4. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
5. 3x = 3 times; 5x = 5 times; COC = Contaminant of Concern; Cr = chromium; ft bss = feet below sediment surface; Hg = mercury; mg/kg = milligram(s) per kilogram; NE = not encountered; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PEC = Probable Effects Concentration

Figure 2-3A
Analytical Results Summary
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

SD-49

	Depth	PCB	Cr	Pb	Hg	PAH
569.5	0 - 0.5	0.49	11.2	25.9	0.0954	10.3
NE	0.5 - 1.5	0.36	10.9	36.5	0.111	13.9
	1.5 - 2.1	0.68	10.9	27.7	0.0329	-
	5 - 6	0.64	12.5	34.2	0.0756	-
	6 - 7	5.6	120	372	0.439	-
	7 - 8.4	2.6	33.9	115	0.179	-
	10 - 11	1.2	22.2	86.2	0.0875	-
	11 - 12	7.3	73.3	195	0.394	-
	12 - 13	86.1	670	703	1.32	-

SD-50

	Depth	PCB	Cr	Pb	Hg	PAH
575.3	0 - 0.5	0.64	27.2	53.5	0.171	10.7
NE	0.5 - 1.5	1.9	27.2	61.9	0.14	74.6
	1.5 - 2.5	1.9	24.2	92.4	0.117	-
	2.5 - 3.4	149	490	473	0.585	-
	4.3 - 5.3	0.76	166	405	1.48	-
	5.3 - 6.3	0.23	338	418	0.701	-
	6.3 - 7.3	0.011	448	469	1.25	-
	7.3 - 8.3	0.011	225	584	1.53	-
	9.3 - 9.8	1	93.2	205	1.29	-

SD-51

	Depth	PCB	Cr	Pb	Hg	PAH
569.2	0 - 0.5	0.37	7.82	30.7	0.0974	9.7
16.8	0.5 - 1.1	1.5	17	61.4	0.0894	23.1
	1.8 - 2.8	2.5	16.9	86.8	0.0664	-
	2.8 - 3.8	0.61	15.4	36.4	0.0651	-
	3.8 - 4.4	0.74	15.1	88.5	0.0599	-
	6.8 - 7.8	1.1	15.8	46.3	0.104	-
	7.8 - 8.8	4.6	84.6	271	0.424	-
	8.8 - 9.8	15.3	181	593	0.868	-
	9.8 - 10.5	156	516	686	1.71	-
	11.8 - 12.8	19.3	69.9	341	1.41	-
	12.8 - 13.8	0.45	119	282	2.68	-
	13.8 - 14.8	0.056	513	375	1.16	-
	14.8 - 15.8	0.069	241	454	1.24	-
	16.8 - 17.8	0.011	8.67	9.19	0.0953	-

MK-SD-91

	Depth	PCB
575.5	0 - 1	1.9
17.0	1 - 2	23
	2 - 3	0.24
	3 - 4	0.054
	4 - 5	0.081
	5 - 6.2	0.029

MK-SD-90

	Depth	PCB
575.9	0 - 1	35
10.9	1 - 2	0.4
	2 - 3	0.14
	4 - 5	0.22

SD-29

	Depth	PCB	Cr	Pb	Hg	PAH
573.2	0 - 0.5	3	64.2	190	0.31	8
NE	0.5 - 1.5	18.3	230	436	0.95	23.4
	1.5 - 2.5	76.8	711	680	1.1	23.7
	2.5 - 3.5	2	132	318	1.7	26.4
	3.5 - 4.5	0.52	152	340	1.5	11.3
	4.5 - 6.5	0.89	516	284	0.73	23.2
	6.5 - 9.4	0.017	396	67.6	0.19	6.2
	9.8 - 10.8	0.011	122	371	1.71	-
	10.8 - 11.8	0.011	178	300	1.21	-
	11.8 - 13	0.011	91.8	189	0.934	-
	14.8 - 16.2	0.011	292	299	1.89	-

SD-54

	Depth	PCB
568.1	0 - 0.5	1.6
NE	0.5 - 1.5	0.83
	1.5 - 2.5	2.1
	5 - 6	7
	6 - 7.4	6.8

SD-53

	Depth	PCB	Cr	Pb	Hg	PAH
572.6	0 - 0.5	9.9	73.1	247	0.586	56.3
NE	0.5 - 1.5	2.2	101	312	1.12	154
	1.5 - 2.2	0.46	92.7	299	1.1	-
	3 - 4	0.01	18.7	27.6	0.097	-
	4 - 5	0.011	66.7	29.6	0.198	-
	5 - 5.7	0.055	249	302	0.747	-
	8 - 9	0.054	53.9	361	1.21	-
	9 - 10	0.055	233	578	1.7	-
	10 - 11.4	0.055	61.7	271	1.22	-

MK-SD-95

	Depth	PCB
569.7	7.5 - 8.7	0.036
10.2	8.7 - 9.7	0.042
	9.7 - 10.2	0.029

SD-52

	Depth	PCB	Cr	Pb	Hg	PAH
569.9	0 - 0.6	0.86	10.7	39.4	0.0984	12.8
16.2	5 - 6	1.1	24.5	92.3	0.113	-
	6 - 7	1.7	17.3	165	0.114	-
	7 - 8	4.1	28.3	105	0.204	-
	8 - 9.4	13.9	64.2	272	0.471	-
	10 - 11	26.9	95.8	627	0.66	-
	11 - 12	160	583	800	1.53	-
	12 - 13.1	106	49.4	105	1.32	-
	15 - 16.2	0.1	558	456	1.28	-
	16.2 - 16.9	0.011	26.1	17.1	0.0871	-

SD-56

	Depth	PCB	Cr	Pb	Hg	PAH
569.5	0 - 0.5	0.36	11.1	27.3	0.0367	5.2
NE	0.5 - 1.5	0.56	12.9	30.6	0.042	20.2
	1.5 - 2.2	1.4	28.3	60.8	0.117	-
	5 - 6	15.9	90.9	551	0.331	-
	6 - 7	5.9	109	461	1.01	-
	7 - 8.2	12	231	640	0.611	-
	10 - 11	188	361	655	1.14	-
	11 - 12	8.9	299	620	1.8	-
	12 - 13.4	1.2	623	608	2.69	-

MK-SD-92

	Depth	PCB
575.1	4 - 5	0.033
NE	5 - 5.6	0.046
	7 - 8	0.046
	8 - 9	0.035

SD-55

	Depth	PCB
570.4	0 - 0.5	2
NE	0.5 - 1.5	61.4
	1.5 - 2.5	29.8
	2.5 - 3.1	0.16
	4.1 - 5.1	0.055
	5.1 - 6.1	0.84
	6.1 - 7.5	0.055

MK-SD-93

	Depth	PCB
574.5	3.4 - 4.4	0.045
NE	4.4 - 5.4	0.03
	5.4 - 6.4	0.029
	6.4 - 7.4	0.055
	7.4 - 8.4	0.029

MK-SD-94

	Depth	PCB
569.5	4 - 5	0.67
NE	5 - 5.7	0.39
	7 - 8	4
	8 - 9	5.4
	9 - 10	23
	10 - 10.6	93
	12 - 13	3.8
	13 - 13.9	9.1

SD-30

	Depth	PCB	Cr	Pb	Hg	PAH
571.2	0 - 0.5	2.1	44.4	111	0.11	2
NE	0.5 - 1.5	2.7	78.4	261	0.35	8.4
	1.5 - 2.5	6.8	147	521	0.78	23.8
	2.5 - 3.5	46.5	237	385	0.94	16.8
	3.5 - 4.5	95.9	169	424	1.6	12.9
	4.5 - 6.5	1	104	256	1.2	10.6
	6.5 - 8.5	0.43	207	294	0.69	13.5
	8.1 - 9.1	0.091	351	476	31.1	-
	8.5 - 9.5	0.048	1800	421	0.91	19.2
	9.1 - 10.1	1.2	712	438	1.31	-

SD-58

	Depth	PCB	Cr	Pb	Hg	PAH
566.4	0 - 0.5	0.49	8.37	17.6	0.119	16.8
6.9	0.5 - 1.5	0.83	9.81	20.7	0.12	89
	1.5 - 2	0.88	21.2	99.4	0.139	-
	5 - 6	8.5	55.6	304	0.202	-
	6 - 7.2	11.4	60.6	474	0.984	-

SD-57

	Depth	PCB	Cr	Pb	Hg	PAH
565.4	0 - 0.5	0.21	9.3	165	0.036	4.4
NE	0.5 - 1.5	1.2	72.1	228	0.52	56
	1.5 - 2.5	0.011	184	368	1.18	-
	2.5 - 3.5	0.011	319	353	1.84	-
	3.5 - 4.4	0.011	631	169	0.896	-
	5 - 6	0.017	44.2	45.9	0.0744	-
	6 - 7.4	0.011	1.02	5.12	0.0945	-

MK-SD-89

MK-SD-59 MK-SD-60 MK-SD-61 MK-SD-31/31X MK-SD-62 MK-SD-63 MK-SD-64 MK-SD-65 MK-SD-66 MK-SD-32/32X

Figure A

See Sample Results on Figure B2

Figure C1/C2

N BOOTH ST E HAMILTON ST E VINE ST N HUBBARD ST

Milwaukee River

LEGEND

- Analytical Sample Location
- Results included on another results map figure
- Milwaukee River Downtown Reach Project Area

Utilities

- Gas
- Storm Sewer

Bathymetry (feet)

- Bathymetric Contour

Elevation (feet)

- 575 - 580
- 570 - 575
- 565 - 570
- 560 - 565

0 75 150

Approximate scale in feet

Analytical Results Table Format

Location ID

Mudline Elevation

Native Material Depth

Depth	PCBs (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
	<1	<PEC	<PEC
Sample interval (ft bss)	1 - 3	>PEC	>PEC
	3 - 5	>3xPEC	>3xPEC
	5 - 50	>5xPEC	>5xPEC
	>50		

Bold values represent results above the detection limit

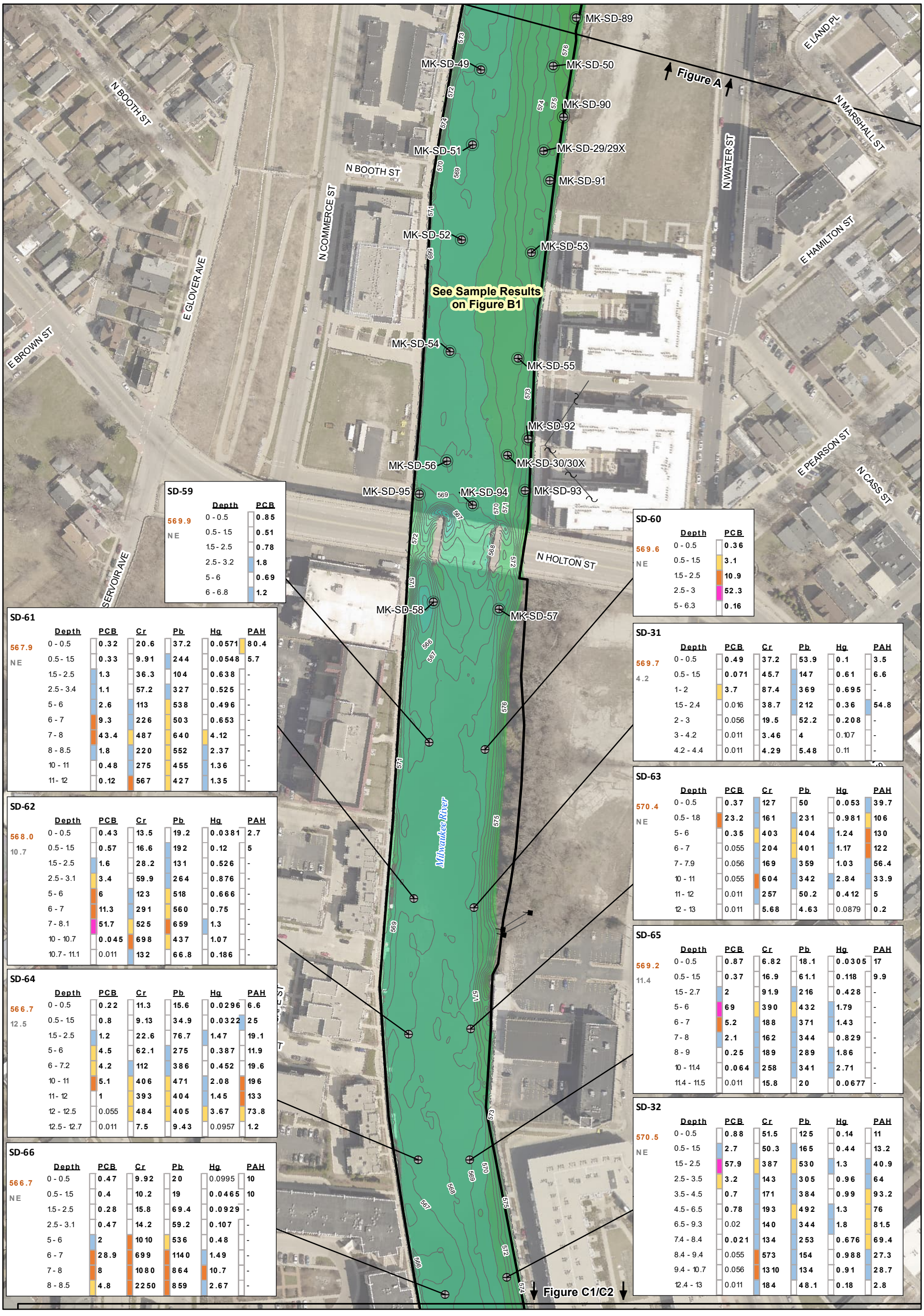
"-" = COC was not sampled/analyzed

NE = Native Material Not Encountered

Notes:

1. Basemap: Milwaukee County 2020 Aerial Orthophotography captured April 2020.
2. Horizontal Datum: North American Datum 1983 (NAD83)
3. Vertical Datum: North American Vertical Datum of 1988 (NAVD88). Bathymetric contour and shading were generated from hydrographic survey data collected by Seaworks (2020).
4. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
5. 3x = 3 times; 5x = 5 times; COC = Contaminant of Concern; Cr = chromium; ft bss = feet below sediment surface; Hg = mercury; mg/kg = milligram(s) per kilogram; NE = Not Encountered; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PEC = Probable Effects Concentration

Figure 2-3B1
Analytical Results Summary
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin



SD-59

	Depth	PCB
569.9	0 - 0.5	0.85
NE	0.5 - 1.5	0.51
	1.5 - 2.5	0.78
	2.5 - 3.2	1.8
	5 - 6	0.69
	6 - 6.8	1.2

SD-60

	Depth	PCB
569.6	0 - 0.5	0.36
NE	0.5 - 1.5	3.1
	1.5 - 2.5	10.9
	2.5 - 3	52.3
	5 - 6.3	0.16

SD-61

	Depth	PCB	Cr	Pb	Hg	PAH
567.9	0 - 0.5	0.32	20.6	37.2	0.0571	80.4
NE	0.5 - 1.5	0.33	9.91	244	0.0548	5.7
	1.5 - 2.5	1.3	36.3	104	0.638	-
	2.5 - 3.4	1.1	57.2	327	0.525	-
	5 - 6	2.6	113	538	0.496	-
	6 - 7	9.3	226	503	0.653	-
	7 - 8	43.4	487	640	4.12	-
	8 - 8.5	1.8	220	552	2.37	-
	10 - 11	0.48	275	455	1.36	-
	11 - 12	0.12	567	427	1.35	-

SD-31

	Depth	PCB	Cr	Pb	Hg	PAH
569.7	0 - 0.5	0.49	37.2	53.9	0.1	3.5
4.2	0.5 - 1.5	0.071	45.7	147	0.61	6.6
	1 - 2	3.7	87.4	369	0.695	-
	1.5 - 2.4	0.016	38.7	212	0.36	54.8
	2 - 3	0.056	19.5	52.2	0.208	-
	3 - 4.2	0.011	3.46	4	0.107	-
	4.2 - 4.4	0.011	4.29	5.48	0.11	-

SD-62

	Depth	PCB	Cr	Pb	Hg	PAH
568.0	0 - 0.5	0.43	13.5	19.2	0.0381	2.7
10.7	0.5 - 1.5	0.57	16.6	192	0.12	5
	1.5 - 2.5	1.6	28.2	131	0.526	-
	2.5 - 3.1	3.4	59.9	264	0.876	-
	5 - 6	6	123	518	0.666	-
	6 - 7	11.3	291	560	0.75	-
	7 - 8.1	51.7	525	659	1.3	-
	10 - 10.7	0.045	698	437	1.07	-
	10.7 - 11.1	0.011	132	66.8	0.186	-

SD-63

	Depth	PCB	Cr	Pb	Hg	PAH
570.4	0 - 0.5	0.37	127	50	0.053	39.7
NE	0.5 - 1.8	23.2	161	231	0.981	106
	5 - 6	0.35	403	404	1.24	130
	6 - 7	0.055	204	401	1.17	122
	7 - 7.9	0.056	169	359	1.03	56.4
	10 - 11	0.055	604	342	2.84	33.9
	11 - 12	0.011	257	50.2	0.412	5
	12 - 13	0.011	5.68	4.63	0.0879	0.2

SD-64

	Depth	PCB	Cr	Pb	Hg	PAH
566.7	0 - 0.5	0.22	11.3	15.6	0.0296	6.6
12.5	0.5 - 1.5	0.8	9.13	34.9	0.0322	25
	1.5 - 2.5	1.2	22.6	76.7	1.47	19.1
	5 - 6	4.5	62.1	275	0.387	11.9
	6 - 7.2	4.2	112	386	0.452	19.6
	10 - 11	5.1	406	471	2.08	196
	11 - 12	1	393	404	1.45	133
	12 - 12.5	0.055	484	405	3.67	73.8
	12.5 - 12.7	0.011	7.5	9.43	0.0957	1.2

SD-65

	Depth	PCB	Cr	Pb	Hg	PAH
569.2	0 - 0.5	0.87	6.82	18.1	0.0305	17
11.4	0.5 - 1.5	0.37	16.9	61.1	0.118	9.9
	1.5 - 2.7	2	91.9	216	0.428	-
	5 - 6	69	390	432	1.79	-
	6 - 7	5.2	188	371	1.43	-
	7 - 8	2.1	162	344	0.829	-
	8 - 9	0.25	189	289	1.86	-
	10 - 11.4	0.064	258	341	2.71	-
	11.4 - 11.5	0.011	15.8	20	0.0677	-

SD-66

	Depth	PCB	Cr	Pb	Hg	PAH
566.7	0 - 0.5	0.47	9.92	20	0.0995	10
NE	0.5 - 1.5	0.4	10.2	19	0.0465	10
	1.5 - 2.5	0.28	15.8	69.4	0.0929	-
	2.5 - 3.1	0.47	14.2	59.2	0.107	-
	5 - 6	2	1010	536	0.48	-
	6 - 7	28.9	699	1140	1.49	-
	7 - 8	8	1080	864	10.7	-
	8 - 8.5	4.8	2250	859	2.67	-

SD-32

	Depth	PCB	Cr	Pb	Hg	PAH
570.5	0 - 0.5	0.88	51.5	125	0.14	11
NE	0.5 - 1.5	2.7	50.3	165	0.44	13.2
	1.5 - 2.5	57.9	387	530	1.3	40.9
	2.5 - 3.5	3.2	143	305	0.96	64
	3.5 - 4.5	0.7	171	384	0.99	93.2
	4.5 - 6.5	0.78	193	492	1.3	76
	6.5 - 9.3	0.02	140	344	1.8	81.5
	7.4 - 8.4	0.021	134	253	0.676	69.4
	8.4 - 9.4	0.055	573	154	0.988	27.3
	9.4 - 10.7	0.056	1310	134	0.91	28.7
	12.4 - 13	0.011	184	48.1	0.18	2.8

LEGEND

- Analytical Sample Location
- Results included on another results map figure
- Milwaukee River Downtown Reach Project Area

Utilities

- Gas
- Storm Sewer

Bathymetry (feet)

- Bathymetric Contour

Elevation (feet)

- 575 - 580
- 570 - 575
- 565 - 570
- 560 - 565

0 75 150

Approximate scale in feet

Analytical Results Table Format

Location ID

Mudline Elevation

Native Material Depth

Depth	PCBs (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
	<1	<PEC	<PEC
Sample interval (ft bss)	1 - 3	>PEC	>PEC
	3 - 5	>3xPEC	>3xPEC
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	>50		

Bold values represent results above the detection limit

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Notes:
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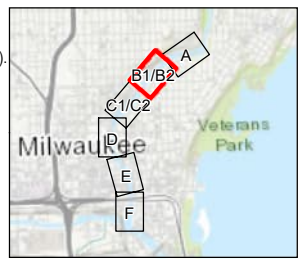


Figure 2-3B2
Analytical Results Summary
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Figure B1/B2

N HUBBARD ST

N COMMERCE ST

E PLEASANT ST

N EDISON ST

E LYON ST

N MILWAUKEE ST

N RIVERCENTER DR

Milwaukee River

W MANPOWER PL

E CHERRY ST

N EDISON ST

E KNAPP ST

N MARTIN L KING JR DR

Figure D

See Sample Results on Figure C2

MK-SD-73

MK-SD-74

MK-SD-99

MK-SD-100

MK-SD-76

MK-SD-75

MK-SD-101

MK-SD-35/35X

MK-SD-102

MK-SD-77

MK-SD-103

SD-67

	Depth	PCB
562.7	0 - 0.5	0.53
NE	0.5 - 1.5	0.4
	1.5 - 2.2	0.55
	5 - 6.2	2.8

SD-68

	Depth	PCB
569.3	0 - 0.5	0.35
NE	0.5 - 1.5	0.56
	1.5 - 2.5	1.6
	2.5 - 3	2.2

SD-33

	Depth	PCB	Cr	Pb	Hg	PAH
569.7	0 - 0.5	3.2	67.1	158	0.27	11.5
NE	0.5 - 1.5	4.5	141	641	0.41	96.1
	1.5 - 2.5	1.7	106	324	0.48	15
	2.5 - 3.5	2.7	114	352	0.64	75.5
	3.5 - 4.5	3.6	498	470	0.99	87.8
	4.5 - 6.5	5.5	781	408	0.72	45.4
	6.5 - 9.3	10.2	642	681	1.7	93.6
	7.6 - 8.6	91.8	739	317	2.3	371
	8.6 - 9.6	0.79	1380	260	1.53	225
	9.6 - 10.6	0.055	16.1	32.9	5.98	173
	10.6 - 11.3	0.055	1670	258	3.26	37.7
	12.6 - 13.6	0.056	1330	151	1.21	29.3
	13.6 - 14.6	0.011	38.3	10.4	0.163	2.7
	14.6 - 15.3	0.011	1380	377	0.079	0.083

SD-69

	Depth	PCB	Cr	Pb	Hg	PAH
568.7	0 - 0.5	0.53	7.72	20.4	0.0378	24
NE	0.5 - 1.5	0.82	10.3	410	0.0644	28.8
	5 - 6.1	0.8	17.5	87.3	0.0762	-
	10 - 11	5.8	89.7	447	0.336	-
	11 - 12.3	55.6	1090	520	0.713	-
	15 - 16	9.6	925	651	1.14	-
	16 - 17.1	0.036	282	414	0.794	-

MK-SD-96

	Depth	PCB
576.4	1.4 - 2.4	30
NE	2.4 - 3.4	11
	3.4 - 4.4	0.6
	4.4 - 5.4	0.34
	5.4 - 6.3	0.14

MK-SD-97

	Depth	PCB
576.3	1 - 2	34
NE	2 - 3	3.2
	3 - 4	0.81
	4 - 5	0.17
	5 - 5.5	0.13

SD-70

	Depth	PCB	Cr	Pb	Hg	PAH
569.7	0 - 0.5	0.59	13.6	16.5	0.0438	3.3
NE	0.5 - 1.5	0.72	12.8	29.5	0.0564	48.6
	1.5 - 2.5	0.59	15.9	51.8	0.0861	7.9
	2.5 - 3.7	0.59	53.6	144	0.192	25.9
	5 - 6	3.2	147	349	0.344	54
	6 - 7	4.3	161	373	0.725	44.7
	7 - 8	4.5	196	478	0.508	31.7
	8 - 9	2.8	409	832	0.432	54.3
	10 - 11	5.2	128	234	0.304	51.8
	11 - 12	6	25.7	166	0.526	30.8
	12 - 13	5.3	67.6	339	0.506	20.5
	13 - 14.2	5.4	226	577	0.424	64.6
	15 - 16	0.011	402	772	1.32	171
	16 - 17	0.011	730	485	1.69	63.8
	17 - 18.4	0.011	1080	826	2.33	91.9

SD-71

	Depth	PCB	Cr	Pb	Hg	PAH
573.4	0 - 0.5	0.23	0.303	0.785	0.082	0.8
NE	0.5 - 1.5	29	1480	346	0.745	2.5
	1.5 - 2.6	58.2	0.144	0.448	1.13	-
	6 - 7	0.41	636	400	1.89	-
	7 - 8	0.056	515	476	1.63	-
	8 - 9.2	0.055	297	484	1.78	-
	11 - 12	0.047	451	652	1.85	-
	12 - 13	0.055	772	538	1.9	-
	13 - 14	0.056	1140	532	3.09	-
	14 - 14.8	0.011	126	198	0.89	-
	16 - 17	0.055	1180	292	4.89	-
	17 - 18	0.055	155	193	2.71	-
	18 - 19	0.011	444	98	1.06	-
	19 - 19.5	0.011	37.7	11.2	0.0937	-

SD-34

	Depth	PCB	Cr	Pb	Hg	PAH
569.8	0 - 0.5	0.86	12.3	21.6	0.045	48.3
NE	0.5 - 1.5	0.57	8.3	25.2	0.044	26.8
	1.5 - 2.5	0.31	27.6	38.3	0.042	33.5
	2.5 - 3.5	0.76	84.7	122	0.23	17.7
	3.5 - 4.5	1.3	61.3	178	0.28	35.9
	3.7 - 4.7	1.2	27.6	77.6	0.244	-
	4.5 - 5.3	1.6	61.1	189	0.28	6.2
	4.7 - 5.5	0.011	54.4	191	0.261	-
	8.7 - 9.7	3	357	407	0.457	-
	9.7 - 10.7	11.6	5850	415	1.2	-
	10.7 - 11.7	41.8	1760	504	1.44	-
	11.7 - 12.9	0.59	292	431	5.85	-
	13.7 - 14.7	4.2	146	167	0.285	-
	14.7 - 15.7	1.5	138	249	11.4	-
	15.7 - 16.7	8.6	256	369	7.81	-
	16.7 - 17.7	0.25	132	239	0.654	-
	18.7 - 19.7	0.062	646	325	2.34	-
	19.7 - 20.7	0.011	427	225	1.89	-
	20.7 - 21.7	3.5	353	258	1.44	-
	21.7 - 22.8	0.011	329	143	1.22	-

SD-72

	Depth	PCB	Cr	Pb	Hg	PAH
568.9	0 - 0.5	35.8	4740	454	2.72	48.6
NE	0.5 - 1.8	3.6	522	659	1.3	86.6
	5.4 - 6.4	0.011	241	370	1.04	112
	6.4 - 7.4	0.011	546	422	1.54	111
	7.4 - 8.6	0.011	132	402	1	114
	10.4 - 11.4	0.011	271	584	1.54	163
	11.4 - 12.4	0.011	403	768	1.82	135
	12.4 - 13.4	0.011	574	685	1.59	72.8
	13.4 - 14.6	0.011	469	545	2.38	46.5
	15.4 - 16.4	0.21	321	564	1.11	95.9
	16.4 - 17.4	0.011	322	595	0.808	69
	17.4 - 18.7	0.011	763	646	8.17	107
	20.4 - 21.4	0.011	566	511	0.239	82.3
	21.4 - 22.4	0.011	213	158	0.921	89.3
	22.4 - 23.4	0.011	4.93	5.9	0.093	0.15
	23.4 - 24.2	0.011	3.96	9.48	0.0939	0.037

MK-SD-98

	Depth	PCB
570.1	2 - 3	0.43
NE	3 - 4	0.2
	4 - 5	0.24
	5 - 6	0.2
	6 - 6.8	0.081
	7 - 8	0.042
	8 - 9	0.042

LEGEND

- Analytical Sample Location
- Results included on another results map figure
- Milwaukee River Downtown Reach Project Area

Utilities

- Electric
- Fiber Optic
- Gas
- Sanitary Sewer
- Storm Sewer
- Water Line

Bathymetry (feet)

- Bathymetric Contour

Elevation

- 575 - 580
- 570 - 575
- 565 - 570
- 560 - 565
- 555 - 560
- 550 - 555

0 75 150

Approximate scale in feet

Analytical Results Table Format

Location ID

	Depth	PCBs (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Mudline Elevation				
Native Material Depth		<1	<PEC	<PEC
	Sample interval (ft bss)	1 - 3	>PEC	>PEC
		3 - 5	>3xPEC	>3xPEC
		5 - 50	>5xPEC	>5xPEC
		>50		

Bold values represent results above the detection limit

"-" = COC was not sampled/analyzed

NE = Native Material Not Encountered

Notes:

1. Basemap: Milwaukee County 2020 Aerial Orthophotography captured April 2020.
2. Horizontal Datum: North American Datum 1983 (NAD83)
3. Vertical Datum: North American Vertical Datum of 1988 (NAVD88). Bathymetric contour and shading were generated from hydrographic survey data collected by Seaworks (2020).
4. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
5. 3x = 3 times; 5x = 5 times; COC = Contaminant of Concern; Cr = chromium; ft bss = feet below sediment surface; Hg = mercury; NE = Not Encountered; mg/kg = milligram(s) per kilogram; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PEC = Probable Effects Concentration

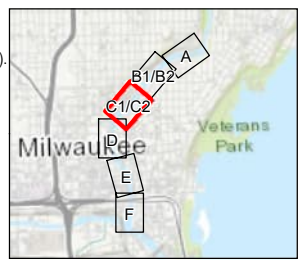


Figure 2-3C1
Analytical Results Summary
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

\\dc1vs01\GISProj\E\EPA\681867_MKERiverDownstream\MapFiles\2022\Downtown_Analytical\Figure2-3C1_SummaryofAnalyticalResults_508.mxd AESPEJO (8/30/2024)

Jacobs

Figure B1/B2

N HUBBARD ST
N COMMERCE ST
N PALMER ST
E PLEASANT ST
N JEFFERSON ST
N EDISON ST
N RIVERCENTER DR
W CHERRY ST
E CHERRY ST
N MARTIN L KING JR DR
Milwaukee River
Figure D

MK-SD-67
MK-SD-68
MK-SD-69
MK-SD-33/33X
MK-SD-96
MK-SD-70
MK-SD-71
MK-SD-97
MK-SD-34/34X
MK-SD-72
MK-SD-98

See Sample Results on Figure C1

SD-73

569.6 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.53	25.3	36.3	0.0445	204
0.5 - 1.5	1.1	32.2	139	0.176	7.3
1.5 - 2.3	4.1	55.2	192	0.3	16
5 - 6	1.6	64.3	304	0.383	4.4
6 - 7	6.5	626	472	0.511	107
7 - 8.2	51.1	4640	692	2.37	110
10 - 11	0.63	356	597	1.76	126
11 - 12	0.011	506	574	1.89	54.4
12 - 13.1	0.011	468	604	1.48	68
15 - 16	0.011	477	566	1.64	52.4
16 - 17	0.011	116	283	1.93	105
17 - 18	0.011	248	500	1.64	193
18 - 19.1	0.011	189	236	2	61.7
20 - 21	0.011	341	418	1.3	66.8
21 - 22	0.011	212	374	1.4	100
22 - 23	0.011	299	397	1.32	115
23 - 24	0.011	277	163	1.96	16.2

SD-74

565.9 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.38	9.93	21.9	0.0954	4.6
0.5 - 1.5	1	48.3	88.8	0.118	85.4
1.5 - 2.6	83.9	6710	548	1.01	-
5 - 6	4.3	301	332	1.27	-
6 - 7	2.7	272	474	1.33	-
7 - 8	1.7	188	416	1.68	-
10 - 11	0.39	374	381	0.956	-
11 - 12	0.011	669	431	1.51	-
12 - 13.3	0.011	244	351	1.02	-
15 - 16	0.045	199	353	0.954	-
16 - 17	0.011	179	176	1.51	-
17 - 17.6	0.011	3.25	2.4	0.0987	-

MK-SD-99

568.6 NE

Depth	PCB
1.5 - 2.8	0.32
5 - 6.5	0.069

MK-SD-100

567.3 NE

Depth	PCB
0 - 1	0.46
1 - 2	0.6
2 - 3	0.038
5 - 6	0.91
6 - 7	12

SD-75

566.4 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.29	20.4	80.3	0.0749	5
0.5 - 1.5	0.65	18.5	34.8	0.0769	8.8
1.5 - 2.5	0.56	38.1	77.9	0.158	-
2.5 - 3.5	6.7	180	233	0.279	-
3.5 - 4.2	28.7	3620	578	1.46	-
7.3 - 8.3	1.4	200	320	0.916	-
8.3 - 9.3	0.011	259	503	1.58	-
9.3 - 10.2	0.011	234	447	1.56	-
12.3 - 13.3	0.011	493	348	3.41	-
13.3 - 14.3	0.011	618	379	4.09	-
14.3 - 15.3	0.011	659	484	7.61	-
15.3 - 16.3	0.011	506	384	3.93	-
17.3 - 18.3	0.011	2.94	3.92	0.988	-
18.3 - 19.3	0.011	5.57	3.79	0.0944	-
19.3 - 20.3	0.011	4.1	2.03	0.179	-
20.3 - 21.3	0.011	4.62	2.38	0.0881	-

MK-SD-101

571.4 NE

Depth	PCB
5 - 6	1.7
6 - 7	0.65
7 - 7.8	0.034
10 - 11	0.032
11 - 12	0.031

SD-76

574.8 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.81	23	65	0.15	23.8
0.5 - 1.5	1.3	22.4	61.3	0.153	18.7
1.5 - 2.5	1.4	41.6	110	0.251	-
2.5 - 3.5	2.1	37.4	95.7	0.25	-
3.5 - 4.5	2.9	146	240	0.337	-
7.8 - 8.8	12.9	478	346	0.79	-
8.8 - 9.8	15.9	692	266	0.455	-
9.8 - 11.1	48.5	2090	608	1.47	-
12.8 - 13.8	1.2	77.8	208	1.3	-
13.8 - 14.8	0.46	125	288	1.59	-
14.8 - 15.8	0.73	123	230	1.37	-
15.8 - 16.6	0.14	269	415	1.55	-
17.8 - 18.8	0.14	340	457	2.83	-
18.8 - 19.8	0.011	728	578	4.48	-
19.8 - 20.8	0.011	437	275	4.43	-
20.8 - 21.8	0.023	345	238	2.7	-
22.8 - 23.8	0.073	19.8	19.6	0.0693	-
23.8 - 24.8	0.011	7.11	4.29	0.0929	-
24.8 - 26.2	0.011	3.49	1.92	0.0982	-

SD-77

567.7 20

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.51	21	77.3	0.0812	13.6
0.5 - 1.5	2.2	85	272	0.263	13.3
1.5 - 2.5	2.7	252	401	0.303	-
2.5 - 3.5	20.1	2100	477	0.682	-
3.5 - 4.5	133	3720	490	3.24	-
4.5 - 5.5	65.4	1140	428	2.55	-
7.1 - 8.1	1.5	193	348	1.27	-
8.1 - 9.5	0.69	299	477	1.3	-
12.1 - 13.1	0.011	465	495	4.07	-
13.1 - 14.1	0.011	584	566	6.34	-
14.1 - 15.2	0.011	662	500	6.45	-
17.1 - 18.1	0.011	33.8	29.9	0.0661	-
18.1 - 19.1	0.011	0.409	0.337	0.0977	-
19.1 - 20	0.011	0.409	0.337	0.0938	-
20 - 21	0.011	6.56	8.16	0.099	-

SD-35

570.9 14.9

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.66	33.7	61.3	0.13	2.2
0.5 - 1.5	0.34	44.6	51	0.16	2.2
1.5 - 2.5	0.81	40.9	65.7	0.38	2.9
2.5 - 3.5	1.4	111	177	0.32	9.5
3.5 - 4.5	2	105	302	0.47	9.4
4.5 - 6.5	3.3	877	329	0.88	12.5
6.5 - 8.5	36.6	808	405	1.8	36.2
8.5 - 10.5	3.4	298	425	2	29.9
10.5 - 12.5	1.5	189	308	1.2	33.4
12.5 - 14.5	0.41	327	428	2.1	30.3
14.9 - 15.9	0.011	8.86	5.85	0.0986	0.72

MK-SD-102

568.0 13.5

Depth	PCB
0 - 1	0.59
1 - 2	0.33
2 - 3	0.77
3 - 4	1.2
6 - 7	1.6

MK-SD-103

572.6 NE

Depth	PCB
4.2 - 5.3	0.75
7 - 8.2	0.39
8.2 - 9.2	0.15
9.2 - 10.5	0.041

LEGEND

- Analytical Sample Location
- Results included on another results map figure
- Milwaukee River Downtown Reach Project Area

Utilities

- Electric
- Fiber Optic
- Gas
- Sanitary Sewer
- Storm Sewer
- Water Line

Bathymetry (feet)

- Bathymetric Contour

Elevation (feet)

- 575 - 580
- 570 - 575
- 565 - 570
- 560 - 565
- 555 - 560
- 550 - 555

0 75 150
Approximate scale in feet

Analytical Results Table Format

Location ID
Mudline Elevation

Depth	PCBs (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Native Material Depth	<1	<PEC	<PEC
Sample interval (ft bss)	1 - 3	>PEC	>PEC
	3 - 5	>3xPEC	>3xPEC
	5 - 50	>5xPEC	>5xPEC
	>50		

Bold values represent results above the detection limit
"-" = COC was not sampled/analyzed
NE = Native Material Not Encountered

Notes:
1. Basemap: Milwaukee County 2020 Aerial Orthophotography captured April 2020.
2. Horizontal Datum: North American Datum 1983 (NAD83)
3. Vertical Datum: North American Vertical Datum of 1988 (NAVD88). Bathymetric contour and shading were generated from hydrographic survey data collected by Seaworks (2020).
4. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
5. 3x = 3 times; 5x = 5 times; COC = Contaminant of Concern; Cr = chromium; ft bss = feet below sediment surface; Hg = mercury; mg/kg = milligram(s) per kilogram; NE = Not Encountered; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PEC = Probable Effects Concentration

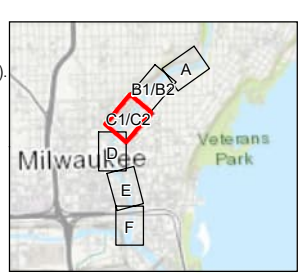


Figure 2-3C2
Analytical Results Summary
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

SD-79

566.3 / 10.7

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.48	37.8	107	0.155	6.1
0.5 - 1.5	3.8	54.9	152	2.27	22.7
1.5 - 2.5	3.4	74.6	251	0.338	-
2.5 - 3.5	7.6	50.1	376	0.361	-
3.5 - 4.3	32.1	1850	379	0.962	-
7.4 - 8.4	1.8	238	410	1.55	-
8.4 - 9.4	0.51	196	327	1.12	-
9.4 - 10.7	0.056	446	382	1.29	-
10.7 - 11.7	0.011	10.9	8.88	0.092	-

SD-78

568.9 / NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.44	19.6	40	0.057	10
0.5 - 1.5	0.7	32.5	70.6	0.0965	8.4
1.5 - 2.5	1.8	150	268	0.278	-
2.5 - 3.5	17.9	4470	560	0.579	-
3.5 - 4.5	84	2450	685	1.58	-
4.5 - 5	4.5	226	399	1.22	-
7.1 - 8.1	5.7	458	515	1.4	-
8.1 - 9.1	0.85	126	301	1.33	-
9.1 - 10.1	0.39	288	448	2.36	-
10.1 - 10.9	1.4	271	424	1.17	-
12.1 - 13.1	0.031	248	457	1.29	-
13.1 - 14.2	0.011	176	348	1.67	-

MK-SD-105

562.2 / 7.4

Depth	PCB
0 - 1	25
1 - 2.3	3.4
5 - 6	0.72

MK-SD-104

571.9 / 13.5

Depth	PCB
3 - 4	27
4 - 4.5	14
5.5 - 6.5	50
6.5 - 7.8	0.47

SD-36

567.6 / 14.7

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	3.7	99.5	152	0.41	9
0.5 - 1.5	4.4	2390	336	0.55	16.5
1.5 - 2.5	33.2	3450	552	1.3	27.6
2.5 - 3.5	27.4	827	410	1.2	18.9
3.5 - 4.5	5.2	157	304	1.2	20.7
4.5 - 6.5	2.2	156	337	0.93	1.8
6.5 - 8.2	0.073	201	456	1.9	30.3
6.8 - 7.8	0.55	132	147	0.649	19
7.8 - 8.8	0.011	333	186	1.97	55.6
8.8 - 9.5*	0.011	88.3	50.7	0.804	9.1

*Four sampling intervals from 11.8 to 15.4 feet not shown; results do not exceed any applicable PEC or screening value.

SD-80

559.3 / 5.8

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	65.4	3150	510	1.11	17.9
0.5 - 1.5	67.9	1380	380	1.12	8.5
1.5 - 2.9	2.5	248	434	2.17	-
5.8 - 6.8	0.011	10.4	7.17	0.0953	-

MK-SD-106

562.4 / 5.0

Depth	PCB
0 - 1	62
1 - 2	11
2 - 3	2
3 - 4	0.59

SD-81

558.5 / 20.5

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.25	26.8	46.2	0.151	34
0.5 - 1.5	0.44	38.2	68.3	0.153	5.7
1.5 - 2.5	0.61	33.6	72.1	0.176	-
2.8 - 3.8	0.64	115	269	1.33	-
3.8 - 4.6	0.12	94.5	240	0.834	-
7.8 - 8.8*	0.011	3.42	2.4	0.0782	-

*Eight sampling intervals from 8.8 to 21.3 feet not shown; results do not exceed any applicable PEC or screening value.

SD-37

561.8 / NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.46	122	218	0.34	20.3
0.5 - 1.5	0.72	105	181	0.25	2.8
1.5 - 2.5	2.6	204	365	0.42	5.9
2.5 - 3.5	4.6	899	540	0.48	9.2
3.5 - 4.5	18.7	4580	632	1.6	10
4.5 - 6.5	36.5	1110	448	1.7	12.1
6.5 - 8.5	0.76	286	676	2	9.7
8.5 - 10	0.31	381	605	2.2	35.6
8.8 - 9.8	0.36	313	471	1.82	40.9
9.8 - 10.8	0.041	274	223	2.02	755
10.8 - 11.8	0.011	24	25	0.0383	1.4
11.8 - 12.5	0.011	6.11	261	0.0803	0.11
13.8 - 14.8*	0.27	11.1	6.6	0.0846	0.44

*Eight sampling intervals from 14.8 to 25.9 feet not shown; results do not exceed any applicable PEC or screening value.

MK-SD-107

572.7 / NE

Depth	PCB
0 - 0.4	0.89
0.4 - 1.4	2.4
1.35 - 2.35	3.3
2.4 - 3.4	0.12
3.35 - 4.35	0.043
4.35 - 5.35	0.045
5.35 - 6.35	0.043
7 - 8	0.046
15 - 16.1	0.039

SD-82

568.9 / NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.92	50.7	194	0.205	21.2
0.5 - 1.5	2.5	425	323	0.36	29.7
1.5 - 2.5	91	2120	586	4.57	-
2.5 - 3.5	1.4	1040	518	1.4	-
3.5 - 4.9	0.87	629	637	1.24	-
6.1 - 7.1	0.096	426	590	2.46	-
7.1 - 8.1	0.011	1040	919	7.57	-
8.1 - 8.7	0.011	745	591	7.71	-
11.1 - 12.1	0.011	521	363	3.38	-
12.1 - 13.1	0.011	153	129	0.648	-
13.1 - 14.1*	0.011	11.1	8.59	0.0249	-

*Eight sampling intervals from 14.1 to 24.5 feet not shown; results do not exceed any applicable PEC or screening value.

SD-83

563.6 / 22.8

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	7.5	400	585	7.79	73.5
0.5 - 1.5	3.4	255	458	2.19	42.5
1.5 - 2.5	2.6	236	505	3.54	-
2.5 - 3.5	3.8	273	455	1.72	-
3.5 - 4.5	0.38	9.03	8.61	3.77	-
4.5 - 5.8	0.011	312	721	4.67	-
7.1 - 8.1	0.069	214	446	1.76	-
8.1 - 9.1	0.011	85.3	186	5.3	-
9.1 - 10.3	0.011	277	430	2.89	-
12.1 - 13.1	0.078	28.7	115	0.441	-
13.1 - 14.1	0.011	3.82	2.57	0.0931	-
14.1 - 14.8	0.011	2.58	1.67	0.0989	-
17.1 - 18.1	0.011	24.9	44.1	0.129	-
18.1 - 19.1	0.011	3.63	2.65	0.0985	-
19.1 - 20.1	0.011	3.54	2.61	0.0994	-
20.1 - 21.3	0.011	3.61	2.04	0.0905	-
22.1 - 22.8	1.8	2.82	1.73	0.322	-
22.8 - 23.7	0.011	20.5	30	0.0977	-

MK-SD-108

572.8 / NE

Depth	PCB
0 - 0.8	1.5
0.8 - 1.8	0.26
1.8 - 2.8	0.033
2.8 - 3.8	0.045
3.8 - 4.8	0.044
4.8 - 6.8	0.044
6.8 - 7.8	0.049

SD-38

572.2 / NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.63	30.7	51.7	0.14	2.3
0.5 - 1.5	0.71	36.7	80.2	0.14	11.2
1.5 - 2.5	1.1	71.8	140	0.23	17.7
2.5 - 3.5	2.8	511	225	0.31	23
3.5 - 4.5	2.6	474	417	0.52	51.6
4.5 - 6.5	11.5	870	306	0.59	71.2
6.5 - 8.5	26.8	3440	664	1.4	51
8.5 - 10.5	4.1	588	267	1.1	52.4
10.5 - 12.5	0.14	258	304	1.6	35.1
12.5 - 14.8	0.93	184	312	1.8	50.8
14.4 - 15.4	0.11	216	389	2.28	73.4
15.4 - 16.4	0.055	146	389	0.967	60.2
16.4 - 17.4	0.019	189	442	1.73	37
17.4 - 17.9	0.011	287	536	2.28	52.2
19.4 - 20.4	0.23	330	383	3.03	43
20.4 - 21.4	0.11	44.5	77.6	0.339	28.5
21.4 - 22.4*	0.011	12.9	18.4	0.432	10.1

*Five sampling intervals from 22.4 to 28.4 feet not shown; results do not exceed any applicable PEC or screening value.

LEGEND

- Analytical Sample Location
- Milwaukee River Downtown Reach Project Area

Utilities

- Electric
- Gas
- Sanitary Sewer
- Storm Sewer
- Telephone
- Water Line
- Unknown

Bathymetry (feet)

- Bathymetric Contour

Elevation (feet)

- 575 - 580
- 570 - 575
- 565 - 570
- 560 - 565
- 555 - 560
- 550 - 555

0 75 150

Approximate scale in feet

Analytical Results Table Format

Location ID

Mudline Elevation

Depth	PCBs (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Native Material Depth	<1	<PEC	<PEC
Sample interval (ft bss)	1 - 3	>PEC	>PEC
	3 - 5	>3xPEC	>3xPEC
	5 - 50	>5xPEC	>5xPEC
	>50		

Bold values represent results above the detection limit

"-" = COC was not sampled/analyzed

NE = Native Material Not Encountered

Notes:
1. Basemap: Milwaukee County 2020 Aerial Orthophotography captured April 2020.
2. Horizontal Datum: North American Datum 1983 (NAD83)
3. Vertical Datum: North American Vertical Datum of 1988 (NAVD88). Bathymetric contour and shading were generated from hydrographic survey data collected by Seaworks (2020).
4. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
5. 3x = 3 times; 5x = 5 times; COC = Contaminant of Concern; Cr = chromium; ft bss = feet below sediment surface; Hg = mercury; mg/kg = milligram(s) per kilogram; NE = not encountered; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PEC = Probable Effects Concentration

Figure 2-3D
Analytical Results Summary
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

W KILBOURN AVE

E KILBOURN AVE

Figure D

E WELLS ST

N PLANKINTON AVE

W WISCONSIN AVE

W MICHIGAN ST

Figure F

W CLYBOURN ST

SD-84

559.2
NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	2	229	363	0.309	17.8
0.5 - 1.5	4.7	580	392	0.384	35.9
1.5 - 2.1	25	901	192	1.28	-
3.5 - 4.5	0.28	37.4	72	0.633	-
4.5 - 5.5	0.075	9.79	11.4	0.0564	-
5.5 - 6.5	0.025	4.79	3.63	0.0971	-
6.5 - 7.4	0.011	6.39	4.43	0.437	-
8.5 - 9.5	0.11	12	17.5	0.496	-
9.5 - 10.5	0.011	6.88	4.83	0.461	-
10.5 - 11.5	0.011	6.41	4.76	0.0982	-
11.5 - 12.1	0.011	7.06	11	0.0985	-

SD-39

562.1
NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	2.6	435	281	0.38	11.8
0.5 - 1.5	1.8	152	275	0.48	3.9
1.5 - 2.5	1.8	352	397	0.46	7.9
2.5 - 3.5	4.2	487	686	0.49	17.3
3.5 - 4.5	10.3	1370	1240	16	16.7
4.5 - 6.5	2.9	937	377	1.4	10.4
6.5 - 9	0.023	812	760	5.4	23.1
8.7 - 9.7	5.1	406	474	6.52	-
9.7 - 10.7	0.64	530	559	4.94	-
10.7 - 11.9	0.028	61.1	54.2	0.311	-
13.7 - 14.7	0.096	6.45	21.9	0.0956	-
14.7 - 15.7	0.011	3.37	4.76	0.0986	-
15.7 - 16.2	0.011	4.26	2.5	0.0974	-
18.7 - 19.8	0.054	13.1	28.4	0.0324	-

SD-85

564.6
NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.57	33.5	61.4	0.163	24
0.5 - 1.5	1.1	44.9	79.9	0.194	19.5
1.5 - 2.5	1.9	55	114	0.357	-
2.5 - 3.5	1.9	78.3	142	0.399	-
3.5 - 4.4	1.8	48.4	109	0.352	-
4.6 - 5.6	3.6	130	202	0.448	-
5.6 - 6.6	3.9	236	252	0.555	-
6.6 - 7.4	3.9	1290	293	0.692	-
9.6 - 10.6	2.9	288	309	0.391	-
10.6 - 11.6	1.1	59.8	58.9	0.0536	-
11.6 - 12.6	0.011	3.97	2.56	0.083	-
12.6 - 13.3	0.011	6.61	4.85	0.0891	-
14.6 - 15.6	0.011	4.92	3.17	0.0842	-
15.6 - 16.6	0.011	7.35	5.56	0.089	-
16.6 - 17.6	0.011	4.39	2.68	0.0992	-
19.1 - 20.1	0.011	3.84	2.29	0.0983	-
20.1 - 21.5	0.011	2.59	2.04	0.0899	-
24.1 - 25	0.011	4.13	6.61	0.093	-

SD-40

561.4
8.5

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	3.3	290	273	0.6	2.8
0.5 - 1.5	3.1	246	347	0.41	7.4
1.5 - 2.5	2.3	567	567	0.54	7.5
2.5 - 3.5	5.1	1020	657	4.5	9.6
3.5 - 4.5	29	1860	626	1.3	10.1
4.5 - 6.5	18.9	2470	677	3	6.7
6.5 - 8.5	0.058	943	828	11.1	6.7
8.5 - 10	0.015	15.5	7.3	0.042	0.095

SD-86

564.7
8.4

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.8	38.4	106	0.144	30.2
0.5 - 1.5	2.7	82.6	170	0.403	41.8
1.5 - 2.5	4.6	30.3	52.2	0.414	-
2.5 - 3.5	6.5	310	211	0.371	-
3.5 - 4.5	4	240	247	0.364	-
4.5 - 5.8	5.5	380	470	0.571	-
7.3 - 8.4	4.9	2170	674	1.76	-
8.4 - 9.4	0.052	14.3	11.4	0.0838	-

SD-87

556.7
NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	14.1	226	1140	2.67	25.8
0.5 - 1.5	0.24	382	426	4.69	46.5
1.5 - 2.5	0.011	162	311	2.16	-
2.5 - 3.3	0.011	6.72	7.33	0.0329	-
6.3 - 7.3	0.021	5.67	4.6	0.0256	-
7.3 - 8.3	0.011	4.59	3.16	0.096	-
8.3 - 9.3	0.011	2.62	2.79	0.0351	-
9.3 - 9.9	0.011	6.6	5.55	0.0808	-

SD-41

561.8
12.9

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	5.8	933	497	0.66	7.2
0.5 - 1.5	28.4	1810	566	1.4	14.8
1.5 - 2.5	25.1	1240	501	5.9	23.9
2.5 - 3.5	0.59	305	478	3	24.8
3.5 - 4.5	0.35	426	558	1.7	9
4.5 - 6.5	0.094	300	532	6	6.4
6.5 - 8.5	0.047	618	479	6.9	10.6
8.5 - 10	0.021	509	406	4.1	20
11.9 - 12.9	0.0087	11	21	0.221	-
12.9 - 13.9	0.011	9.01	7.02	0.0752	-

SD-42

557.1
NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	1.6	311	340	0.72	7.1
0.5 - 1.5	2.1	384	417	0.532	-
0.5 - 1.6	3.3	713	582	0.6	8.4
4.1 - 5.1	0.092	5.64	12.7	0.287	-
5.1 - 6.1	0.023	6.74	7.63	0.0987	-
6.1 - 7.1	0.06	5.52	8.72	0.084	-
7.1 - 8	0.083	4.5	10.1	0.091	-
9.1 - 10.1	0.084	5.51	6.5	0.0888	-
10.1 - 11.1	0.011	5.09	4.03	0.0937	-
11.1 - 12.1	0.011	5.43	3.83	0.0943	-
12.1 - 13.3	0.011	4.51	3.76	0.087	-
14.1 - 15.1	0.043	5.16	4.15	0.0959	-
15.1 - 16.1	0.011	4.13	3.04	0.0814	-
16.1 - 17.1	0.011	5.28	3.49	0.0853	-
17.1 - 18.1	0.011	4.1	2.72	0.0838	-

LEGEND

- Analytical Sample Location
- Milwaukee River Downtown Reach Project Area

Utilities

- Cable TV
- Electric
- Fiber Optic
- Gas
- Storm Sewer

Bathymetry (feet)

- Bathymetric Contour

Elevation (feet)

- 575 - 580
- 570 - 575
- 565 - 570
- 560 - 565
- 555 - 560
- 550 - 555
- 545 - 550

N

0 75 150

Approximate scale in feet

Analytical Results Table Format

Location ID

Mudline Elevation

Depth	PCBs (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Native Material Depth	<1	<PEC	<PEC
Sample interval (ft bss)	1 - 3	>PEC	>PEC
	3 - 5	>3xPEC	>3xPEC
	5 - 50	>5xPEC	>5xPEC
	>50		

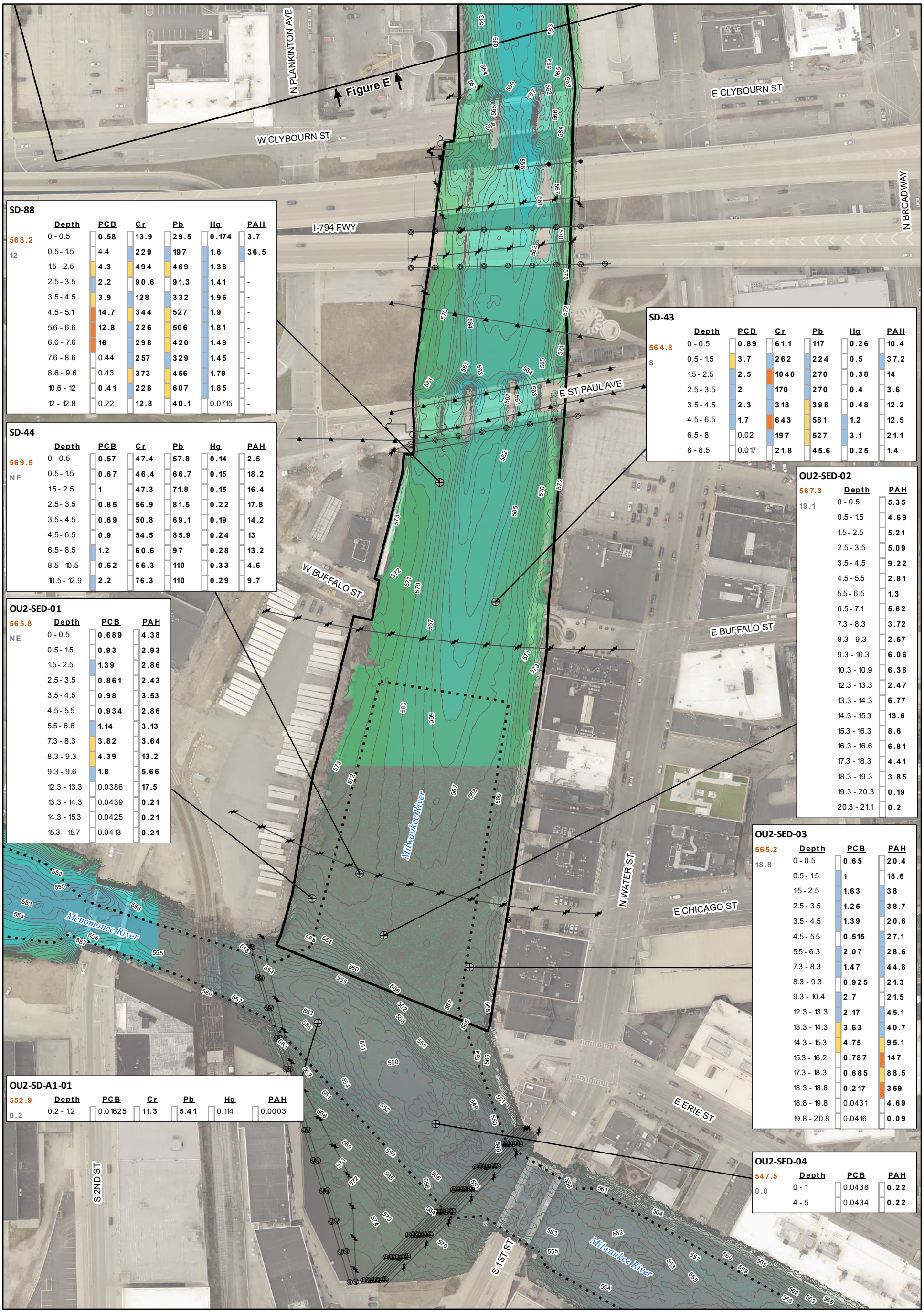
Bold values represent results above the detection limit

"-" = COC was not sampled/analyzed

NE = Native Material Not Encountered

Notes:
1. Basemap: Milwaukee County 2020 Aerial Orthophotography captured April 2020.
2. Horizontal Datum: North American Datum 1983 (NAD83)
3. Vertical Datum: North American Vertical Datum of 1988 (NAVD88). Bathymetric contour and shading were generated from hydrographic survey data collected by Seaworks (2020).
4. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
5. 3x = 3 times; 5x = 5 times; COC = Contaminant of Concern; Cr = chromium; ft bss = feet below sediment surface; Hg = mercury; mg/kg = milligram(s) per kilogram; NE = not encountered; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PEC = Probable Effects Concentration

Figure 2-3E
Analytical Results Summary
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin



SD-88

568.2 / 12

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.58	13.9	29.5	0.174	3.7
0.5 - 1.5	4.4	229	197	1.6	36.5
1.5 - 2.5	4.3	494	469	1.38	-
2.5 - 3.5	2.2	90.6	91.3	1.41	-
3.5 - 4.5	3.9	128	332	1.96	-
4.5 - 5.1	14.7	344	527	1.9	-
5.6 - 6.6	12.8	226	506	1.81	-
6.6 - 7.6	16	298	420	1.49	-
7.6 - 8.6	0.44	257	329	1.45	-
8.6 - 9.6	0.43	373	456	1.79	-
10.6 - 12	0.41	228	607	1.85	-
12 - 12.8	0.22	12.8	40.1	0.0715	-

SD-43

564.8 / 8

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.89	61.1	117	0.26	10.4
0.5 - 1.5	3.7	262	224	0.5	37.2
1.5 - 2.5	2.5	1040	270	0.38	14
2.5 - 3.5	2	170	270	0.4	3.6
3.5 - 4.5	2.3	318	398	0.48	12.2
4.5 - 6.5	1.7	643	581	1.2	12.5
6.5 - 8	0.02	197	527	3.1	21.1
8 - 8.5	0.017	21.8	45.6	0.25	1.4

SD-44

569.5 / NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.57	47.4	57.8	0.14	2.5
0.5 - 1.5	0.67	46.4	66.7	0.15	18.2
1.5 - 2.5	1	47.3	71.8	0.15	16.4
2.5 - 3.5	0.85	56.9	81.5	0.22	17.8
3.5 - 4.5	0.69	50.8	69.1	0.19	14.2
4.5 - 6.5	0.9	54.5	85.9	0.24	13
6.5 - 8.5	1.2	60.6	97	0.28	13.2
8.5 - 10.5	0.62	66.3	110	0.33	4.6
10.5 - 12.9	2.2	76.3	110	0.29	9.7

OU2-SED-02

567.3 / 19.1

Depth	PAH
0 - 0.5	5.35
0.5 - 1.5	4.69
1.5 - 2.5	5.21
2.5 - 3.5	5.09
3.5 - 4.5	9.22
4.5 - 5.5	2.81
5.5 - 6.5	1.3
6.5 - 7.1	5.62
7.3 - 8.3	3.72
8.3 - 9.3	2.57
9.3 - 10.3	6.06
10.3 - 10.9	6.38
12.3 - 13.3	2.47
13.3 - 14.3	6.77
14.3 - 15.3	13.6
15.3 - 16.3	8.6
16.3 - 16.6	6.81
17.3 - 18.3	4.41
18.3 - 19.3	3.85
19.3 - 20.3	0.19
20.3 - 21.1	0.2

OU2-SED-01

565.8 / NE

Depth	PCB	PAH
0 - 0.5	0.689	4.38
0.5 - 1.5	0.93	2.93
1.5 - 2.5	1.39	2.86
2.5 - 3.5	0.861	2.43
3.5 - 4.5	0.98	3.53
4.5 - 5.5	0.934	2.86
5.5 - 6.6	1.14	3.13
7.3 - 8.3	3.82	3.64
8.3 - 9.3	4.39	13.2
9.3 - 9.6	1.8	5.66
12.3 - 13.3	0.0386	17.5
13.3 - 14.3	0.0439	0.21
14.3 - 15.3	0.0425	0.21
15.3 - 15.7	0.0413	0.21

OU2-SED-03

565.2 / 18.8

Depth	PCB	PAH
0 - 0.5	0.65	20.4
0.5 - 1.5	1	18.6
1.5 - 2.5	1.63	38
2.5 - 3.5	1.25	38.7
3.5 - 4.5	1.39	20.6
4.5 - 5.5	0.515	27.1
5.5 - 6.3	2.07	28.6
7.3 - 8.3	1.47	44.8
8.3 - 9.3	0.925	21.3
9.3 - 10.4	2.7	21.5
12.3 - 13.3	2.17	45.1
13.3 - 14.3	3.63	40.7
14.3 - 15.3	4.75	95.1
15.3 - 16.2	0.787	147
17.3 - 18.3	0.685	88.5
18.3 - 18.8	0.217	359
18.8 - 19.8	0.0431	4.69
19.8 - 20.8	0.0416	0.09

OU2-SD-A1-01

552.9 / 0.2

Depth	PCB	Cr	Pb	Hg	PAH
0.2 - 1.2	0.01625	11.3	5.41	0.114	0.0003

OU2-SED-04

547.5 / 0.0

Depth	PCB	PAH
0 - 1	0.0438	0.22
4 - 5	0.0434	0.22

LEGEND

- Analytical Sample Location
- Federal Navigation Channel (Source: United States Army Corps of Engineers)
- Milwaukee River Downtown Reach Project Area

Utilities

- Electric
- Fiber Optic
- Gas
- Sanitary Sewer
- Storm Sewer
- Utility Identified during Menomonee and Milwaukee River FFS
- Water Line

Bathymetry (feet)

- Bathymetric Contour

Elevation (feet)

- 575 - 580
- 570 - 575
- 565 - 570
- 560 - 565
- 555 - 560
- 550 - 555
- 545 - 550

N

0 75 150

Approximate scale in feet

Analytical Results Table Format

Location ID

Mudline Elevation

Depth	PCBs (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Native Material Depth	<1	<PEC	<PEC
Sample interval (ft bss)	1 - 3	>PEC	>PEC
	3 - 5	>3xPEC	>3xPEC
	5 - 50	>5xPEC	>5xPEC
	>50		

Bold values represent results above the detection limit

"-" = COC was not sampled/analyzed

NE = Native Material Not Encountered

Notes:
1. Basemap: Milwaukee County 2020 Aerial Orthophotography captured April 2020.
2. Horizontal Datum: North American Datum 1983 (NAD83)
3. Vertical Datum: North American Vertical Datum of 1988 (NAVD88). Bathymetric contour and shading were generated from hydrographic survey data collected by Seaworks (2020).
4. Bathymetric surface point data provided by Seaworks within portions of this figure extent contained gaps and therefore the derived colored shading is not continuous.
5. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
6. 3x = 3 times; 5x = 5 times; COC = Contaminant of Concern; Cr = chromium; ft bss = feet below sediment surface; Hg = mercury; mg/kg = milligram(s) per kilogram; NE = not encountered; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PEC = Probable Effects Concentration

Figure 2-3F
Analytical Results Summary
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Jacobs

\\dc1vs01\GISProj\E\EPA\681867_MKERiverDownstream\MapFiles\2022\Downtown_Analytical\Figure2-3F_SummaryofAnalyticalResults_508.mxd AESPEJO (8/30/2024)

Former North Avenue Dam

Figure ID	Site Location
01	MILWAUKEE CTY RIVERVIEW FACILITY
02	LAZENBY PROPERTY FMR
03	JOHN CHOWANEC PROPERTY
04	WALKERS LANDING APARTMENTS
05	NATIONAL BLDG MAINTENANCE INC
06	WEISS PROPERTY
07	EIGHTEEN87 ON WATER
08	GALLUN SITE (PMO PROJECT)
09	AF GALLUN
10	THE EDGE
11	1890 N COMMERCE UNDEVELOPED PARCEL
12	FORESTRY NE HEADQUARTERS
13	TROSTEL-PARCELS 1,2 &3
14	BEERLINE B APARTMENTS
15	HABHEGGER AUTO REPAIR (FMR)
16	NORTHERN LIGHTS INDUSTRIES
17	US LEATHER PROPERTIES - SITE A
18	PFISTER & VOGEL TANNERY (NW LOT)
19	PFISTER & VOGEL FMR SITE E
20	LAACKE & JOYS (FMR)
21	OFFICE BUILDING
22	FIRE BOAT STATION - ABANDONED
23	BREWERY WORK DEV-PARCEL 3A
24	WEPCO/BREWERY WORKS DEV-PARCEL 2A
25	WEPCO/BREWERY WORKS DEV-PARCEL 2B
26	ALOFT
27	ALLRIGHT PARKING
28	1027 N EDISON ST
29	CITY HALL SQUARE PROPERTY
30	TOWNE REALTY INC / FORMER SHELL STATION
31	BANC ONE PLAZA PAVILION
32	WALKERS LANDING ASSOC
33	MINELLIS BRAKE SERVICE DOWNTOWN
34	SIDNEY & HARRY HACK & JULIUS BERNSTEIN TRUST
35	217-221 N WATER ST
36	HISTORIC RIVER WALK PLAZA LLC
37	HARRI HOFFMAN CO

LEGEND

- Municipal Separate Storm Sewer System (MS4) Industrial Outfall
- Storm Sewer Outfall
- Combined Sewer Outfall - MS4 Municipal
- BRRTS Site Boundary
- Milwaukee River Downtown Project Area
- 01 Closed BRRTS Site Identification Number
- 02 Open BRRTS Site Identification Number

N

0 350 700

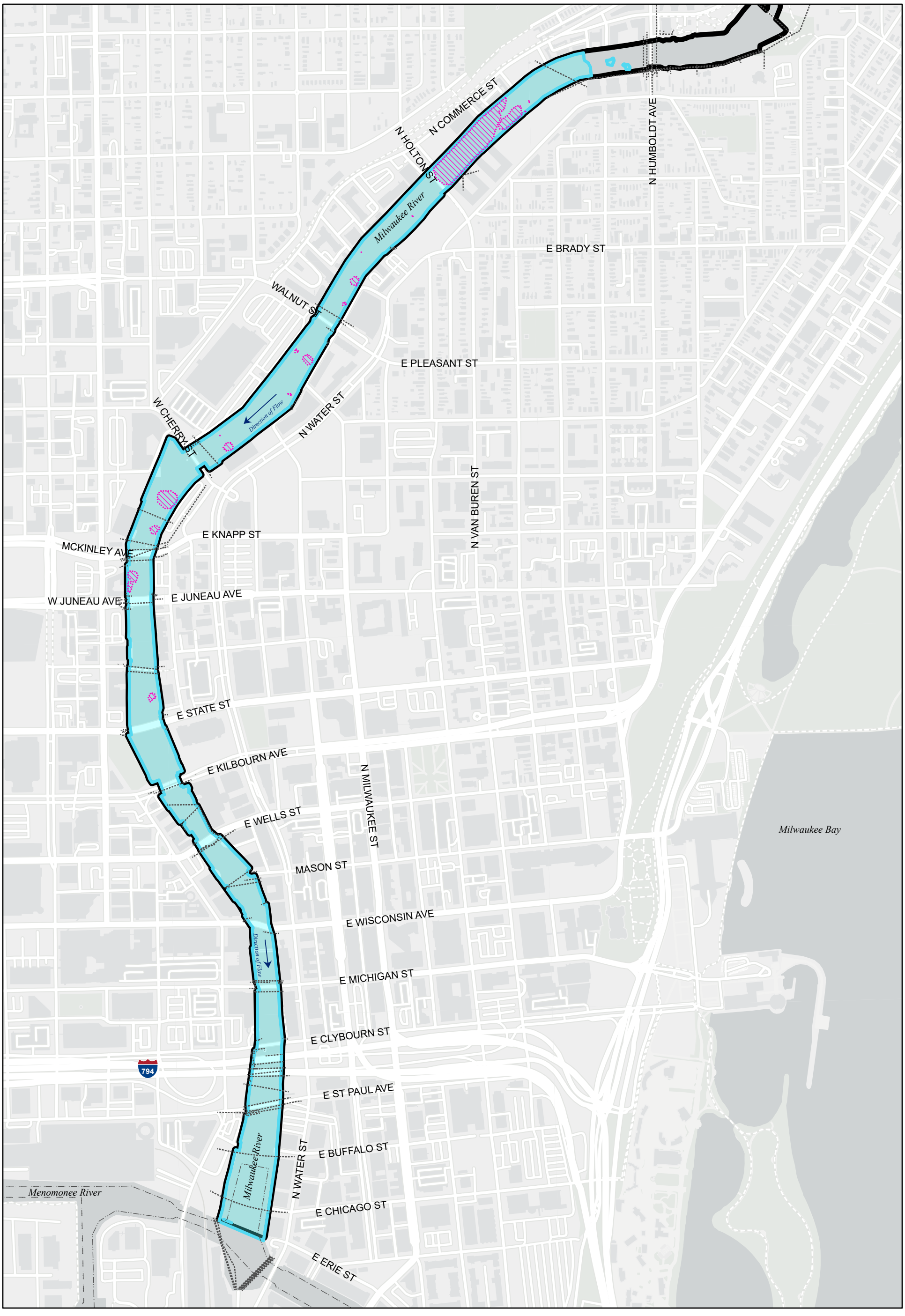
Approximate scale in feet

Notes:
1. 2020 Aerial Photography provided by The Milwaukee County Land Information Office (MCLIO).
2. Parcel data provided by the MCLIO dated December 21, 2020.
3. BRRTS = WDNR Bureau for Remediation and Redevelopment Tracking System; WDNR = Wisconsin Department of Natural Resources

Figure 2-4
Potential Sources
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Jacobs

\\Dc1vs01\gisproj\E\EPA\681867_MKERiverDownstream\MapFiles\2022\Misc\Figure2-4_Potential_Sources_DT_508.mxd AESPEJO (9/4/2024)



LEGEND

- Remediation Target Area - Alternative 2
- TSCA Dredge Limits
- Milwaukee River Downtown Reach Project Area
- Utilities
- Federal Navigation Channel (Source: United States Army Corps of Engineers)

Notes:
1. Basemap source: Esri ArcGIS Online Light Gray Base Map
2. Cr = chromium; Hg = mercury; mg/kg = milligram(s) per kilogram; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PECs = Probable Effects Concentrations from *Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application*, Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003); TSCA = Toxic Substances Control Act (50 mg/kg)

Figure 3-1
Remediation Target Areas - Downtown Reach Alternative 2 - Total PCBs > 1 mg/kg, or metals (Cr, Hg, or Pb), or Total PAHs > PECs
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Notes:
1. Basemap source: Esri ArcGIS Online Light Gray Base Map
2. Cr = chromium; Hg = mercury; mg/kg = milligram(s) per kilogram; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PECs = Probable Effects Concentrations from *Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application*, Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003); TSCA = Toxic Substances Control Act (50 mg/kg)

Figure 3-2
Remediation Target Areas - Downtown Reach
Alternative 3 - Total PCBs > 1 mg/kg, or metals (Cr, Hg, or Pb), or Total PAHs > 3x PECs
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

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LEGEND

- Remediation Target Area - Alternative 4
- TSCA Dredge Limits
- Milwaukee River Downtown Reach Project Area
- Utilities
- Federal Navigation Channel (Source: United States Army Corps of Engineers)

N

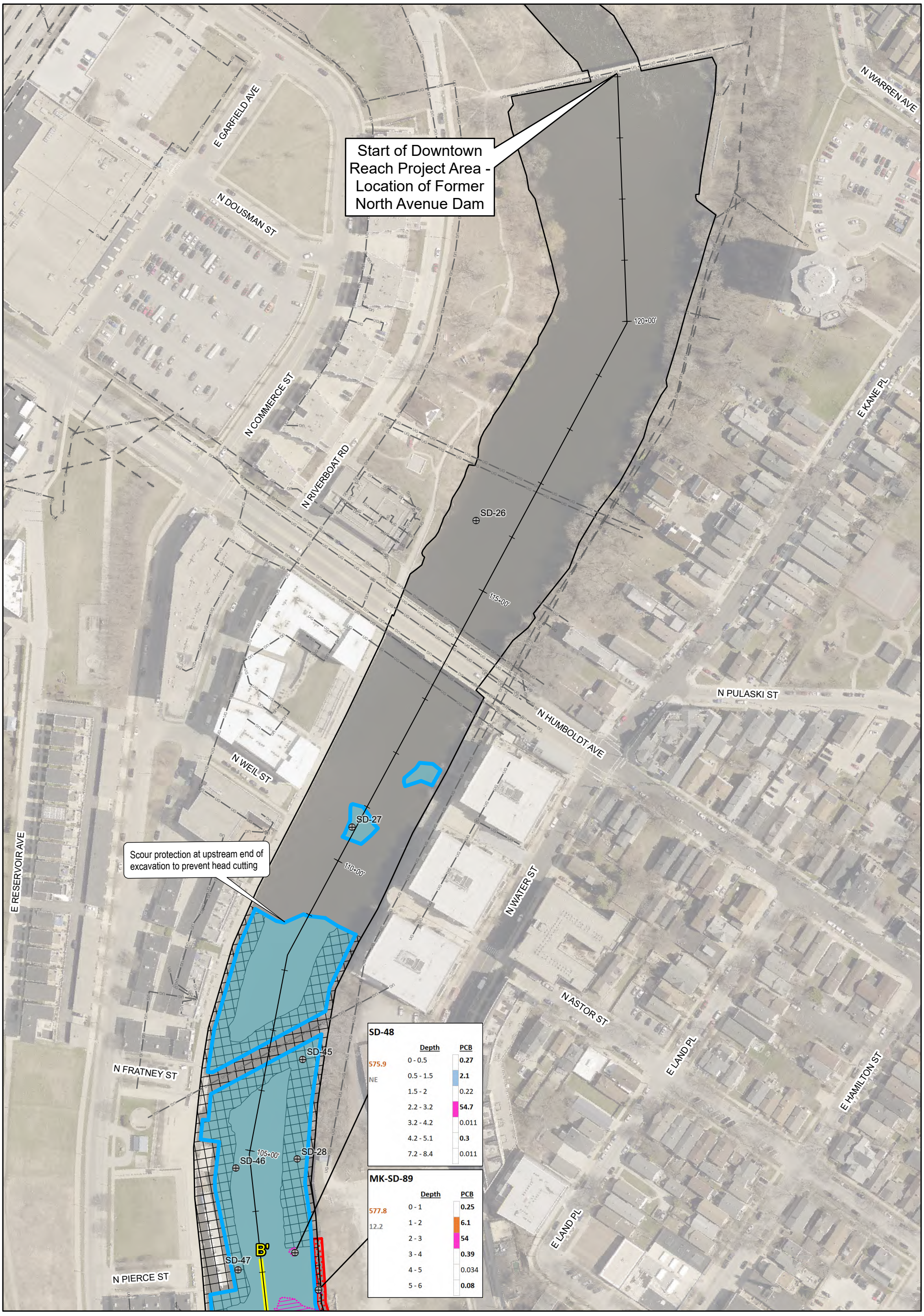
0 350 700

Approximate scale in feet

Notes:
1. Basemap source: Esri ArcGIS Online Light Gray Base Map
2. Cr = chromium; Hg = mercury; mg/kg = milligram(s) per kilogram; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PECs = Probable Effects Concentrations from *Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application*, Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003); TSCA = Toxic Substances Control Act (50 mg/kg)

Figure 3-3
Remediation Target Areas - Downtown Reach Alternative 4 - Total PCBs > 3 mg/kg, or metals (Cr, Hg, or Pb), or Total PAHs > 3x PECs
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Jacobs



LEGEND

- Analytical Sample Location
- Underground Utility
- Cross Section
- Milwaukee River Downtown Reach Project Area
- Non-TSCA Sediment Dredge Extent
- Cap Extent
- TSCA Sediment Extent
- TSCA Removal Shoreline Reinforcement

0 75 150

Approximate scale in feet

Analytical Results for Locations with PCB >50 mg/kg

Location ID		PCB (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Mudline Elevation	Depth			
Native Material Depth		<1	<PEC	<PEC
	Sample interval (ft bss) 1 - 3	>PEC	>PEC	>PEC
	3 - 5	>3xPEC	>3xPEC	>3xPEC
	5 - 50	>5xPEC	>5xPEC	>5xPEC
	>50			

Bold values represent results above the detection limit

"-" = COC was not sampled/analyzed

NE = Not Encountered

Notes:

1. 2020 Aerial Photography provided by The Milwaukee County Land Information Office.
2. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources, 2003).
3. 3x = 3 times; 5x = 5 times; COC = Contaminant of Concern; ft bss = feet below sediment surface; mg/kg = milligram(s) per kilogram; NE = not encountered; PAH = polycyclic aromatic hydrocarbons; PCB = polychlorinated biphenyls; PEC = Probable Effects Concentration; TSCA = Toxic Substances Control Act (50 mg/kg)

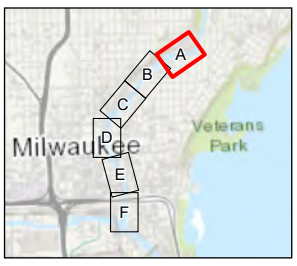
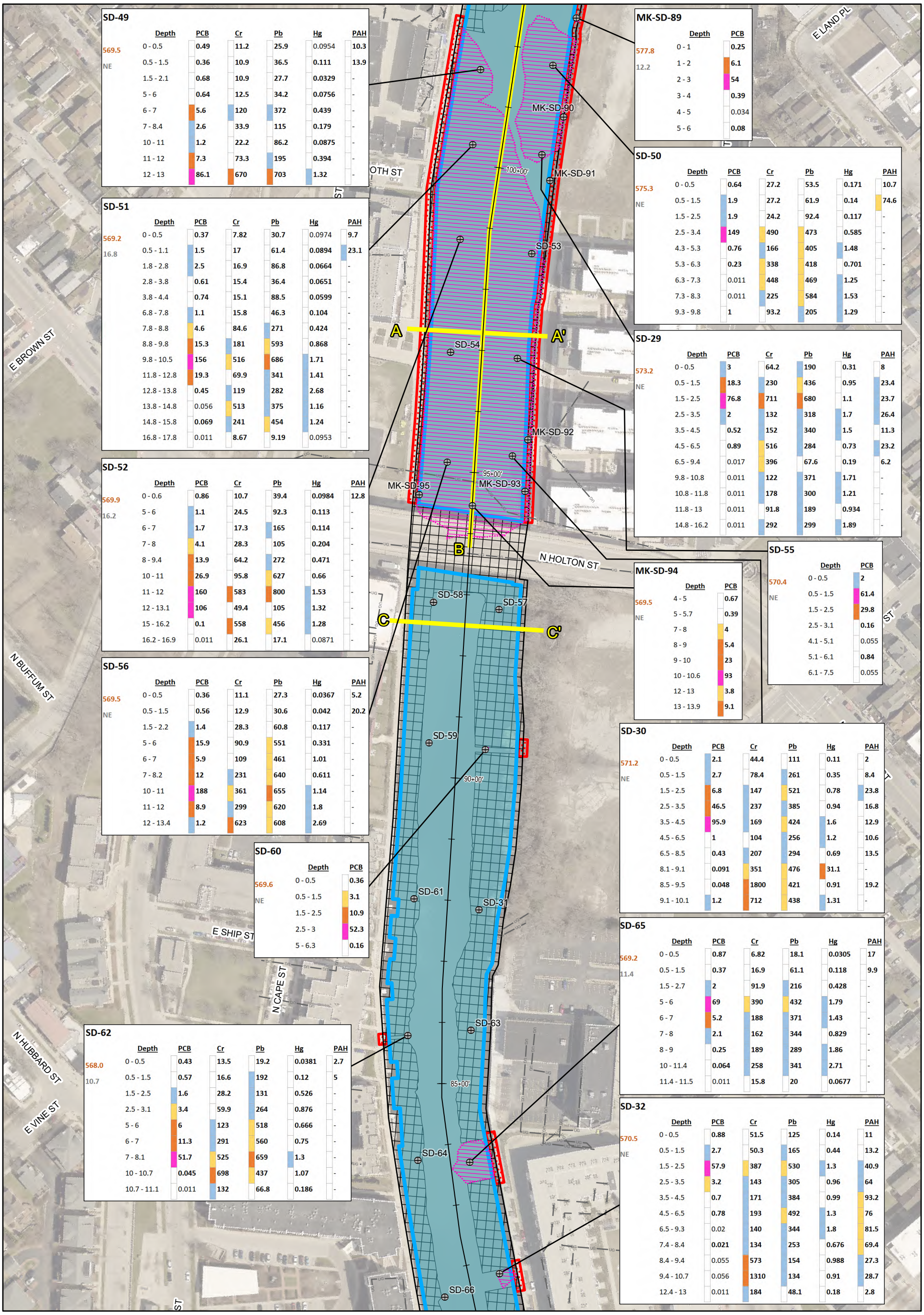


Figure 5-1A
Downtown Reach -
Alternative 2 Conceptual Layout
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin



SD-49

	Depth	PCB	Cr	Pb	Hg	PAH
569.5	0 - 0.5	0.49	11.2	25.9	0.0954	10.3
NE	0.5 - 1.5	0.36	10.9	36.5	0.111	13.9
	1.5 - 2.1	0.68	10.9	27.7	0.0329	-
	5 - 6	0.64	12.5	34.2	0.0756	-
	6 - 7	5.6	120	372	0.439	-
	7 - 8.4	2.6	33.9	115	0.179	-
	10 - 11	1.2	22.2	86.2	0.0875	-
	11 - 12	7.3	73.3	195	0.394	-
	12 - 13	86.1	670	703	1.32	-

SD-51

	Depth	PCB	Cr	Pb	Hg	PAH
569.2	0 - 0.5	0.37	7.82	30.7	0.0974	9.7
16.8	0.5 - 1.1	1.5	17	61.4	0.0894	23.1
	1.8 - 2.8	2.5	16.9	86.8	0.0664	-
	2.8 - 3.8	0.61	15.4	36.4	0.0651	-
	3.8 - 4.4	0.74	15.1	88.5	0.0599	-
	6.8 - 7.8	1.1	15.8	46.3	0.104	-
	7.8 - 8.8	4.6	84.6	271	0.424	-
	8.8 - 9.8	15.3	181	593	0.868	-
	9.8 - 10.5	156	516	686	1.71	-
	11.8 - 12.8	19.3	69.9	341	1.41	-
	12.8 - 13.8	0.45	119	282	2.68	-
	13.8 - 14.8	0.056	513	375	1.16	-
	14.8 - 15.8	0.069	241	454	1.24	-
	16.8 - 17.8	0.011	8.67	9.19	0.0953	-

SD-52

	Depth	PCB	Cr	Pb	Hg	PAH
569.9	0 - 0.6	0.86	10.7	39.4	0.0984	12.8
16.2	5 - 6	1.1	24.5	92.3	0.113	-
	6 - 7	1.7	17.3	165	0.114	-
	7 - 8	4.1	28.3	105	0.204	-
	8 - 9.4	13.9	64.2	272	0.471	-
	10 - 11	26.9	95.8	627	0.66	-
	11 - 12	160	583	800	1.53	-
	12 - 13.1	106	49.4	105	1.32	-
	15 - 16.2	0.1	558	456	1.28	-
	16.2 - 16.9	0.011	26.1	17.1	0.0871	-

SD-56

	Depth	PCB	Cr	Pb	Hg	PAH
569.5	0 - 0.5	0.36	11.1	27.3	0.0367	5.2
NE	0.5 - 1.5	0.56	12.9	30.6	0.042	20.2
	1.5 - 2.2	1.4	28.3	60.8	0.117	-
	5 - 6	15.9	90.9	551	0.331	-
	6 - 7	5.9	109	461	1.01	-
	7 - 8.2	12	231	640	0.611	-
	10 - 11	188	361	655	1.14	-
	11 - 12	8.9	299	620	1.8	-
	12 - 13.4	1.2	623	608	2.69	-

SD-60

	Depth	PCB
569.6	0 - 0.5	0.36
NE	0.5 - 1.5	3.1
	1.5 - 2.5	10.9
	2.5 - 3	52.3
	5 - 6.3	0.16

SD-62

	Depth	PCB	Cr	Pb	Hg	PAH
568.0	0 - 0.5	0.43	13.5	19.2	0.0381	2.7
10.7	0.5 - 1.5	0.57	16.6	192	0.12	5
	1.5 - 2.5	1.6	28.2	131	0.526	-
	2.5 - 3.1	3.4	59.9	264	0.876	-
	5 - 6	6	123	518	0.666	-
	6 - 7	11.3	291	560	0.75	-
	7 - 8.1	51.7	525	659	1.3	-
	10 - 10.7	0.045	698	437	1.07	-
	10.7 - 11.1	0.011	132	66.8	0.186	-

MK-SD-89

	Depth	PCB
577.8	0 - 1	0.25
12.2	1 - 2	6.1
	2 - 3	54
	3 - 4	0.39
	4 - 5	0.034
	5 - 6	0.08

SD-50

	Depth	PCB	Cr	Pb	Hg	PAH
575.3	0 - 0.5	0.64	27.2	53.5	0.171	10.7
NE	0.5 - 1.5	1.9	27.2	61.9	0.14	74.6
	1.5 - 2.5	1.9	24.2	92.4	0.117	-
	2.5 - 3.4	149	490	473	0.585	-
	4.3 - 5.3	0.76	166	405	1.48	-
	5.3 - 6.3	0.23	338	418	0.701	-
	6.3 - 7.3	0.011	448	469	1.25	-
	7.3 - 8.3	0.011	225	584	1.53	-
	9.3 - 9.8	1	93.2	205	1.29	-

SD-29

	Depth	PCB	Cr	Pb	Hg	PAH
573.2	0 - 0.5	3	64.2	190	0.31	8
NE	0.5 - 1.5	18.3	230	436	0.95	23.4
	1.5 - 2.5	76.8	711	680	1.1	23.7
	2.5 - 3.5	2	132	318	1.7	26.4
	3.5 - 4.5	0.52	152	340	1.5	11.3
	4.5 - 6.5	0.89	516	284	0.73	23.2
	6.5 - 9.4	0.017	396	67.6	0.19	6.2
	9.8 - 10.8	0.011	122	371	1.71	-
	10.8 - 11.8	0.011	178	300	1.21	-
	11.8 - 13	0.011	91.8	189	0.934	-
	14.8 - 16.2	0.011	292	299	1.89	-

MK-SD-94

	Depth	PCB
569.5	4 - 5	0.67
NE	5 - 5.7	0.39
	7 - 8	4
	8 - 9	5.4
	9 - 10	23
	10 - 10.6	93
	12 - 13	3.8
	13 - 13.9	9.1

SD-55

	Depth	PCB
570.4	0 - 0.5	2
NE	0.5 - 1.5	61.4
	1.5 - 2.5	29.8
	2.5 - 3.1	0.16
	4.1 - 5.1	0.055
	5.1 - 6.1	0.84
	6.1 - 7.5	0.055

SD-30

	Depth	PCB	Cr	Pb	Hg	PAH
571.2	0 - 0.5	2.1	44.4	111	0.11	2
NE	0.5 - 1.5	2.7	78.4	261	0.35	8.4
	1.5 - 2.5	6.8	147	521	0.78	23.8
	2.5 - 3.5	46.5	237	385	0.94	16.8
	3.5 - 4.5	95.9	169	424	1.6	12.9
	4.5 - 6.5	1	104	256	1.2	10.6
	6.5 - 8.5	0.43	207	294	0.69	13.5
	8.1 - 9.1	0.091	351	476	31.1	-
	8.5 - 9.5	0.048	1800	421	0.91	19.2
	9.1 - 10.1	1.2	712	438	1.31	-

SD-65

	Depth	PCB	Cr	Pb	Hg	PAH
569.2	0 - 0.5	0.87	6.82	18.1	0.0305	17
11.4	0.5 - 1.5	0.37	16.9	61.1	0.118	9.9
	1.5 - 2.7	2	91.9	216	0.428	-
	5 - 6	69	390	432	1.79	-
	6 - 7	5.2	188	371	1.43	-
	7 - 8	2.1	162	344	0.829	-
	8 - 9	0.25	189	289	1.86	-
	10 - 11.4	0.064	258	341	2.71	-
	11.4 - 11.5	0.011	15.8	20	0.0677	-

SD-32

	Depth	PCB	Cr	Pb	Hg	PAH
570.5	0 - 0.5	0.88	51.5	125	0.14	11
NE	0.5 - 1.5	2.7	50.3	165	0.44	13.2
	1.5 - 2.5	57.9	387	530	1.3	40.9
	2.5 - 3.5	3.2	143	305	0.96	64
	3.5 - 4.5	0.7	171	384	0.99	93.2
	4.5 - 6.5	0.78	193	492	1.3	76
	6.5 - 9.3	0.02	140	344	1.8	81.5
	7.4 - 8.4	0.021	134	253	0.676	69.4
	8.4 - 9.4	0.055	573	154	0.988	27.3
	9.4 - 10.7	0.056	1310	134	0.91	28.7
	12.4 - 13	0.011	184	48.1	0.18	2.8

LEGEND

- Analytical Sample Location
- Underground Utility
- Cross Section
- Milwaukee River Downtown Reach Project Area
- Non-TSCA Sediment Dredge Extent
- Cap Extent
- TSCA Sediment Extent
- TSCA Removal Shoreline Reinforcement

0 75 150

Approximate scale in feet

Analytical Results for Locations with PCB >50 mg/kg

Location ID

Mudline Elevation

Native Material Depth

Depth	PCB (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
	<1	<PEC	<PEC
Sample interval (ft bss)	1 - 3	>PEC	>PEC
	3 - 5	>3xPEC	>3xPEC
	5 - 50	>5xPEC	>5xPEC
	>50		

Bold values represent results above the detection limit

"-" = COC was not sampled/analyzed

NE = Not Encountered

Notes:
1. 2020 Aerial Photography provided by The Milwaukee County Land Information Office.
2. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources, 2003).
3. 3x = 3 times; 5x = 5 times; COC = Contaminant of Concern; Cr = chromium; ft bss = feet below sediment surface; Hg = mercury; mg/kg = milligram(s) per kilogram; NE =not encountered; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PEC = Probable Effects Concentration; TSCA = Toxic Substances Control Act (50mg/kg)

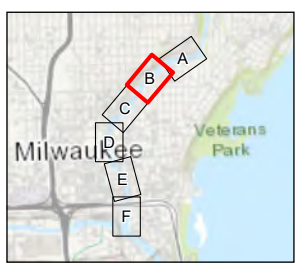
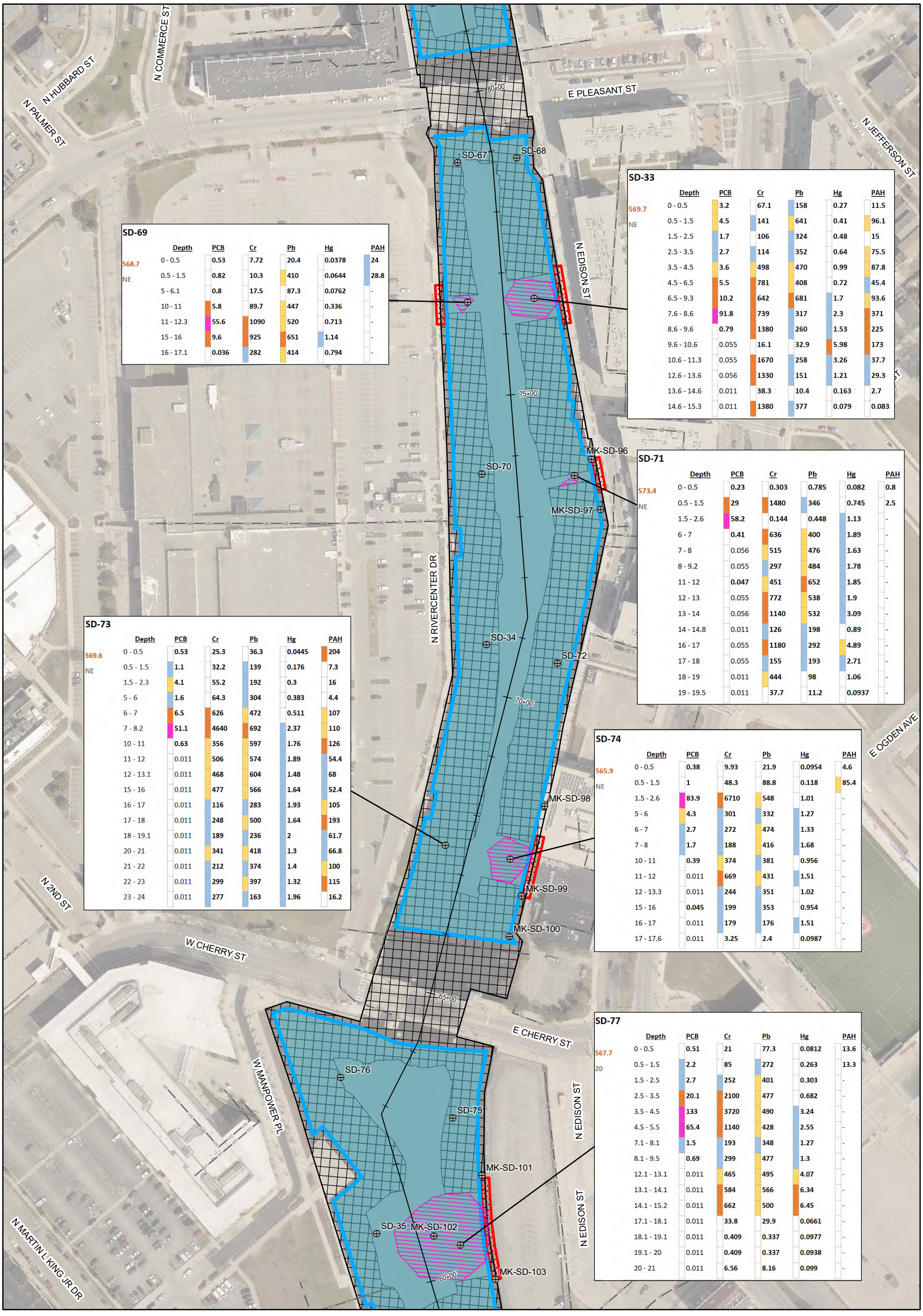


Figure 5-1B
Downtown Reach -
Alternative 2 Conceptual Layout
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Jacobs



SD-69

568.7 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.53	7.72	20.4	0.0378	24
0.5 - 1.5	0.82	10.3	410	0.0644	28.8
5 - 6.1	0.8	17.5	87.3	0.0762	-
10 - 11	5.8	89.7	447	0.336	-
11 - 12.3	55.6	1090	520	0.713	-
15 - 16	9.6	925	651	1.14	-
16 - 17.1	0.036	282	414	0.794	-

SD-33

569.7 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	3.2	67.1	158	0.27	11.5
0.5 - 1.5	4.5	141	641	0.41	96.1
1.5 - 2.5	1.7	106	324	0.48	15
2.5 - 3.5	2.7	114	352	0.64	75.5
3.5 - 4.5	3.6	498	470	0.99	87.8
4.5 - 6.5	5.5	781	408	0.72	45.4
6.5 - 9.3	10.2	642	681	1.7	93.6
7.6 - 8.6	91.8	739	317	2.3	371
8.6 - 9.6	0.79	1380	260	1.53	225
9.6 - 10.6	0.055	16.1	32.9	5.98	173
10.6 - 11.3	0.055	1670	258	3.26	37.7
12.6 - 13.6	0.056	1330	151	1.21	29.3
13.6 - 14.6	0.011	38.3	10.4	0.163	2.7
14.6 - 15.3	0.011	1380	377	0.079	0.083

SD-71

573.4 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.23	0.303	0.785	0.082	0.8
0.5 - 1.5	29	1480	346	0.745	2.5
1.5 - 2.6	58.2	0.144	0.448	1.13	-
6 - 7	0.41	636	400	1.89	-
7 - 8	0.056	515	476	1.63	-
8 - 9.2	0.055	297	484	1.78	-
11 - 12	0.047	451	652	1.85	-
12 - 13	0.055	772	538	1.9	-
13 - 14	0.056	1140	532	3.09	-
14 - 14.8	0.011	126	198	0.89	-
16 - 17	0.055	1180	292	4.89	-
17 - 18	0.055	155	193	2.71	-
18 - 19	0.011	444	98	1.06	-
19 - 19.5	0.011	37.7	11.2	0.0937	-

SD-73

569.6 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.53	25.3	36.3	0.0445	204
0.5 - 1.5	1.1	32.2	139	0.176	7.3
1.5 - 2.3	4.1	55.2	192	0.3	16
5 - 6	1.6	64.3	304	0.383	4.4
6 - 7	6.5	626	472	0.511	107
7 - 8.2	51.1	4640	692	2.37	110
10 - 11	0.63	356	597	1.76	126
11 - 12	0.011	506	574	1.89	54.4
12 - 13.1	0.011	468	604	1.48	68
15 - 16	0.011	477	566	1.64	52.4
16 - 17	0.011	116	283	1.93	105
17 - 18	0.011	248	500	1.64	193
18 - 19.1	0.011	189	236	2	61.7
20 - 21	0.011	341	418	1.3	66.8
21 - 22	0.011	212	374	1.4	100
22 - 23	0.011	299	397	1.32	115
23 - 24	0.011	277	163	1.96	16.2

SD-74

565.9 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.38	9.93	21.9	0.0954	4.6
0.5 - 1.5	1	48.3	88.8	0.118	85.4
1.5 - 2.6	83.9	6710	548	1.01	-
5 - 6	4.3	301	332	1.27	-
6 - 7	2.7	272	474	1.33	-
7 - 8	1.7	188	416	1.68	-
10 - 11	0.39	374	381	0.956	-
11 - 12	0.011	669	431	1.51	-
12 - 13.3	0.011	244	351	1.02	-
15 - 16	0.045	199	353	0.954	-
16 - 17	0.011	179	176	1.51	-
17 - 17.6	0.011	3.25	2.4	0.0987	-

SD-77

567.7 20

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.51	21	77.3	0.0812	13.6
0.5 - 1.5	2.2	85	272	0.263	13.3
1.5 - 2.5	2.7	252	401	0.303	-
2.5 - 3.5	20.1	2100	477	0.682	-
3.5 - 4.5	133	3720	490	3.24	-
4.5 - 5.5	65.4	1140	428	2.55	-
7.1 - 8.1	1.5	193	348	1.27	-
8.1 - 9.5	0.69	299	477	1.3	-
12.1 - 13.1	0.011	465	495	4.07	-
13.1 - 14.1	0.011	584	566	6.34	-
14.1 - 15.2	0.011	662	500	6.45	-
17.1 - 18.1	0.011	33.8	29.9	0.0661	-
18.1 - 19.1	0.011	0.409	0.337	0.0977	-
19.1 - 20	0.011	0.409	0.337	0.0938	-
20 - 21	0.011	6.56	8.16	0.099	-

LEGEND

- Analytical Sample Location
- Underground Utility
- Milwaukee River Downtown Reach Project Area
- Non-TSCA Sediment Dredge Extent
- Cap Extent
- TSCA Sediment Extent
- TSCA Removal Shoreline Reinforcement

0 75 150

Approximate scale in feet

Analytical Results for Locations with PCB >50 mg/kg

Location ID

Mudline Elevation

Native Material Depth

Depth	PCB (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Sample interval (ft bss)	<1	<PEC	<PEC
	1 - 3	>PEC	>PEC
	3 - 5	>3xPEC	>3xPEC
	5 - 50	>5xPEC	>5xPEC
	>50		

Bold values represent results above the detection limit

"-" = COC was not sampled/analyzed

NE = Not Encountered

Notes:

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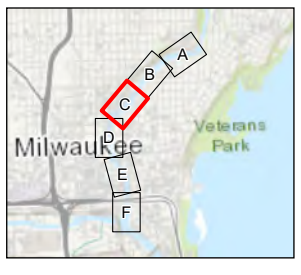

Figure 5-1C
Downtown Reach -
Alternative 2 Conceptual Layout
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

SD-78

568.9
NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.44	19.6	40	0.057	10
0.5 - 1.5	0.7	32.5	70.6	0.0965	8.4
1.5 - 2.5	1.8	150	268	0.278	-
2.5 - 3.5	17.9	4470	560	0.579	-
3.5 - 4.5	84	2450	685	1.58	-
4.5 - 5	4.5	226	399	1.22	-
7.1 - 8.1	5.7	458	515	1.4	-
8.1 - 9.1	0.85	126	301	1.33	-
9.1 - 10.1	0.39	288	448	2.36	-
10.1 - 10.9	1.4	271	424	1.17	-
12.1 - 13.1	0.031	248	457	1.29	-
13.1 - 14.2	0.011	176	348	1.67	-

SD-80

559.3
5.8

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	65.4	3150	510	1.11	17.9
0.5 - 1.5	67.9	1380	380	1.12	8.5
1.5 - 2.9	2.5	248	434	2.17	-
5.8 - 6.8	0.011	10.4	7.17	0.0953	-

MK-SD-106

562.4
5.0

Depth	PCB
0 - 1	62
1 - 2	11
2 - 3	2
3 - 4	0.59

SD-82

568.9
NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.92	50.7	194	0.205	21.2
0.5 - 1.5	2.5	425	323	0.36	29.7
1.5 - 2.5	91	2120	586	4.57	-
2.5 - 3.5	1.4	1040	518	1.4	-
3.5 - 4.9	0.87	629	637	1.24	-
6.1 - 7.1	0.096	426	590	2.46	-
7.1 - 8.1	0.011	1040	919	7.57	-
8.1 - 8.7	0.011	745	591	7.71	-
11.1 - 12.1	0.011	521	363	3.38	-
12.1 - 13.1	0.011	153	129	0.648	-
13.1 - 14.1*	0.011	11.1	8.59	0.0249	-

*Eight sampling intervals from 14.1 to 24.5 feet not shown; results do not exceed any applicable PEC or screening value.

LEGEND

- Analytical Sample Location
- Underground Utility
- Milwaukee River Downtown Reach Project Area
- Non-TSCA Sediment Dredge Extent
- Cap Extent
- TSCA Sediment Extent
- TSCA Removal Shoreline Reinforcement

N

0 75 150

Approximate scale in feet

Analytical Results for Locations with PCB >50 mg/kg

Location ID		PCB (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Mudline Elevation				
Native Material Depth		<1	<PEC	<PEC
	Sample interval (ft bss)	1 - 3	>PEC	>PEC
		3 - 5	>3xPEC	>3xPEC
		5 - 50	>5xPEC	>5xPEC
		>50		

Bold values represent results above the detection limit
"-" = COC was not sampled/analyzed
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Notes:
1. 2020 Aerial Photography provided by The Milwaukee County Land Information Office.
2. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources, 2003).
3. 3x = 3 times; 5x = 5 times; COC = Contaminant of Concern; Cr = chromium; ft bss =feet below sediment surface; Hg = mercury; mg/kg = milligram(s) per kilogram; NE =not encountered; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PEC = Probable Effects Concentration; TSCA = Toxic Substances Control Act (50 mg/kg)

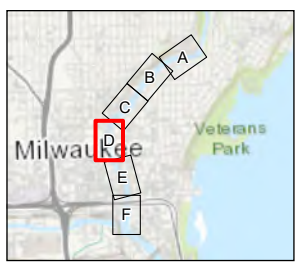
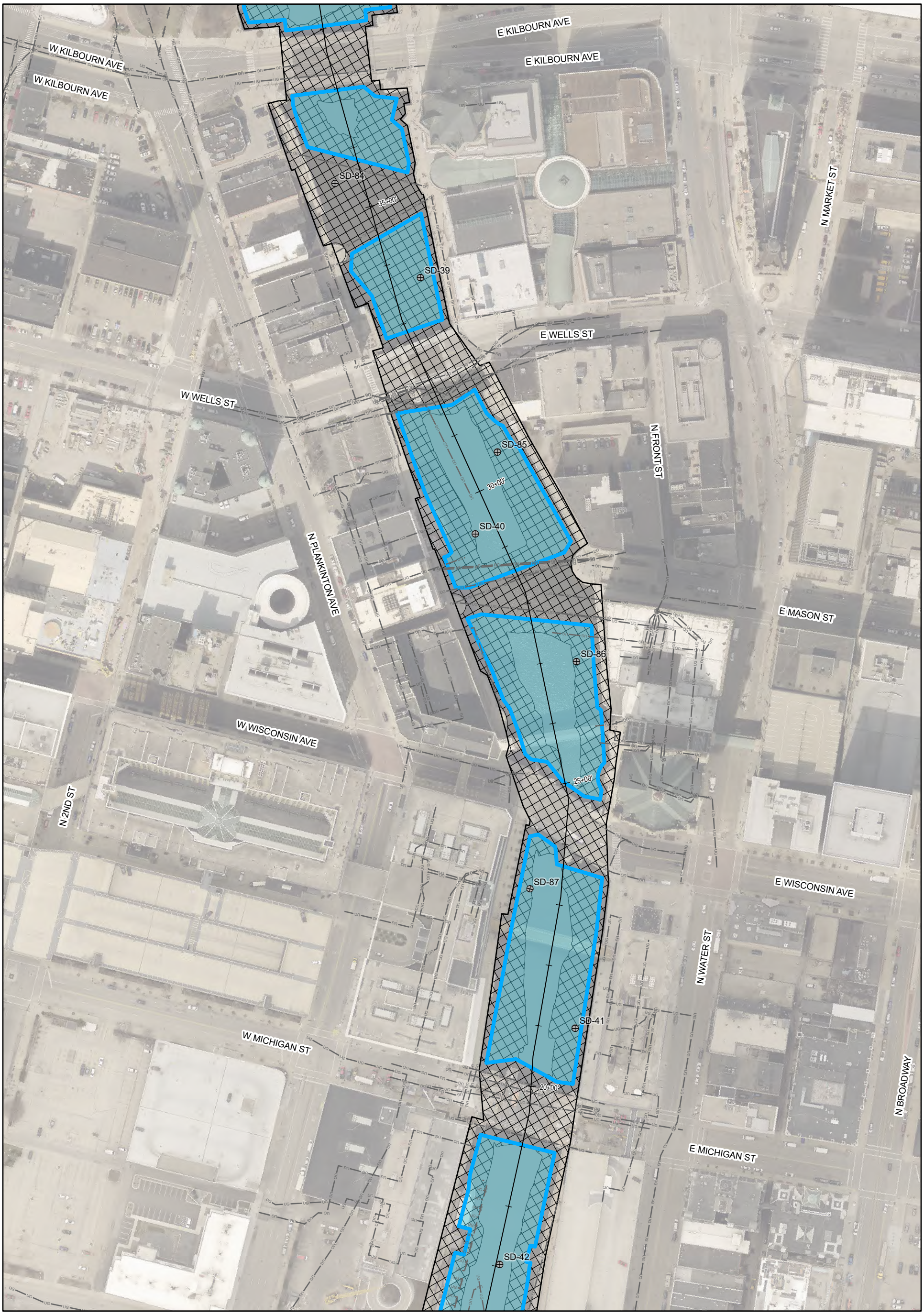


Figure 5-1D
Downtown Reach -
Alternative 2 Conceptual Layout
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin



LEGEND

- Analytical Sample Location
- Underground Utility
- Milwaukee River Downtown Reach Project Area
- Non-TSCA Sediment Dredge Extent
- Cap Extent

N

0 75 150

Approximate scale in feet

Notes:
1. 2020 Aerial Photography provided by The Milwaukee County Land Information Office.
2. mg/kg = milligram(s) per kilogram; TSCA = Toxic Substances Control Act (50 mg/kg)

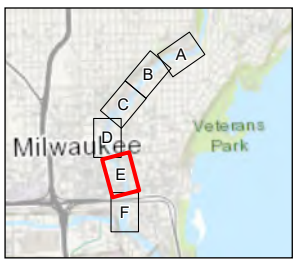


Figure 5-1E
Downtown Reach -
Alternative 2 Conceptual Layout
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

W CLYBOURN ST
E CLYBOURN ST
N BROADWAY
794
W ST PAUL AVE
E ST PAUL AVE
15+00'
10+00'
SD-88
SD-43
W BUFFALO ST
N PLANKINTON AVE
E BUFFALO ST
5+00'
Milwaukee River
SD-44
OU2-SED-01
N WATER ST
R5-17
Menomonee River
OU2-SED-02
OU2-SED-03
E CHICAGO ST
End of Downtown Reach Project Area
OU2-SED-A1-01
0+00'
Scour protection at downstream end of excavation to prevent erosion
E ERIE ST
OU2-SED-04
OU2-SD-A1-02A
S 2ND ST
OU2-SED-05
S 1ST ST
OU2-SD-A2-01
OU2-SED-06
Milwaukee River
OU2-SED-07

LEGEND

- Analytical Sample Location
- Underground Utility
- Federal Navigation Channel (Source: United States Army Corps of Engineers)
- Milwaukee River Downtown Reach Project Area
- Non-TSCA Sediment Dredge Extent
- Cap Extent

N

0 75 150

Approximate scale in feet

Notes:
1. 2020 Aerial Photography provided by The Milwaukee County Land Information Office.
2. mg/kg = milligram(s) per kilogram; TSCA = Toxic Substances Control Act (50 mg/kg)

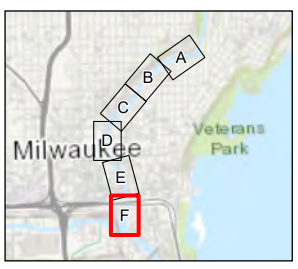
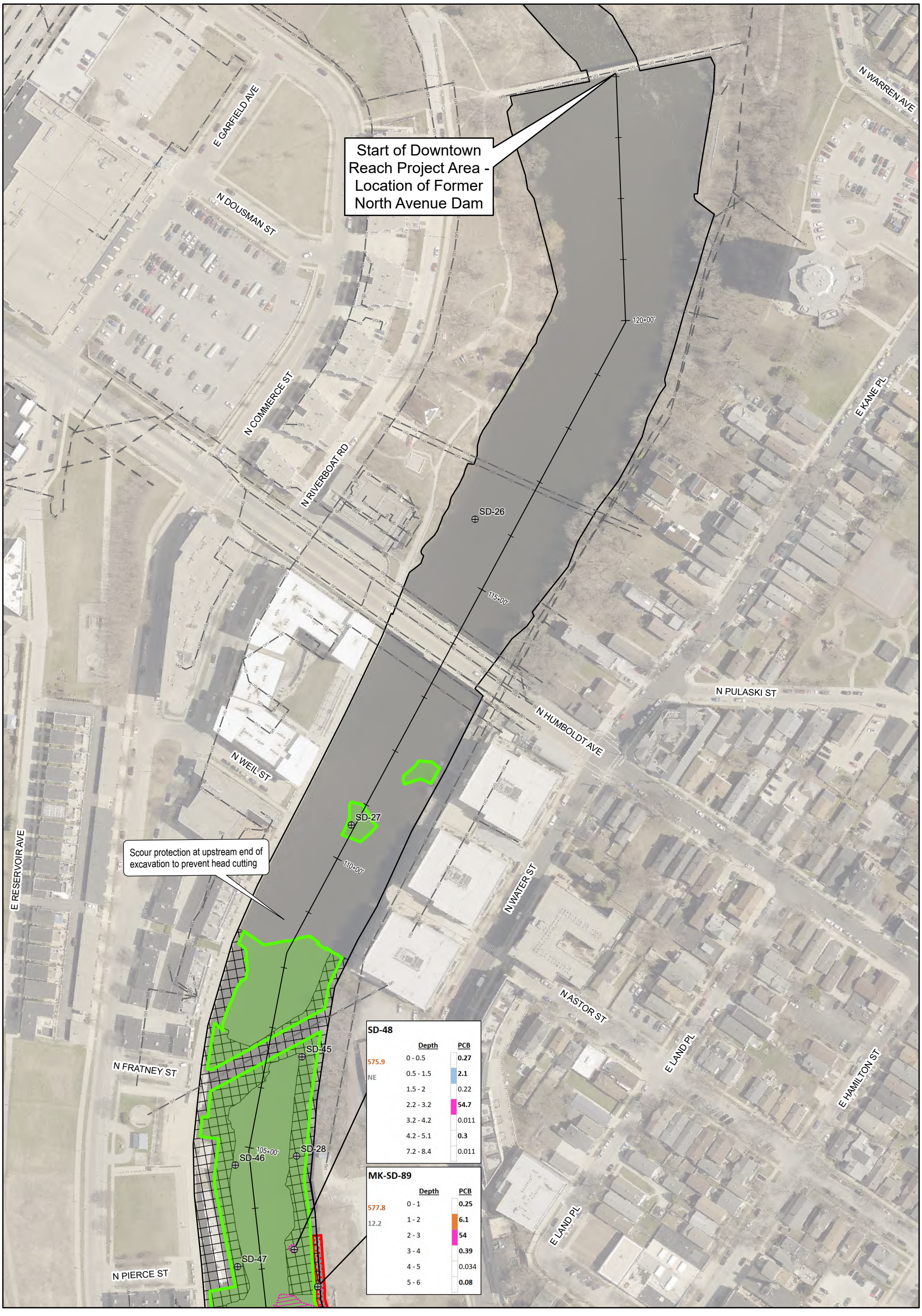


Figure 5-1F
Downtown Reach -
Alternative 2 Conceptual Layout
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin



LEGEND

- Analytical Sample Location
- Underground Utility
- Milwaukee River Downtown Reach Project Area
- Non-TSCA Sediment Dredge Extent
- Cap Extent
- TSCA Sediment Extent
- TSCA Removal Shoreline Reinforcement

0 75 150

Approximate scale in feet

Analytical Results for Locations with PCB >50 mg/kg

Location ID		PCB (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Mudline Elevation	Depth	<1	<PEC	<PEC
Native Material Depth	Sample interval (ft bss)	1 - 3	>PEC	>PEC
		3 - 5	>3xPEC	>3xPEC
		5 - 50	>5xPEC	>5xPEC
		>50		

Bold values represent results above the detection limit

"-" = COC was not sampled/analyzed

NE = Not Encountered

Notes:

1. 2020 Aerial Photography provided by The Milwaukee County Land Information Office.
2. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
3. 3x = 3 times; 5x = 5 times; COC = Contaminant of Concern; ft bss = feet below sediment surface; mg/kg = milligram(s) per kilogram; NE = Not Encountered; PAH = polycyclic aromatic hydrocarbons; PCB = polychlorinated biphenyl; PEC =Probable Effects Concentration; TSCA = Toxic Substances Control Act (50 mg/kg)

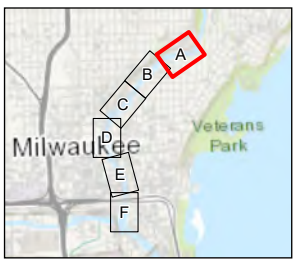
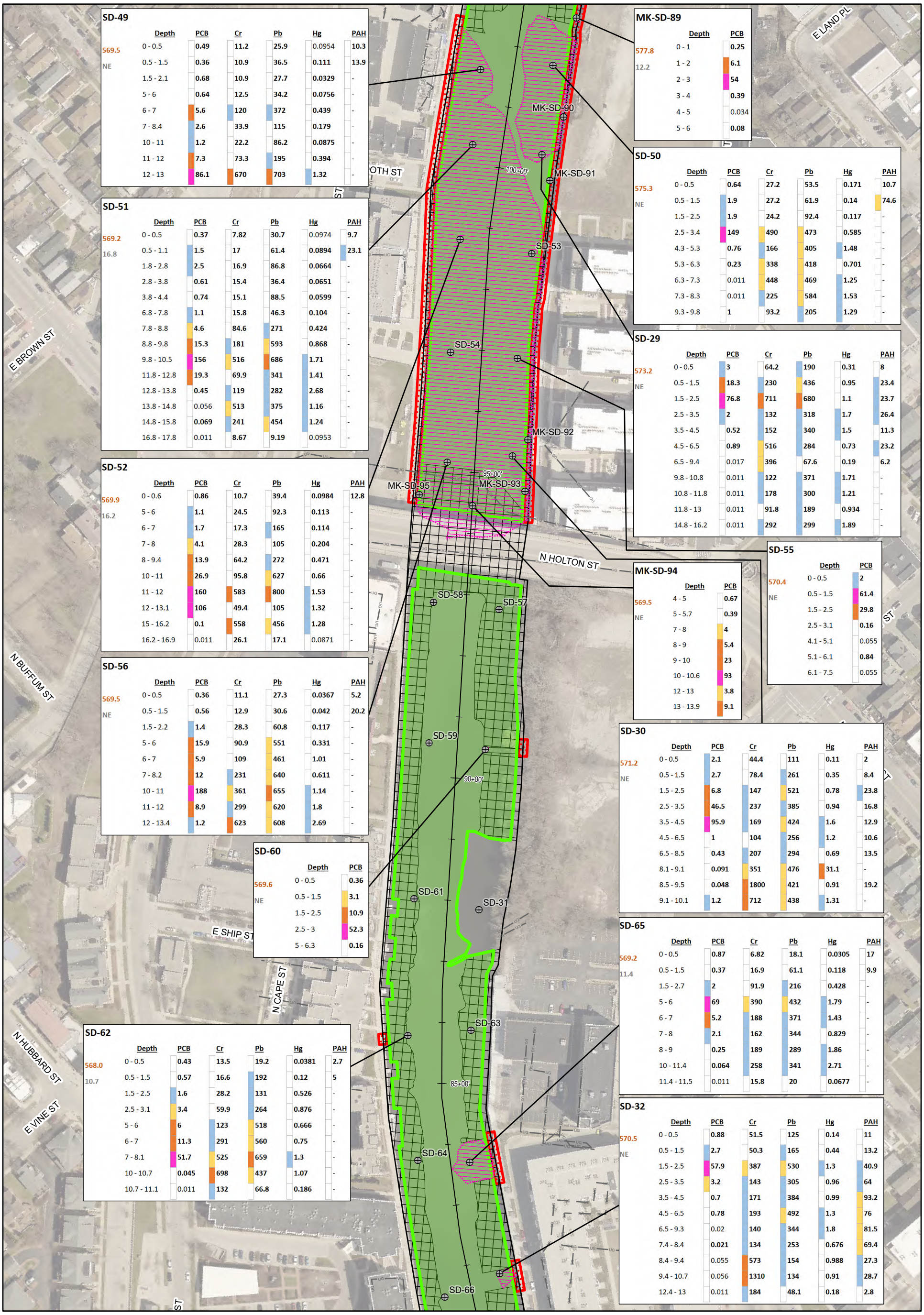


Figure 5-2A
Downtown Reach -
Alternative 3 Conceptual Layout
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin



SD-49

	Depth	PCB	Cr	Pb	Hg	PAH
569.5	0 - 0.5	0.49	11.2	25.9	0.0954	10.3
NE	0.5 - 1.5	0.36	10.9	36.5	0.111	13.9
	1.5 - 2.1	0.68	10.9	27.7	0.0329	-
	5 - 6	0.64	12.5	34.2	0.0756	-
	6 - 7	5.6	120	372	0.439	-
	7 - 8.4	2.6	33.9	115	0.179	-
	10 - 11	1.2	22.2	86.2	0.0875	-
	11 - 12	7.3	73.3	195	0.394	-
	12 - 13	86.1	670	703	1.32	-

SD-51

	Depth	PCB	Cr	Pb	Hg	PAH
569.2	0 - 0.5	0.37	7.82	30.7	0.0974	9.7
16.8	0.5 - 1.1	1.5	17	61.4	0.0894	23.1
	1.8 - 2.8	2.5	16.9	86.8	0.0664	-
	2.8 - 3.8	0.61	15.4	36.4	0.0651	-
	3.8 - 4.4	0.74	15.1	88.5	0.0599	-
	6.8 - 7.8	1.1	15.8	46.3	0.104	-
	7.8 - 8.8	4.6	84.6	271	0.424	-
	8.8 - 9.8	15.3	181	593	0.868	-
	9.8 - 10.5	156	516	686	1.71	-
	11.8 - 12.8	19.3	69.9	341	1.41	-
	12.8 - 13.8	0.45	119	282	2.68	-
	13.8 - 14.8	0.056	513	375	1.16	-
	14.8 - 15.8	0.069	241	454	1.24	-
	16.8 - 17.8	0.011	8.67	9.19	0.0953	-

SD-52

	Depth	PCB	Cr	Pb	Hg	PAH
569.9	0 - 0.6	0.86	10.7	39.4	0.0984	12.8
16.2	5 - 6	1.1	24.5	92.3	0.113	-
	6 - 7	1.7	17.3	165	0.114	-
	7 - 8	4.1	28.3	105	0.204	-
	8 - 9.4	13.9	64.2	272	0.471	-
	10 - 11	26.9	95.8	627	0.66	-
	11 - 12	160	583	800	1.53	-
	12 - 13.1	106	49.4	105	1.32	-
	15 - 16.2	0.1	558	456	1.28	-
	16.2 - 16.9	0.011	26.1	17.1	0.0871	-

SD-56

	Depth	PCB	Cr	Pb	Hg	PAH
569.5	0 - 0.5	0.36	11.1	27.3	0.0367	5.2
NE	0.5 - 1.5	0.56	12.9	30.6	0.042	20.2
	1.5 - 2.2	1.4	28.3	60.8	0.117	-
	5 - 6	15.9	90.9	551	0.331	-
	6 - 7	5.9	109	461	1.01	-
	7 - 8.2	12	231	640	0.611	-
	10 - 11	188	361	655	1.14	-
	11 - 12	8.9	299	620	1.8	-
	12 - 13.4	1.2	623	608	2.69	-

SD-60

	Depth	PCB
569.6	0 - 0.5	0.36
NE	0.5 - 1.5	3.1
	1.5 - 2.5	10.9
	2.5 - 3	52.3
	5 - 6.3	0.16

SD-62

	Depth	PCB	Cr	Pb	Hg	PAH
568.0	0 - 0.5	0.43	13.5	19.2	0.0381	2.7
10.7	0.5 - 1.5	0.57	16.6	192	0.12	5
	1.5 - 2.5	1.6	28.2	131	0.526	-
	2.5 - 3.1	3.4	59.9	264	0.876	-
	5 - 6	6	123	518	0.666	-
	6 - 7	11.3	291	560	0.75	-
	7 - 8.1	51.7	525	659	1.3	-
	10 - 10.7	0.045	698	437	1.07	-
	10.7 - 11.1	0.011	132	66.8	0.186	-

MK-SD-89

	Depth	PCB
577.8	0 - 1	0.25
12.2	1 - 2	6.1
	2 - 3	54
	3 - 4	0.39
	4 - 5	0.034
	5 - 6	0.08

SD-50

	Depth	PCB	Cr	Pb	Hg	PAH
575.3	0 - 0.5	0.64	27.2	53.5	0.171	10.7
NE	0.5 - 1.5	1.9	27.2	61.9	0.14	74.6
	1.5 - 2.5	1.9	24.2	92.4	0.117	-
	2.5 - 3.4	149	490	473	0.585	-
	4.3 - 5.3	0.76	166	405	1.48	-
	5.3 - 6.3	0.23	338	418	0.701	-
	6.3 - 7.3	0.011	448	469	1.25	-
	7.3 - 8.3	0.011	225	584	1.53	-
	9.3 - 9.8	1	93.2	205	1.29	-

SD-29

	Depth	PCB	Cr	Pb	Hg	PAH
573.2	0 - 0.5	3	64.2	190	0.31	8
NE	0.5 - 1.5	18.3	230	436	0.95	23.4
	1.5 - 2.5	76.8	711	680	1.1	23.7
	2.5 - 3.5	2	132	318	1.7	26.4
	3.5 - 4.5	0.52	152	340	1.5	11.3
	4.5 - 6.5	0.89	516	284	0.73	23.2
	6.5 - 9.4	0.017	396	67.6	0.19	6.2
	9.8 - 10.8	0.011	122	371	1.71	-
	10.8 - 11.8	0.011	178	300	1.21	-
	11.8 - 13	0.011	91.8	189	0.934	-
	14.8 - 16.2	0.011	292	299	1.89	-

SD-55

	Depth	PCB
570.4	0 - 0.5	2
NE	0.5 - 1.5	61.4
	1.5 - 2.5	29.8
	2.5 - 3.1	0.16
	4.1 - 5.1	0.055
	5.1 - 6.1	0.84
	6.1 - 7.5	0.055

MK-SD-94

	Depth	PCB
569.5	4 - 5	0.67
NE	5 - 5.7	0.39
	7 - 8	4
	8 - 9	5.4
	9 - 10	23
	10 - 10.6	93
	12 - 13	3.8
	13 - 13.9	9.1

SD-30

	Depth	PCB	Cr	Pb	Hg	PAH
571.2	0 - 0.5	2.1	44.4	111	0.11	2
NE	0.5 - 1.5	2.7	78.4	261	0.35	8.4
	1.5 - 2.5	6.8	147	521	0.78	23.8
	2.5 - 3.5	46.5	237	385	0.94	16.8
	3.5 - 4.5	95.9	169	424	1.6	12.9
	4.5 - 6.5	1	104	256	1.2	10.6
	6.5 - 8.5	0.43	207	294	0.69	13.5
	8.1 - 9.1	0.091	351	476	31.1	-
	8.5 - 9.5	0.048	1800	421	0.91	19.2
	9.1 - 10.1	1.2	712	438	1.31	-

SD-65

	Depth	PCB	Cr	Pb	Hg	PAH
569.2	0 - 0.5	0.87	6.82	18.1	0.0305	17
11.4	0.5 - 1.5	0.37	16.9	61.1	0.118	9.9
	1.5 - 2.7	2	91.9	216	0.428	-
	5 - 6	69	390	432	1.79	-
	6 - 7	5.2	188	371	1.43	-
	7 - 8	2.1	162	344	0.829	-
	8 - 9	0.25	189	289	1.86	-
	10 - 11.4	0.064	258	341	2.71	-
	11.4 - 11.5	0.011	15.8	20	0.0677	-

SD-32

	Depth	PCB	Cr	Pb	Hg	PAH
570.5	0 - 0.5	0.88	51.5	125	0.14	11
NE	0.5 - 1.5	2.7	50.3	165	0.44	13.2
	1.5 - 2.5	57.9	387	530	1.3	40.9
	2.5 - 3.5	3.2	143	305	0.96	64
	3.5 - 4.5	0.7	171	384	0.99	93.2
	4.5 - 6.5	0.78	193	492	1.3	76
	6.5 - 9.3	0.02	140	344	1.8	81.5
	7.4 - 8.4	0.021	134	253	0.676	69.4
	8.4 - 9.4	0.055	573	154	0.988	27.3
	9.4 - 10.7	0.056	1310	134	0.91	28.7
	12.4 - 13	0.011	184	48.1	0.18	2.8

LEGEND

- Analytical Sample Location
- Underground Utility
- Milwaukee River Downtown Reach Project Area
- Non-TSCA Sediment Dredge Extent
- Cap Extent
- TSCA Sediment Extent
- TSCA Removal Shoreline Reinforcement

N

0 75 150

Approximate scale in feet

Analytical Results for Locations with PCB >50 mg/kg

Location ID

Mudline Elevation

Native Material Depth

Depth	PCB (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
	<1	<PEC	<PEC
Sample interval (ft bss)	1 - 3	>PEC	>PEC
	3 - 5	>3xPEC	>3xPEC
	5 - 50	>5xPEC	>5xPEC
	>50		

Bold values represent results above the detection limit

"-" = COC was not sampled/analyzed

NE = Not Encountered

Notes:

1. 2020 Aerial Photography provided by The Milwaukee County Land Information Office.
2. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
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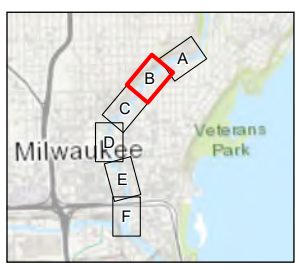


Figure 5-2B
Downtown Reach -
Alternative 3 Conceptual Layout
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

N COMMERCE ST
N HUBBARD ST
N PALMER ST
E PLEASANT ST
N JEFFERSON ST
N EDISON ST
N RIVERCENTER DR
N 2ND ST
W CHERRY ST
E CHERRY ST
E OGDEN AVE
W MANPOWER PL
N MARTIN L KING JR DR
80+00'
75+00'
70+00'
65+00'
60+00'
SD-67
SD-68
SD-70
SD-34
SD-72
SD-76
SD-75
SD-35
MK-SD-96
MK-SD-97
MK-SD-98
MK-SD-99
MK-SD-100
MK-SD-101
MK-SD-102
MK-SD-103

SD-69

568.7 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.53	7.72	20.4	0.0378	24
0.5 - 1.5	0.82	10.3	410	0.0644	28.8
5 - 6.1	0.8	17.5	87.3	0.0762	-
10 - 11	5.8	89.7	447	0.336	-
11 - 12.3	55.6	1090	520	0.713	-
15 - 16	9.6	925	651	1.14	-
16 - 17.1	0.036	282	414	0.794	-

SD-33

569.7 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	3.2	67.1	158	0.27	11.5
0.5 - 1.5	4.5	141	641	0.41	96.1
1.5 - 2.5	1.7	106	324	0.48	15
2.5 - 3.5	2.7	114	352	0.64	75.5
3.5 - 4.5	3.6	498	470	0.99	87.8
4.5 - 6.5	5.5	781	408	0.72	45.4
6.5 - 9.3	10.2	642	681	1.7	93.6
7.6 - 8.6	91.8	739	317	2.3	371
8.6 - 9.6	0.79	1380	260	1.53	225
9.6 - 10.6	0.055	16.1	32.9	5.98	173
10.6 - 11.3	0.055	1670	258	3.26	37.7
12.6 - 13.6	0.056	1330	151	1.21	29.3
13.6 - 14.6	0.011	38.3	10.4	0.163	2.7
14.6 - 15.3	0.011	1380	377	0.079	0.083

SD-71

573.4 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.23	0.303	0.785	0.082	0.8
0.5 - 1.5	29	1480	346	0.745	2.5
1.5 - 2.6	58.2	0.144	0.448	1.13	-
6 - 7	0.41	636	400	1.89	-
7 - 8	0.056	515	476	1.63	-
8 - 9.2	0.055	297	484	1.78	-
11 - 12	0.047	451	652	1.85	-
12 - 13	0.055	772	538	1.9	-
13 - 14	0.056	1140	532	3.09	-
14 - 14.8	0.011	126	198	0.89	-
16 - 17	0.055	1180	292	4.89	-
17 - 18	0.055	155	193	2.71	-
18 - 19	0.011	444	98	1.06	-
19 - 19.5	0.011	37.7	11.2	0.0937	-

SD-73

569.6 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.53	25.3	36.3	0.0445	204
0.5 - 1.5	1.1	32.2	139	0.176	7.3
1.5 - 2.3	4.1	55.2	192	0.3	16
5 - 6	1.6	64.3	304	0.383	4.4
6 - 7	6.5	626	472	0.511	107
7 - 8.2	51.1	4640	692	2.37	110
10 - 11	0.63	356	597	1.76	126
11 - 12	0.011	506	574	1.89	54.4
12 - 13.1	0.011	468	604	1.48	68
15 - 16	0.011	477	566	1.64	52.4
16 - 17	0.011	116	283	1.93	105
17 - 18	0.011	248	500	1.64	193
18 - 19.1	0.011	189	236	2	61.7
20 - 21	0.011	341	418	1.3	66.8
21 - 22	0.011	212	374	1.4	100
22 - 23	0.011	299	397	1.32	115
23 - 24	0.011	277	163	1.96	16.2

SD-74

565.9 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.38	9.93	21.9	0.0954	4.6
0.5 - 1.5	1	48.3	88.8	0.118	85.4
1.5 - 2.6	83.9	6710	548	1.01	-
5 - 6	4.3	301	332	1.27	-
6 - 7	2.7	272	474	1.33	-
7 - 8	1.7	188	416	1.68	-
10 - 11	0.39	374	381	0.956	-
11 - 12	0.011	669	431	1.51	-
12 - 13.3	0.011	244	351	1.02	-
15 - 16	0.045	199	353	0.954	-
16 - 17	0.011	179	176	1.51	-
17 - 17.6	0.011	3.25	2.4	0.0987	-

SD-77

567.7 20

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.51	21	77.3	0.0812	13.6
0.5 - 1.5	2.2	85	272	0.263	13.3
1.5 - 2.5	2.7	252	401	0.303	-
2.5 - 3.5	20.1	2100	477	0.682	-
3.5 - 4.5	133	3720	490	3.24	-
4.5 - 5.5	65.4	1140	428	2.55	-
7.1 - 8.1	1.5	193	348	1.27	-
8.1 - 9.5	0.69	299	477	1.3	-
12.1 - 13.1	0.011	465	495	4.07	-
13.1 - 14.1	0.011	584	566	6.34	-
14.1 - 15.2	0.011	662	500	6.45	-
17.1 - 18.1	0.011	33.8	29.9	0.0661	-
18.1 - 19.1	0.011	0.409	0.337	0.0977	-
19.1 - 20	0.011	0.409	0.337	0.0938	-
20 - 21	0.011	6.56	8.16	0.099	-

LEGEND

- Analytical Sample Location
- Underground Utility
- Milwaukee River Downtown Reach Project Area
- Non-TSCA Sediment Dredge Extent
- Cap Extent
- TSCA Sediment Extent
- TSCA Removal Shoreline Reinforcement

0 75 150

Approximate scale in feet

Analytical Results for Locations with PCB >50 mg/kg

Location ID
Mudline Elevation
Native Material Depth

Depth	PCB (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
	<1	<PEC	<PEC
Sample interval (ft bss) 1 - 3	>PEC	>PEC	
3 - 5	>3xPEC	>3xPEC	
5 - 50	>5xPEC	>5xPEC	
>50			

Bold values represent results above the detection limit
"-" = COC was not sampled/analyzed
NE = Not Encountered

Notes:
1. 2020 Aerial Photography provided by The Milwaukee County Land Information Office.
2. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
3. 3x = 3 times; 5x = 5 times; COC = Contaminant of Concern; Cr = chromium; ft bss =feet below sediment surface; mg/kg = milligrams per kilogram; NE = Not Encountered; Hg = mercury; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PEC = Probably Effects Concentration; TSCA = Toxic Substances Control Act (50 mg/kg)

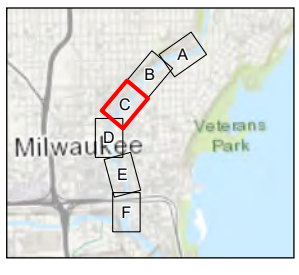
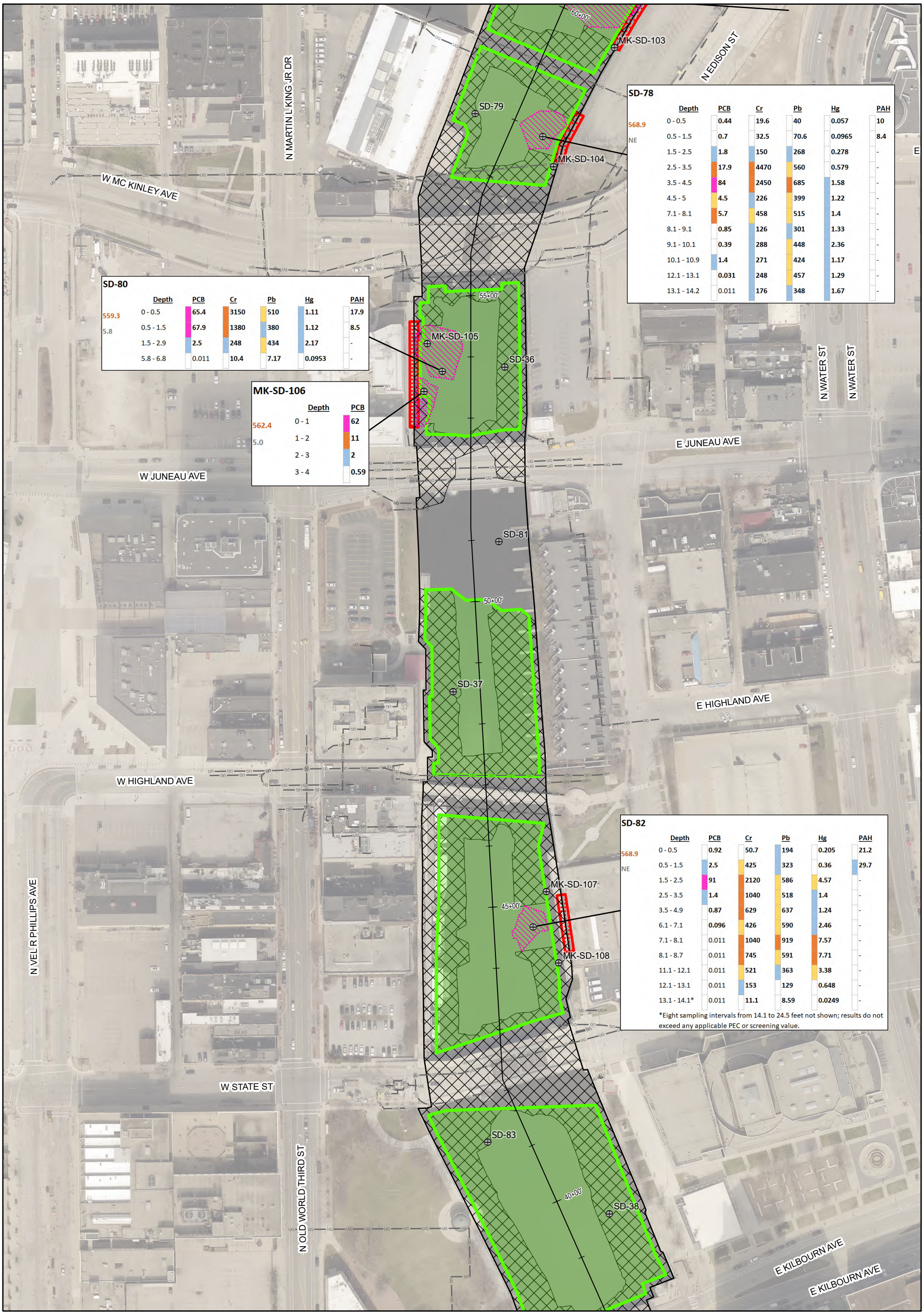


Figure 5-2C
Downtown Reach -
Alternative 3 Conceptual Layout
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin



SD-78

568.9 / NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.44	19.6	40	0.057	10
0.5 - 1.5	0.7	32.5	70.6	0.0965	8.4
1.5 - 2.5	1.8	150	268	0.278	-
2.5 - 3.5	17.9	4470	560	0.579	-
3.5 - 4.5	84	2450	685	1.58	-
4.5 - 5	4.5	226	399	1.22	-
7.1 - 8.1	5.7	458	515	1.4	-
8.1 - 9.1	0.85	126	301	1.33	-
9.1 - 10.1	0.39	288	448	2.36	-
10.1 - 10.9	1.4	271	424	1.17	-
12.1 - 13.1	0.031	248	457	1.29	-
13.1 - 14.2	0.011	176	348	1.67	-

SD-80

559.3 / 5.8

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	65.4	3150	510	1.11	17.9
0.5 - 1.5	67.9	1380	380	1.12	8.5
1.5 - 2.9	2.5	248	434	2.17	-
5.8 - 6.8	0.011	10.4	7.17	0.0953	-

MK-SD-106

562.4 / 5.0

Depth	PCB
0 - 1	62
1 - 2	11
2 - 3	2
3 - 4	0.59

SD-82

568.9 / NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.92	50.7	194	0.205	21.2
0.5 - 1.5	2.5	425	323	0.36	29.7
1.5 - 2.5	91	2120	586	4.57	-
2.5 - 3.5	1.4	1040	518	1.4	-
3.5 - 4.9	0.87	629	637	1.24	-
6.1 - 7.1	0.096	426	590	2.46	-
7.1 - 8.1	0.011	1040	919	7.57	-
8.1 - 8.7	0.011	745	591	7.71	-
11.1 - 12.1	0.011	521	363	3.38	-
12.1 - 13.1	0.011	153	129	0.648	-
13.1 - 14.1*	0.011	11.1	8.59	0.0249	-

*Eight sampling intervals from 14.1 to 24.5 feet not shown; results do not exceed any applicable PEC or screening value.

LEGEND

- Analytical Sample Location
- Underground Utility
- Milwaukee River Downtown Reach Project Area
- Non-TSCA Sediment Dredge Extent
- Cap Extent
- TSCA Sediment Extent
- TSCA Removal Shoreline Reinforcement

N

0 75 150

Approximate scale in feet

Analytical Results for Locations with PCB >50 mg/kg

Location ID		PCB (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Mudline Elevation				
Native Material Depth		<1	<PEC	<PEC
Sample interval (ft bss)	1 - 3	>PEC	>PEC	>PEC
	3 - 5	>3xPEC	>3xPEC	>3xPEC
	5 - 50	>5xPEC	>5xPEC	>5xPEC
	>50			

Bold values represent results above the detection limit

"-" = COC was not sampled/analyzed

NE = Not Encountered

Notes:
1. 2020 Aerial Photography provided by The Milwaukee County Land Information Office.
2. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
3. 3x = 3 times; 5x = 5 times; COC = Contaminant of Concern; Cr = chromium; ft bss =feet below sediment surface; mg/kg = milligrams per kilogram; NE = Not Encountered; Hg = mercury; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PEC = Probable Effects Concentration; TSCA = Toxic Substances Control Act (50 mg/kg)

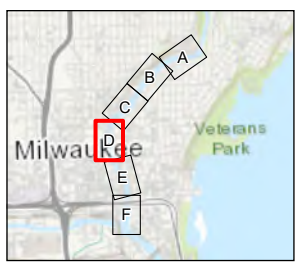
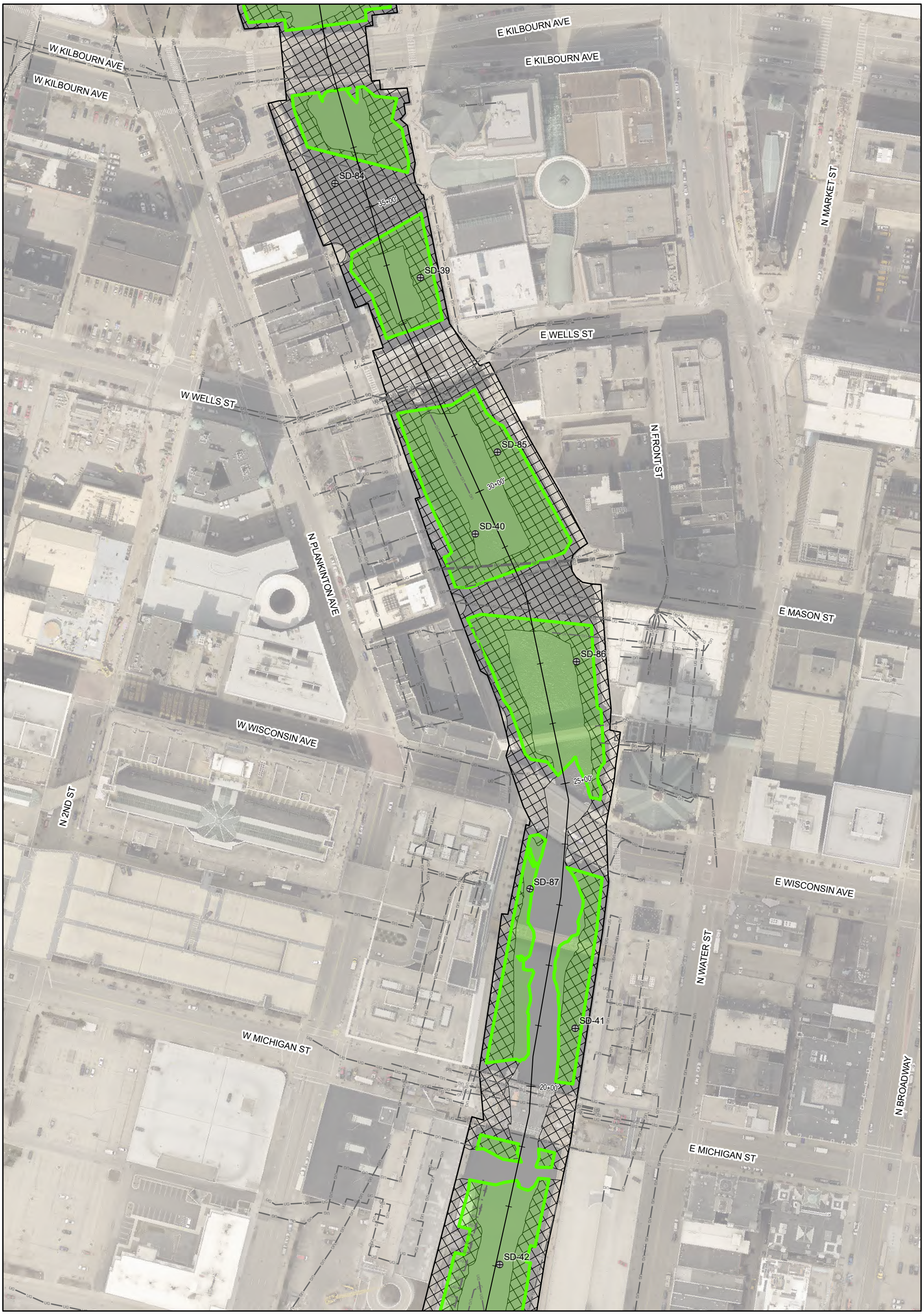


Figure 5-2D
Downtown Reach -
Alternative 3 Conceptual Layout
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin



LEGEND

- Analytical Sample Location
- Underground Utility
- Milwaukee River Downtown Reach Project Area
- Non-TSCA Sediment Dredge Extent
- Cap Extent

N

0 75 150

Approximate scale in feet

Notes:
1. 2020 Aerial Photography provided by The Milwaukee County Land Information Office.
2. mg/kg = milligram(s) per kilogram; TSCA = Toxic Substances Control Act (50 mg/kg)

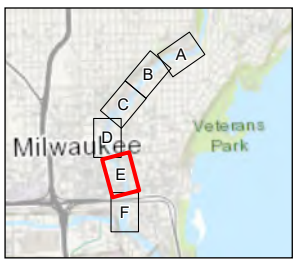


Figure 5-2E
Downtown Reach -
Alternative 3 Conceptual Layout
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

W CLYBOURN ST
E CLYBOURN ST
N BROADWAY
794
W ST PAUL AVE
E ST PAUL AVE
15+00'
10+00'
SD-88
W BUFFALO ST
SD-43
N PLANKINTON AVE
E BUFFALO ST
5+00'
Milwaukee River
N WATER ST
SD-44
OU2-SED-01
R5-17
Menomonee River
OU2-SED-02
E CHICAGO ST
OU2-SED-03
End of Downtown Reach Project Area
OU2-SED-A1-01
0+00'
Scour protection at downstream end of excavation to prevent erosion
E ERIE ST
OU2-SED-04
OU2-SD-A1-02A
S 2ND ST
OU2-SED-05
S 1ST ST
OU2-SD-A2-01
OU2-SED-06
Milwaukee River
OU2-SED-07

LEGEND

- Analytical Sample Location
- Underground Utility
- Federal Navigation Channel (Source: United States Army Corps of Engineers)
- Milwaukee River Downtown Reach Project Area
- Non-TSCA Sediment Dredge Extent
- Cap Extent

N

0 75 150

Approximate scale in feet

Notes:
1. 2020 Aerial Photography provided by The Milwaukee County Land Information Office.
2. mg/kg = milligram(s) per kilogram; TSCA = Toxic Substances Control Act (50 mg/kg)

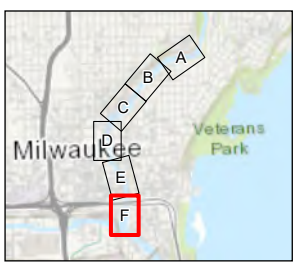


Figure 5-2F
Downtown Reach -
Alternative 3 Conceptual Layout
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Start of Downtown Reach Project Area - Location of Former North Avenue Dam

E GARFIELD AVE
N DOUSMAN ST
N COMMERCE ST
N RIVERBOAT RD
N WARREN AVE
E KANE PL
N PULASKI ST
N HUMBOLDT AVE
N WEIL ST
E RESERVOIR AVE
N WATER ST
N ASTOR ST
E LAND PL
E HAMILTON ST
N FRATNEY ST
N PIERCE ST

120+00'
115+00'
110+00'
105+00'

SD-26
SD-27
SD-28
SD-45
SD-46
SD-47

Scour protection at upstream end of excavation to prevent head cutting

SD-48

	Depth	PCB
575.9	0 - 0.5	**0.27**
NE	0.5 - 1.5	**2.1**
	1.5 - 2	0.22
	2.2 - 3.2	**54.7**
	3.2 - 4.2	0.011
	4.2 - 5.1	**0.3**
	7.2 - 8.4	0.011

MK-SD-89

	Depth	PCB
577.8	0 - 1	**0.25**
12.2	1 - 2	**6.1**
	2 - 3	**54**
	3 - 4	**0.39**
	4 - 5	0.034
	5 - 6	**0.08**

LEGEND

- Analytical Sample Location
- Underground Utility
- Milwaukee River Downtown Reach Project Area
- Non-TSCA Sediment Dredge Extent
- Alternative 3 Cap Extent
- TSCA Sediment Extent
- TSCA Removal Shoreline Reinforcement

0 75 150
Approximate scale in feet

Analytical Results for Locations with PCB >50 mg/kg

Location ID		PCB (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Mudline Elevation	Depth	<1	<PEC	<PEC
Native Material Depth	Sample interval (ft bss)	1 - 3	>PEC	>PEC
		3 - 5	>3xPEC	>3xPEC
		5 - 50	>5xPEC	>5xPEC
		>50		

Bold values represent results above the detection limit
"-" = COC was not sampled/analyzed
NE = Not Encountered

Notes:
1. 2020 Aerial Photography provided by The Milwaukee County Land Information Office.
2. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
3. 3x = 3 times; 5x = 5 times; COC = Contaminant of Concern; ft bss = feet below sediment surface; mg/kg = milligram(s) per kilogram; NE = Not Encountered; PAH = polycyclic aromatic hydrocarbons; PCB = polychlorinated biphenyls: PEC =Probable Effects Concentration; TSCA = Toxic Substances Control Act (50 mg/kg)

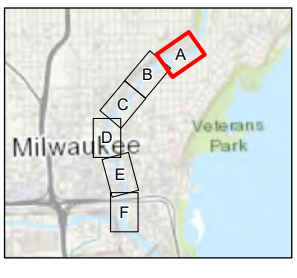
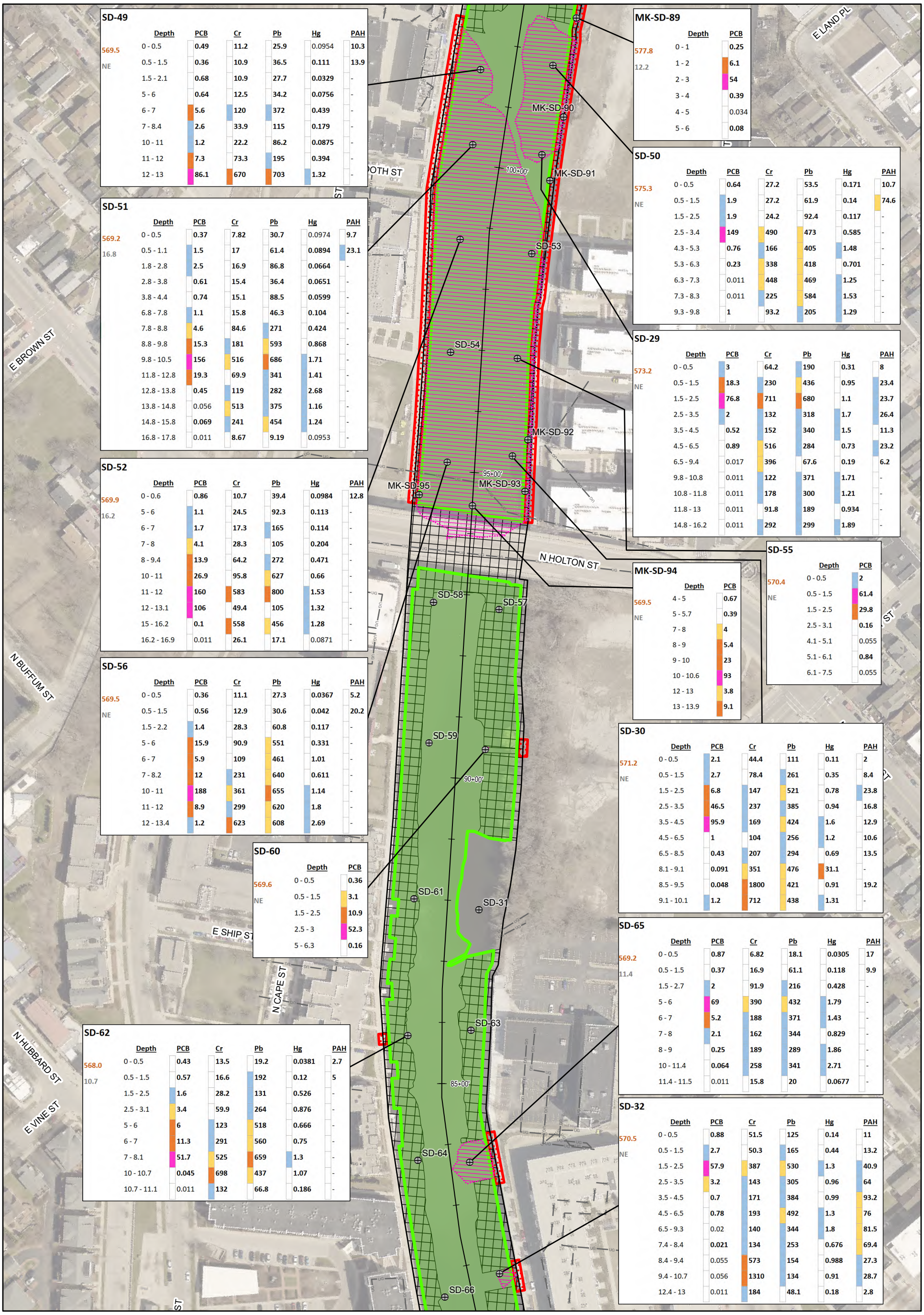


Figure 5-3A
Downtown Reach -
Alternative 3A Conceptual Layout
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin



SD-49

	Depth	PCB	Cr	Pb	Hg	PAH
569.5	0 - 0.5	0.49	11.2	25.9	0.0954	10.3
NE	0.5 - 1.5	0.36	10.9	36.5	0.111	13.9
	1.5 - 2.1	0.68	10.9	27.7	0.0329	-
	5 - 6	0.64	12.5	34.2	0.0756	-
	6 - 7	5.6	120	372	0.439	-
	7 - 8.4	2.6	33.9	115	0.179	-
	10 - 11	1.2	22.2	86.2	0.0875	-
	11 - 12	7.3	73.3	195	0.394	-
	12 - 13	86.1	670	703	1.32	-

SD-51

	Depth	PCB	Cr	Pb	Hg	PAH
569.2	0 - 0.5	0.37	7.82	30.7	0.0974	9.7
16.8	0.5 - 1.1	1.5	17	61.4	0.0894	23.1
	1.8 - 2.8	2.5	16.9	86.8	0.0664	-
	2.8 - 3.8	0.61	15.4	36.4	0.0651	-
	3.8 - 4.4	0.74	15.1	88.5	0.0599	-
	6.8 - 7.8	1.1	15.8	46.3	0.104	-
	7.8 - 8.8	4.6	84.6	271	0.424	-
	8.8 - 9.8	15.3	181	593	0.868	-
	9.8 - 10.5	156	516	686	1.71	-
	11.8 - 12.8	19.3	69.9	341	1.41	-
	12.8 - 13.8	0.45	119	282	2.68	-
	13.8 - 14.8	0.056	513	375	1.16	-
	14.8 - 15.8	0.069	241	454	1.24	-
	16.8 - 17.8	0.011	8.67	9.19	0.0953	-

SD-52

	Depth	PCB	Cr	Pb	Hg	PAH
569.9	0 - 0.6	0.86	10.7	39.4	0.0984	12.8
16.2	5 - 6	1.1	24.5	92.3	0.113	-
	6 - 7	1.7	17.3	165	0.114	-
	7 - 8	4.1	28.3	105	0.204	-
	8 - 9.4	13.9	64.2	272	0.471	-
	10 - 11	26.9	95.8	627	0.66	-
	11 - 12	160	583	800	1.53	-
	12 - 13.1	106	49.4	105	1.32	-
	15 - 16.2	0.1	558	456	1.28	-
	16.2 - 16.9	0.011	26.1	17.1	0.0871	-

SD-56

	Depth	PCB	Cr	Pb	Hg	PAH
569.5	0 - 0.5	0.36	11.1	27.3	0.0367	5.2
NE	0.5 - 1.5	0.56	12.9	30.6	0.042	20.2
	1.5 - 2.2	1.4	28.3	60.8	0.117	-
	5 - 6	15.9	90.9	551	0.331	-
	6 - 7	5.9	109	461	1.01	-
	7 - 8.2	12	231	640	0.611	-
	10 - 11	188	361	655	1.14	-
	11 - 12	8.9	299	620	1.8	-
	12 - 13.4	1.2	623	608	2.69	-

SD-60

	Depth	PCB
569.6	0 - 0.5	0.36
NE	0.5 - 1.5	3.1
	1.5 - 2.5	10.9
	2.5 - 3	52.3
	5 - 6.3	0.16

SD-62

	Depth	PCB	Cr	Pb	Hg	PAH
568.0	0 - 0.5	0.43	13.5	19.2	0.0381	2.7
10.7	0.5 - 1.5	0.57	16.6	192	0.12	5
	1.5 - 2.5	1.6	28.2	131	0.526	-
	2.5 - 3.1	3.4	59.9	264	0.876	-
	5 - 6	6	123	518	0.666	-
	6 - 7	11.3	291	560	0.75	-
	7 - 8.1	51.7	525	659	1.3	-
	10 - 10.7	0.045	698	437	1.07	-
	10.7 - 11.1	0.011	132	66.8	0.186	-

MK-SD-89

	Depth	PCB
577.8	0 - 1	0.25
12.2	1 - 2	6.1
	2 - 3	54
	3 - 4	0.39
	4 - 5	0.034
	5 - 6	0.08

SD-50

	Depth	PCB	Cr	Pb	Hg	PAH
575.3	0 - 0.5	0.64	27.2	53.5	0.171	10.7
NE	0.5 - 1.5	1.9	27.2	61.9	0.14	74.6
	1.5 - 2.5	1.9	24.2	92.4	0.117	-
	2.5 - 3.4	149	490	473	0.585	-
	4.3 - 5.3	0.76	166	405	1.48	-
	5.3 - 6.3	0.23	338	418	0.701	-
	6.3 - 7.3	0.011	448	469	1.25	-
	7.3 - 8.3	0.011	225	584	1.53	-
	9.3 - 9.8	1	93.2	205	1.29	-

SD-29

	Depth	PCB	Cr	Pb	Hg	PAH
573.2	0 - 0.5	3	64.2	190	0.31	8
NE	0.5 - 1.5	18.3	230	436	0.95	23.4
	1.5 - 2.5	76.8	711	680	1.1	23.7
	2.5 - 3.5	2	132	318	1.7	26.4
	3.5 - 4.5	0.52	152	340	1.5	11.3
	4.5 - 6.5	0.89	516	284	0.73	23.2
	6.5 - 9.4	0.017	396	67.6	0.19	6.2
	9.8 - 10.8	0.011	122	371	1.71	-
	10.8 - 11.8	0.011	178	300	1.21	-
	11.8 - 13	0.011	91.8	189	0.934	-
	14.8 - 16.2	0.011	292	299	1.89	-

MK-SD-94

	Depth	PCB
569.5	4 - 5	0.67
NE	5 - 5.7	0.39
	7 - 8	4
	8 - 9	5.4
	9 - 10	23
	10 - 10.6	93
	12 - 13	3.8
	13 - 13.9	9.1

SD-55

	Depth	PCB
570.4	0 - 0.5	2
NE	0.5 - 1.5	61.4
	1.5 - 2.5	29.8
	2.5 - 3.1	0.16
	4.1 - 5.1	0.055
	5.1 - 6.1	0.84
	6.1 - 7.5	0.055

SD-30

	Depth	PCB	Cr	Pb	Hg	PAH
571.2	0 - 0.5	2.1	44.4	111	0.11	2
NE	0.5 - 1.5	2.7	78.4	261	0.35	8.4
	1.5 - 2.5	6.8	147	521	0.78	23.8
	2.5 - 3.5	46.5	237	385	0.94	16.8
	3.5 - 4.5	95.9	169	424	1.6	12.9
	4.5 - 6.5	1	104	256	1.2	10.6
	6.5 - 8.5	0.43	207	294	0.69	13.5
	8.1 - 9.1	0.091	351	476	31.1	-
	8.5 - 9.5	0.048	1800	421	0.91	19.2
	9.1 - 10.1	1.2	712	438	1.31	-

SD-65

	Depth	PCB	Cr	Pb	Hg	PAH
569.2	0 - 0.5	0.87	6.82	18.1	0.0305	17
11.4	0.5 - 1.5	0.37	16.9	61.1	0.118	9.9
	1.5 - 2.7	2	91.9	216	0.428	-
	5 - 6	69	390	432	1.79	-
	6 - 7	5.2	188	371	1.43	-
	7 - 8	2.1	162	344	0.829	-
	8 - 9	0.25	189	289	1.86	-
	10 - 11.4	0.064	258	341	2.71	-
	11.4 - 11.5	0.011	15.8	20	0.0677	-

SD-32

	Depth	PCB	Cr	Pb	Hg	PAH
570.5	0 - 0.5	0.88	51.5	125	0.14	11
NE	0.5 - 1.5	2.7	50.3	165	0.44	13.2
	1.5 - 2.5	57.9	387	530	1.3	40.9
	2.5 - 3.5	3.2	143	305	0.96	64
	3.5 - 4.5	0.7	171	384	0.99	93.2
	4.5 - 6.5	0.78	193	492	1.3	76
	6.5 - 9.3	0.02	140	344	1.8	81.5
	7.4 - 8.4	0.021	134	253	0.676	69.4
	8.4 - 9.4	0.055	573	154	0.988	27.3
	9.4 - 10.7	0.056	1310	134	0.91	28.7
	12.4 - 13	0.011	184	48.1	0.18	2.8

LEGEND

- Analytical Sample Location
- UG — Underground Utility
- Milwaukee River Downtown Reach Project Area
- Non-TSCA Sediment Dredge Extent
- Alternative 3 Cap Extent
- TSCA Sediment Extent
- TSCA Removal Shoreline Reinforcement

N

0 75 150

Approximate scale in feet

Analytical Results for Locations with PCB >50 mg/kg

Location ID	Depth	PCB (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Mudline Elevation		<1	<PEC	<PEC
Native Material Depth	Sample interval (ft bss)	1 - 3	>PEC	>PEC
		3 - 5	>3xPEC	>3xPEC
		5 - 50	>5xPEC	>5xPEC
		>50		

Bold values represent results above the detection limit

"-" = COC was not sampled/analyzed

NE = Not Encountered

Notes:

1. 2020 Aerial Photography provided by The Milwaukee County Land Information Office.
2. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources, 2003).
3. 3x = 3 times; 5x = 5 times; COC = Contaminant of Concern; Cr = chromium; ft bss =feet below sediment surface; mg/kg = milligram(s) per kilogram; NE = Not Encountered; Hg = mercury; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PEC = Probable Effects Concentration; TSCA = Toxic Substances Control Act (50 mg/kg)

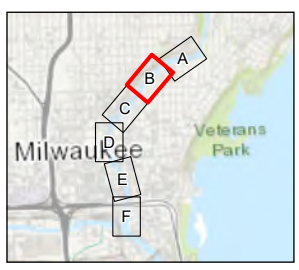


Figure 5-3B
Downtown Reach -
Alternative 3A Conceptual Layout
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

N COMMERCE ST
N HUBBARD ST
N PALMER ST
E PLEASANT ST
N JEFFERSON ST
N EDISON ST
N RIVERCENTER DR
E OGDEN AVE
N 2ND ST
W CHERRY ST
E CHERRY ST
W MANPOWER PL
N MARTIN L KING JR DR

80+00'
75+00'
70+00'
65+00'
60+00'

SD-67
SD-68
SD-70
SD-34
SD-72
SD-76
SD-75
SD-35

MK-SD-96
MK-SD-97
MK-SD-98
MK-SD-99
MK-SD-100
MK-SD-101
MK-SD-102
MK-SD-103

SD-69

568.7 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.53	7.72	20.4	0.0378	24
0.5 - 1.5	0.82	10.3	410	0.0644	28.8
5 - 6.1	0.8	17.5	87.3	0.0762	-
10 - 11	5.8	89.7	447	0.336	-
11 - 12.3	55.6	1090	520	0.713	-
15 - 16	9.6	925	651	1.14	-
16 - 17.1	0.036	282	414	0.794	-

SD-33

569.7 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	3.2	67.1	158	0.27	11.5
0.5 - 1.5	4.5	141	641	0.41	96.1
1.5 - 2.5	1.7	106	324	0.48	15
2.5 - 3.5	2.7	114	352	0.64	75.5
3.5 - 4.5	3.6	498	470	0.99	87.8
4.5 - 6.5	5.5	781	408	0.72	45.4
6.5 - 9.3	10.2	642	681	1.7	93.6
7.6 - 8.6	91.8	739	317	2.3	371
8.6 - 9.6	0.79	1380	260	1.53	225
9.6 - 10.6	0.055	16.1	32.9	5.98	173
10.6 - 11.3	0.055	1670	258	3.26	37.7
12.6 - 13.6	0.056	1330	151	1.21	29.3
13.6 - 14.6	0.011	38.3	10.4	0.163	2.7
14.6 - 15.3	0.011	1380	377	0.079	0.083

SD-71

573.4 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.23	0.303	0.785	0.082	0.8
0.5 - 1.5	29	1480	346	0.745	2.5
1.5 - 2.6	58.2	0.144	0.448	1.13	-
6 - 7	0.41	636	400	1.89	-
7 - 8	0.056	515	476	1.63	-
8 - 9.2	0.055	297	484	1.78	-
11 - 12	0.047	451	652	1.85	-
12 - 13	0.055	772	538	1.9	-
13 - 14	0.056	1140	532	3.09	-
14 - 14.8	0.011	126	198	0.89	-
16 - 17	0.055	1180	292	4.89	-
17 - 18	0.055	155	193	2.71	-
18 - 19	0.011	444	98	1.06	-
19 - 19.5	0.011	37.7	11.2	0.0937	-

SD-73

569.6 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.53	25.3	36.3	0.0445	204
0.5 - 1.5	1.1	32.2	139	0.176	7.3
1.5 - 2.3	4.1	55.2	192	0.3	16
5 - 6	1.6	64.3	304	0.383	4.4
6 - 7	6.5	626	472	0.511	107
7 - 8.2	51.1	4640	692	2.37	110
10 - 11	0.63	356	597	1.76	126
11 - 12	0.011	506	574	1.89	54.4
12 - 13.1	0.011	468	604	1.48	68
15 - 16	0.011	477	566	1.64	52.4
16 - 17	0.011	116	283	1.93	105
17 - 18	0.011	248	500	1.64	193
18 - 19.1	0.011	189	236	2	61.7
20 - 21	0.011	341	418	1.3	66.8
21 - 22	0.011	212	374	1.4	100
22 - 23	0.011	299	397	1.32	115
23 - 24	0.011	277	163	1.96	16.2

SD-74

565.9 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.38	9.93	21.9	0.0954	4.6
0.5 - 1.5	1	48.3	88.8	0.118	85.4
1.5 - 2.6	83.9	6710	548	1.01	-
5 - 6	4.3	301	332	1.27	-
6 - 7	2.7	272	474	1.33	-
7 - 8	1.7	188	416	1.68	-
10 - 11	0.39	374	381	0.956	-
11 - 12	0.011	669	431	1.51	-
12 - 13.3	0.011	244	351	1.02	-
15 - 16	0.045	199	353	0.954	-
16 - 17	0.011	179	176	1.51	-
17 - 17.6	0.011	3.25	2.4	0.0987	-

SD-77

567.7 20

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.51	21	77.3	0.0812	13.6
0.5 - 1.5	2.2	85	272	0.263	13.3
1.5 - 2.5	2.7	252	401	0.303	-
2.5 - 3.5	20.1	2100	477	0.682	-
3.5 - 4.5	133	3720	490	3.24	-
4.5 - 5.5	65.4	1140	428	2.55	-
7.1 - 8.1	1.5	193	348	1.27	-
8.1 - 9.5	0.69	299	477	1.3	-
12.1 - 13.1	0.011	465	495	4.07	-
13.1 - 14.1	0.011	584	566	6.34	-
14.1 - 15.2	0.011	662	500	6.45	-
17.1 - 18.1	0.011	33.8	29.9	0.0661	-
18.1 - 19.1	0.011	0.409	0.337	0.0977	-
19.1 - 20	0.011	0.409	0.337	0.0938	-
20 - 21	0.011	6.56	8.16	0.099	-

LEGEND

- Analytical Sample Location
- Underground Utility
- Milwaukee River Downtown Reach Project Area
- Non-TSCA Sediment Dredge Extent
- Additional Cap Extent for Alternative 3A
- Alternative 3 Cap Extent
- TSCA Sediment Extent
- TSCA Removal Shoreline Reinforcement

0 75 150
Approximate scale in feet

Analytical Results for Locations with PCB >50 mg/kg

Location ID		PCB (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Mudline Elevation	Depth			
Native Material Depth		<1	<PEC	<PEC
	Sample interval (ft bss)	1 - 3	>PEC	>PEC
		3 - 5	>3xPEC	>3xPEC
		5 - 50	>5xPEC	>5xPEC
		>50		

Bold values represent results above the detection limit
"-" = COC was not sampled/analyzed
NE = Not Encountered

Notes:
1. 2020 Aerial Photography provided by The Milwaukee County Land Information Office.
2. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
3. 3x = 3 times; 5x = 5 times; COC = Contaminant of Concern; Cr = chromium; ft bss =feet below sediment surface; mg/kg = milligram(s) per kilogram; NE = Not Encountered; Hg = mercury; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PEC = Probable Effects Concentration; TSCA = Toxic Substances Control Act (50 mg/kg)

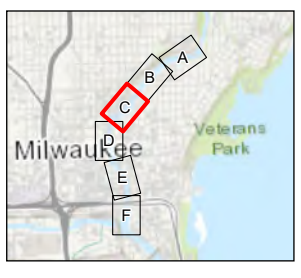
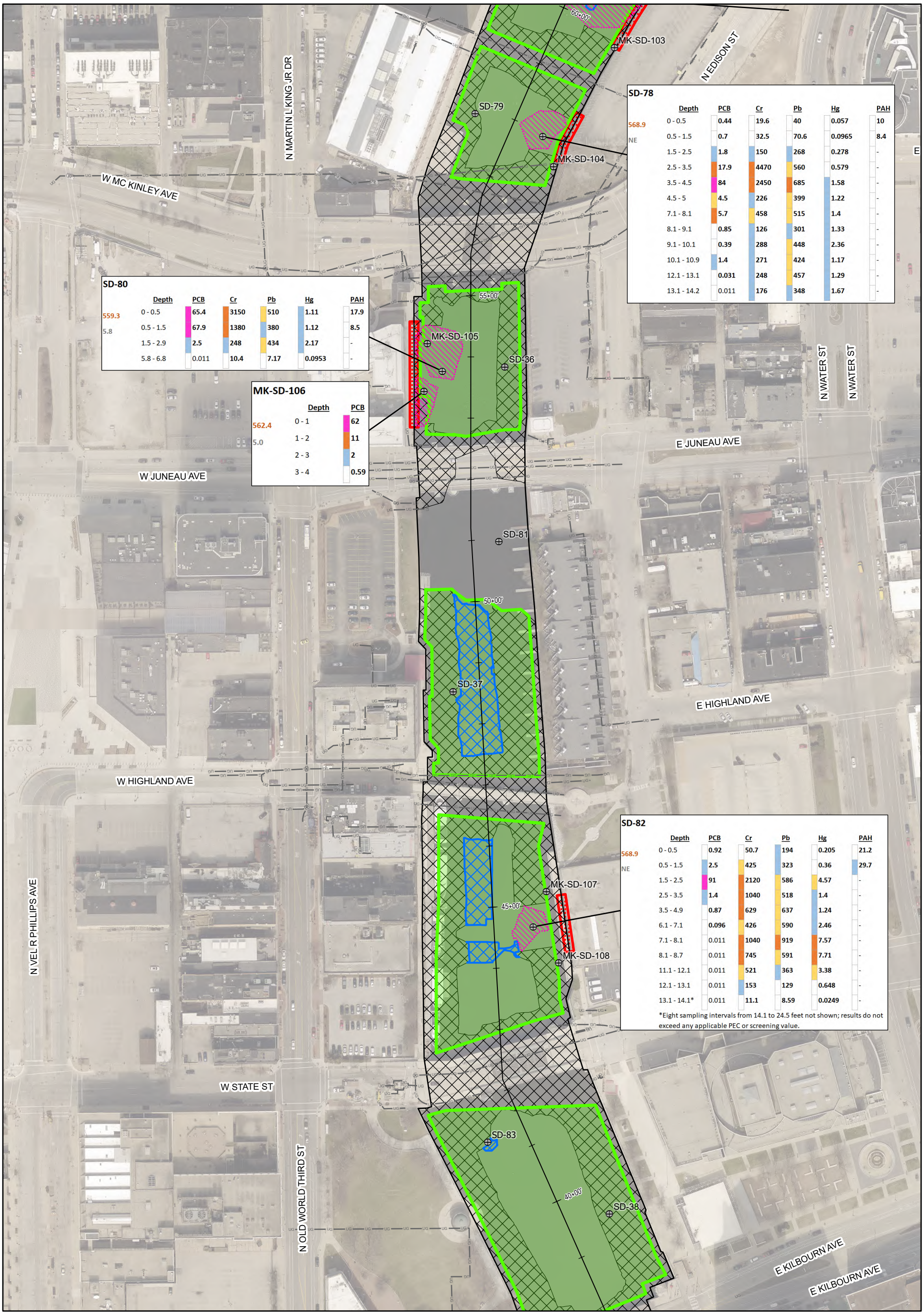


Figure 5-3C
Downtown Reach -
Alternative 3A Conceptual Layout
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin



SD-78

568.9 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.44	19.6	40	0.057	10
0.5 - 1.5	0.7	32.5	70.6	0.0965	8.4
1.5 - 2.5	1.8	150	268	0.278	-
2.5 - 3.5	17.9	4470	560	0.579	-
3.5 - 4.5	84	2450	685	1.58	-
4.5 - 5	4.5	226	399	1.22	-
7.1 - 8.1	5.7	458	515	1.4	-
8.1 - 9.1	0.85	126	301	1.33	-
9.1 - 10.1	0.39	288	448	2.36	-
10.1 - 10.9	1.4	271	424	1.17	-
12.1 - 13.1	0.031	248	457	1.29	-
13.1 - 14.2	0.011	176	348	1.67	-

SD-80

559.3 5.8

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	65.4	3150	510	1.11	17.9
0.5 - 1.5	67.9	1380	380	1.12	8.5
1.5 - 2.9	2.5	248	434	2.17	-
5.8 - 6.8	0.011	10.4	7.17	0.0953	-

MK-SD-106

562.4 5.0

Depth	PCB
0 - 1	62
1 - 2	11
2 - 3	2
3 - 4	0.59

SD-82

568.9 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.92	50.7	194	0.205	21.2
0.5 - 1.5	2.5	425	323	0.36	29.7
1.5 - 2.5	91	2120	586	4.57	-
2.5 - 3.5	1.4	1040	518	1.4	-
3.5 - 4.9	0.87	629	637	1.24	-
6.1 - 7.1	0.096	426	590	2.46	-
7.1 - 8.1	0.011	1040	919	7.57	-
8.1 - 8.7	0.011	745	591	7.71	-
11.1 - 12.1	0.011	521	363	3.38	-
12.1 - 13.1	0.011	153	129	0.648	-
13.1 - 14.1*	0.011	11.1	8.59	0.0249	-

*Eight sampling intervals from 14.1 to 24.5 feet not shown; results do not exceed any applicable PEC or screening value.

LEGEND

- Analytical Sample Location
- Underground Utility
- Milwaukee River Downtown Reach Project Area
- Non-TSCA Sediment Dredge Extent
- Additional Cap Extent for Alternative 3A
- Alternative 3 Cap Extent
- TSCA Sediment Extent
- TSCA Removal Shoreline Reinforcement

N

0 75 150

Approximate scale in feet

Analytical Results for Locations with PCB >50 mg/kg

Location ID		PCB (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Mudline Elevation				
Native Material Depth		<1	<PEC	<PEC
Sample interval (ft bss)	1 - 3	>PEC	>PEC	
	3 - 5	>3xPEC	>3xPEC	
	5 - 50	>5xPEC	>5xPEC	
	>50			

Bold values represent results above the detection limit

"-" = COC was not sampled/analyzed

NE = Not Encountered

Notes:
1. 2020 Aerial Photography provided by The Milwaukee County Land Information Office.
2. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
3. 3x = 3 times; 5x = 5 times; COC = Contaminant of Concern; Cr = chromium; ft bss =feet below sediment surface; mg/kg = milligram(s) per kilogram; NE = Not Encountered; Hg = mercury; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PEC = Probable Effects Concentration; TSCA = Toxic Substances Control Act (50 mg/kg)

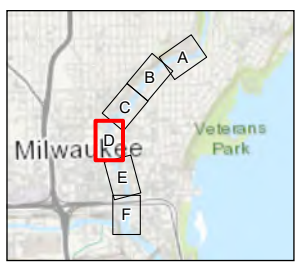
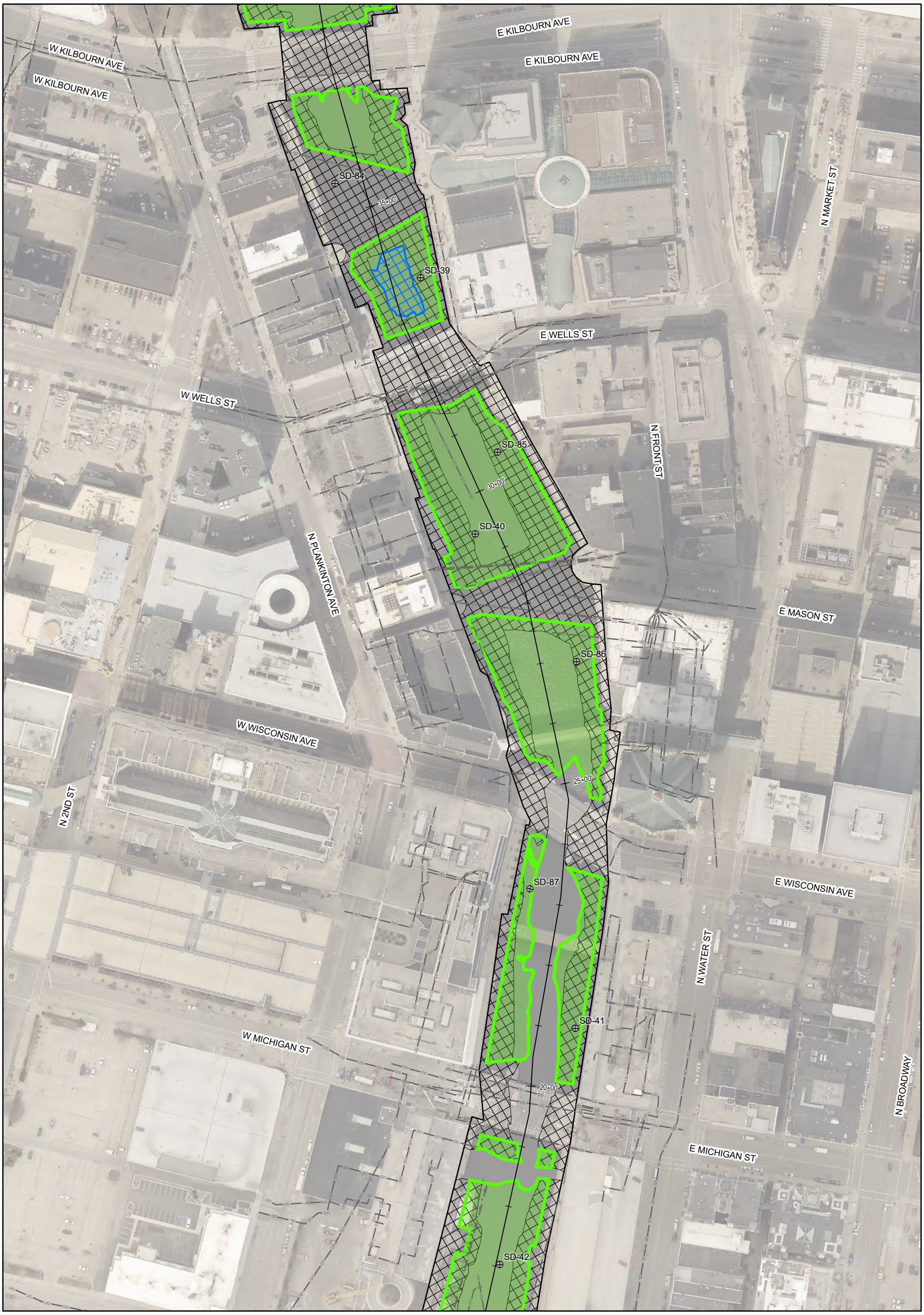


Figure 5-3D
Downtown Reach -
Alternative 3A Conceptual Layout
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin



LEGEND

- Analytical Sample Location
- Underground Utility
- Milwaukee River Downtown Reach Project Area
- Non-TSCA Sediment Dredge Extent
- Additional Cap Extent for Alternative 3A
- Alternative 3 Cap Extent

N

0 75 150

Approximate scale in feet

Notes:
1. 2020 Aerial Photography provided by The Milwaukee County Land Information Office.
2. mg/kg = milligram(s) per kilogram; TSCA = Toxic Substances Control Act (50 mg/kg)

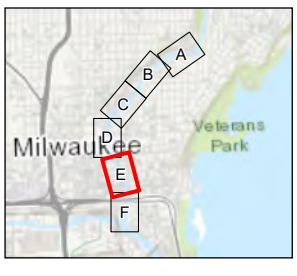


Figure 5-3E
Downtown Reach -
Alternative 3A Conceptual Layout
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

W CLYBOURN ST
E CLYBOURN ST
N BROADWAY
794
W ST PAUL AVE
E ST PAUL AVE
15+00'
10+00'
SD-88
W BUFFALO ST
SD-43
N PLANKINTON AVE
E BUFFALO ST
5+00'
Milwaukee River
N WATER ST
SD-44
OU2-SED-01
R5-17
Menomonee River
OU2-SED-02
OU2-SED-03
E CHICAGO ST
End of Downtown Reach Project Area
OU2-SD-A1-01
0+00'
Scour protection at downstream end of excavation to prevent erosion
OU2-SED-04
E ERIE ST
OU2-SD-A1-02A
S 2ND ST
OU2-SED-05
OU2-SD-A2-01
OU2-SED-06
S 1ST ST
Milwaukee River
OU2-SED-07

LEGEND

- Analytical Sample Location
- Underground Utility
- Federal Navigation Channel (Source: United States Army Corps of Engineers)
- Milwaukee River Downtown Reach Project Area
- Non-TSCA Sediment Dredge Extent
- Additional Cap Extent for Alternative 3A
- Alternative 3 Cap Extent

N

0 75 150

Approximate scale in feet

Notes:
1. 2020 Aerial Photography provided by The Milwaukee County Land Information Office.
2. mg/kg = milligram(s) per kilogram; TSCA = Toxic Substances Control Act (50 mg/kg)

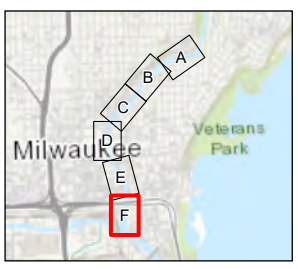
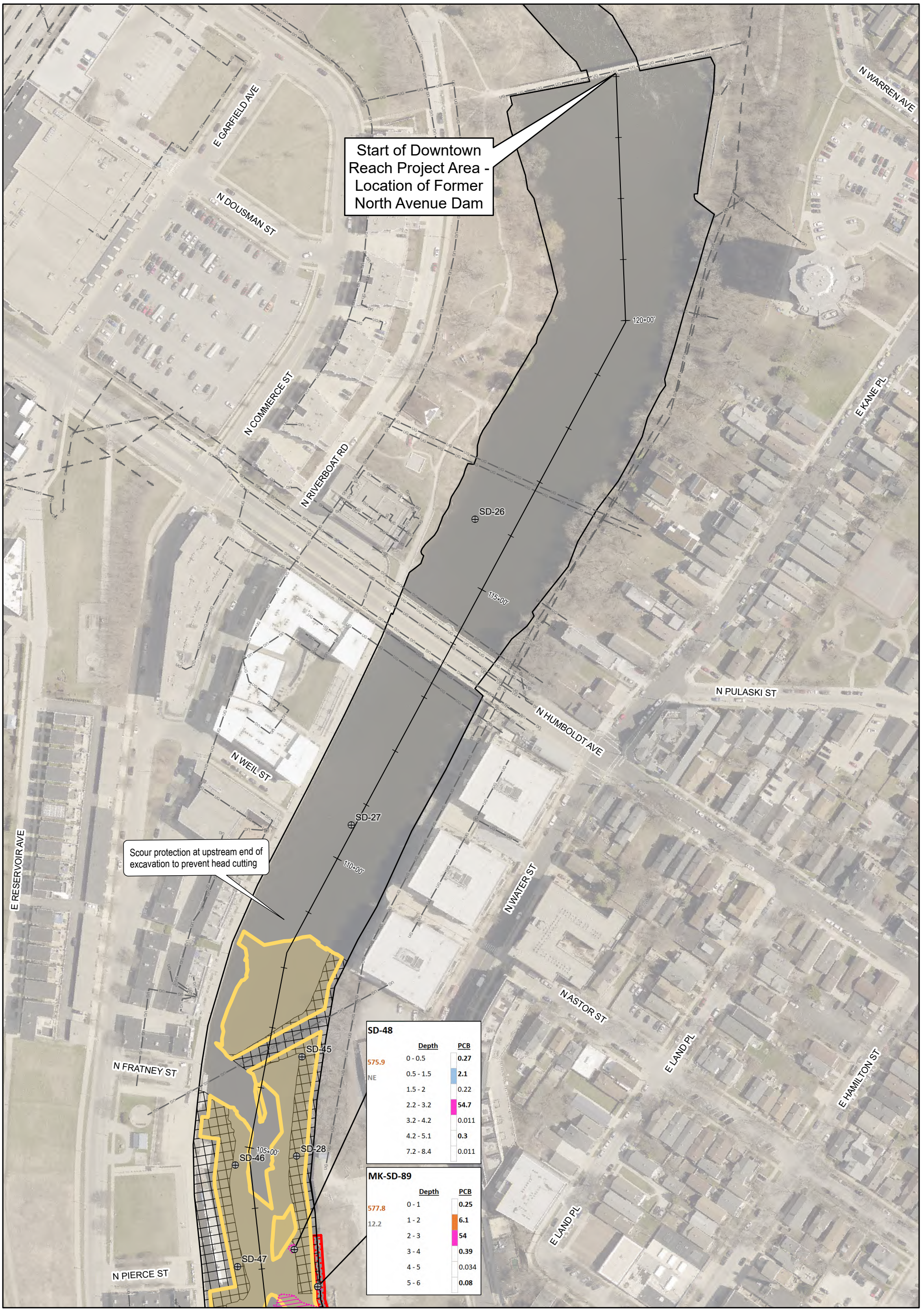


Figure 5-3F
Downtown Reach -
Alternative 3A Conceptual Layout
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin



LEGEND

- Analytical Sample Location
- Underground Utility
- Milwaukee River Downtown Reach Project Area
- Non-TSCA Sediment Dredge Extent
- Cap Extent
- TSCA Sediment Extent
- TSCA Removal Shoreline Reinforcement

0 75 150

Approximate scale in feet

Analytical Results for Locations with PCB >50 mg/kg

Location ID		PCB (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Mudline Elevation	Depth	<1	<PEC	<PEC
Native Material Depth	Sample interval (ft bss)	1 - 3	>PEC	>PEC
		3 - 5	>3xPEC	>3xPEC
		5 - 50	>5xPEC	>5xPEC
		>50		

Bold values represent results above the detection limit

"-" = COC was not sampled/analyzed

NE = Not Encountered

Notes:
1. 2020 Aerial Photography provided by The Milwaukee County Land Information Office.
2. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
3. 3x = 3 times; 5x = 5 times; COC = Contaminant of Concern; ft bss = feet below sediment surface; mg/kg = milligram(s) per kilogram; NE = Not Encountered; PAH = polycyclic aromatic hydrocarbons; PCB = polychlorinated biphenyls; PEC =Probable Effects Concentration; TSCA = Toxic Substances Control Act (50 mg/kg))

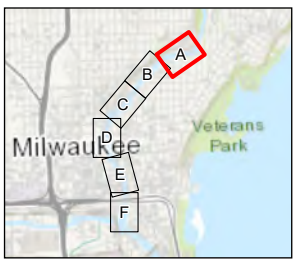
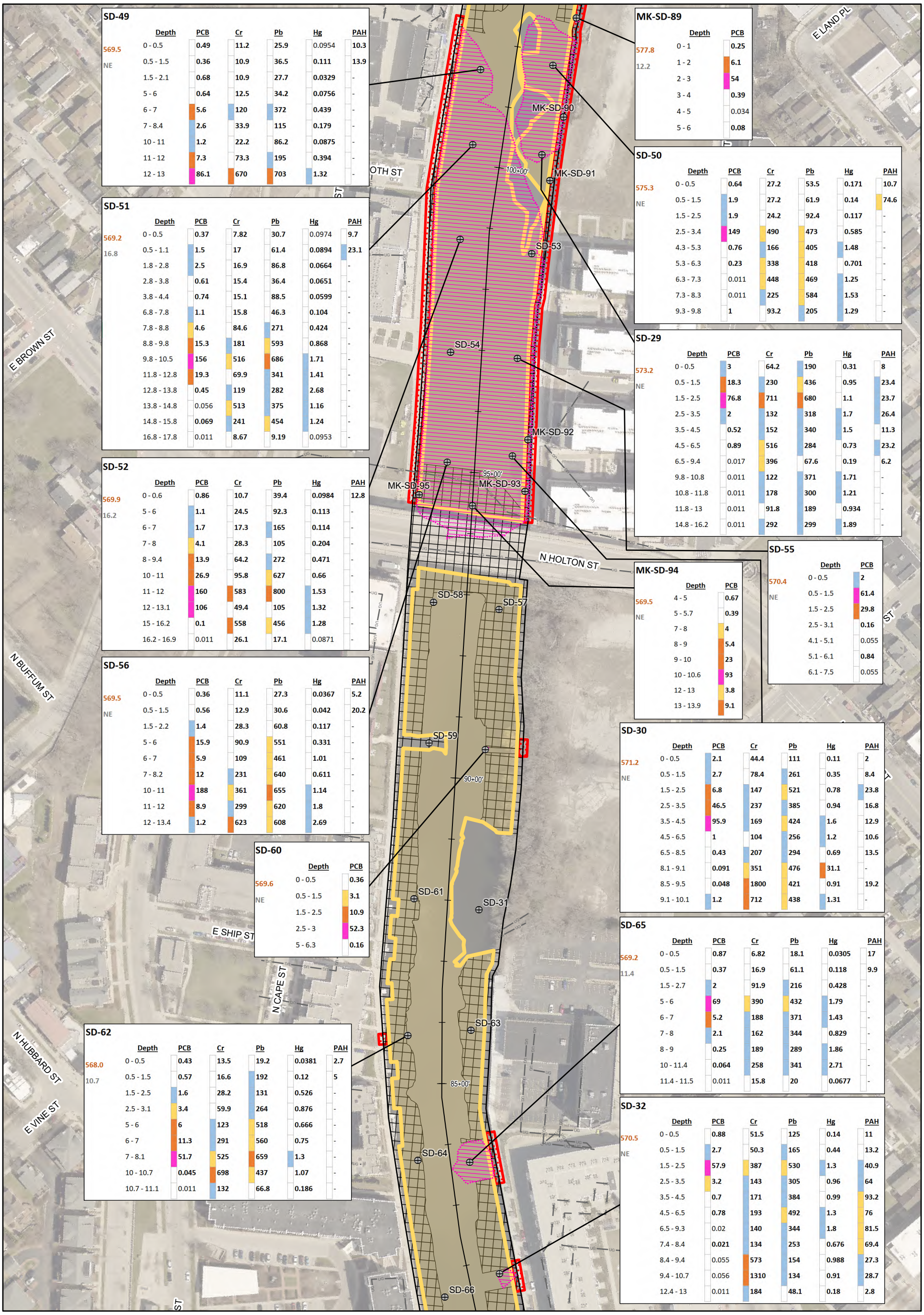


Figure 5-4A
Downtown Reach -
Alternative 4 Conceptual Layout
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin



SD-49

	Depth	PCB	Cr	Pb	Hg	PAH
569.5	0 - 0.5	0.49	11.2	25.9	0.0954	10.3
NE	0.5 - 1.5	0.36	10.9	36.5	0.111	13.9
	1.5 - 2.1	0.68	10.9	27.7	0.0329	-
	5 - 6	0.64	12.5	34.2	0.0756	-
	6 - 7	5.6	120	372	0.439	-
	7 - 8.4	2.6	33.9	115	0.179	-
	10 - 11	1.2	22.2	86.2	0.0875	-
	11 - 12	7.3	73.3	195	0.394	-
	12 - 13	86.1	670	703	1.32	-

SD-51

	Depth	PCB	Cr	Pb	Hg	PAH
569.2	0 - 0.5	0.37	7.82	30.7	0.0974	9.7
16.8	0.5 - 1.1	1.5	17	61.4	0.0894	23.1
	1.8 - 2.8	2.5	16.9	86.8	0.0664	-
	2.8 - 3.8	0.61	15.4	36.4	0.0651	-
	3.8 - 4.4	0.74	15.1	88.5	0.0599	-
	6.8 - 7.8	1.1	15.8	46.3	0.104	-
	7.8 - 8.8	4.6	84.6	271	0.424	-
	8.8 - 9.8	15.3	181	593	0.868	-
	9.8 - 10.5	156	516	686	1.71	-
	11.8 - 12.8	19.3	69.9	341	1.41	-
	12.8 - 13.8	0.45	119	282	2.68	-
	13.8 - 14.8	0.056	513	375	1.16	-
	14.8 - 15.8	0.069	241	454	1.24	-
	16.8 - 17.8	0.011	8.67	9.19	0.0953	-

SD-52

	Depth	PCB	Cr	Pb	Hg	PAH
569.9	0 - 0.6	0.86	10.7	39.4	0.0984	12.8
16.2	5 - 6	1.1	24.5	92.3	0.113	-
	6 - 7	1.7	17.3	165	0.114	-
	7 - 8	4.1	28.3	105	0.204	-
	8 - 9.4	13.9	64.2	272	0.471	-
	10 - 11	26.9	95.8	627	0.66	-
	11 - 12	160	583	800	1.53	-
	12 - 13.1	106	49.4	105	1.32	-
	15 - 16.2	0.1	558	456	1.28	-
	16.2 - 16.9	0.011	26.1	17.1	0.0871	-

SD-56

	Depth	PCB	Cr	Pb	Hg	PAH
569.5	0 - 0.5	0.36	11.1	27.3	0.0367	5.2
NE	0.5 - 1.5	0.56	12.9	30.6	0.042	20.2
	1.5 - 2.2	1.4	28.3	60.8	0.117	-
	5 - 6	15.9	90.9	551	0.331	-
	6 - 7	5.9	109	461	1.01	-
	7 - 8.2	12	231	640	0.611	-
	10 - 11	188	361	655	1.14	-
	11 - 12	8.9	299	620	1.8	-
	12 - 13.4	1.2	623	608	2.69	-

SD-60

	Depth	PCB
569.6	0 - 0.5	0.36
NE	0.5 - 1.5	3.1
	1.5 - 2.5	10.9
	2.5 - 3	52.3
	5 - 6.3	0.16

SD-62

	Depth	PCB	Cr	Pb	Hg	PAH
568.0	0 - 0.5	0.43	13.5	19.2	0.0381	2.7
10.7	0.5 - 1.5	0.57	16.6	192	0.12	5
	1.5 - 2.5	1.6	28.2	131	0.526	-
	2.5 - 3.1	3.4	59.9	264	0.876	-
	5 - 6	6	123	518	0.666	-
	6 - 7	11.3	291	560	0.75	-
	7 - 8.1	51.7	525	659	1.3	-
	10 - 10.7	0.045	698	437	1.07	-
	10.7 - 11.1	0.011	132	66.8	0.186	-

MK-SD-89

	Depth	PCB
577.8	0 - 1	0.25
12.2	1 - 2	6.1
	2 - 3	54
	3 - 4	0.39
	4 - 5	0.034
	5 - 6	0.08

SD-50

	Depth	PCB	Cr	Pb	Hg	PAH
575.3	0 - 0.5	0.64	27.2	53.5	0.171	10.7
NE	0.5 - 1.5	1.9	27.2	61.9	0.14	74.6
	1.5 - 2.5	1.9	24.2	92.4	0.117	-
	2.5 - 3.4	149	490	473	0.585	-
	4.3 - 5.3	0.76	166	405	1.48	-
	5.3 - 6.3	0.23	338	418	0.701	-
	6.3 - 7.3	0.011	448	469	1.25	-
	7.3 - 8.3	0.011	225	584	1.53	-
	9.3 - 9.8	1	93.2	205	1.29	-

SD-29

	Depth	PCB	Cr	Pb	Hg	PAH
573.2	0 - 0.5	3	64.2	190	0.31	8
NE	0.5 - 1.5	18.3	230	436	0.95	23.4
	1.5 - 2.5	76.8	711	680	1.1	23.7
	2.5 - 3.5	2	132	318	1.7	26.4
	3.5 - 4.5	0.52	152	340	1.5	11.3
	4.5 - 6.5	0.89	516	284	0.73	23.2
	6.5 - 9.4	0.017	396	67.6	0.19	6.2
	9.8 - 10.8	0.011	122	371	1.71	-
	10.8 - 11.8	0.011	178	300	1.21	-
	11.8 - 13	0.011	91.8	189	0.934	-
	14.8 - 16.2	0.011	292	299	1.89	-

MK-SD-94

	Depth	PCB
569.5	4 - 5	0.67
NE	5 - 5.7	0.39
	7 - 8	4
	8 - 9	5.4
	9 - 10	23
	10 - 10.6	93
	12 - 13	3.8
	13 - 13.9	9.1

SD-55

	Depth	PCB
570.4	0 - 0.5	2
NE	0.5 - 1.5	61.4
	1.5 - 2.5	29.8
	2.5 - 3.1	0.16
	4.1 - 5.1	0.055
	5.1 - 6.1	0.84
	6.1 - 7.5	0.055

SD-30

	Depth	PCB	Cr	Pb	Hg	PAH
571.2	0 - 0.5	2.1	44.4	111	0.11	2
NE	0.5 - 1.5	2.7	78.4	261	0.35	8.4
	1.5 - 2.5	6.8	147	521	0.78	23.8
	2.5 - 3.5	46.5	237	385	0.94	16.8
	3.5 - 4.5	95.9	169	424	1.6	12.9
	4.5 - 6.5	1	104	256	1.2	10.6
	6.5 - 8.5	0.43	207	294	0.69	13.5
	8.1 - 9.1	0.091	351	476	31.1	-
	8.5 - 9.5	0.048	1800	421	0.91	19.2
	9.1 - 10.1	1.2	712	438	1.31	-

SD-65

	Depth	PCB	Cr	Pb	Hg	PAH
569.2	0 - 0.5	0.87	6.82	18.1	0.0305	17
11.4	0.5 - 1.5	0.37	16.9	61.1	0.118	9.9
	1.5 - 2.7	2	91.9	216	0.428	-
	5 - 6	69	390	432	1.79	-
	6 - 7	5.2	188	371	1.43	-
	7 - 8	2.1	162	344	0.829	-
	8 - 9	0.25	189	289	1.86	-
	10 - 11.4	0.064	258	341	2.71	-
	11.4 - 11.5	0.011	15.8	20	0.0677	-

SD-32

	Depth	PCB	Cr	Pb	Hg	PAH
570.5	0 - 0.5	0.88	51.5	125	0.14	11
NE	0.5 - 1.5	2.7	50.3	165	0.44	13.2
	1.5 - 2.5	57.9	387	530	1.3	40.9
	2.5 - 3.5	3.2	143	305	0.96	64
	3.5 - 4.5	0.7	171	384	0.99	93.2
	4.5 - 6.5	0.78	193	492	1.3	76
	6.5 - 9.3	0.02	140	344	1.8	81.5
	7.4 - 8.4	0.021	134	253	0.676	69.4
	8.4 - 9.4	0.055	573	154	0.988	27.3
	9.4 - 10.7	0.056	1310	134	0.91	28.7
	12.4 - 13	0.011	184	48.1	0.18	2.8

LEGEND

- Analytical Sample Location
- Underground Utility
- Milwaukee River Downtown Reach Project Area
- Non-TSCA Sediment Dredge Extent
- Cap Extent
- TSCA Sediment Extent
- TSCA Removal Shoreline Reinforcement

N

0 75 150

Approximate scale in feet

Analytical Results for Locations with PCB >50 mg/kg

Location ID	Depth	PCB (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Mudline Elevation		<1	<PEC	<PEC
Native Material Depth	Sample interval (ft bss)	1 - 3	>PEC	>PEC
		3 - 5	>3xPEC	>3xPEC
		5 - 50	>5xPEC	>5xPEC
		>50		

Bold values represent results above the detection limit

"-" = COC was not sampled/analyzed

NE = Not Encountered

Notes:

1. 2020 Aerial Photography provided by The Milwaukee County Land Information Office.
2. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
3. 3x = 3 times; 5x = 5 times; COC = Contaminant of Concern; Cr = chromium; ft bss =feet below sediment surface; mg/kg = milligram(s) per kilogram; NE = Not Encountered; Hg = mercury; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PEC = Probable Effects Concentration; TSCA = Toxic Substances Control Act (50 mg/kg)

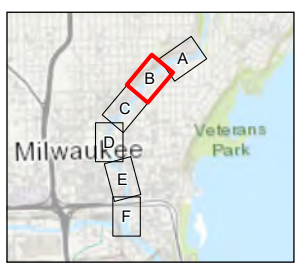
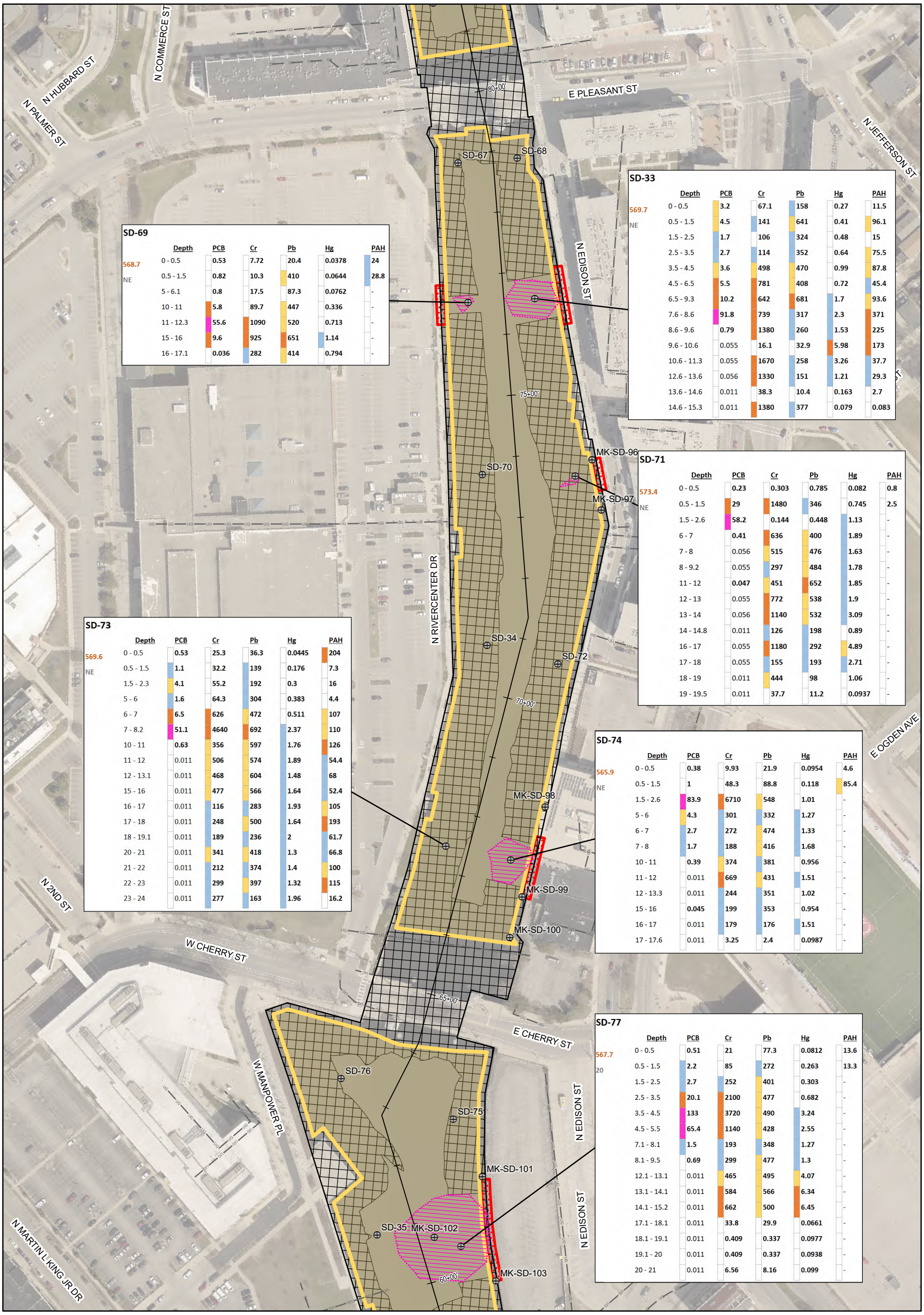


Figure 5-4B
Downtown Reach -
Alternative 4 Conceptual Layout
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin



SD-69

	Depth	PCB	Cr	Pb	Hg	PAH
568.7	0 - 0.5	0.53	7.72	20.4	0.0378	24
NE	0.5 - 1.5	0.82	10.3	410	0.0644	28.8
	5 - 6.1	0.8	17.5	87.3	0.0762	-
	10 - 11	5.8	89.7	447	0.336	-
	11 - 12.3	55.6	1090	520	0.713	-
	15 - 16	9.6	925	651	1.14	-
	16 - 17.1	0.036	282	414	0.794	-

SD-33

	Depth	PCB	Cr	Pb	Hg	PAH
569.7	0 - 0.5	3.2	67.1	158	0.27	11.5
NE	0.5 - 1.5	4.5	141	641	0.41	96.1
	1.5 - 2.5	1.7	106	324	0.48	15
	2.5 - 3.5	2.7	114	352	0.64	75.5
	3.5 - 4.5	3.6	498	470	0.99	87.8
	4.5 - 6.5	5.5	781	408	0.72	45.4
	6.5 - 9.3	10.2	642	681	1.7	93.6
	7.6 - 8.6	91.8	739	317	2.3	371
	8.6 - 9.6	0.79	1380	260	1.53	225
	9.6 - 10.6	0.055	16.1	32.9	5.98	173
	10.6 - 11.3	0.055	1670	258	3.26	37.7
	12.6 - 13.6	0.056	1330	151	1.21	29.3
	13.6 - 14.6	0.011	38.3	10.4	0.163	2.7
	14.6 - 15.3	0.011	1380	377	0.079	0.083

SD-71

	Depth	PCB	Cr	Pb	Hg	PAH
573.4	0 - 0.5	0.23	0.303	0.785	0.082	0.8
NE	0.5 - 1.5	29	1480	346	0.745	2.5
	1.5 - 2.6	58.2	0.144	0.448	1.13	-
	6 - 7	0.41	636	400	1.89	-
	7 - 8	0.056	515	476	1.63	-
	8 - 9.2	0.055	297	484	1.78	-
	11 - 12	0.047	451	652	1.85	-
	12 - 13	0.055	772	538	1.9	-
	13 - 14	0.056	1140	532	3.09	-
	14 - 14.8	0.011	126	198	0.89	-
	16 - 17	0.055	1180	292	4.89	-
	17 - 18	0.055	155	193	2.71	-
	18 - 19	0.011	444	98	1.06	-
	19 - 19.5	0.011	37.7	11.2	0.0937	-

SD-73

	Depth	PCB	Cr	Pb	Hg	PAH
569.6	0 - 0.5	0.53	25.3	36.3	0.0445	204
NE	0.5 - 1.5	1.1	32.2	139	0.176	7.3
	1.5 - 2.3	4.1	55.2	192	0.3	16
	5 - 6	1.6	64.3	304	0.383	4.4
	6 - 7	6.5	626	472	0.511	107
	7 - 8.2	51.1	4640	692	2.37	110
	10 - 11	0.63	356	597	1.76	126
	11 - 12	0.011	506	574	1.89	54.4
	12 - 13.1	0.011	468	604	1.48	68
	15 - 16	0.011	477	566	1.64	52.4
	16 - 17	0.011	116	283	1.93	105
	17 - 18	0.011	248	500	1.64	193
	18 - 19.1	0.011	189	236	2	61.7
	20 - 21	0.011	341	418	1.3	66.8
	21 - 22	0.011	212	374	1.4	100
	22 - 23	0.011	299	397	1.32	115
	23 - 24	0.011	277	163	1.96	16.2

SD-74

	Depth	PCB	Cr	Pb	Hg	PAH
565.9	0 - 0.5	0.38	9.93	21.9	0.0954	4.6
NE	0.5 - 1.5	1	48.3	88.8	0.118	85.4
	1.5 - 2.6	83.9	6710	548	1.01	-
	5 - 6	4.3	301	332	1.27	-
	6 - 7	2.7	272	474	1.33	-
	7 - 8	1.7	188	416	1.68	-
	10 - 11	0.39	374	381	0.956	-
	11 - 12	0.011	669	431	1.51	-
	12 - 13.3	0.011	244	351	1.02	-
	15 - 16	0.045	199	353	0.954	-
	16 - 17	0.011	179	176	1.51	-
	17 - 17.6	0.011	3.25	2.4	0.0987	-

SD-77

	Depth	PCB	Cr	Pb	Hg	PAH
567.7	0 - 0.5	0.51	21	77.3	0.0812	13.6
20	0.5 - 1.5	2.2	85	272	0.263	13.3
	1.5 - 2.5	2.7	252	401	0.303	-
	2.5 - 3.5	20.1	2100	477	0.682	-
	3.5 - 4.5	133	3720	490	3.24	-
	4.5 - 5.5	65.4	1140	428	2.55	-
	7.1 - 8.1	1.5	193	348	1.27	-
	8.1 - 9.5	0.69	299	477	1.3	-
	12.1 - 13.1	0.011	465	495	4.07	-
	13.1 - 14.1	0.011	584	566	6.34	-
	14.1 - 15.2	0.011	662	500	6.45	-
	17.1 - 18.1	0.011	33.8	29.9	0.0661	-
	18.1 - 19.1	0.011	0.409	0.337	0.0977	-
	19.1 - 20	0.011	0.409	0.337	0.0938	-
	20 - 21	0.011	6.56	8.16	0.099	-

LEGEND

- Analytical Sample Location
- Underground Utility
- Milwaukee River Downtown Reach Project Area
- Non-TSCA Sediment Dredge Extent
- Cap Extent
- TSCA Sediment Extent
- TSCA Removal Shoreline Reinforcement

N

0 75 150

Approximate scale in feet

Analytical Results for Locations with PCB >50 mg/kg

Location ID		PCB (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Mudline Elevation	Depth			
Native Material Depth		<1	<PEC	<PEC
	Sample interval (ft bss) 1 - 3	>PEC	>PEC	>PEC
	3 - 5	>3xPEC	>3xPEC	>3xPEC
	5 - 50	>5xPEC	>5xPEC	>5xPEC
	>50			

Bold values represent results above the detection limit

"-" = COC was not sampled/analyzed

NE = Not Encountered

Notes:
1. 2020 Aerial Photography provided by The Milwaukee County Land Information Office.
2. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
3. 3x = 3 times; 5x = 5 times; COC = Contaminant of Concern; Cr = chromium; ft bss =feet below sediment surface; mg/kg = milligram(s) per kilogram; NE = Not Encountered; Hg = mercury; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PEC = Probable Effects Concentration; TSCA = Toxic Substances Control Act (50 mg/kg)

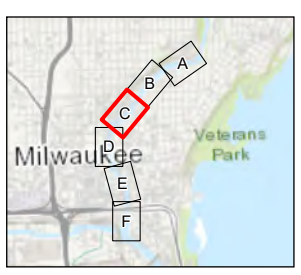
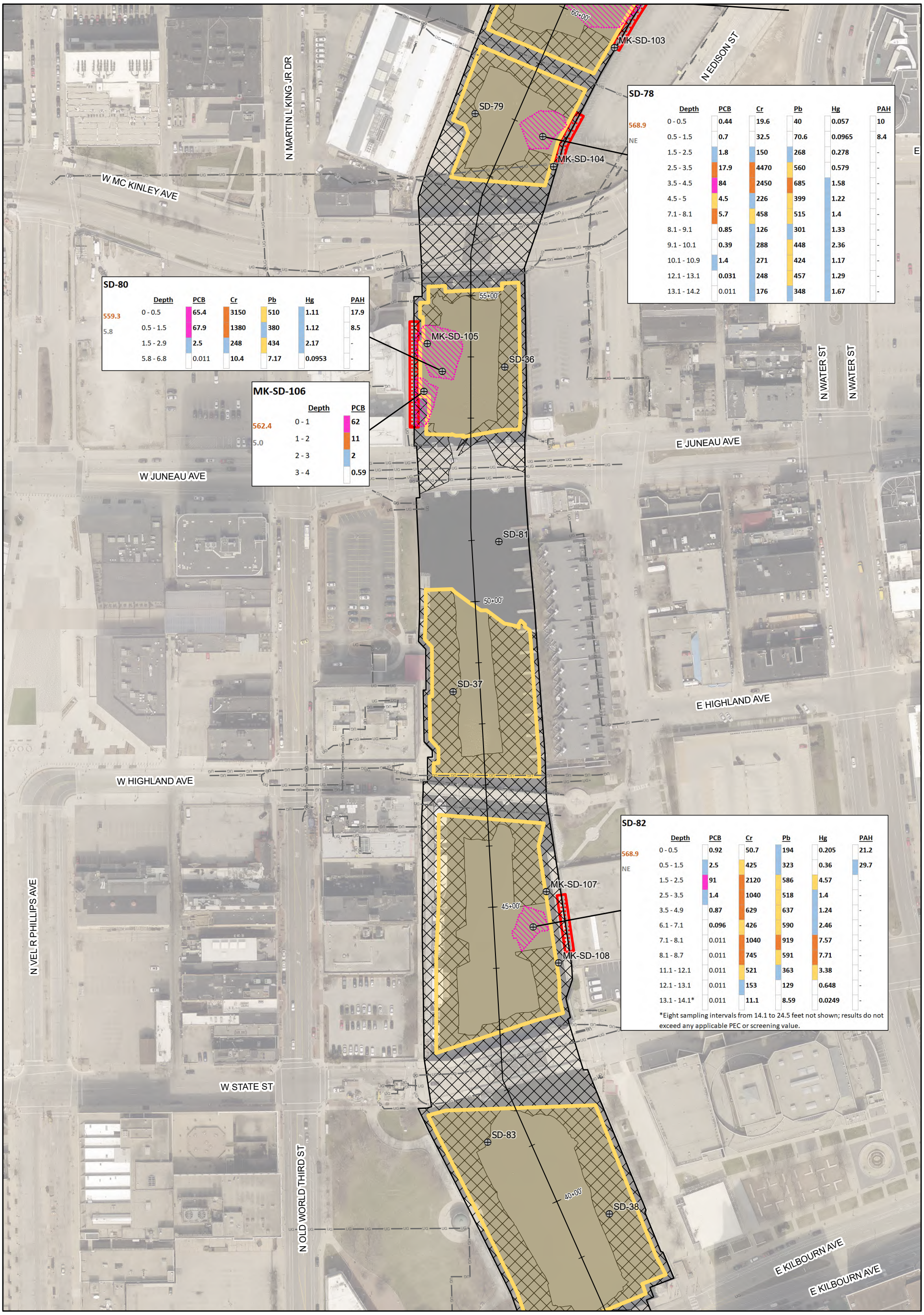


Figure 5-4C
Downtown Reach -
Alternative 4 Conceptual Layout
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin



LEGEND

- Analytical Sample Location
- Underground Utility
- Milwaukee River Downtown Reach Project Area
- Non-TSCA Sediment Dredge Extent
- Cap Extent
- TSCA Sediment Extent
- TSCA Removal Shoreline Reinforcement

N

0 75 150

Approximate scale in feet

Analytical Results for Locations with PCB >50 mg/kg

Location ID		PCB (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Mudline Elevation				
Native Material Depth		<1	<PEC	<PEC
	Sample interval (ft bss)	1 - 3	>PEC	>PEC
		3 - 5	>3xPEC	>3xPEC
		5 - 50	>5xPEC	>5xPEC
		>50		

Bold values represent results above the detection limit

"-" = COC was not sampled/analyzed

NE = Not Encountered

Notes:

1. 2020 Aerial Photography provided by The Milwaukee County Land Information Office.
2. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
3. 3x = 3 times; 5x = 5 times; COC = Contaminant of Concern; Cr = chromium; ft bss =feet below sediment surface; mg/kg = milligram(s) per kilogram; NE = Not Encountered; Hg = mercury; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PEC = Probable Effects Concentration; TSCA = Toxic Substances Control Act (50 mg/kg)

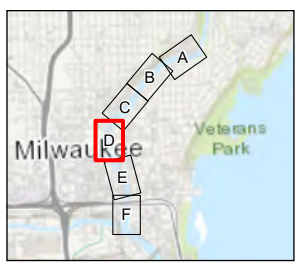
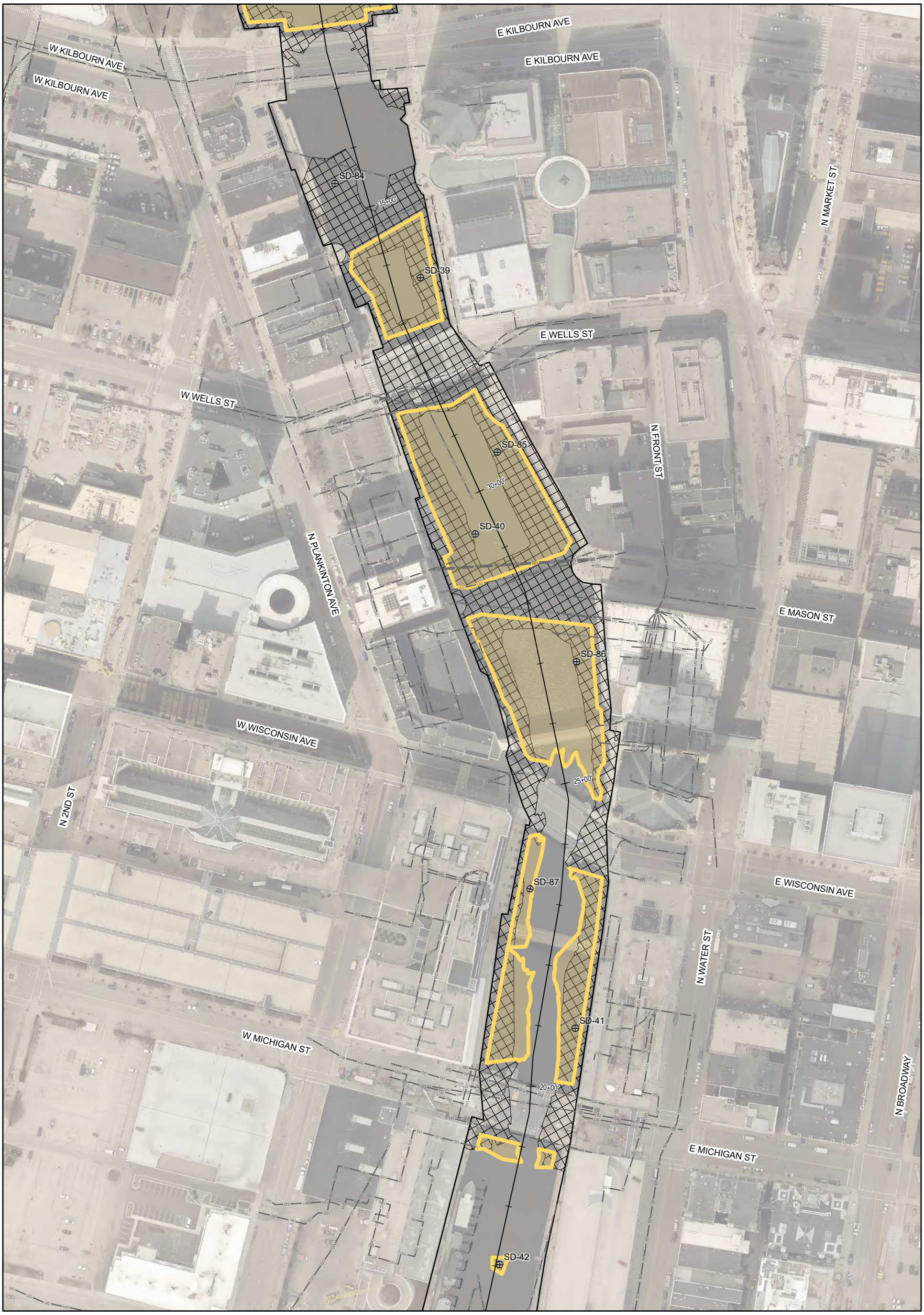


Figure 5-4D
Downtown Reach -
Alternative 4 Conceptual Layout
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin



LEGEND

- Analytical Sample Location
- Underground Utility
- Milwaukee River Downtown Reach Project Area
- Non-TSCA Sediment Dredge Extent
- Cap Extent

N

0 75 150

Approximate scale in feet

Notes:
1. 2020 Aerial Photography provided by The Milwaukee County Land Information Office.
2. mg/kg = milligram(s) per kilogram; TSCA = Toxic Substances Control Act (50 mg/kg)

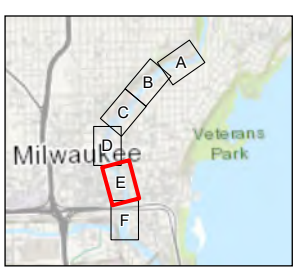


Figure 5-4E
Downtown Reach -
Alternative 4 Conceptual Layout
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

W CLYBOURN ST
E CLYBOURN ST
N BROADWAY
794
15+00'
E ST PAUL AVE
W ST PAUL AVE
10+00'
SD-88
W BUFFALO ST
SD-43
N PLANKINTON AVE
E BUFFALO ST
5+00'
Milwaukee River
N WATER ST
SD-44
OU2-SED-01
R5-17
Menomonee River
E CHICAGO ST
OU2-SED-02
OU2-SED-03
End of Downtown Reach Project Area
OU2-SD-A1-01
0+00'
Scour protection at downstream end of excavation to prevent erosion
E ERIE ST
OU2-SED-04
OU2-SD-A1-02A
S 2ND ST
OU2-SED-05
S 1ST ST
OU2-SD-A2-01
OU2-SED-06
Milwaukee River
OU2-SED-07

LEGEND

- Analytical Sample Location
- Underground Utility
- Federal Navigation Channel (Source: United States Army Corps of Engineers)
- Milwaukee River Downtown Reach Project Area
- Non-TSCA Sediment Dredge Extent
- Cap Extent

N

0 75 150

Approximate scale in feet

Notes:
1. 2020 Aerial Photography provided by The Milwaukee County Land Information Office.
2. mg/kg = milligram(s) per kilogram; TSCA = Toxic Substances Control Act (50 mg/kg)

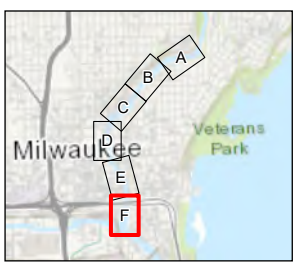
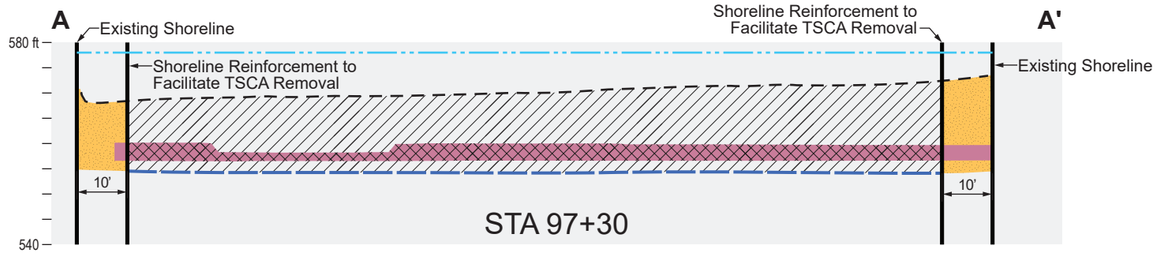
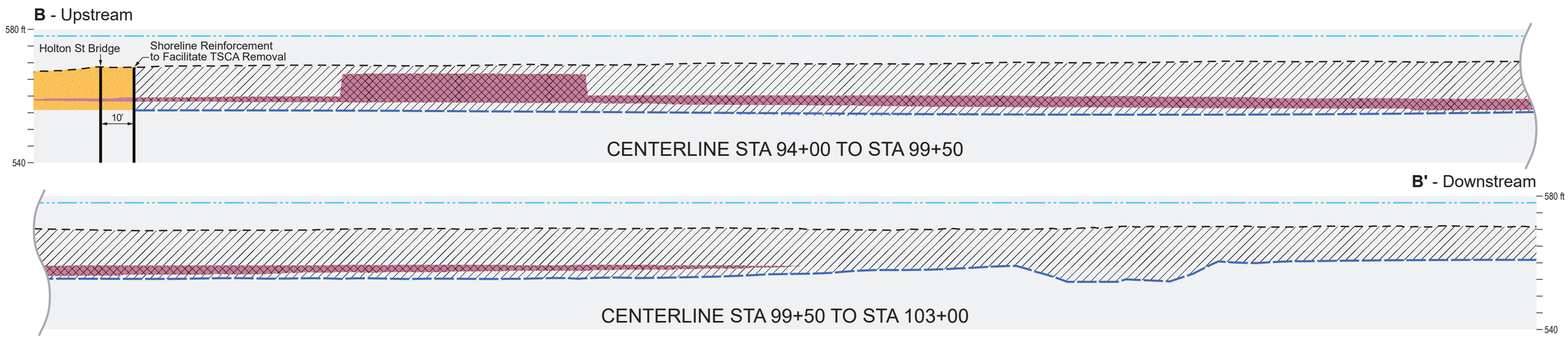
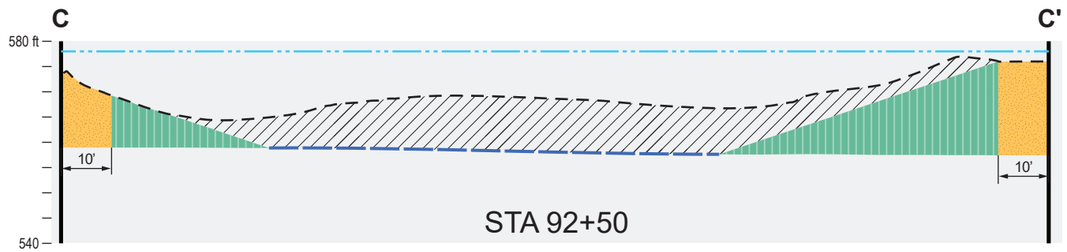


Figure 5-4F
Downtown Reach -
Alternative 4 Conceptual Layout
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin







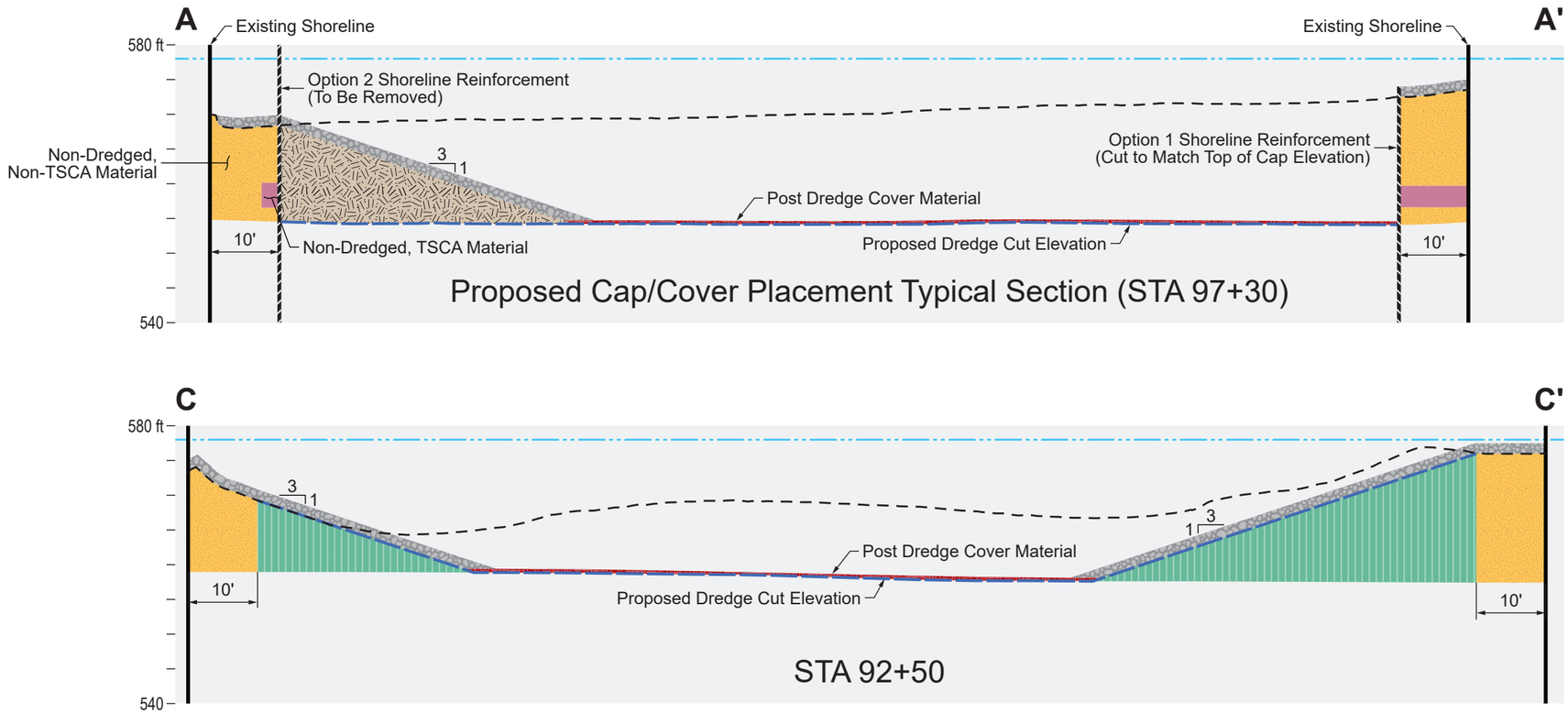
Legend

- TSCA Sediment
- Shoreline and Utility Offset/No Dredge Zone
- Non-Dredged Sediment
- Proposed Mechanical Dredging (TSCA)
- Proposed Hydraulic Dredging
- Top of Water (578 NAVD88=IGLD85 LWD 577.5)
- Top of Sediment
- Proposed Dredge Cut Elevation

Notes:
Profile locations shown on Figures 5-1A and 5-1B.
IGLD85 = International Great Lakes Datum 1985
LWD = Low Water Datum
NAVD88 = North American Vertical Datum of 1988
STA = Station
TSCA = Toxic Substances Control Act

Figure 5-5
Downtown Reach
Example Sediment Removal Profiles
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Jacobs



Legend

- TSCA Sediment
- Shoreline and Utility Offset/No Dredge Zone
- Non-Dredged Sediment
- Post Dredge Cover Material
- Cap
- Clean Fill
- Top of Water (578 NAVD88=IGLD85 LWD 577.5)
- Top of Sediment
- Proposed Dredge Cut Elevation

Notes:
Profile locations shown on Figures 5-1A and 5-1B.
IGLD85 = International Great Lakes Datum 1985
LWD = Low Water Datum
NAVD88 = North American Vertical Datum of 1988
STA = Station
TSCA = Toxic Substances Control Act

Figure 5-6
Downtown Reach
Example Sediment Cap and Cover Placement
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Former North Avenue Dam

E GARFIELD AVE
N DOUSMAN ST
N WARREN AVE
N RIVERBOAT RD
N HUMBOLDT AVE
N COMMERCE ST
N PULASKI ST
E KANE PL
N WATER ST
N ASTOR ST
E HAMILTON ST
N FRATNEY ST
N PIERCE ST
E RES
Milwaukee River

Figure B1/B2

SD-26

	Depth	PCB	Cr	Pb	Hg	PAH
570.7	0 - 0.5	0.6	32.2	53.5	0.11	3.9
NE	0.5 - 1.2	0.64	13.9	28.9	0.067	13.6

SD-27

	Depth	PCB	Cr	Pb	Hg	PAH
568.9	0 - 0.5	1.7	20.9	43.2	0.044	1.8
NE	0.5 - 1.4	0.42	17	31.7	0.3	6

SD-46

	Depth	PCB	Cr	Pb	Hg	PAH
568.9	0 - 0.5	0.61	13.3	33.1	0.0314	16.2
NE	0.5 - 1	0.47	23	50.8	0.0656	8.9
	1 - 2.1	0.5	14.1	33.1	0.0318	-
	6 - 7	1.8	28.6	123	0.176	-
	7 - 8	4.3	53.3	9.07	0.247	-

SD-45

	Depth	PCB	Cr	Pb	Hg	PAH
574.2	0 - 0.5	0.31	25.5	55.6	0.14	20.5
NE	0.5 - 1.5	0.24	41.1	145	0.367	27.6
	1.5 - 2.2	0.011	149	366	0.955	133
	2.2 - 3.2	0.011	78.9	452	1.47	-
	3.2 - 4.2	0.011	127	487	10.2	-
	4.2 - 4.7	0.22	106	601	4.02	-
	7.2 - 8.5	0.22	69.1	281	1.64	-

SD-28

	Depth	PCB	Cr	Pb	Hg	PAH
574.6	0 - 0.5	0.82	23.3	117	0.16	17
NE	0.5 - 1.5	2.2	59	340	0.44	56.6
	1.5 - 2	3.2	80.1	329	0.56	203
	2.5 - 3.5	1.6	104	672	13.2	57.5
	3.5 - 4.5	0.023	126	686	4.9	20.9
	4.5 - 6.5	0.022	101	448	3.4	23.7
	6.5 - 7.3	0.019	65	378	2.1	8.1
	6.8 - 8	0.035	47.4	280	1.63	-

SD-48

	Depth	PCB
575.9	0 - 0.5	0.27
NE	0.5 - 1.5	2.1
	1.5 - 2	0.22
	2.2 - 3.2	54.7
	3.2 - 4.2	0.011
	4.2 - 5.1	0.3
	7.2 - 8.4	0.011

SD-47

	Depth	PCB
568.1	0 - 0.5	0.58
NE	0.5 - 1.8	0.49
	1.8 - 2.8	0.73
	2.8 - 3.8	1.2
	3.8 - 4.8	3.2
	4.8 - 5.3	3.9
	6.8 - 7.8	2.6
	7.8 - 8.4	6.3

MK-SD-89

	Depth	PCB
577.8	0 - 1	0.25
12.2	1 - 2	6.1
	2 - 3	54
	3 - 4	0.39
	4 - 5	0.034
	5 - 6	0.08

LEGEND

- Analytical Sample Location
- Non-TSCA Sediment Dredge Extent
- TSCA Sediment Dredge Extent
- Cap Extent
- Milwaukee River Downtown Reach Project Area
- UG Underground Utility

Bathymetry (feet)
- Bathymetric Contour

Elevation (feet)
- 575 - 580
- 570 - 575
- 565 - 570
- 560 - 565
- 555 - 560

0 75 150
Approximate scale in feet

Analytical Results Table Format

Location ID
Mudline Elevation

Depth	PCBs (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Native Material Depth	<1	<PEC	<PEC
Sample interval (ft bss)	1 - 3	>PEC	>PEC
	3 - 5	>3xPEC	>3xPEC
	5 - 50	>5xPEC	>5xPEC
	>50		

Bold values represent results above the detection limit
"-" = COC was not sampled/analyzed
NE = Native Material Not Encountered

Notes:
1. Basemap: Milwaukee County 2020 Aerial Orthophotography captured April 2020.
2. Horizontal Datum: North American Datum 1983 (NAD83)
3. Vertical Datum: North American Vertical Datum of 1988 (NAVD88). Bathymetric contour and shading were generated from hydrographic survey data collected by Seaworks (2020).
4. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
5. 3x = 3 times; 5x = 5 times; ft bss = feet below sediment surface; COC = Contaminant of Concern; Cr = chromium; Hg = mercury; mg/kg = milligram(s) per kilogram; NE = not encountered; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PEC = Probable Effects Concentration; TSCA = Toxic Substances Control Act (50 mg/kg)

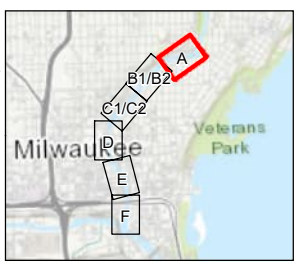
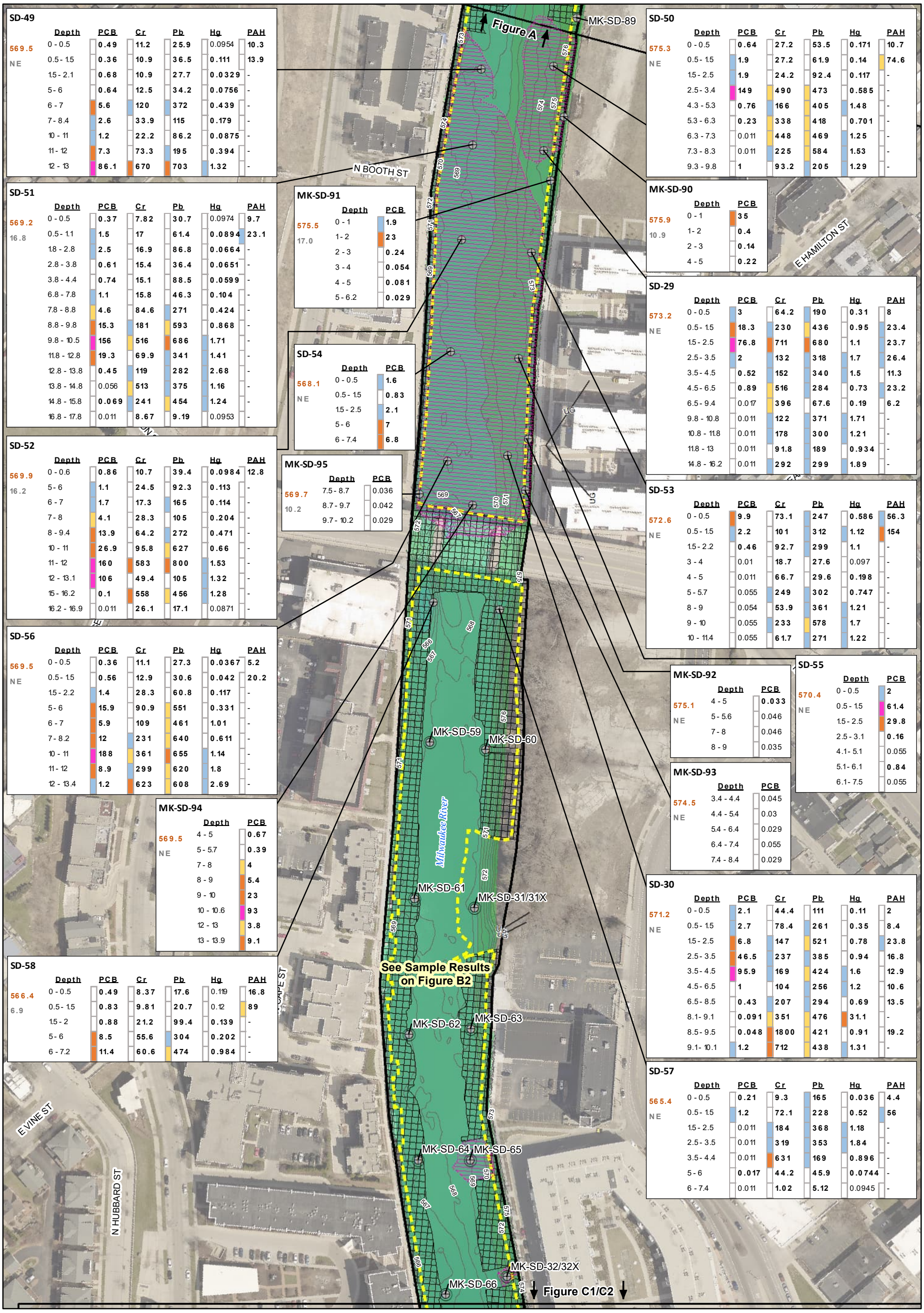


Figure 7-1A
Recommended Remedial Alternative 3A
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin



SD-49

Depth	PCB	Cr	Pb	Hg	PAH
569.5					
NE					
0 - 0.5	0.49	11.2	25.9	0.0954	10.3
0.5 - 1.5	0.36	10.9	36.5	0.111	13.9
1.5 - 2.1	0.68	10.9	27.7	0.0329	-
5 - 6	0.64	12.5	34.2	0.0756	-
6 - 7	5.6	120	372	0.439	-
7 - 8.4	2.6	33.9	115	0.179	-
10 - 11	1.2	22.2	86.2	0.0875	-
11 - 12	7.3	73.3	195	0.394	-
12 - 13	86.1	670	703	1.32	-

SD-50

Depth	PCB	Cr	Pb	Hg	PAH
575.3					
NE					
0 - 0.5	0.64	27.2	53.5	0.171	10.7
0.5 - 1.5	1.9	27.2	61.9	0.14	74.6
1.5 - 2.5	1.9	24.2	92.4	0.117	-
2.5 - 3.4	149	490	473	0.585	-
4.3 - 5.3	0.76	166	405	1.48	-
5.3 - 6.3	0.23	338	418	0.701	-
6.3 - 7.3	0.011	448	469	1.25	-
7.3 - 8.3	0.011	225	584	1.53	-
9.3 - 9.8	1	93.2	205	1.29	-

SD-51

Depth	PCB	Cr	Pb	Hg	PAH
569.2					
16.8					
0 - 0.5	0.37	7.82	30.7	0.0974	9.7
0.5 - 1.1	1.5	17	61.4	0.0894	23.1
1.8 - 2.8	2.5	16.9	86.8	0.0664	-
2.8 - 3.8	0.61	15.4	36.4	0.0651	-
3.8 - 4.4	0.74	15.1	88.5	0.0599	-
6.8 - 7.8	1.1	15.8	46.3	0.104	-
7.8 - 8.8	4.6	84.6	271	0.424	-
8.8 - 9.8	15.3	181	593	0.868	-
9.8 - 10.5	156	516	686	1.71	-
11.8 - 12.8	19.3	69.9	341	1.41	-
12.8 - 13.8	0.45	119	282	2.68	-
13.8 - 14.8	0.056	513	375	1.16	-
14.8 - 15.8	0.069	241	454	1.24	-
16.8 - 17.8	0.011	8.67	9.19	0.0953	-

MK-SD-91

Depth	PCB
575.5	
17.0	
0 - 1	1.9
1 - 2	23
2 - 3	0.24
3 - 4	0.054
4 - 5	0.081
5 - 6.2	0.029

MK-SD-90

Depth	PCB
575.9	
10.9	
0 - 1	35
1 - 2	0.4
2 - 3	0.14
4 - 5	0.22

SD-29

Depth	PCB	Cr	Pb	Hg	PAH
573.2					
NE					
0 - 0.5	3	64.2	190	0.31	8
0.5 - 1.5	18.3	230	436	0.95	23.4
1.5 - 2.5	76.8	711	680	1.1	23.7
2.5 - 3.5	2	132	318	1.7	26.4
3.5 - 4.5	0.52	152	340	1.5	11.3
4.5 - 6.5	0.89	516	284	0.73	23.2
6.5 - 9.4	0.017	396	67.6	0.19	6.2
9.8 - 10.8	0.011	122	371	1.71	-
10.8 - 11.8	0.011	178	300	1.21	-
11.8 - 13	0.011	91.8	189	0.934	-
14.8 - 16.2	0.011	292	299	1.89	-

SD-54

Depth	PCB
568.1	
NE	
0 - 0.5	1.6
0.5 - 1.5	0.83
1.5 - 2.5	2.1
5 - 6	7
6 - 7.4	6.8

SD-52

Depth	PCB	Cr	Pb	Hg	PAH
569.9					
16.2					
0 - 0.6	0.86	10.7	39.4	0.0984	12.8
5 - 6	1.1	24.5	92.3	0.113	-
6 - 7	1.7	17.3	165	0.114	-
7 - 8	4.1	28.3	105	0.204	-
8 - 9.4	13.9	64.2	272	0.471	-
10 - 11	26.9	95.8	627	0.66	-
11 - 12	160	583	800	1.53	-
12 - 13.1	106	49.4	105	1.32	-
15 - 16.2	0.1	558	456	1.28	-
16.2 - 16.9	0.011	26.1	17.1	0.0871	-

MK-SD-95

Depth	PCB
569.7	
10.2	
7.5 - 8.7	0.036
8.7 - 9.7	0.042
9.7 - 10.2	0.029

SD-53

Depth	PCB	Cr	Pb	Hg	PAH
572.6					
NE					
0 - 0.5	9.9	73.1	247	0.586	56.3
0.5 - 1.5	2.2	101	312	1.12	154
1.5 - 2.2	0.46	92.7	299	1.1	-
3 - 4	0.01	18.7	27.6	0.097	-
4 - 5	0.011	66.7	29.6	0.198	-
5 - 5.7	0.055	249	302	0.747	-
8 - 9	0.054	53.9	361	1.21	-
9 - 10	0.055	233	578	1.7	-
10 - 11.4	0.055	61.7	271	1.22	-

SD-56

Depth	PCB	Cr	Pb	Hg	PAH
569.5					
NE					
0 - 0.5	0.36	11.1	27.3	0.0367	5.2
0.5 - 1.5	0.56	12.9	30.6	0.042	20.2
1.5 - 2.2	1.4	28.3	60.8	0.117	-
5 - 6	15.9	90.9	551	0.331	-
6 - 7	5.9	109	461	1.01	-
7 - 8.2	12	231	640	0.611	-
10 - 11	188	361	655	1.14	-
11 - 12	8.9	299	620	1.8	-
12 - 13.4	1.2	623	608	2.69	-

MK-SD-92

Depth	PCB
575.1	
NE	
4 - 5	0.033
5 - 5.6	0.046
7 - 8	0.046
8 - 9	0.035

SD-55

Depth	PCB
570.4	
NE	
0 - 0.5	2
0.5 - 1.5	61.4
1.5 - 2.5	29.8
2.5 - 3.1	0.16
4.1 - 5.1	0.055
5.1 - 6.1	0.84
6.1 - 7.5	0.055

MK-SD-94

Depth	PCB
569.5	
NE	
4 - 5	0.67
5 - 5.7	0.39
7 - 8	4
8 - 9	5.4
9 - 10	23
10 - 10.6	93
12 - 13	3.8
13 - 13.9	9.1

MK-SD-93

Depth	PCB
574.5	
NE	
3.4 - 4.4	0.045
4.4 - 5.4	0.03
5.4 - 6.4	0.029
6.4 - 7.4	0.055
7.4 - 8.4	0.029

SD-30

Depth	PCB	Cr	Pb	Hg	PAH
571.2					
NE					
0 - 0.5	2.1	44.4	111	0.11	2
0.5 - 1.5	2.7	78.4	261	0.35	8.4
1.5 - 2.5	6.8	147	521	0.78	23.8
2.5 - 3.5	46.5	237	385	0.94	16.8
3.5 - 4.5	95.9	169	424	1.6	12.9
4.5 - 6.5	1	104	256	1.2	10.6
6.5 - 8.5	0.43	207	294	0.69	13.5
8.1 - 9.1	0.091	351	476	31.1	-
8.5 - 9.5	0.048	1800	421	0.91	19.2
9.1 - 10.1	1.2	712	438	1.31	-

SD-58

Depth	PCB	Cr	Pb	Hg	PAH
566.4					
6.9					
0 - 0.5	0.49	8.37	17.6	0.119	16.8
0.5 - 1.5	0.83	9.81	20.7	0.12	89
1.5 - 2	0.88	21.2	99.4	0.139	-
5 - 6	8.5	55.6	304	0.202	-
6 - 7.2	11.4	60.6	474	0.984	-

SD-57

Depth	PCB	Cr	Pb	Hg	PAH
565.4					
NE					
0 - 0.5	0.21	9.3	165	0.036	4.4
0.5 - 1.5	1.2	72.1	228	0.52	56
1.5 - 2.5	0.011	184	368	1.18	-
2.5 - 3.5	0.011	319	353	1.84	-
3.5 - 4.4	0.011	631	169	0.896	-
5 - 6	0.017	44.2	45.9	0.0744	-
6 - 7.4	0.011	1.02	5.12	0.0945	-

LEGEND

- Analytical Sample Location
- Results included on another results map figure
- Non-TSCA Sediment Dredge Extent
- TSCA Sediment Dredge Extent
- Cap Extent
- Milwaukee River Downtown Reach Project Area
- UG Underground Utility

Bathymetry (feet)

- Bathymetric Contour

Elevation (feet)

- 575 - 580
- 570 - 575
- 565 - 570
- 560 - 565

0 75 150

Approximate scale in feet

Analytical Results Table Format

Location ID

Mudline Elevation

Native Material Depth

Depth	PCBs (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Sample interval (ft bss)	<1	<PEC	<PEC
	1 - 3	>PEC	>PEC
	3 - 5	>3xPEC	>3xPEC
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Bold values represent results above the detection limit

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Notes:
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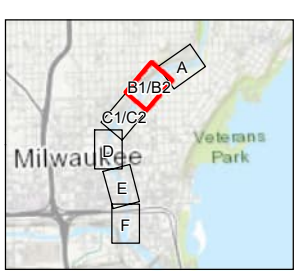
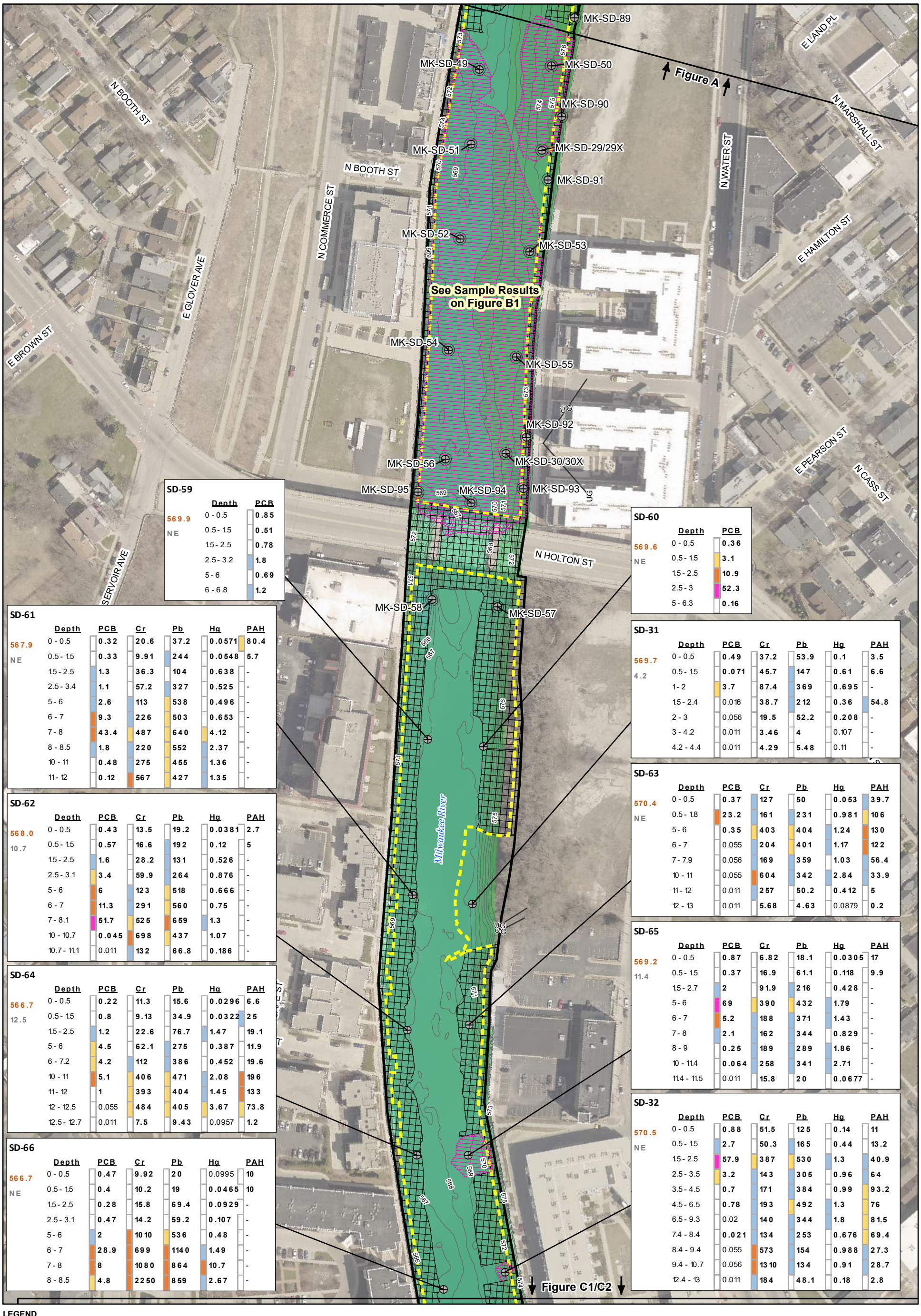


Figure 7-1B1
Recommended Remedial Alternative 3A
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Jacobs



SD-59

	Depth	PCB
569.9	0 - 0.5	0.85
NE	0.5 - 1.5	0.51
	1.5 - 2.5	0.78
	2.5 - 3.2	1.8
	5 - 6	0.69
	6 - 6.8	1.2

SD-60

	Depth	PCB
569.6	0 - 0.5	0.36
NE	0.5 - 1.5	3.1
	1.5 - 2.5	10.9
	2.5 - 3	52.3
	5 - 6.3	0.16

SD-61

	Depth	PCB	Cr	Pb	Hg	PAH
567.9	0 - 0.5	0.32	20.6	37.2	0.0571	80.4
NE	0.5 - 1.5	0.33	9.91	244	0.0548	5.7
	1.5 - 2.5	1.3	36.3	104	0.638	-
	2.5 - 3.4	1.1	57.2	327	0.525	-
	5 - 6	2.6	113	538	0.496	-
	6 - 7	9.3	226	503	0.653	-
	7 - 8	43.4	487	640	4.12	-
	8 - 8.5	1.8	220	552	2.37	-
	10 - 11	0.48	275	455	1.36	-
	11 - 12	0.12	567	427	1.35	-

SD-31

	Depth	PCB	Cr	Pb	Hg	PAH
569.7	0 - 0.5	0.49	37.2	53.9	0.1	3.5
4.2	0.5 - 1.5	0.071	45.7	147	0.61	6.6
	1 - 2	3.7	87.4	369	0.695	-
	1.5 - 2.4	0.016	38.7	212	0.36	54.8
	2 - 3	0.056	19.5	52.2	0.208	-
	3 - 4.2	0.011	3.46	4	0.107	-
	4.2 - 4.4	0.011	4.29	5.48	0.11	-

SD-62

	Depth	PCB	Cr	Pb	Hg	PAH
568.0	0 - 0.5	0.43	13.5	19.2	0.0381	2.7
10.7	0.5 - 1.5	0.57	16.6	192	0.12	5
	1.5 - 2.5	1.6	28.2	131	0.526	-
	2.5 - 3.1	3.4	59.9	264	0.876	-
	5 - 6	6	123	518	0.666	-
	6 - 7	11.3	291	560	0.75	-
	7 - 8.1	51.7	525	659	1.3	-
	10 - 10.7	0.045	698	437	1.07	-
	10.7 - 11.1	0.011	132	66.8	0.186	-

SD-63

	Depth	PCB	Cr	Pb	Hg	PAH
570.4	0 - 0.5	0.37	127	50	0.053	39.7
NE	0.5 - 1.8	23.2	161	231	0.981	106
	5 - 6	0.35	403	404	1.24	130
	6 - 7	0.055	204	401	1.17	122
	7 - 7.9	0.056	169	359	1.03	56.4
	10 - 11	0.055	604	342	2.84	33.9
	11 - 12	0.011	257	50.2	0.412	5
	12 - 13	0.011	5.68	4.63	0.0879	0.2

SD-64

	Depth	PCB	Cr	Pb	Hg	PAH
566.7	0 - 0.5	0.22	11.3	15.6	0.0296	6.6
12.5	0.5 - 1.5	0.8	9.13	34.9	0.0322	25
	1.5 - 2.5	1.2	22.6	76.7	1.47	19.1
	5 - 6	4.5	62.1	275	0.387	11.9
	6 - 7.2	4.2	112	386	0.452	19.6
	10 - 11	5.1	406	471	2.08	196
	11 - 12	1	393	404	1.45	133
	12 - 12.5	0.055	484	405	3.67	73.8
	12.5 - 12.7	0.011	7.5	9.43	0.0957	1.2

SD-65

	Depth	PCB	Cr	Pb	Hg	PAH
569.2	0 - 0.5	0.87	6.82	18.1	0.0305	17
11.4	0.5 - 1.5	0.37	16.9	61.1	0.118	9.9
	1.5 - 2.7	2	91.9	216	0.428	-
	5 - 6	69	390	432	1.79	-
	6 - 7	5.2	188	371	1.43	-
	7 - 8	2.1	162	344	0.829	-
	8 - 9	0.25	189	289	1.86	-
	10 - 11.4	0.064	258	341	2.71	-
	11.4 - 11.5	0.011	15.8	20	0.0677	-

SD-66

	Depth	PCB	Cr	Pb	Hg	PAH
566.7	0 - 0.5	0.47	9.92	20	0.0995	10
NE	0.5 - 1.5	0.4	10.2	19	0.0465	10
	1.5 - 2.5	0.28	15.8	69.4	0.0929	-
	2.5 - 3.1	0.47	14.2	59.2	0.107	-
	5 - 6	2	1010	536	0.48	-
	6 - 7	28.9	699	1140	1.49	-
	7 - 8	8	1080	864	10.7	-
	8 - 8.5	4.8	2250	859	2.67	-

SD-32

	Depth	PCB	Cr	Pb	Hg	PAH
570.5	0 - 0.5	0.88	51.5	125	0.14	11
NE	0.5 - 1.5	2.7	50.3	165	0.44	13.2
	1.5 - 2.5	57.9	387	530	1.3	40.9
	2.5 - 3.5	3.2	143	305	0.96	64
	3.5 - 4.5	0.7	171	384	0.99	93.2
	4.5 - 6.5	0.78	193	492	1.3	76
	6.5 - 9.3	0.02	140	344	1.8	81.5
	7.4 - 8.4	0.021	134	253	0.676	69.4
	8.4 - 9.4	0.055	573	154	0.988	27.3
	9.4 - 10.7	0.056	1310	134	0.91	28.7
	12.4 - 13	0.011	184	48.1	0.18	2.8

LEGEND

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0 75 150

Approximate scale in feet

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Mudline Elevation

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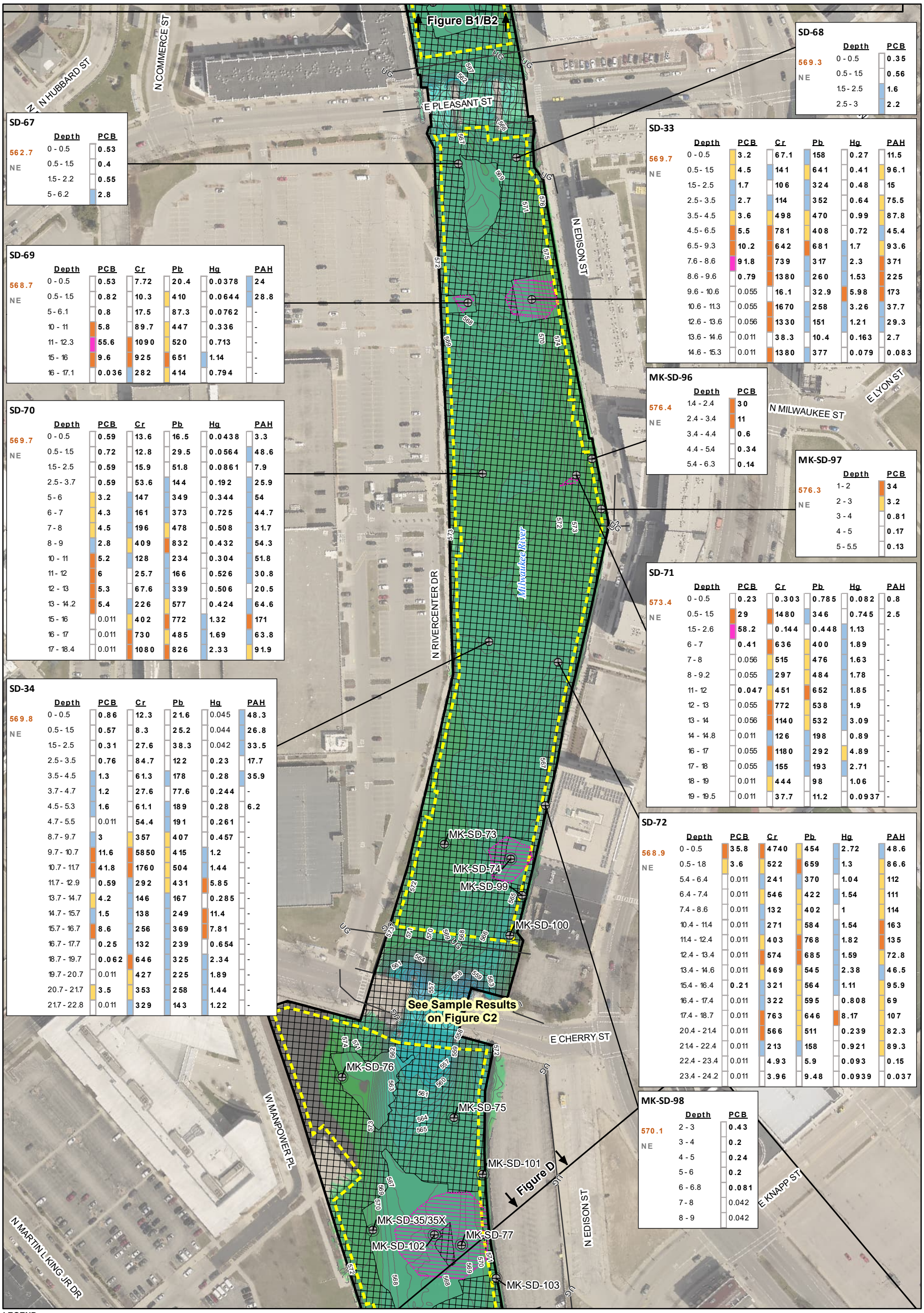
Figure 7-1B2
Recommended Remedial Alternative 3A
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin



SD-67

	Depth	PCB
562.7	0 - 0.5	0.53
NE	0.5 - 1.5	0.4
	1.5 - 2.2	0.55
	5 - 6.2	2.8

SD-68

	Depth	PCB
569.3	0 - 0.5	0.35
NE	0.5 - 1.5	0.56
	1.5 - 2.5	1.6
	2.5 - 3	2.2

SD-33

	Depth	PCB	Cr	Pb	Hg	PAH
569.7	0 - 0.5	3.2	67.1	158	0.27	11.5
NE	0.5 - 1.5	4.5	141	641	0.41	96.1
	1.5 - 2.5	1.7	106	324	0.48	15
	2.5 - 3.5	2.7	114	352	0.64	75.5
	3.5 - 4.5	3.6	498	470	0.99	87.8
	4.5 - 6.5	5.5	781	408	0.72	45.4
	6.5 - 9.3	10.2	642	681	1.7	93.6
	7.6 - 8.6	91.8	739	317	2.3	371
	8.6 - 9.6	0.79	1380	260	1.53	225
	9.6 - 10.6	0.055	16.1	32.9	5.98	173
	10.6 - 11.3	0.055	1670	258	3.26	37.7
	12.6 - 13.6	0.056	1330	151	1.21	29.3
	13.6 - 14.6	0.011	38.3	10.4	0.163	2.7
	14.6 - 15.3	0.011	1380	377	0.079	0.083

SD-69

	Depth	PCB	Cr	Pb	Hg	PAH
568.7	0 - 0.5	0.53	7.72	20.4	0.0378	24
NE	0.5 - 1.5	0.82	10.3	410	0.0644	28.8
	5 - 6.1	0.8	17.5	87.3	0.0762	-
	10 - 11	5.8	89.7	447	0.336	-
	11 - 12.3	55.6	1090	520	0.713	-
	15 - 16	9.6	925	651	1.14	-
	16 - 17.1	0.036	282	414	0.794	-

MK-SD-96

	Depth	PCB
576.4	1.4 - 2.4	30
NE	2.4 - 3.4	11
	3.4 - 4.4	0.6
	4.4 - 5.4	0.34
	5.4 - 6.3	0.14

MK-SD-97

	Depth	PCB
576.3	1 - 2	34
NE	2 - 3	3.2
	3 - 4	0.81
	4 - 5	0.17
	5 - 5.5	0.13

SD-70

	Depth	PCB	Cr	Pb	Hg	PAH
569.7	0 - 0.5	0.59	13.6	16.5	0.0438	3.3
NE	0.5 - 1.5	0.72	12.8	29.5	0.0564	48.6
	1.5 - 2.5	0.59	15.9	51.8	0.0861	7.9
	2.5 - 3.7	0.59	53.6	144	0.192	25.9
	5 - 6	3.2	147	349	0.344	54
	6 - 7	4.3	161	373	0.725	44.7
	7 - 8	4.5	196	478	0.508	31.7
	8 - 9	2.8	409	832	0.432	54.3
	10 - 11	5.2	128	234	0.304	51.8
	11 - 12	6	25.7	166	0.526	30.8
	12 - 13	5.3	67.6	339	0.506	20.5
	13 - 14.2	5.4	226	577	0.424	64.6
	15 - 16	0.011	402	772	1.32	171
	16 - 17	0.011	730	485	1.69	63.8
	17 - 18.4	0.011	1080	826	2.33	91.9

SD-71

	Depth	PCB	Cr	Pb	Hg	PAH
573.4	0 - 0.5	0.23	0.303	0.785	0.082	0.8
NE	0.5 - 1.5	29	1480	346	0.745	2.5
	1.5 - 2.6	58.2	0.144	0.448	1.13	-
	6 - 7	0.41	636	400	1.89	-
	7 - 8	0.056	515	476	1.63	-
	8 - 9.2	0.055	297	484	1.78	-
	11 - 12	0.047	451	652	1.85	-
	12 - 13	0.055	772	538	1.9	-
	13 - 14	0.056	1140	532	3.09	-
	14 - 14.8	0.011	126	198	0.89	-
	16 - 17	0.055	1180	292	4.89	-
	17 - 18	0.055	155	193	2.71	-
	18 - 19	0.011	444	98	1.06	-
	19 - 19.5	0.011	37.7	11.2	0.0937	-

SD-34

	Depth	PCB	Cr	Pb	Hg	PAH
569.8	0 - 0.5	0.86	12.3	21.6	0.045	48.3
NE	0.5 - 1.5	0.57	8.3	25.2	0.044	26.8
	1.5 - 2.5	0.31	27.6	38.3	0.042	33.5
	2.5 - 3.5	0.76	84.7	122	0.23	17.7
	3.5 - 4.5	1.3	61.3	178	0.28	35.9
	3.7 - 4.7	1.2	27.6	77.6	0.244	-
	4.5 - 5.3	1.6	61.1	189	0.28	6.2
	4.7 - 5.5	0.011	54.4	191	0.261	-
	8.7 - 9.7	3	357	407	0.457	-
	9.7 - 10.7	11.6	5850	415	1.2	-
	10.7 - 11.7	41.8	1760	504	1.44	-
	11.7 - 12.9	0.59	292	431	5.85	-
	13.7 - 14.7	4.2	146	167	0.285	-
	14.7 - 15.7	1.5	138	249	11.4	-
	15.7 - 16.7	8.6	256	369	7.81	-
	16.7 - 17.7	0.25	132	239	0.654	-
	18.7 - 19.7	0.062	646	325	2.34	-
	19.7 - 20.7	0.011	427	225	1.89	-
	20.7 - 21.7	3.5	353	258	1.44	-
	21.7 - 22.8	0.011	329	143	1.22	-

SD-72

	Depth	PCB	Cr	Pb	Hg	PAH
568.9	0 - 0.5	35.8	4740	454	2.72	48.6
NE	0.5 - 1.8	3.6	522	659	1.3	86.6
	5.4 - 6.4	0.011	241	370	1.04	112
	6.4 - 7.4	0.011	546	422	1.54	111
	7.4 - 8.6	0.011	132	402	1	114
	10.4 - 11.4	0.011	271	584	1.54	163
	11.4 - 12.4	0.011	403	768	1.82	135
	12.4 - 13.4	0.011	574	685	1.59	72.8
	13.4 - 14.6	0.011	469	545	2.38	46.5
	15.4 - 16.4	0.21	321	564	1.11	95.9
	16.4 - 17.4	0.011	322	595	0.808	69
	17.4 - 18.7	0.011	763	646	8.17	107
	20.4 - 21.4	0.011	566	511	0.239	82.3
	21.4 - 22.4	0.011	213	158	0.921	89.3
	22.4 - 23.4	0.011	4.93	5.9	0.093	0.15
	23.4 - 24.2	0.011	3.96	9.48	0.0939	0.037

MK-SD-98

	Depth	PCB
570.1	2 - 3	0.43
NE	3 - 4	0.2
	4 - 5	0.24
	5 - 6	0.2
	6 - 6.8	0.081
	7 - 8	0.042
	8 - 9	0.042

LEGEND

- Analytical Sample Location
- Results included on another results map figure
- Non-TSCA Sediment Dredge Extent
- TSCA Sediment Dredge Extent
- Cap Extent
- Milwaukee River Downtown Reach Project Area
- UG — Underground Utility

Bathymetry (feet)
- Bathymetric Contour

Elevation (feet)
- 575 - 580
- 570 - 575
- 565 - 570
- 560 - 565
- 555 - 560
- 550 - 555

0 75 150
Approximate scale in feet

Analytical Results Table Format

Location ID

Mudline Elevation

	Depth	PCBs (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Native Material Depth		<1	<PEC	<PEC
	Sample interval (ft bss)	1 - 3	>PEC	>PEC
		3 - 5	>3xPEC	>3xPEC
		5 - 50	>5xPEC	>5xPEC
		>50		

Bold values represent results above the detection limit
"-" = COC was not sampled/analyzed
NE = Native Material Not Encountered

Notes:
1. Basemap: Milwaukee County 2020 Aerial Orthophotography captured April 2020.
2. Horizontal Datum: North American Datum 1983 (NAD83)
3. Vertical Datum: North American Vertical Datum of 1988 (NAVD88). Bathymetric contour and shading were generated from hydrographic survey data collected by Seaworks (2020).
4. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
5. 3x = 3 times; 5x = 5 times; ft bss = feet below sediment surface; COC = Contaminant of Concern; Cr = chromium; Hg = mercury; mg/kg = milligram(s) per kilogram; NE = not encountered; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PEC = Probable Effects Concentration; TSCA = Toxic Substances Control Act (50 mg/kg)

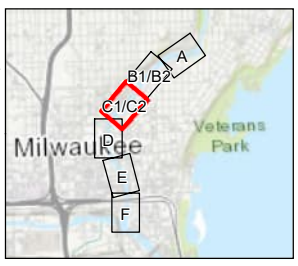


Figure 7-1C1
Recommended Remedial Alternative 3A
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Jacobs

\\Dc1vs01\gisproj\E\EPA\681867_MKERiverDownstream\MapFiles\2023\FFS_Downtown\Figure7-1C1_DT_SummaryofAnalyticalResults_508.mxd AESPEJO (8/30/2024)

Figure B1/B2

Figure C1

Figure D

See Sample Results on Figure C1

N HUBBARD ST
N COMMERCE ST
N PALMER ST
E PLEASANT ST
N JEFFERSON ST
N EDISON ST
N RIVERCENTER DR
W CHERRY ST
E CHERRY ST
N MARTIN L KING JR DR
Milwaukee River

MK-SD-67
MK-SD-68
MK-SD-69
MK-SD-33/33X
MK-SD-96
MK-SD-70
MK-SD-71
MK-SD-97
MK-SD-34/34X
MK-SD-72
MK-SD-98

SD-73

569.6 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.53	25.3	36.3	0.0445	204
0.5 - 1.5	1.1	32.2	139	0.176	7.3
1.5 - 2.3	4.1	55.2	192	0.3	16
5 - 6	1.6	64.3	304	0.383	4.4
6 - 7	6.5	626	472	0.511	107
7 - 8.2	51.1	4640	692	2.37	110
10 - 11	0.63	356	597	1.76	126
11 - 12	0.011	506	574	1.89	54.4
12 - 13.1	0.011	468	604	1.48	68
15 - 16	0.011	477	566	1.64	52.4
16 - 17	0.011	116	283	1.93	105
17 - 18	0.011	248	500	1.64	193
18 - 19.1	0.011	189	236	2	61.7
20 - 21	0.011	341	418	1.3	66.8
21 - 22	0.011	212	374	1.4	100
22 - 23	0.011	299	397	1.32	115
23 - 24	0.011	277	163	1.96	16.2

SD-74

565.9 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.38	9.93	21.9	0.0954	4.6
0.5 - 1.5	1	48.3	88.8	0.118	85.4
1.5 - 2.6	83.9	6710	548	1.01	-
5 - 6	4.3	301	332	1.27	-
6 - 7	2.7	272	474	1.33	-
7 - 8	1.7	188	416	1.68	-
10 - 11	0.39	374	381	0.956	-
11 - 12	0.011	669	431	1.51	-
12 - 13.3	0.011	244	351	1.02	-
15 - 16	0.045	199	353	0.954	-
16 - 17	0.011	179	176	1.51	-
17 - 17.6	0.011	3.25	2.4	0.0987	-

MK-SD-99

568.6 NE

Depth	PCB
1.5 - 2.8	0.32
5 - 6.5	0.069

MK-SD-100

567.3 NE

Depth	PCB
0 - 1	0.46
1 - 2	0.6
2 - 3	0.038
5 - 6	0.91
6 - 7	12

SD-75

566.4 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.29	20.4	80.3	0.0749	5
0.5 - 1.5	0.65	18.5	34.8	0.0769	8.8
1.5 - 2.5	0.56	38.1	77.9	0.158	-
2.5 - 3.5	6.7	180	233	0.279	-
3.5 - 4.2	28.7	3620	578	1.46	-
7.3 - 8.3	1.4	200	320	0.916	-
8.3 - 9.3	0.011	259	503	1.58	-
9.3 - 10.2	0.011	234	447	1.56	-
12.3 - 13.3	0.011	493	348	3.41	-
13.3 - 14.3	0.011	618	379	4.09	-
14.3 - 15.3	0.011	659	484	7.61	-
15.3 - 16.3	0.011	506	384	3.93	-
17.3 - 18.3	0.011	2.94	3.92	0.988	-
18.3 - 19.3	0.011	5.57	3.79	0.0944	-
19.3 - 20.3	0.011	4.1	2.03	0.179	-
20.3 - 21.3	0.011	4.62	2.38	0.0881	-

MK-SD-101

571.4 NE

Depth	PCB
5 - 6	1.7
6 - 7	0.65
7 - 7.8	0.034
10 - 11	0.032
11 - 12	0.031

SD-76

574.8 NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.81	23	65	0.15	23.8
0.5 - 1.5	1.3	22.4	61.3	0.153	18.7
1.5 - 2.5	1.4	41.6	110	0.251	-
2.5 - 3.5	2.1	37.4	95.7	0.25	-
3.5 - 4.5	2.9	146	240	0.337	-
7.8 - 8.8	12.9	478	346	0.79	-
8.8 - 9.8	15.9	692	266	0.455	-
9.8 - 11.1	48.5	2090	608	1.47	-
12.8 - 13.8	1.2	77.8	208	1.3	-
13.8 - 14.8	0.46	125	288	1.59	-
14.8 - 15.8	0.73	123	230	1.37	-
15.8 - 16.6	0.14	269	415	1.55	-
17.8 - 18.8	0.14	340	457	2.83	-
18.8 - 19.8	0.011	728	578	4.48	-
19.8 - 20.8	0.011	437	275	4.43	-
20.8 - 21.8	0.023	345	238	2.7	-
22.8 - 23.8	0.073	19.8	19.6	0.0693	-
23.8 - 24.8	0.011	7.11	4.29	0.0929	-
24.8 - 26.2	0.011	3.49	1.92	0.0982	-

SD-77

567.7 20

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.51	21	77.3	0.0812	13.6
0.5 - 1.5	2.2	85	272	0.263	13.3
1.5 - 2.5	2.7	252	401	0.303	-
2.5 - 3.5	20.1	2100	477	0.682	-
3.5 - 4.5	133	3720	490	3.24	-
4.5 - 5.5	65.4	1140	428	2.55	-
7.1 - 8.1	1.5	193	348	1.27	-
8.1 - 9.5	0.69	299	477	1.3	-
12.1 - 13.1	0.011	465	495	4.07	-
13.1 - 14.1	0.011	584	566	6.34	-
14.1 - 15.2	0.011	662	500	6.45	-
17.1 - 18.1	0.011	33.8	29.9	0.0661	-
18.1 - 19.1	0.011	0.409	0.337	0.0977	-
19.1 - 20	0.011	0.409	0.337	0.0938	-
20 - 21	0.011	6.56	8.16	0.099	-

SD-35

570.9 14.9

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.66	33.7	61.3	0.13	2.2
0.5 - 1.5	0.34	44.6	51	0.16	2.2
1.5 - 2.5	0.81	40.9	65.7	0.38	2.9
2.5 - 3.5	1.4	111	177	0.32	9.5
3.5 - 4.5	2	105	302	0.47	9.4
4.5 - 6.5	3.3	877	329	0.88	12.5
6.5 - 8.5	36.6	808	405	1.8	36.2
8.5 - 10.5	3.4	298	425	2	29.9
10.5 - 12.5	1.5	189	308	1.2	33.4
12.5 - 14.5	0.41	327	428	2.1	30.3
14.9 - 15.9	0.011	8.86	5.85	0.0986	0.72

MK-SD-102

568.0 13.5

Depth	PCB
0 - 1	0.59
1 - 2	0.33
2 - 3	0.77
3 - 4	1.2
6 - 7	1.6

MK-SD-103

572.6 NE

Depth	PCB
4.2 - 5.3	0.75
7 - 8.2	0.39
8.2 - 9.2	0.15
9.2 - 10.5	0.041

LEGEND

- Analytical Sample Location
- Results included on another results map figure
- Non-TSCA Sediment Dredge Extent
- TSCA Sediment Dredge Extent
- Cap Extent
- Milwaukee River Downtown Reach Project Area
- UG Underground Utility

Bathymetry (feet)
- Bathymetric Contour

Elevation (feet)
- 575 - 580
- 570 - 575
- 565 - 570
- 560 - 565
- 555 - 560
- 550 - 555

0 75 150
Approximate scale in feet

Analytical Results Table Format

Location ID
Mudline Elevation
Native Material Depth

Depth	PCBs (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
	<1	<PEC	<PEC
Sample interval (ft bss)	1 - 3	>PEC	>PEC
	3 - 5	>3xPEC	>3xPEC
	5 - 50	>5xPEC	>5xPEC
	>50		

Bold values represent results above the detection limit
"-" = COC was not sampled/analyzed
NE = Native Material Not Encountered

Notes:
1. Basemap: Milwaukee County 2020 Aerial Orthophotography captured April 2020.
2. Horizontal Datum: North American Datum 1983 (NAD83)
3. Vertical Datum: North American Vertical Datum of 1988 (NAVD88). Bathymetric contour and shading were generated from hydrographic survey data collected by Seaworks (2020).
4. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
5. 3x = 3 times; 5x = 5 times; ft bss = feet below sediment surface; COC = Contaminant of Concern; Cr = chromium; Hg = mercury; mg/kg = milligram(s) per kilogram; NE = not encountered; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PEC = Probable Effects Concentration; TSCA = Toxic Substances Control Act (50 mg/kg)

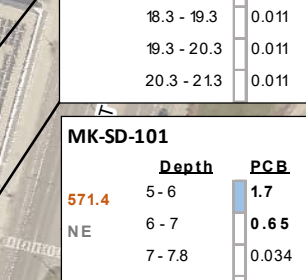


Figure 7-1C2
Recommended Remedial Alternative 3A
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Jacobs

SD-79

566.3
10.7

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.48	37.8	107	0.155	6.1
0.5 - 1.5	3.8	54.9	152	2.27	22.7
1.5 - 2.5	3.4	74.6	251	0.338	-
2.5 - 3.5	7.6	50.1	376	0.361	-
3.5 - 4.3	32.1	1850	379	0.962	-
7.4 - 8.4	1.8	238	410	1.55	-
8.4 - 9.4	0.51	196	327	1.12	-
9.4 - 10.7	0.056	446	382	1.29	-
10.7 - 11.7	0.011	10.9	8.88	0.092	-

SD-78

568.9
NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.44	19.6	40	0.057	10
0.5 - 1.5	0.7	32.5	70.6	0.0965	8.4
1.5 - 2.5	1.8	150	268	0.278	-
2.5 - 3.5	17.9	4470	560	0.579	-
3.5 - 4.5	84	2450	685	1.58	-
4.5 - 5	4.5	226	399	1.22	-
7.1 - 8.1	5.7	458	515	1.4	-
8.1 - 9.1	0.85	126	301	1.33	-
9.1 - 10.1	0.39	288	448	2.36	-
10.1 - 10.9	1.4	271	424	1.17	-
12.1 - 13.1	0.031	248	457	1.29	-
13.1 - 14.2	0.011	176	348	1.67	-

MK-SD-105

562.2
7.4

Depth	PCB
0 - 1	25
1 - 2.3	3.4
5 - 6	0.72

MK-SD-104

571.9
13.5

Depth	PCB
3 - 4	27
4 - 4.5	14
5.5 - 6.5	50
6.5 - 7.8	0.47

SD-36

567.6
14.7

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	3.7	99.5	152	0.41	9
0.5 - 1.5	4.4	2390	336	0.55	16.5
1.5 - 2.5	33.2	3450	552	1.3	27.6
2.5 - 3.5	27.4	827	410	1.2	18.9
3.5 - 4.5	5.2	157	304	1.2	20.7
4.5 - 6.5	2.2	156	337	0.93	1.8
6.5 - 8.2	0.073	201	456	1.9	30.3
6.8 - 7.8	0.55	132	147	0.649	19
7.8 - 8.8	0.011	333	186	1.97	55.6
8.8 - 9.5*	0.011	88.3	50.7	0.804	9.1

*Four sampling intervals from 11.8 to 15.4 feet not shown; results do not exceed any applicable PEC or screening value.

SD-80

559.3
5.8

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	65.4	3150	510	1.11	17.9
0.5 - 1.5	67.9	1380	380	1.12	8.5
1.5 - 2.9	2.5	248	434	2.17	-
5.8 - 6.8	0.011	10.4	7.17	0.0953	-

MK-SD-106

562.4
5.0

Depth	PCB
0 - 1	62
1 - 2	11
2 - 3	2
3 - 4	0.59

SD-81

558.5
20.5

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.25	26.8	46.2	0.151	34
0.5 - 1.5	0.44	38.2	68.3	0.153	5.7
1.5 - 2.5	0.61	33.6	72.1	0.176	-
2.8 - 3.8	0.64	115	269	1.33	-
3.8 - 4.6	0.12	94.5	240	0.834	-
7.8 - 8.8*	0.011	3.42	2.4	0.0782	-

*Eight sampling intervals from 8.8 to 21.3 feet not shown; results do not exceed any applicable PEC or screening value.

SD-37

561.8
NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.46	122	218	0.34	20.3
0.5 - 1.5	0.72	105	181	0.25	2.8
1.5 - 2.5	2.6	204	365	0.42	5.9
2.5 - 3.5	4.6	899	540	0.48	9.2
3.5 - 4.5	18.7	4580	632	1.6	10
4.5 - 6.5	36.5	1110	448	1.7	12.1
6.5 - 8.5	0.76	286	676	2	9.7
8.5 - 10	0.31	381	605	2.2	35.6
8.8 - 9.8	0.36	313	471	1.82	40.9
9.8 - 10.8	0.041	274	223	2.02	755
10.8 - 11.8	0.011	24	25	0.0383	1.4
11.8 - 12.5	0.011	6.11	261	0.0803	0.11
13.8 - 14.8*	0.27	11.1	6.6	0.0846	0.44

*Eight sampling intervals from 14.8 to 25.9 feet not shown; results do not exceed any applicable PEC or screening value.

MK-SD-107

572.7
NE

Depth	PCB
0 - 0.4	0.89
0.4 - 1.4	2.4
1.35 - 2.35	3.3
2.4 - 3.4	0.12
3.35 - 4.35	0.043
4.35 - 5.35	0.045
5.35 - 6.35	0.043
7 - 8	0.046
15 - 16.1	0.039

SD-82

568.9
NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.92	50.7	194	0.205	21.2
0.5 - 1.5	2.5	425	323	0.36	29.7
1.5 - 2.5	91	2120	586	4.57	-
2.5 - 3.5	1.4	1040	518	1.4	-
3.5 - 4.9	0.87	629	637	1.24	-
6.1 - 7.1	0.096	426	590	2.46	-
7.1 - 8.1	0.011	1040	919	7.57	-
8.1 - 8.7	0.011	745	591	7.71	-
11.1 - 12.1	0.011	521	363	3.38	-
12.1 - 13.1	0.011	153	129	0.648	-
13.1 - 14.1*	0.011	11.1	8.59	0.0249	-

*Eight sampling intervals from 14.1 to 24.5 feet not shown; results do not exceed any applicable PEC or screening value.

SD-83

563.6
22.8

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	7.5	400	585	7.79	73.5
0.5 - 1.5	3.4	255	458	2.19	42.5
1.5 - 2.5	2.6	236	505	3.54	-
2.5 - 3.5	3.8	273	455	1.72	-
3.5 - 4.5	0.38	9.03	8.61	3.77	-
4.5 - 5.8	0.011	312	721	4.67	-
7.1 - 8.1	0.069	214	446	1.76	-
8.1 - 9.1	0.011	85.3	186	5.3	-
9.1 - 10.3	0.011	277	430	2.89	-
12.1 - 13.1	0.078	28.7	115	0.441	-
13.1 - 14.1	0.011	3.82	2.57	0.0931	-
14.1 - 14.8	0.011	2.58	1.67	0.0989	-
17.1 - 18.1	0.011	24.9	44.1	0.129	-
18.1 - 19.1	0.011	3.63	2.65	0.0985	-
19.1 - 20.1	0.011	3.54	2.61	0.0994	-
20.1 - 21.3	0.011	3.61	2.04	0.0905	-
22.1 - 22.8	1.8	2.82	1.73	0.322	-
22.8 - 23.7	0.011	20.5	30	0.0977	-

MK-SD-108

572.8
NE

Depth	PCB
0 - 0.8	1.5
0.8 - 1.8	0.26
1.8 - 2.8	0.033
2.8 - 3.8	0.045
3.8 - 4.8	0.044
4.8 - 6.8	0.044
6.8 - 7.8	0.049

SD-38

572.2
NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.63	30.7	51.7	0.14	2.3
0.5 - 1.5	0.71	36.7	80.2	0.14	11.2
1.5 - 2.5	1.1	71.8	140	0.23	17.7
2.5 - 3.5	2.8	511	225	0.31	23
3.5 - 4.5	2.6	474	417	0.52	51.6
4.5 - 6.5	11.5	870	306	0.59	71.2
6.5 - 8.5	26.8	3440	664	1.4	51
8.5 - 10.5	4.1	588	267	1.1	52.4
10.5 - 12.5	0.14	258	304	1.6	35.1
12.5 - 14.8	0.93	184	312	1.8	50.8
14.4 - 15.4	0.11	216	389	2.28	73.4
15.4 - 16.4	0.055	146	389	0.967	60.2
16.4 - 17.4	0.019	189	442	1.73	37
17.4 - 17.9	0.011	287	536	2.28	52.2
19.4 - 20.4	0.23	330	383	3.03	43
20.4 - 21.4	0.11	44.5	77.6	0.339	28.5
21.4 - 22.4*	0.011	12.9	18.4	0.432	10.1

*Five sampling intervals from 22.4 to 28.4 feet not shown; results do not exceed any applicable PEC or screening value.

LEGEND

- Analytical Sample Location
- Non-TSCA Sediment Dredge Extent
- TSCA Sediment Dredge Extent
- Cap Extent
- Milwaukee River Downtown Reach Project Area
- UG — Underground Utility

Bathymetry (feet)
- Bathymetric Contour

Elevation (feet)
- 575 - 580
- 570 - 575
- 565 - 570
- 560 - 565
- 555 - 560
- 550 - 555

N

0 75 150

Approximate scale in feet

Analytical Results Table Format

Location ID
Mudline Elevation
Native Material Depth

Depth	PCBs (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Sample interval (ft bss)	1 - 3	>PEC	>PEC
	3 - 5	>3xPEC	>3xPEC
	5 - 50	>5xPEC	>5xPEC
	>50		
	<1	<PEC	<PEC

Bold values represent results above the detection limit
"-" = COC was not sampled/analyzed
NE = Native Material Not Encountered

Notes:
1. Basemap: Milwaukee County 2020 Aerial Orthophotography captured April 2020.
2. Horizontal Datum: North American Datum 1983 (NAD83)
3. Vertical Datum: North American Vertical Datum of 1988 (NAVD88). Bathymetric contour and shading were generated from hydrographic survey data collected by Seaworks (2020).
4. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
5. 3x = 3 times; 5x = 5 times; ft bss = feet below sediment surface; COC = Contaminant of Concern; Cr = chromium; Hg = mercury; mg/kg = milligram(s) per kilogram; NE = not encountered; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PEC = Probable Effects Concentration; TSCA = Toxic Substances Control Act (50 mg/kg)

Figure 7-1D
Recommended Remedial Alternative 3A
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

W KILBOURN AVE

E KILBOURN AVE

E WELLS ST

N PLANKINTON AVE

W WISCONSIN AVE

W MICHIGAN ST

W CLYBOURN ST

Figure D

Figure F

SD-84

559.2
NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	2	229	363	0.309	17.8
0.5 - 1.5	4.7	580	392	0.384	35.9
1.5 - 2.1	25	901	192	1.28	-
3.5 - 4.5	0.28	37.4	72	0.633	-
4.5 - 5.5	0.075	9.79	11.4	0.0564	-
5.5 - 6.5	0.025	4.79	3.63	0.0971	-
6.5 - 7.4	0.011	6.39	4.43	0.437	-
8.5 - 9.5	0.11	12	17.5	0.496	-
9.5 - 10.5	0.011	6.88	4.83	0.461	-
10.5 - 11.5	0.011	6.41	4.76	0.0982	-
11.5 - 12.1	0.011	7.06	11	0.0985	-

SD-39

562.1
NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	2.6	435	281	0.38	11.8
0.5 - 1.5	1.8	152	275	0.48	3.9
1.5 - 2.5	1.8	352	397	0.46	7.9
2.5 - 3.5	4.2	487	686	0.49	17.3
3.5 - 4.5	10.3	1370	1240	16	16.7
4.5 - 6.5	2.9	937	377	1.4	10.4
6.5 - 9	0.023	812	760	5.4	23.1
8.7 - 9.7	5.1	406	474	6.52	-
9.7 - 10.7	0.64	530	559	4.94	-
10.7 - 11.9	0.028	61.1	54.2	0.311	-
13.7 - 14.7	0.096	6.45	21.9	0.0956	-
14.7 - 15.7	0.011	3.37	4.76	0.0986	-
15.7 - 16.2	0.011	4.26	2.5	0.0974	-
18.7 - 19.8	0.054	13.1	28.4	0.0324	-

SD-85

564.6
NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.57	33.5	61.4	0.163	24
0.5 - 1.5	1.1	44.9	79.9	0.194	19.5
1.5 - 2.5	1.9	55	114	0.357	-
2.5 - 3.5	1.9	78.3	142	0.399	-
3.5 - 4.4	1.8	48.4	109	0.352	-
4.6 - 5.6	3.6	130	202	0.448	-
5.6 - 6.6	3.9	236	252	0.555	-
6.6 - 7.4	3.9	1290	293	0.692	-
9.6 - 10.6	2.9	288	309	0.391	-
10.6 - 11.6	1.1	59.8	58.9	0.0536	-
11.6 - 12.6	0.011	3.97	2.56	0.083	-
12.6 - 13.3	0.011	6.61	4.85	0.0891	-
14.6 - 15.6	0.011	4.92	3.17	0.0842	-
15.6 - 16.6	0.011	7.35	5.56	0.089	-
16.6 - 17.6	0.011	4.39	2.68	0.0992	-
19.1 - 20.1	0.011	3.84	2.29	0.0983	-
20.1 - 21.5	0.011	2.59	2.04	0.0899	-
24.1 - 25	0.011	4.13	6.61	0.093	-

SD-40

561.4
8.5

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	3.3	290	273	0.6	2.8
0.5 - 1.5	3.1	246	347	0.41	7.4
1.5 - 2.5	2.3	567	567	0.54	7.5
2.5 - 3.5	5.1	1020	657	4.5	9.6
3.5 - 4.5	29	1860	626	1.3	10.1
4.5 - 6.5	18.9	2470	677	3	6.7
6.5 - 8.5	0.058	943	828	11.1	6.7
8.5 - 10	0.015	15.5	7.3	0.042	0.095

SD-86

564.7
8.4

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.8	38.4	106	0.144	30.2
0.5 - 1.5	2.7	82.6	170	0.403	41.8
1.5 - 2.5	4.6	30.3	52.2	0.414	-
2.5 - 3.5	6.5	310	211	0.371	-
3.5 - 4.5	4	240	247	0.364	-
4.5 - 5.8	5.5	380	470	0.571	-
7.3 - 8.4	4.9	2170	674	1.76	-
8.4 - 9.4	0.052	14.3	11.4	0.0838	-

SD-87

556.7
NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	14.1	226	1140	2.67	25.8
0.5 - 1.5	0.24	382	426	4.69	46.5
1.5 - 2.5	0.011	162	311	2.16	-
2.5 - 3.3	0.011	6.72	7.33	0.0329	-
6.3 - 7.3	0.021	5.67	4.6	0.0256	-
7.3 - 8.3	0.011	4.59	3.16	0.096	-
8.3 - 9.3	0.011	2.62	2.79	0.0351	-
9.3 - 9.9	0.011	6.6	5.55	0.0808	-

SD-41

561.8
12.9

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	5.8	933	497	0.66	7.2
0.5 - 1.5	28.4	1810	566	1.4	14.8
1.5 - 2.5	25.1	1240	501	5.9	23.9
2.5 - 3.5	0.59	305	478	3	24.8
3.5 - 4.5	0.35	426	558	1.7	9
4.5 - 6.5	0.094	300	532	6	6.4
6.5 - 8.5	0.047	618	479	6.9	10.6
8.5 - 10	0.021	509	406	4.1	20
11.9 - 12.9	0.0087	11	21	0.221	-
12.9 - 13.9	0.011	9.01	7.02	0.0752	-

SD-42

557.1
NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	1.6	311	340	0.72	7.1
0.5 - 1.5	2.1	384	417	0.532	-
0.5 - 1.6	3.3	713	582	0.6	8.4
4.1 - 5.1	0.092	5.64	12.7	0.287	-
5.1 - 6.1	0.023	6.74	7.63	0.0987	-
6.1 - 7.1	0.06	5.52	8.72	0.084	-
7.1 - 8	0.083	4.5	10.1	0.091	-
9.1 - 10.1	0.084	5.51	6.5	0.0888	-
10.1 - 11.1	0.011	5.09	4.03	0.0937	-
11.1 - 12.1	0.011	5.43	3.83	0.0943	-
12.1 - 13.3	0.011	4.51	3.76	0.087	-
14.1 - 15.1	0.043	5.16	4.15	0.0959	-
15.1 - 16.1	0.011	4.13	3.04	0.0814	-
16.1 - 17.1	0.011	5.28	3.49	0.0853	-
17.1 - 18.1	0.011	4.1	2.72	0.0838	-

LEGEND

- Analytical Sample Location
- Non-TSCA Sediment Dredge Extent
- Cap Extent
- Milwaukee River Downtown Reach Project Area
- UG Underground Utility

Bathymetry (feet)
- Bathymetric Contour

Elevation (feet)
- 575 - 580
- 570 - 575
- 565 - 570
- 560 - 565
- 555 - 560
- 550 - 555
- 545 - 550

N

0 75 150

Approximate scale in feet

Analytical Results Table Format

Location ID

Mudline Elevation

Depth	PCBs (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Native Material Depth	<1	<PEC	<PEC
Sample interval (ft bss)	1 - 3	>PEC	>PEC
	3 - 5	>3xPEC	>3xPEC
	5 - 50	>5xPEC	>5xPEC
	>50		

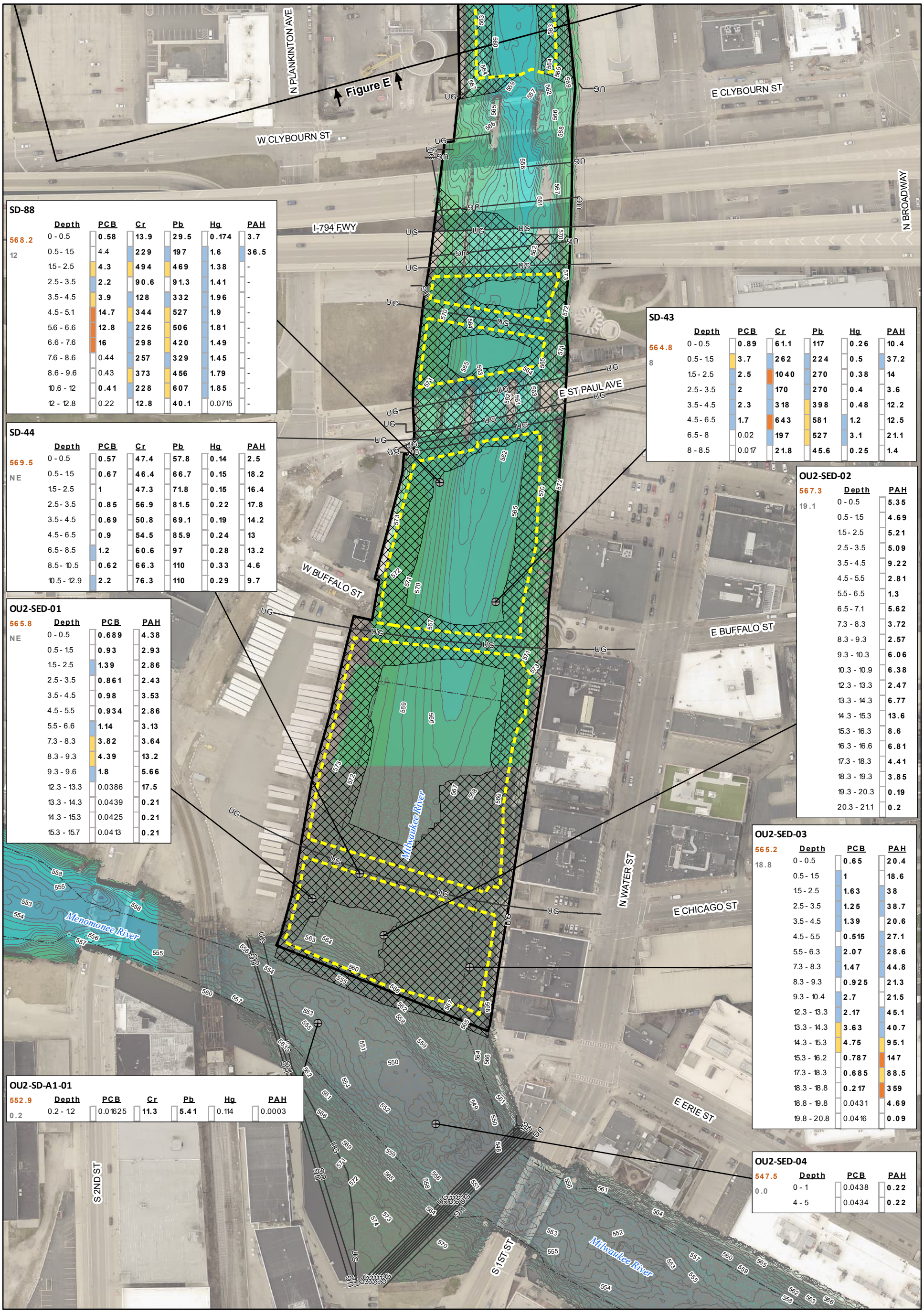
Bold values represent results above the detection limit

"-" = COC was not sampled/analyzed

NE = Native Material Not Encountered

Notes:
1. Basemap: Milwaukee County 2020 Aerial Orthophotography captured April 2020.
2. Horizontal Datum: North American Datum 1983 (NAD83)
3. Vertical Datum: North American Vertical Datum of 1988 (NAVD88). Bathymetric contour and shading were generated from hydrographic survey data collected by Seaworks (2020).
4. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
5. 3x = 3 times; 5x = 5 times; ft bss = feet below sediment surface; COC = Contaminant of Concern; Cr = chromium; Hg = mercury; mg/kg = milligram(s) per kilogram; NE = not encountered; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PEC = Probable Effects Concentration; TSCA = Toxic Substances Control Act (50 mg/kg)

Figure 7-1E
Recommended Remedial Alternative 3A
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin



SD-88

568.2 / 12

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.58	13.9	29.5	0.174	3.7
0.5 - 1.5	4.4	229	197	1.6	36.5
1.5 - 2.5	4.3	494	469	1.38	-
2.5 - 3.5	2.2	90.6	91.3	1.41	-
3.5 - 4.5	3.9	128	332	1.96	-
4.5 - 5.1	14.7	344	527	1.9	-
5.6 - 6.6	12.8	226	506	1.81	-
6.6 - 7.6	16	298	420	1.49	-
7.6 - 8.6	0.44	257	329	1.45	-
8.6 - 9.6	0.43	373	456	1.79	-
10.6 - 12	0.41	228	607	1.85	-
12 - 12.8	0.22	12.8	40.1	0.0715	-

SD-44

569.5 / NE

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.57	47.4	57.8	0.14	2.5
0.5 - 1.5	0.67	46.4	66.7	0.15	18.2
1.5 - 2.5	1	47.3	71.8	0.15	16.4
2.5 - 3.5	0.85	56.9	81.5	0.22	17.8
3.5 - 4.5	0.69	50.8	69.1	0.19	14.2
4.5 - 6.5	0.9	54.5	85.9	0.24	13
6.5 - 8.5	1.2	60.6	97	0.28	13.2
8.5 - 10.5	0.62	66.3	110	0.33	4.6
10.5 - 12.9	2.2	76.3	110	0.29	9.7

OU2-SED-01

565.8 / NE

Depth	PCB	PAH
0 - 0.5	0.689	4.38
0.5 - 1.5	0.93	2.93
1.5 - 2.5	1.39	2.86
2.5 - 3.5	0.861	2.43
3.5 - 4.5	0.98	3.53
4.5 - 5.5	0.934	2.86
5.5 - 6.6	1.14	3.13
7.3 - 8.3	3.82	3.64
8.3 - 9.3	4.39	13.2
9.3 - 9.6	1.8	5.66
12.3 - 13.3	0.0386	17.5
13.3 - 14.3	0.0439	0.21
14.3 - 15.3	0.0425	0.21
15.3 - 15.7	0.0413	0.21

SD-43

564.8 / 8

Depth	PCB	Cr	Pb	Hg	PAH
0 - 0.5	0.89	61.1	117	0.26	10.4
0.5 - 1.5	3.7	262	224	0.5	37.2
1.5 - 2.5	2.5	1040	270	0.38	14
2.5 - 3.5	2	170	270	0.4	3.6
3.5 - 4.5	2.3	318	398	0.48	12.2
4.5 - 6.5	1.7	643	581	1.2	12.5
6.5 - 8	0.02	197	527	3.1	21.1
8 - 8.5	0.017	21.8	45.6	0.25	1.4

OU2-SED-02

567.3 / 19.1

Depth	PAH
0 - 0.5	5.35
0.5 - 1.5	4.69
1.5 - 2.5	5.21
2.5 - 3.5	5.09
3.5 - 4.5	9.22
4.5 - 5.5	2.81
5.5 - 6.5	1.3
6.5 - 7.1	5.62
7.3 - 8.3	3.72
8.3 - 9.3	2.57
9.3 - 10.3	6.06
10.3 - 10.9	6.38
12.3 - 13.3	2.47
13.3 - 14.3	6.77
14.3 - 15.3	13.6
15.3 - 16.3	8.6
16.3 - 16.6	6.81
17.3 - 18.3	4.41
18.3 - 19.3	3.85
19.3 - 20.3	0.19
20.3 - 21.1	0.2

OU2-SED-03

565.2 / 18.8

Depth	PCB	PAH
0 - 0.5	0.65	20.4
0.5 - 1.5	1	18.6
1.5 - 2.5	1.63	38
2.5 - 3.5	1.25	38.7
3.5 - 4.5	1.39	20.6
4.5 - 5.5	0.515	27.1
5.5 - 6.3	2.07	28.6
7.3 - 8.3	1.47	44.8
8.3 - 9.3	0.925	21.3
9.3 - 10.4	2.7	21.5
12.3 - 13.3	2.17	45.1
13.3 - 14.3	3.63	40.7
14.3 - 15.3	4.75	95.1
15.3 - 16.2	0.787	147
17.3 - 18.3	0.685	88.5
18.3 - 18.8	0.217	359
18.8 - 19.8	0.0431	4.69
19.8 - 20.8	0.0416	0.09

OU2-SD-A1-01

552.9 / 0.2

Depth	PCB	Cr	Pb	Hg	PAH
0.2 - 1.2	0.01625	11.3	5.41	0.114	0.0003

OU2-SED-04

547.5 / 0.0

Depth	PCB	PAH
0 - 1	0.0438	0.22
4 - 5	0.0434	0.22

LEGEND

- Analytical Sample Location
- Federal Navigation Channel (Source: United States Army Corps of Engineers)
- Non-TSCA Sediment
- Dredge Extent
- Cap Extent
- Milwaukee River Downtown Reach Project Area
- UG — Underground Utility

Bathymetry (feet)

- Bathymetric Contour

Elevation (feet)

- 575 - 580
- 570 - 575
- 565 - 570
- 560 - 565
- 555 - 560
- 550 - 555
- 545 - 550

N

0 75 150

Approximate scale in feet

Analytical Results Table Format

Location ID

Mudline Elevation

Depth	PCBs (mg/kg)	Metals (mg/kg)	PAHs (mg/kg)
Native Material Depth	<1	<PEC	<PEC
Sample interval (ft bss)	1 - 3	>PEC	>PEC
	3 - 5	>3xPEC	>3xPEC
	5 - 50	>5xPEC	>5xPEC
	>50		

Bold values represent results above the detection limit

"-" = COC was not sampled/analyzed

NE = Native Material Not Encountered

Notes:
1. Basemap: Milwaukee County 2020 Aerial Orthophotography captured April 2020.
2. Horizontal Datum: North American Datum 1983 (NAD83)
3. Vertical Datum: North American Vertical Datum of 1988 (NAVD88). Bathymetric contour and shading were generated from hydrographic survey data collected by Seaworks (2020).
4. PEC values were obtained from the Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application. Publication No. WT-732 2003 (Wisconsin Department of Natural Resources 2003).
5. 3x = 3 times; 5x = 5 times; ft bss = feet below sediment surface; COC = Contaminant of Concern; Cr = chromium; Hg = mercury; mg/kg = milligram(s) per kilogram; NE = not encountered; PAH = polycyclic aromatic hydrocarbons; Pb = lead; PCB = polychlorinated biphenyls; PEC = Probable Effects Concentration; TSCA = Toxic Substances Control Act (50 mg/kg)

Figure 7-1F
Recommended Remedial Alternative 3A
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Appendix A
Milwaukee River Downtown Reach – Analytical Results Summary

Appendix A
Milwaukee River Downtown Reach - Sediment Analytical Results Summary
Focused Feasibity Study, Milwaukee Estuary AOC, Milwaukee, Wisconsin

Analyte Group					PCB											PAH													
Analyte					Total PCB	Aroclor 1260	Aroclor 1254	Aroclor 1268	Aroclor 1221	Aroclor 1232	Aroclor 1248	Aroclor 1016	Aroclor 1262	Aroclor 1242	Total PAH	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b)-fluoranthene	Benzo(e)pyrene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h)anthracene
Unit					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
WI CBSQG PEC					1										22.8													
WI CBSQG PEC 3x					3										68.4													
WI CBSQG PEC 5x					5										114													
TSCA					50																							
Location code	Sample ID	Start Depth (feet)	End Depth (feet)	Date	Total PCB	Aroclor 1260	Aroclor 1254	Aroclor 1268	Aroclor 1221	Aroclor 1232	Aroclor 1248	Aroclor 1016	Aroclor 1262	Aroclor 1242	Total PAH	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b)-fluoranthene	Benzo(e)pyrene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h)anthracene
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SD-26	MK-SD-26-0.0./0.5	0	0.5	11/10/2016	**0.6**	**0.156**	**0.142 J**	0.0693 U	0.0693 U	0.0693 U	0.0693 U	0.0693 U	0.0693 U	**0.298 J**	**3.9**	**0.0333 J**	**0.0268 J**	0.0091 U	**0.106**	**0.268**	**0.257**	**0.409**		**0.14**	**0.198**	**0.378**	**0.0395**
SD-26	MK-SD-26-0.5/1.2	0.5	1.2	11/10/2016	**0.64**	0.0617 U	**0.133 J**	0.0617 U	0.0617 U	0.0617 U	0.0617 U	0.0617 U	0.0617 U	**0.51 J**	**13.6**	0.0309 U	**0.0729 J**	0.0203 U	**0.438**	**1.16 J**	**1.1 J**	**1.39 J**		**0.655 J**	**0.478 J**	**1.4 J**	**0.169**
SD-27	MK-SD-27-0.0./0.5	0	0.5	11/10/2016	**1.7**	0.123 U	**0.409**	0.123 U	0.123 U	0.123 U	0.123 U	0.123 U	0.123 U	**1.27 J**	**1.8**	0.0061 U	**0.0081 J**	0.004 U	**0.0522**	**0.127**	**0.125**	**0.196**		**0.106**	**0.0858**	**0.194**	**0.0262**
SD-27	MK-SD-27-0.5/1.4	0.5	1.4	11/10/2016	**0.42**	0.0358 U	**0.0879**	0.0358 U	0.0358 U	0.0358 U	0.0358 U	0.0358 U	0.0358 U	**0.33**	**6**	0.0287 U	**0.0348 J**	0.0189 U	**0.172**	**0.463**	**0.45**	**0.717**		**0.261**	**0.338**	**0.649**	**0.0811**
SD-28	MK-SD-28-0.0/0.5	0	0.5	11/9/2016	**0.82**	0.0775 U	**0.186**	0.0775 U	0.0775 U	0.0775 U	0.0775 U	0.0775 U	0.0775 U	**0.631**	**17**	**0.0513**	**0.186**	**0.114**	**0.55**	**1.02**	**0.999**	**1.27**	**0.73**	**0.76**	**0.59**	**1.28**	**0.24**
SD-28	MK-SD-28-0.5/1.5	0.5	1.5	11/9/2016	**2.2**	0.158 UJ	**0.479 J-**	0.158 UJ	0.158 UJ	0.158 UJ	0.158 UJ	0.158 UJ	0.158 UJ	**1.76 J-**	**56.6**	**0.101**	**0.607**	**0.344**	**1.58**	**4.99**	**2.32**	**5.55**	**1.74**	**1.93**	**1.21**	**6.08**	**0.744**
SD-28	MK-SD-28-1.5/2.5	1.5	2	11/9/2016	**3.2**	0.202 U	**0.535 J**	0.202 U	0.202 U	0.202 U	0.202 U	0.202 U	0.202 U	**2.7**	**203**	**0.207**	**1.78**	**0.561**	**6.68**	**13.3**	**13.2**	**16.5**	**9.34**	**10.5**	**2.02**	**17.4**	**2.2**
SD-28	MK-SD-28-2.5/3.5	2.5	3.5	11/9/2016	**1.6**	0.0852 UJ	**0.172 J-**	0.0852 UJ	0.0852 UJ	0.0852 UJ	0.0852 UJ	0.0852 UJ	0.0852 UJ	**1.4 J**	**57.5**	**0.171**	**0.6**	**0.335**	**1.41**	**4.99**	**2.36**	**6.1**	**1.8**	**2.01**	**1.29**	**6.44**	**0.776**
SD-28	MK-SD-28-3.5/4.5	3.5	4.5	11/9/2016	0.023 U	0.0465 U	0.0465 U	0.0465 U	0.0465 U	0.0465 U	0.0465 U	0.0465 U	0.0465 U	0.0465 U	**20.9**	**0.106**	**0.276**	**0.141**	**0.694**	**1.3**	**1.39**	**1.64**	**0.952**	**1.02**	**0.762**	**1.68**	**0.329**
SD-28	MK-SD-28-4.5/6.5	4.5	6.5	11/9/2016	0.022 U	0.0438 UJ	0.0438 UJ	0.0438 UJ	0.0438 UJ	0.0438 UJ	0.0438 UJ	0.0438 UJ	0.0438 UJ	0.0438 UJ	**23.7**	**0.103**	**0.288**	**0.145**	**0.844**	**1.33**	**1.42**	**1.65**	**0.948**	**1.05**	**0.685**	**1.67**	**0.336**
SD-28	MK-SD-28-6.5/7.3	6.5	7.3	11/9/2016	0.019 U	0.0387 UJ	0.0387 UJ	0.0387 UJ	0.0387 UJ	0.0387 UJ	0.0387 UJ	0.0387 UJ	0.0387 UJ	0.0387 UJ	**8.1**	**0.0765**	**0.113**	**0.0901**	**0.303**	**0.573**	**0.572**	**0.737**	**0.413**	**0.408**	**0.288**	**0.78**	**0.123**
SD-28X	MK-SD-28X-6.8/8.0	6.8	8	7/17/2018	**0.035**	0.0219 U	0.0219 UJ	0.0219 UJ	0.0219 UJ	0.0219 U	0.0219 U	0.0219 U	0.0219 UJ	**0.0352**													
SD-29	MK-SD-29-0.0./0.5	0	0.5	11/9/2016	**3**	0.188 U	**0.559 J**	0.188 U	0.188 U	0.188 U	0.188 U	0.188 U	0.188 U	**2.47**	**8**	0.0375 U	**0.0488 J**	0.0247 U	**0.187**	**0.607**	**0.608**	**1.02**		**0.315**	**0.37**	**0.869**	**0.0973**
SD-29	MK-SD-29-0.5/1.5	0.5	1.5	11/9/2016	**18.3**	1.49 U	**1.98 J**	1.49 U	1.49 U	1.49 U	1.49 U	1.49 U	1.49 U	**16.3**	**23.4**	0.0793 U	**0.215**	0.0522 U	**0.555**	**1.31**	**1.41**	**2.54**		**1.32**	**1**	**2.62**	**0.302**
SD-29	MK-SD-29-1.5/2.5	1.5	2.5	11/9/2016	**76.8**	5.39 U	5.39 U	5.39 U	5.39 U	5.39 U	5.39 U	5.39 U	5.39 U	**76.8 J**	**23.7**	0.0863 U	**0.201 J**	0.0568 U	**0.537**	**1.49**	**1.44**	**2.6**		**1.24**	**0.992**	**2.55**	**0.342**
SD-29	MK-SD-29-2.5/3.5	2.5	3.5	11/9/2016	**2**	0.139 U	**0.414 J**	0.139 U	0.139 U	0.139 U	0.139 U	0.139 U	0.139 U	**1.56**	**26.4**	0.186 U	**0.171 J**	0.123 U	**0.92**	**1.88**	**1.68**	**2.87**		**0.917**	**1.29**	**2.91**	**0.269 J**
SD-29	MK-SD-29-3.5/4.5	3.5	4.5	11/9/2016	**0.52**	0.047 U	**0.169**	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	**0.354**	**11.3**	0.0752 U	**0.0718 J**	0.0496 U	**0.326**	**0.615**	**0.524**	**1.25**		**0.498**	**0.522**	**1.33**	**0.136**
SD-29	MK-SD-29-4.5/6.5	4.5	6.5	11/9/2016	**0.89**	**0.0938**	**0.205**	0.0451 U	0.0451 U	0.0451 U	0.0451 U	0.0451 U	0.0451 U	**0.593**	**23.2**	0.18 U	**0.171 J**	0.119 U	**0.669 J**	**1.49**	**1.08**	**2.52**		**1.04**	**1.01**	**2.46**	**0.293**
SD-29	MK-SD-29-6.5/9.4	6.5	9.4	11/9/2016	0.017 U	0.0333 UJ	0.0333 UJ	0.0333 UJ	0.0333 UJ	0.0333 UJ	0.0333 UJ	0.0333 UJ	0.0333 UJ	0.0333 UJ	**6.2**	0.0266 U	**0.0817 J**	**0.0316 J**	**0.295 J**	**0.435 J**	**0.361 J**	**0.58 J**		**0.283 J**	**0.22 J**	**0.564 J**	**0.0759 J**
SD-29X	MK-SD-29X-9.8/10.8	9.8	10.8	7/19/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 UJ	0.0221 U	0.0221 U													
SD-29X	MK-SD-29X-10.8/11.8	10.8	11.8	7/19/2018	0.011 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 UJ	0.0219 U	0.0219 U													
SD-29X	MK-SD-29X-11.8/13.0	11.8	13	7/19/2018	0.011 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 UJ	0.0219 U	0.0219 U													
SD-29X	MK-SD-29X-14.8/16.2	14.8	16.2	7/19/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 UJ	0.0221 U	0.0221 U													
SD-30	MK-SD-30-0.0./0.5	0	0.5	11/10/2016	**2.1**	0.15 U	**0.433**	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	**1.71**	**1.9**	0.0075 U	**0.0109 J**	0.0049 U	**0.0449**	**0.143**	**0.147**	**0.24**		**0.0771**	**0.108**	**0.21**	**0.0225**
SD-30	MK-SD-30-0.5/1.5	0.5	1.5	11/10/2016	**2.7**	**0.273 J**	**0.694**	0.204 U	0.204 U	0.204 U	0.204 U	0.204 U	0.204 U	**1.74**	**8.4**	0.0509 U	**0.0603 J**	0.0335 U	**0.22**	**0.519**	**0.457**	**0.999**		**0.425**	**0.389**	**0.955**	**0.109**
SD-30	MK-SD-30-1.5/2.5	1.5	2.5	11/10/2016	**6.8**	0.691 U	**1.43**	0.691 U	0.691 U	0.691 U	0.691 U	0.691 U	0.691 U	**5.32**	**23.8**	0.184 U	**0.177 J**	0.121 U	**0.725**	**1.53**	**1.55**	**2.4**		**1.31**	**1.04**	**2.26**	**0.29**
SD-30	MK-SD-30-2.5/3.5	2.5	3.5	11/10/2016	**46.5**	5.07 U	5.07 U	5.07 U	5.07 U	5.07 U	5.07 U	5.07 U	5.07 U	**46.5**	**16.8**	0.101 U	**0.177 J**	0.0668 U	**0.43**	**0.772**	**0.727**	**1.78**		**0.879**	**0.801**	**1.98**	**0.213**
SD-30	MK-SD-30-3.5/4.5	3.5	4.5	11/10/2016	**95.9**	9.38 U	**12.1 J**	9.38 U	9.38 U	9.38 U	9.38 U	9.38 U	9.38 U	**83.8**	**12.9**	0.0938 U	**0.114 J**	0.0618 U	**0.301 J**	**0.811**	**0.534**	**1.35**		**0.649**	**0.603**	**1.32**	**0.184**
SD-30	MK-SD-30-4.5/6.5	4.5	6.5	11/10/2016	**1**	**0.0892**	**0.401 J**	0.0405 U	0.0405 U	0.0405 U	0.0405 U	0.0405 U	0.0405 U	**0.555 J**	**10.6**	0.081 U	**0.0844 J**	0.0534 U	**0.302 J**	**0.659**	**0.45**	**1.13**		**0.502**	**0.485**	**1.12**	**0.141**
SD-30	MK-SD-30-6.5/8.5	6.5	8.5	11/10/2016	**0.43**	0.0471 UJ	**0.148 J-**	0.0471 UJ	0.0471 UJ	0.0471 UJ	**0.282 J-**	0.0471 UJ	0.0471 UJ	0.0471 UJ	**13.5**	0.0943 U	**0.104 J**	0.0621 U	**0.354 J**	**0.843**	**0.601**	**1.43**		**0.653**	**0.613**	**1.42**	**0.176**
SD-30X	MK-SD-30X-8.1/9.1	8.1	9.1	7/23/2018	**0.091**	0.0442 U	0.0442 UJ	0.0442 U	0.0442 U	0.0442 U	0.0442 U	0.0442 U	0.0442 U	**0.0913**													
SD-30	MK-SD-30-8.5/9.5	8.5	9.5	11/10/2016	**0.048**	0.0477 U	**0.048 J**	0.0477 U	0.0477 U	0.0477 U	0.0477 U	0.0477 U	0.0477 U	0.0477 U	**19.2**	0.0764 UJ	**0.175 J**	0.0503 U	**0.522 J**	**1.27 J**	**1.11 J**	**1.88 J**		**0.815 J**	**0.825 J**	**1.98 J**	**0.225**
SD-30X	MK-SD-30X-9.1/10.1	9.1	10.1	7/23/2018	**1.2**	0.219 U	0.219 UJ	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**1.22**													
SD-31	MK-SD-31-0.0./0.5	0	0.5	11/9/2016	**0.49**	0.0756 U	**0.125 J**	0.0756 U	0.0756 U	0.0756 U	0.0756 U	0.0756 U	0.0756 U	**0.363**	**3.5**	0.0151 UJ	**0.0143 J-**	0.01 UJ	**0.0637**	**0.202**	**0.274**	**0.486**		**0.264**	**0.212**	**0.362**	**0.0613**
SD-31	MK-SD-31-0.5/1.5	0.5	1.5	11/9/2016	**0.071**	0.0363 U	0.0363 U	0.0363 U	0.0363 U	0.0363 U	0.0363 U	0.0363 U	0.0363 U	**0.071 J**	**6.6**	0.0291 U	**0.0529 J**	0.0192 U	**0.123**	**0.404**	**0.358**	**0.782**		**0.341**	**0.31**	**0.83**	**0.0947**
SD-31X	MK-SD-31X-1.0/2.0	1	2	7/23/2018	**3.7**	0.11 U	**0.778**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**2.96**													
SD-31	MK-SD-31-1.5/2.4	1.5	2.4	11/9/2016	0.016 U	0.0319 U	0.0319 U	0.0319 U	0.0319 U	0.0319 U	0.0319 U	0.0319 U	0.0319 U	0.0319 U	**54.8**	0.127 U	**0.794**	0.084 U	**2.1**	**3.78**	**3.39**	**4.8**		**2.31**	**1.87**	**4.76**	**0.641**
SD-31X	MK-SD-31X-2.0/3.0	2	3	7/23/2018	0.056 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U													
SD-31X	MK-SD-31X-3.0/4.2	3	4.2	7/23/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-31X	MK-SD-31X-4.2/4.4	4.2	4.4	7/23/2018	0.011 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U													
SD-32	MK-SD-32-0.0/0.5	0	0.5	11/9/2016	**0.88**	0.0712 U	**0.144**	0.0712 U	0.0712 U	0.0712 U	0.0712 U	0.0712 U	0.0712 U	**0.739**	**11**	**0.007**	**0.0798**	**0.0248**	**0.342**	**0.972**	**0.927**	**1.21**		**0.526**	**0.369**	**0.983**	0.00047 U
SD-32	MK-SD-32-0.5/1.5	0.5	1.5	11/9/2016	**2.7**	**0.31**	**0.572 J**	0.141 U	0.141 U	0.141 U	0.141 U	0.141 U	0.141 U	**1.82**	**13.2**	**0.0065**	**0.143**	**0.0237**	**0.339**	**1.02**	**0.988**	**1.34**		**0.603**	**0.573**	**1.07**	0.00061 U
SD-32	MK-SD-32-1.5/2.5	1.5	2.5	11/9/2016	**57.9**	9.9 U	9.9 U	9.9 U	9.9 U	9.9 U	9.9 U	9.9 U	9.9 U	**57.9 J**	**40.9**	**0.0162**	**0.429**	**0.0615**	**1.22**	**3.19**	**2.91**	**4.27**		**1.83**	**1.69**	**3.42**	0.00065 U
SD-32	MK-SD-32-2.5/3.5	2.5	3.5	11/9/2016	**3.2**	**0.257 J**	**1.23 J**	0.169 U	0.169 U	0.169 U	0.169 U	0.169 U	0.169 U	**1.7 J**	**64**	**0.0377**	**0.623**	**0.144**	**1.75**	**5.32**	**4.88**	**6.62**		**2.75**	**2.83**	**5.65**	**0.877**
SD-32	MK-SD-32-3.5/4.5	3.5	4.5	11/9/2016	**0.7**	**0.0564 J**	**0.269**	0.0448 U	0.0448 U	0.0448 U	0.0448 U	0.0448 U	0.0448 U	**0.378 J**	**93.2**	**0.0601**	**0.564**	**0.119**	**2.41**	**7.93**	**7.46**	**10.1**		**4.43**	**4.08**	**8.58**	0.0029 U
SD-32	MK-SD-32-4.5/6.5	4.5	6.5	11/9/2016	**0.78**	0.0451 U	**0.0599 J**	0.0451 U	0.0451 U	0.0451 U	0.0451 U	0.0451 U	0.0451 U	**0.72**	**76**	**0.0847**	**0.721**	**0.0912 J**	**1.9**	**6.35**	**5.61**	**7.74**		**3.12**	**2.63**	**6.69**	**1.04**
SD-32	MK-SD-32-6.5/9.3	6.5	9.3	11/9/2016	0.02 U	0.0396 U	0.0396 U	0.0396 U	0.0396 U	0.0396 U	0.0396 U	0.0396 U	0.0396 U	0.0396 U	**81.5**	**0.152**	**0.785**	**0.131**	**2.24**	**7.06**	**5.91**	**8.22**		**3.19**	**2.6**	**7.1**	**1.05**
SD-32X	MK-SD-32X-7.4/8.4	7.4	8.4	7/24/2018	**0.021**	0.022 U	**0.00524 J**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.0154 J**	**69.4**	**0.141**	**0.534**	**0.126**	**1.88**	**4.98**	**4.7**	**7.26**	**3.75**	**2.93**	**2.5**	**5.54**	**0.718**
SD-32X	MK-SD-32X-8.4/9.4	8.4	9.4	7/24/2018	0.055 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**27.3**	**0.267**	**0.238**	**0.0667**	**0.469**	**0.882**	**0.844**	**1.14**	**0.627**	**0.355**	**0.39**	**0.876**	**0.118**
SD-32X	MK-SD-32X-9.4/10.7	9.4	10.7	7/24/2018	0.056 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**28.7**	**0.224**	**0.219**	**0.056**	**0.388**	**0.81**	**0.822**	**1.08**	**0.581**	**0.527**	**0.375**	**0.85**	**0.157**
SD-32X	MK-SD-32X-12.4/13.0	12.4	13	7/24/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**2.8**	**0.0241 J-**	**0.0406 J-**	**0.0297 J-**	**0.0814 J-**	**0.167**	**0.167**	**0.219**	**0.122**	**0.0813**	**0.0736**	**0.171**	**0.026**
SD-33	MK-SD-33-0.0/0.5	0	0.5	11/10/2016	**3.2**	0.27 U	**0.575**	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	**2.6**	**11.5**	**0.0113 J**	**0.0885**	**0.0996**	**0.322**	**0.865**	**0.9**	**1.22**	**0.653**	**0.6**	**0.53**	**1.21**	**0.19**
SD-33	MK-SD-33-0.5/1.5	0.5	1.5	11/10/2016	**4.5**	0.237 U	**0.923**	0.237 U	0.237 U	0.237 U	0.237 U	0.237 U	0.237 U	**3.53**	**96.1**	**0.0942**	**0.839**	**0.601**	**2.34**	**7.99**	**7.77**	**9.78**	**2.86**	**5.78**	**1.86**	**10.7**	**1.22**
SD-33	MK-SD-33-1.5/2.5	1.5	2.5	11/10/2016	**1.7**	**0.229 J**	**0.458 J**	0.116 U	0.116 U	0.116 U	0.116 U	0.116 U	0.116 U	**0.991 J**	**15**	**0.0147 J**	**0.151**	**0.102**	**0.45**	**0.992**	**1.02**	**1.34**	**0.73 J**	**0.805 J**	**0.594**	**1.36**	**0.228**
SD-33	MK-SD-33-2.5/3.5	2.5	3.5	11/10/2016	**2.7**	**0.263**	**0.679**	0.105 U	0.105 U	0.105 U	0.105 U	0.105 U	0.105 U	**1.79**	**75.5**	**0.0532**	**0.725**	**0.469**	**1.83**	**6.3**	**2.98**	**8.2**	**2.25**	**2.58**	**1.7**	**8.48**	**0.899**
SD-33	MK-SD-33-3.5/4.5	3.5	4.5	11/10/2016	**3.6**	0.254 U	**0.821**	0.254 U	0.254 U	0.254 U	0.254 U	0.254 U	0.254 U	**2.8 J**	**87.8**	**0.0622**	**0.897**	**0.468**	**2.1**	**6.67**	**3.19**	**8.68**	**2.44**	**2.74**	**2.18**	**9.2**	**0.969**
SD-33	MK-SD-33-4.5/6.5	4.5	6.5	11/10/2016	**5.5**	**0.343 J**	**1.05**	0.246 U	0.246 U	0.246 U	0.246 U	0.246 U	0.246 U	**4.08**	**45.4**	**0.0344**	**0.502**	**0.292**	**1.24**	**3.4**	**2.02**	**5.1**	**1.51**	**1.67**	**1.06**	**2.52**	**0.534**
SD-33	MK-SD-33-6.5/9.3	6.5	9.3	11/10/2016	**10.2**	0.692 U	**0.913 J**	0.692 U	0.692 U	0.692 U	0.692 U	0.692 U	0.692 U	**9.31**	**93.6**	**0.137**	**0.911**	**0.344**	**2.06**	**6.89**	**6.62**	**9.6**	**2.59 J**	**2.72 J**	**1.85**	**9.9**	**1.12**
SD-33X	MK-SD-33X-7.6/8.6	7.6	8.6	7/25/2018	**91.8**	**3.13 J**	5.53 U	5.53 U	5.53 U	5.53 U	5.53 U	5.53 U	5.53 U	**88.7**	**371**	**0.576**	**3.29**	**0.224**	**8.04**	**27.6**	**26.3**	**41.8**	**11.6**	**10.2**	**8.56**	**29.9**	**3.13**
SD-33X	MK-SD-33X-8.6/9.6	8.6	9.6	7/25/2018	**0.79**	**0.199**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**0.593 J**	**225**	**0.633**	**2.12**	**0.175**	**5.51**	**16.7**	**14.8**	**25.4**	**11.3**	**3.12**	**9.07**	**16.6**	**1.29**
SD-33X	MK-SD-33X-9.6/10.6	9.6	10.6	7/25/2018	0.055 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**173**	**0.926**	**2**	**0.326**	**5.18**	**14.3**	**12.6**	**21.3**	**9.5**	**3.08**	**7.36**	**13.8**	**1.22**
SD-33X	MK-SD-33X-10.6/11.3	10.6	11.3	7/25/2018	0.055 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**37.7**	**0.319**	**0.474**	**0.102**	**1.15**	**2.36**	**2.27**	**3.21**	**1.68**	**0.493**	**1.05**	**2.25**	**0.187**
SD-33X	MK-SD-33X-12.6/13.6	12.6	13.6	7/25/2018	0.056 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**29.3**	**0.261**	**0.328**	**0.0679**	**0.627**	**1.44**	**1.48**	**1.99**	**1.01**	**0.299**	**0.657**	**1.27**	**0.107**
SD-33X	MK-SD-33X-13.6/14.6	13.6	14.6	7/25/2018	0.011 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**2.7**	**0.0227 J**	**0.0845**	**0.00854**	**0.0835**	**0.173**	**0.167**	**0.22**	**0.118**	**0.045**	**0.0766**	**0.155**	**0.0126**
SD-33X	MK-SD-33X-14.6/15.3	14.6	15.3	7/25/2018	0.011 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	**0.083**	**0.00356 J**	**0.0459**	0.00218 U	**0.00174 J**	0.00218 U	0.00218 U	0.00218 U	0.00216 U	0.00218 U	0.00218 U	0.00218 U	0.00218 U
SD-34	MK-SD-34-0.0/0.5	0	0.5	11/8/2016	**0.86**	0.0625 U	**0.124 J**	0.0625 U	0.0625 U	0.0625 U	0.0625 U	0.0625 U	0.0625 U	**0.738**	**48.3**	0.125 U	**0.584**	0.0823 U	**1.59**	**3.57**	**3.27**	**4.99**		**2.06**	**1.9**	**4.42**	**0.586**
SD-34	MK-SD-34-0.5/1.5	0.5	1.5	11/8/2016	**0.57**	0.0303 U	**0.0809 J**	0.0303 U	0.0303 U	0.0303 U	0.0303 U	0.0303 U	0.0303 U	**0.489**	**26.8**	0.121 U	**0.346**	0.08 U	**1.21**	**1.93**	**1.67**	**2.48**		**0.991**	**0.962**	**2.31**	**0.283**
SD-34	MK-SD-34-1.5/2.5	1.5	2.5	11/8/2016	**0.31**	0.0313 U	**0.0542 J**	0.0313 U	0.0313 U	0.0313 U	0.0313 U	0.0313 U	0.0313 U	**0.254**	**33.5**	0.125 U	**0.575**	0.0825 U	**2.2**	**2.33**	**1.79**	**2.64**		**1.11**	**1.14**	**2.81**	**0.325**
SD-34	MK-SD-34-2.5/3.5	2.5	3.5	11/8/2016	**0.76**	0.0939 U	**0.19**	0.0939 U	0.0939 U	0.0939 U	0.0939 U	0.0939 U	0.0939 U	**0.571**	**17.6**	0.047 U	**0.197**	**0.0421 J**	**0.68**	**1.23**	**1.13**	**1.66**		**0.693**	**0.727**	**1.58**	**0.201**
SD-34	MK-SD-34-3.5/4.5	3.5	4.5	11/8/2016	**1.3**	0.0778 U	**0.23**	0.0778 U	0.0778 U	0.0778 U	0.0778 U	0.0778 U	0.0778 U	**1.03**	**35.9**	0.156 U	**0.288 J**	0.103 U	**1.18**	**2.49**	**2.5**	**4.09**		**1.54**	**1.57**	**3.52**	**0.438**
SD-34X	MK-SD-34X-3.7/4.7	3.7	4.7	7/26/2018	**1.2**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.199**	**1.05**													
SD-34	MK-SD-34-4.5/5.3	4.5	5.3	11/8/2016	**1.6**	0.0903 U	**0.28 J**	0.0903 U	0.0903 U	0.0903 U	0.0903 U	0.0903 U	0.0903 U	**1.28**	**6.2**	0.0361 U	**0.0402 J**	0.0238 U	**0.165**	**0.431**	**0.421**	**0.723**		**0.3**	**0.288**	**0.657**	**0.0851**

Appendix A
Milwaukee River Downtown Reach - Sediment Analytical Results Summary
Focused Feasibity Study, Milwaukee Estuary AOC, Milwaukee, Wisconsin

Analyte Group					PAH						Metals								Metals							Physical Parameters							
Analyte					Fluoranthene	Fluorene	Indeno(1,2,3-Cd)Pyrene	Naphthalene	Phenanthrene	Pyrene	Chromium	Mercury	Lead	Iron	Manganese	Potassium	Sodium	Thallium	Antimony	Beryllium	Cobalt	Calcium	Cyanide	Magnesium	Vanadium	TOC	Gravel	Sand	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Fines
Unit					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	%	%	%	%	%	%
WI CBSQG PEC											110	1.1	130	40000	1100				25														
WI CBSQG PEC 3x											330	3.3	390	120000	3300				75														
WI CBSQG PEC 5x											550	5.5	650	200000	5500				125														
TSCA																																	
Location code	Sample ID	Start Depth (feet)	End Depth (feet)	Date	Fluoranthene	Fluorene	Indeno(1,2,3-Cd)Pyrene	Naphthalene	Phenanthrene	Pyrene	Chromium	Mercury	Lead	Iron	Manganese	Potassium	Sodium	Thallium	Antimony	Beryllium	Cobalt	Calcium	Cyanide	Magnesium	Vanadium	TOC	Gravel	Sand	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Fines
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	%	%	%	%	%	%	%
SD-26	MK-SD-26-0.0./0.5	0	0.5	11/10/2016	**0.702**	**0.0531**	**0.125**	**0.0773** J	**0.484**	**0.565**	**32.2**	**0.11** J	**53.5**												**56000**								
SD-26	MK-SD-26-0.5/1.2	0.5	1.2	11/10/2016	**2.6** J	**0.124**	**0.525** J	0.052 U	**1.28** J	**2.2** J	**13.9**	**0.067** J	**28.9**												**10500**								
SD-27	MK-SD-27-0.0./0.5	0	0.5	11/10/2016	**0.339**	**0.0128** J	**0.0869**	**0.0228** J	**0.135**	**0.243**	**20.9**	0.044 U	**43.2**												**2230**	**15**	**79.5**						**5.5**
SD-27	MK-SD-27-0.5/1.4	0.5	1.4	11/10/2016	**1.12**	**0.0515** J	**0.253**	0.0483 U	**0.549**	**0.822**	**17**	**0.3**	**31.7**												**1770**	**8**	**77**						**15**
SD-28	MK-SD-28-0.0/0.5	0	0.5	11/9/2016	**3.64**	**0.196**	**0.693**	**0.097**	**1.6**	**2.95**	**23.3**	**0.16**	**117**												**19700**								
SD-28	MK-SD-28-0.5/1.5	0.5	1.5	11/9/2016	**10**	**0.71**	**1.76**	**0.141**	**8.78**	**8.05**	**59**	**0.44**	**340**												**57500**								
SD-28	MK-SD-28-1.5/2.5	1.5	2	11/9/2016	**42.3**	**1.75**	**9.33**	**0.434**	**21.9**	**33.7**	**80.1**	**0.56**	**329**												**54200**								
SD-28	MK-SD-28-2.5/3.5	2.5	3.5	11/9/2016	**10.1**	**0.711**	**1.86**	**0.25**	**8.39**	**7.9**	**104**	**13.2**	**672**												**68800**								
SD-28	MK-SD-28-3.5/4.5	3.5	4.5	11/9/2016	**3.81**	**0.293**	**0.925**	**0.158**	**2.1**	**3.3**	**126**	**4.9**	**686**												**89500** J								
SD-28	MK-SD-28-4.5/6.5	4.5	6.5	11/9/2016	**5**	**0.313**	**0.904**	**0.165**	**2.28**	**4.59**	**101**	**3.4**	**448**												**46800** J								
SD-28	MK-SD-28-6.5/7.3	6.5	7.3	11/9/2016	**1.07**	**0.117**	**0.369**	**0.207**	**1**	**0.883**	**65**	**2.1**	**378**												**50400** J								
SD-28X	MK-SD-28X-6.8/8.0	6.8	8	7/17/2018							**47.4**	**1.63**	**280**												**71100**								
SD-29	MK-SD-29-0.0./0.5	0	0.5	11/9/2016	**1.56**	**0.0619** J	**0.304**	0.0632 U	**0.747**	**1.15**	**64.2**	**0.31**	**190**												**39000**	**0**	**13**						**87**
SD-29	MK-SD-29-0.5/1.5	0.5	1.5	11/9/2016	**4.63**	**0.273**	**0.956**	0.133 U	**2.66**	**3.44**	**230**	**0.95**	**436**												**53400**	**0**	**12**						**88**
SD-29	MK-SD-29-1.5/2.5	1.5	2.5	11/9/2016	**4.58**	**0.267**	**1.07**	0.145 U	**2.52**	**3.71**	**711**	**1.1**	**680**												**69300**	**0**	**11**						**89**
SD-29	MK-SD-29-2.5/3.5	2.5	3.5	11/9/2016	**5.21**	**0.27** J	**0.857**	0.313 U	**2.93**	**3.93**	**132**	**1.7**	**318**												**63900**	**0**	**19**						**81**
SD-29	MK-SD-29-3.5/4.5	3.5	4.5	11/9/2016	**2.29**	**0.111** J	**0.444**	0.127 U	**1.21**	**1.82**	**152**	**1.5**	**340**												**72900**	**0**	**23**						**77**
SD-29	MK-SD-29-4.5/6.5	4.5	6.5	11/9/2016	**5.1**	**0.226** J	**0.893**	**0.38** J	**2.67**	**3.04**	**516**	**0.73**	**284**												**67700**	**0**	**30**						**70**
SD-29	MK-SD-29-6.5/9.4	6.5	9.4	11/9/2016	**1.05** J	**0.115** J	**0.24** J	**0.0719** J	**0.903** J	**0.915** J	**396**	**0.19**	**67.6**												**21700**	**18**	**40**						**42**
SD-29X	MK-SD-29X-9.8/10.8	9.8	10.8	7/19/2018							**122**	**1.71**	**371**												**97000**								
SD-29X	MK-SD-29X-10.8/11.8	10.8	11.8	7/19/2018							**178**	**1.21**	**300**												**82600**								
SD-29X	MK-SD-29X-11.8/13.0	11.8	13	7/19/2018							**91.8**	**0.934**	**189**												**78700**								
SD-29X	MK-SD-29X-14.8/16.2	14.8	16.2	7/19/2018							**292**	**1.89**	**299**												**99800**								
SD-30	MK-SD-30-0.0./0.5	0	0.5	11/10/2016	**0.395**	**0.0153** J	**0.072**	0.0126 U	**0.175**	**0.272**	**44.4**	**0.11** J+	**111**												**26500**	**0**	**45**						**55**
SD-30	MK-SD-30-0.5/1.5	0.5	1.5	11/10/2016	**1.66**	**0.0709** J	**0.358**	0.0857 U	**0.838**	**1.29**	**78.4**	**0.35** J+	**261**												**50400**	**0**	**31**						**69**
SD-30	MK-SD-30-1.5/2.5	1.5	2.5	11/10/2016	**4.79**	**0.205** J	**1.02**	0.31 U	**2.74**	**3.46**	**147**	**0.78** J+	**521**												**43200**	**0**	**22**						**78**
SD-30	MK-SD-30-2.5/3.5	2.5	3.5	11/10/2016	**3.37**	**0.21** J	**0.755**	0.171 U	**2.01**	**2.51**	**237**	**0.94** J+	**385**												**52200**	**0**	**8**						**92**
SD-30	MK-SD-30-3.5/4.5	3.5	4.5	11/10/2016	**2.41**	**0.164** J	**0.565**	**0.484** J	**1.49**	**1.84**	**169**	**1.6** J+	**424**												**55000**	**0**	**9**						**91**
SD-30	MK-SD-30-4.5/6.5	4.5	6.5	11/10/2016	**2.09**	**0.137** J	**0.456**	0.136 U	**1.3**	**1.6**	**104**	**1.2** J+	**256**												**35700**	**0**	**10**						**90**
SD-30	MK-SD-30-6.5/8.5	6.5	8.5	11/10/2016	**2.64**	**0.162** J	**0.575**	0.159 U	**1.59**	**2.16**	**207**	**0.69** J+	**294**												**45300**	**0**	**7**						**93**
SD-30X	MK-SD-30X-8.1/9.1	8.1	9.1	7/23/2018							**351**	**31.1**	**476**												**72700**								
SD-30	MK-SD-30-8.5/9.5	8.5	9.5	11/10/2016	**3.73**	**0.238** J	**0.694** J	**0.469** J	**2.31** J	**2.93**	**1800**	**0.91** J+	**421**												**82100**	**0**	**25**						**75**
SD-30X	MK-SD-30X-9.1/10.1	9.1	10.1	7/23/2018							**712**	**1.31**	**438**												**143000**								
SD-31	MK-SD-31-0.0./0.5	0	0.5	11/9/2016	**0.616**	**0.0183** J-	**0.217**	0.0255 UJ	**0.243**	**0.441**	**37.2**	**0.1** J+	**53.9**												**45400**								
SD-31	MK-SD-31-0.5/1.5	0.5	1.5	11/9/2016	**1.4**	**0.0433** J	**0.284**	**0.0619** J	**0.445**	**1.01**	**45.7**	**0.61** J+	**147**												**65800**								
SD-31X	MK-SD-31X-1.0/2.0	1	2	7/23/2018							**87.4** J	**0.695**	**369**												**55700**								
SD-31	MK-SD-31-1.5/2.4	1.5	2.4	11/9/2016	**11.3**	**0.826**	**1.91**	**0.639** J	**7.32**	**8.22**	**38.7**	**0.36**	**212**												**41100**								
SD-31X	MK-SD-31X-2.0/3.0	2	3	7/23/2018							**19.5** J	**0.208**	**52.2**												**25400**								
SD-31X	MK-SD-31X-3.0/4.2	3	4.2	7/23/2018							**3.46** J	0.107 U	**4**												**17900**								
SD-31X	MK-SD-31X-4.2/4.4	4.2	4.4	7/23/2018							**4.29** J	0.11 U	**5.48**												**21100** J								
SD-32	MK-SD-32-0.0/0.5	0	0.5	11/9/2016	**2.16**	**0.111**	**0.484**	**0.0091**	**1.07**	**1.76**	**51.5**	**0.14**	**125**												**7150** J								
SD-32	MK-SD-32-0.5/1.5	0.5	1.5	11/9/2016	**2.74**	**0.152**	**0.544**	**0.0081**	**1.65**	**1.99**	**50.3**	**0.44**	**165**												**33200** J								
SD-32	MK-SD-32-1.5/2.5	1.5	2.5	11/9/2016	**8.5**	**0.519**	**1.58**	**0.0139**	**5.36**	**5.92**	**387**	**1.3**	**530**												**59900** J								
SD-32	MK-SD-32-2.5/3.5	2.5	3.5	11/9/2016	**12.3**	**0.833**	**2.6**	**0.0497**	**7.35**	**9.39**	**143**	**0.96**	**305**												**39100** J								
SD-32	MK-SD-32-3.5/4.5	3.5	4.5	11/9/2016	**18.2**	**0.94**	**4.07**	**0.0928**	**9.82**	**14.3**	**171**	**0.99**	**384**												**65200** J								
SD-32	MK-SD-32-4.5/6.5	4.5	6.5	11/9/2016	**15**	**1.13**	**2.99**	**0.186** J	**9.62**	**11.1**	**193**	**1.3**	**492**												**90900** J								
SD-32	MK-SD-32-6.5/9.3	6.5	9.3	11/9/2016	**15.9**	**1.16**	**3.06**	**0.342**	**10.7**	**11.9**	**140**	**1.8**	**344**												**67500** J								
SD-32X	MK-SD-32X-7.4/8.4	7.4	8.4	7/24/2018	**12.8**	**0.894**	**2.76**	**0.55**	**8.01**	**9.3**	**134** J	**0.676**	**253** J												**61200**								
SD-32X	MK-SD-32X-8.4/9.4	8.4	9.4	7/24/2018	**3.08**	**0.288**	**0.34**	**12.6**	**2.24**	**2.43**	**573** J	**0.988**	**154** J												**62500**								
SD-32X	MK-SD-32X-9.4/10.7	9.4	10.7	7/24/2018	**2.46**	**0.249**	**0.459**	**15**	**1.98**	**2.49**	**1310** J	**0.91**	**134** J												**60200**								
SD-32X	MK-SD-32X-12.4/13.0	12.4	13	7/24/2018	**0.331** J-	**0.0504** J-	**0.0741**	**0.501** J-	**0.292** J-	**0.323** J-	**184** J	**0.18**	**48.1** J												**36300**								
SD-33	MK-SD-33-0.0/0.5	0	0.5	11/10/2016	**1.71**	**0.106**	**0.569**	**0.0149** J	**1.08**	**1.33**	**67.1**	**0.27**	**158**												**42100**	**0**	**6**						**94**
SD-33	MK-SD-33-0.5/1.5	0.5	1.5	11/10/2016	**15**	**0.953**	**2.87**	**0.132**	**12.4**	**12.9**	**141**	**0.41**	**641**												**37200**	**0**	**48**						**52**
SD-33	MK-SD-33-1.5/2.5	1.5	2.5	11/10/2016	**3.22**	**0.159**	**0.701** J	**0.0229** J	**1.54**	**1.59**	**106**	**0.48**	**324**												**59900**	**0**	**10**						**90**
SD-33	MK-SD-33-2.5/3.5	2.5	3.5	11/10/2016	**13.7**	**0.824**	**2.33**	**0.0755**	**11.2**	**10.9**	**114**	**0.64**	**352**												**40100**	**0**	**11**						**89**
SD-33	MK-SD-33-3.5/4.5	3.5	4.5	11/10/2016	**17**	**1.02**	**2.58**	**0.0778**	**14**	**13.5**	**498**	**0.99**	**470**												**55100**	**0**	**19**						**81**
SD-33	MK-SD-33-4.5/6.5	4.5	6.5	11/10/2016	**8.9**	**0.567**	**1.51**	**0.0402**	**7.63**	**6.89**	**781**	**0.72**	**408**												**46200**	**0**	**10**						**90**
SD-33	MK-SD-33-6.5/9.3	6.5	9.3	11/10/2016	**19.2**	**1.15**	**2.59**	**0.195**	**13.3**	**12.4**	**642** J	**1.7**	**681**												**76400**	**0**	**25**						**75**
SD-33X	MK-SD-33X-7.6/8.6	7.6	8.6	7/25/2018	**78.3**	**4.37**	**9.38**	**1.22** J	**50.1**	**56.8**	**739**	**2.3** J-	**317**												**91200**								
SD-33X	MK-SD-33X-8.6/9.6	8.6	9.6	7/25/2018	**45.7**	**3.47**	**3.67**	**1.33**	**28.5**	**35.2**	**1380**	**1.53** J-	**260**												**108000**								
SD-33X	MK-SD-33X-9.6/10.6	9.6	10.6	7/25/2018	**27**	**3.31**	**3.43**	**4.28**	**22.7**	**20.5**	**16.1**	**5.98** J-	**32.9**												**78700**								
SD-33X	MK-SD-33X-10.6/11.3	10.6	11.3	7/25/2018	**5.49**	**0.623**	**0.553**	**5.26**	**4.18**	**6**	**1670**	**3.26** J-	**258**												**96200**								
SD-33X	MK-SD-33X-12.6/13.6	12.6	13.6	7/25/2018	**3.43**	**0.372**	**0.337**	**9.38**	**2.5**	**3.73**	**1330**	**1.21** J-	**151**												**73900**								
SD-33X	MK-SD-33X-13.6/14.6	13.6	14.6	7/25/2018	**0.409**	**0.0433**	**0.0436**	**0.263** J-	**0.33**	**0.441**	**38.3**	**0.163** J-	**10.4**												**50900**								
SD-33X	MK-SD-33X-14.6/15.3	14.6	15.3	7/25/2018	**0.00369** J	**0.00261**	0.00218 U	**0.00277** J	**0.00915** J	**0.00286**	**1380**	**0.079** R	**377**												**57600**								
SD-34	MK-SD-34-0.0/0.5	0	0.5	11/8/2016	**9.32**	**0.536**	**1.86**	**0.35** J	**6.32**	**6.84**	**12.3**	0.045 U	**21.6**												**20300** J+								
SD-34	MK-SD-34-0.5/1.5	0.5	1.5	11/8/2016	**5.08**	**0.298** J	**0.914**	0.204 U	**4.36**	**3.77**	**8.3**	0.044 U	**25.2**												**1330** J+								
SD-34	MK-SD-34-1.5/2.5	1.5	2.5	11/8/2016	**6.22**	**0.68**	**0.972**	0.211 U	**5.81**	**4.72**	**27.6**	0.042 U	**38.3**												**1360** J+								
SD-34	MK-SD-34-2.5/3.5	2.5	3.5	11/8/2016	**3.45**	**0.278**	**0.629**	**0.175** J	**2.48**	**2.47**	**84.7**	**0.23**	**122**												**35900** J+								
SD-34	MK-SD-34-3.5/4.5	3.5	4.5	11/8/2016	**6.99**	**0.37** J	**1.46**	0.262 U	**4.08**	**5.14**	**61.3**	**0.28**	**178**												**22600** J+								
SD-34X	MK-SD-34X-3.7/4.7	3.7	4.7	7/26/2018							**27.6** J	**0.244** J-	**77.6** J												**36600**								
SD-34	MK-SD-34-4.5/5.3	4.5	5.3	11/8/2016	**1.22**	**0.0544** J	**0.273**	0.0609 U	**0.601**	**0.843**	**61.1**	**0.28**	**189**												**40900** J+								

Appendix A
Milwaukee River Downtown Reach - Sediment Analytical Results Summary
Focused Feasibity Study, Milwaukee Estuary AOC, Milwaukee, Wisconsin

Analyte Group					PCB											PAH												
Analyte					Total PCB	Aroclor 1260	Aroclor 1254	Aroclor 1268	Aroclor 1221	Aroclor 1232	Aroclor 1248	Aroclor 1016	Aroclor 1262	Aroclor 1242	Total PAH	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b)-fluoranthene	Benzo(e)pyrene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h)anthracene
Unit					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
WI CBSQG PEC					1										22.8												
WI CBSQG PEC 3x					3										68.4												
WI CBSQG PEC 5x					5										114												
TSCA					50																						
Location code	Sample ID	Start Depth (feet)	End Depth (feet)	Date	Total PCB	Aroclor 1260	Aroclor 1254	Aroclor 1268	Aroclor 1221	Aroclor 1232	Aroclor 1248	Aroclor 1016	Aroclor 1262	Aroclor 1242	Total PAH	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b)-fluoranthene	Benzo(e)pyrene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h)anthracene
SD-34X	MK-SD-34X-4.7/5.5	4.7	5.5	7/26/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U														
SD-34X	MK-SD-34X-8.7/9.7	8.7	9.7	7/26/2018	**3**	0.0221 U	**0.651**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**2.38**														
SD-34X	MK-SD-34X-9.7/10.7	9.7	10.7	7/26/2018	**11.6**	0.0222 U	**1.52**	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**10.1**														
SD-34X	MK-SD-34X-10.7/11.7	10.7	11.7	7/26/2018	**41.8**	**1.17 J**	2.18 U	2.18 U	2.18 U	2.18 U	2.18 U	2.18 U	2.18 U	**40.6**														
SD-34X	MK-SD-34X-11.7/12.9	11.7	12.9	7/26/2018	**0.59**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**0.587 J**	0.11 U	0.11 U	0.11 U														
SD-34X	MK-SD-34X-13.7/14.7	13.7	14.7	7/26/2018	**4.2**	0.022 U	**0.726**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**3.44**														
SD-34X	MK-SD-34X-14.7/15.7	14.7	15.7	7/26/2018	**1.5**	0.0222 U	**0.286**	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**1.23**														
SD-34X	MK-SD-34X-15.7/16.7	15.7	16.7	7/26/2018	**8.6**	0.0221 U	**0.911**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**7.68**														
SD-34X	MK-SD-34X-16.7/17.7	16.7	17.7	7/26/2018	**0.25**	0.022 U	**0.113**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.136 J**														
SD-34X	MK-SD-34X-18.7/19.7	18.7	19.7	7/26/2018	**0.062**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.0621**														
SD-34X	MK-SD-34X-19.7/20.7	19.7	20.7	7/26/2018	0.011 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U														
SD-34X	MK-SD-34X-20.7/21.7	20.7	21.7	7/26/2018	**3.5**	0.0217 U	**0.598**	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	**2.91**														
SD-34X	MK-SD-34X-21.7/22.8	21.7	22.8	7/26/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U														
SD-35	MK-SD-35-0.0./0.5	0	0.5	11/9/2016	**0.66**	**0.075 J**	**0.174**	0.0571 U	0.0571 U	0.0571 U	0.0571 U	0.0571 U	0.0571 U	**0.409 J**	**2.2**	**0.001 J**	**0.0101**	**0.0044**	**0.0426**	**0.165**	**0.186**	**0.28**		**0.141**	**0.116**	**0.197**	0.00075 U
SD-35	MK-SD-35-0.5/1.5	0.5	1.5	11/9/2016	**0.34**	0.053 U	**0.1 J**	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	**0.241 J**	**2.2**	0.00093 U	**0.0108**	**0.0054**	**0.0434**	**0.162**	**0.186**	**0.274**		**0.141**	**0.112**	**0.192**	0.00069 U
SD-35	MK-SD-35-1.5/2.5	1.5	2.5	11/9/2016	**0.81**	**0.0807 J**	**0.214**	0.0538 U	0.0538 U	0.0538 U	0.0538 U	0.0538 U	0.0538 U	**0.513**	**2.9**	**0.0014 J**	**0.0157**	**0.006**	**0.0597**	**0.224**	**0.243**	**0.347**		**0.168**	**0.145**	**0.253**	0.0007 U
SD-35	MK-SD-35-2.5/3.5	2.5	3.5	11/9/2016	**1.4**	**0.13 J**	**0.315**	0.108 U	0.108 U	0.108 U	0.108 U	0.108 U	0.108 U	**0.972**	**9.5**	**0.0047**	**0.0783**	**0.0178**	**0.226**	**0.693**	**0.696**	**1.02**		**0.458**	**0.417**	**0.813**	0.0007 U
SD-35	MK-SD-35-3.5/4.5	3.5	4.5	11/9/2016	**2**	**0.292 J-**	**0.602 J-**	0.109 UJ	0.109 UJ	0.109 UJ	0.109 UJ	0.109 UJ	0.109 UJ	**1.15 J**	**9.4**	**0.0035**	**0.0724**	**0.0183**	**0.184**	**0.72**	**0.724**	**1.08**		**0.496**	**0.41**	**0.823**	0.00071 U
SD-35	MK-SD-35-4.5/6.5	4.5	6.5	11/9/2016	**3.3**	**0.32 J**	**0.729**	0.189 U	0.189 U	0.189 U	0.189 U	0.189 U	0.189 U	**2.26**	**12.5**	**0.0087**	**0.134**	**0.027**	**0.286**	**0.92**	**1.02**	**1.3**		**0.626**	**0.525**	**1.01**	**0.165**
SD-35	MK-SD-35-6.5/8.5	6.5	8.5	11/9/2016	**36.6**	5.79 U	5.79 U	5.79 U	5.79 U	5.79 U	5.79 U	5.79 U	5.79 U	**36.6**	**36.2**	**0.0739**	**0.377**	**0.0764**	**0.618**	**2.57**	**2.9**	**3.53**		**1.89**	**1.4**	**3.09**	**0.485**
SD-35	MK-SD-35-8.5/10.5	8.5	10.5	11/9/2016	**3.4**	**0.265 J**	**1.65**	0.141 U	0.141 U	0.141 U	0.141 U	0.141 U	0.141 U	**1.48 J**	**29.9**	**0.0318**	**0.257**	**0.0784**	**0.625**	**2.28**	**2.52**	**3.28**		**1.43**	**1.62**	**2.93**	0.00062 U
SD-35	MK-SD-35-10.5/12.5	10.5	12.5	11/9/2016	**1.5**	**0.13 J**	**0.498 J**	0.0883 U	0.0883 U	0.0883 U	0.0883 U	0.0883 U	0.0883 U	**0.918 J**	**33.4**	**0.0566**	**0.228**	**0.0756**	**0.659**	**2.75**	**2.68**	**3.87**		**1.75**	**1.51**	**3.09**	0.00058 U
SD-35	MK-SD-35-12.5/14.5	12.5	145	11/9/2016	**0.41**	**0.0483 J-**	**0.206 J-**	0.0463 UJ	0.0463 UJ	0.0463 UJ	0.0463 UJ	0.0463 UJ	0.0463 UJ	**0.151 J**	**30.3**	**0.0546**	**0.202**	**0.0536**	**0.421**	**2.41**	**2.44**	**3.58**		**1.65**	**1.44**	**2.78**	0.00061 U
SD-35X	MK-SD-35X-14.9/15.9	14.9	15.9	7/25/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.72**	0.022 U	0.022 U	0.022 U	0.022 U	**0.0393**	**0.0433**	**0.0665**	**0.0383**	**0.0329**	**0.0232**	**0.0634**	0.022 U
SD-36	MK-SD-36-0.0/0.5	0	0.5	11/9/2016	**3.7**	0.22 U	**0.728**	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	**3.02**	**9**	**0.0073**	**0.0502**	**0.0297**	**0.111**	**0.689**	**0.828**	**1.15**		**0.511**	**0.499**	**0.936**	0.00072 U
SD-36	MK-SD-36-0.5/1.5	0.5	1.5	11/9/2016	**4.4**	**0.274 J**	**0.868**	0.228 U	0.228 U	0.228 U	0.228 U	0.228 U	0.228 U	**3.3**	**16.5**	**0.0096**	**0.148**	**0.0356**	**0.337**	**1.22**	**1.45**	**1.89**		**0.856**	**0.901**	**1.54**	0.00074 U
SD-36	MK-SD-36-1.5/2.5	1.5	2.5	11/9/2016	**33.2**	6.1 U	6.1 U	6.1 U	6.1 U	6.1 U	6.1 U	6.1 U	6.1 U	**33.2 J**	**27.6**	**0.0251**	**0.295**	**0.0682**	**0.5**	**1.82**	**2.16**	**3.04**		**1.44**	**1.25**	**2.55**	0.0008 U
SD-36	MK-SD-36-2.5/3.5	2.5	3.5	11/9/2016	**27.4**	4.82 U	4.82 U	4.82 U	4.82 U	4.82 U	4.82 U	4.82 U	4.82 U	**27.4**	**18.9**	**0.0174**	**0.172**	**0.0346**	**0.368**	**1.33**	**1.53**	**2.16**		**0.908**	**0.968**	**1.85**	**0.278**
SD-36	MK-SD-36-3.5/4.5	3.5	4.5	11/9/2016	**5.2**	**0.344 J**	**1.8 J**	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	**3.07**	**20.7**	**0.0189**	**0.21**	**0.0546**	**0.465**	**1.57**	**1.67**	**2.36**		**0.942**	**1.01**	**1.98**	0.00062 U
SD-36	MK-SD-36-4.5/6.5	4.5	6.5	11/9/2016	**2.2**	**0.195 J**	**0.655 J**	0.173 U	0.173 U	0.173 U	0.173 U	0.173 U	0.173 U	**1.3**	**1.8**	**0.003 J-**	**0.017 J-**	**0.0056 J-**	**0.058 J-**	**0.143 J-**	**0.15 J-**	**0.188 J-**		**0.0906 J-**	**0.0842 J-**	**0.165 J-**	0.00056 UJ
SD-36	MK-SD-36-6.5/8.2	6.5	8.2	11/9/2016	**0.073**	0.0444 U	0.0444 U	0.0444 U	0.0444 U	0.0444 U	0.0444 U	0.0444 U	0.0444 U	**0.0734 J**	**30.3**	**0.167**	**0.351**	**0.0794**	**0.976**	**2.22**	**2.45**	**3.22**		**1.41**	**1.3**	**2.78**	0.00058 U
SD-36X	MK-SD-36X-6.8/7.8	6.8	7.8	7/25/2018	**0.55**	**0.042**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.505 J**	**19**	**0.0979**	**0.15**	**0.0404**	**0.402**	**1.34**	**1.25**	**1.97**	**0.989**	**0.757**	**0.706**	**1.63**	**0.199**
SD-36X	MK-SD-36X-7.8/8.8	7.8	8.8	7/25/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**55.6**	**0.295**	**0.988**	**0.232**	**2.14**	**3.75**	**3.51**	**4.5**	**2.33**	**1.88**	**1.56**	**3.6**	**0.471**
SD-36X	MK-SD-36X-8.8/9.5	8.8	9.5	7/25/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**9.1**	**0.0453**	**0.119**	**0.0385**	**0.259**	**0.638**	**0.623**	**0.786**	**0.433**	**0.342**	**0.278**	**0.638**	**0.0818**
SD-36X	MK-SD-36X-11.8/12.8	11.8	12.8	7/25/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**3.1**	**0.0205**	**0.036**	**0.012**	**0.0856**	**0.235 J**	**0.225**	**0.34 J**	**0.161**	**0.0766**	**0.119**	**0.239 J**	**0.0238**
SD-36X	MK-SD-36X-12.8/13.8	12.8	13.8	7/25/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.32**	**0.00357**	**0.00526**	0.00221 U	**0.00479**	**0.0191**	**0.0201**	**0.034**	**0.017**	**0.00971**	**0.012**	**0.0262**	**0.00225**
SD-36X	MK-SD-36X-13.8/14.7	13.8	14.7	7/25/2018	0.011 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**0.032**	**0.00242**	0.00222 U	0.00222 U	0.00222 U	0.00222 U	0.00222 U	0.00222 U	0.0022 U	0.00222 U	0.00222 U	0.00222 U	0.00222 U
SD-36X	MK-SD-36X-14.7/15.4	14.7	15.4	7/25/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**0.077**	**0.00304**	**0.00194 J**	0.00222 U	0.00222 U	0.00222 U	**0.00358**	**0.00813**	**0.00753**	**0.00552**	0.00222 U	**0.00849**	0.00222 U
SD-37	MK-SD-37-0.0/0.5	0	0.5	11/8/2016	**0.46**	0.0468 U	**0.0909 J**	0.0468 U	0.0468 U	0.0468 U	0.0468 U	0.0468 U	0.0468 U	**0.37**	**20.3**	0.0937 U	**0.239 J**	0.0618 U	**1.08**	**1.3**	**1.16**	**1.81**		**0.841**	**0.796**	**1.84**	**0.242**
SD-37	MK-SD-37-0.5/1.5	0.5	1.5	11/8/2016	**0.72**	**0.079 J-**	**0.187 J-**	0.045 UJ	0.045 UJ	0.045 UJ	0.045 UJ	0.045 UJ	0.045 UJ	**0.457 J-**	**2.7**	0.009 U	**0.0159 J**	**0.0079 J**	**0.0467 J**	**0.191**	**0.27**	**0.38**		**0.133**	**0.139**	**0.266 J**	**0.034**
SD-37	MK-SD-37-1.5/2.5	1.5	2.5	11/8/2016	**2.6**	**0.265**	**0.629**	0.105 U	0.105 U	0.105 U	0.105 U	0.105 U	0.105 U	**1.66**	**5.8**	0.0209 U	**0.044 J**	0.0138 U	**0.145**	**0.365**	**0.409**	**0.682**		**0.354**	**0.318**	**0.581**	**0.0908**
SD-37	MK-SD-37-2.5/3.5	2.5	3.5	11/8/2016	**4.6**	**0.452**	**1.17**	0.207 U	0.207 U	0.207 U	0.207 U	0.207 U	0.207 U	**2.97**	**9.1**	0.0414 U	**0.0603 J**	0.0273 U	**0.236**	**0.507**	**0.555**	**1.03**		**0.544**	**0.441**	**0.954**	**0.122**
SD-37	MK-SD-37-3.5/4.5	3.5	4.5	11/8/2016	**18.7**	1.23 U	**2.33 J**	1.23 U	1.23 U	1.23 U	1.23 U	1.23 U	1.23 U	**16.4**	**10**	0.0493 U	**0.0832 J**	0.0325 U	**0.241**	**0.516**	**0.63**	**1.23**		**0.61**	**0.486**	**1.01**	**0.149**
SD-37	MK-SD-37-4.5/6.5	4.5	6.5	11/8/2016	**36.5**	4.31 U	4.31 U	4.31 U	4.31 U	4.31 U	4.31 U	4.31 U	4.31 U	**36.5 J**	**12.1**	0.069 U	**0.0907 J**	0.0455 U	**0.301**	**0.706**	**0.711**	**1.36**		**0.635**	**0.598**	**1.39**	**0.17**
SD-37	MK-SD-37-6.5/8.5	6.5	8.5	11/8/2016	**0.76**	**0.0706 J**	**0.269 J**	0.0451 U	0.0451 U	0.0451 U	0.0451 U	0.0451 U	0.0451 U	**0.419 J**	**9.7**	**0.0731 J**	**0.0784 J**	0.0297 U	**0.267**	**0.629**	**0.638**	**1.14**		**0.363**	**0.417**	**1.01**	**0.105**
SD-37	MK-SD-37-8.5/10.0	8.5	10	11/8/2016	**0.31**	**0.214**	**0.0946 J**	0.0468 U	0.0468 U	0.0468 U	0.0468 U	0.0468 U	0.0468 U	**35.6**	**0.267 J**	**0.242**	**0.0683 J**	**0.914**	**2.54**	**2.34**	**3.75**		**1.66**	**1.52**	**3.57**	**0.466**
SD-37X	MK-SD-37X-8.8/9.8	8.8	9.8	7/24/2018	**0.36**	**0.0544 J**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**0.305**	**40.9**	**0.268**	**0.569**	**0.157**	**1.22**	**2.64**	**2.74**	**3.93**	**2.14**	**1.92**	**1.22**	**3**	**0.542**
SD-37X	MK-SD-37X-9.8/10.8	9.8	10.8	7/24/2018	**0.041**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**0.0414 J**	**755**	**11.5**	**9.18**	**0.558**	**21.9**	**38.7**	**34.1**	**47**	**25**	**18.9**	**16.1**	**41.1**	**6.73**
SD-37X	MK-SD-37X-10.8/11.8	10.8	11.8	7/24/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**1.4**	**0.0118**	**0.0535**	**0.00463**	**0.0412 J**	**0.0833 J**	**0.0907 J**	**0.139 J**	**0.0697 J**	**0.0407**	**0.0468 J**	**0.0953 J**	**0.0114**
SD-37X	MK-SD-37X-11.8/12.5	11.8	12.5	7/24/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.11**	**0.00478**	**0.00842**	0.00221 U	**0.00221**	**0.0051**	**0.00561**	**0.00905**	**0.00514**	**0.00373**	**0.00253**	**0.00687**	0.00221 U
SD-37X	MK-SD-37X-13.8/14.8	13.8	14.8	7/24/2018	**0.27**	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**0.272**	**0.44**	**0.00564**	**0.00973**	0.00222 U	**0.00794**	**0.0255**	**0.0319**	**0.0544**	**0.0275**	**0.0167**	**0.0197**	**0.0332**	**0.00454**
SD-37X	MK-SD-37X-14.8/15.8	14.8	15.8	7/24/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.068**	**0.00442**	**0.00548**	0.00222 U	0.00222 U	0.00222 U	**0.00304**	**0.00601**	**0.00331**	**0.00245**	**0.00186 J**	**0.00442**	0.00222 U
SD-37X	MK-SD-37X-15.8/16.8	15.8	16.8	7/24/2018	0.011 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.041**	0.00221 U	0.00221 UJ	0.00221 UJ	0.00221 UJ	0.00221 U	**0.00265**	**0.00533**	**0.00288**	0.00221 U	0.00221 U	**0.00378**	0.00221 U
SD-37X	MK-SD-37X-18.8/19.8	18.8	19.8	7/24/2018	**0.039**	0.0221 UJ	0.0221 UJ	0.0221 UJ	0.0221 UJ	0.0221 UJ	0.0221 UJ	0.0221 UJ	0.0221 UJ	**0.0387**	**0.076**	0.00221 UJ	0.00221 UJ	0.00221 UJ	0.00221 UJ	**0.00414**	**0.00502**	**0.00882**	**0.00448**	**0.00263**	**0.00249**	**0.00578**	0.00221 U
SD-37X	MK-SD-37X-19.8/20.8	19.8	20.8	7/24/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**0.039**	**0.039**	0.00222 U	0.00222 UJ	0.00222 UJ	0.00222 UJ	0.00222 U	**0.00241 J**	**0.00426**	**0.00222**	0.00222 U	0.00222 U	**0.0025 J**	0.00222 U
SD-37X	MK-SD-37X-20.8/21.8	20.8	21.8	7/24/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.024**	0.00221 U	0.00221 U	0.00221 U	0.00221 U	0.00221 U	0.00221 U	0.00221 U	0.00219 U	0.00221 U	0.00221 U	0.00221 U	0.00221 U
SD-37X	MK-SD-37X-21.8/22.5	21.8	22.5	7/24/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.021**	0.00222 U	0.00222 UJ	0.00222 UJ	0.00222 UJ	0.00222 U	0.00222 U	0.00222 U	0.0022 U	0.00222 U	0.00222 U	0.00222 U	0.00222 U
SD-37X	MK-SD-37X-23.8/24.8	23.8	24.8	7/24/2018	**0.14**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.143**	**1.6**	**0.00567**	**0.0171 J-**	**0.00525 J-**	**0.0412 J-**	**0.101 J**	**0.107 J**	**0.174 J**	**0.0902 J**	**0.0734 J**	**0.059 J**	**0.125 J**	**0.0211**
SD-37X	MK-SD-37X-24.8/25.9	24.8	25.9	7/24/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.038**	**0.00199 J**	**0.00199 J**	0.00217 U	0.00217 U	0.00217 U	0.00217 U	**0.00292**	**0.00236**	**0.00306**	0.00217 U	**0.00246**	0.00217 U
SD-38	MK-SD-38-0.0/0.5	0	0.5	11/8/2016	**0.63**	**0.0644 J**	**0.162**	0.0603 U	0.0603 U	0.0603 U	0.0603 U	0.0603 U	0.0603 U	**0.403 J**	**2.3**	**0.0018 J**	**0.0129**	**0.015**	**0.0493**	**0.155**	**0.175**	**0.261**	**0.141**	**0.155**	**0.105**	**0.244**	**0.0405**
SD-38	MK-SD-38-0.5/1.5	0.5	1.5	11/8/2016	**0.71**	0.0812 U	**0.184**	0.0812 U	0.0812 U	0.0812 U	0.0812 U	0.0812 U	0.0812 U	**0.529**	**11.2**	**0.0117**	**0.102**	**0.0595**	**0.366**	**0.793 J-**	**0.761 J-**	**1 J-**	**0.532 J-**	**0.561 J-**	**0.422 J-**	**1.02 J-**	**0.158 J-**
SD-38	MK-SD-38-1.5/2.5	1.5	2.5	11/8/2016	**1.1**	**0.106 J**	**0.277**	0.0956 U	0.0956 U	0.0956 U	0.0956 U	0.0956 U	0.0956 U	**0.743 J**	**17.7**	**0.0213**	**0.12**	**0.122**	**0.435**	**1.16 J-**	**1.23 J-**	**1.66 J-**	**0.892 J-**	**0.988 J-**	**0.676 J-**	**1.64 J-**	**0.276 J-**
SD-38	MK-SD-38-2.5/3.5	2.5	3.5	11/8/2016	**2.8**	**0.213 J**	**0.587**	0.203 U	0.203 U	0.203 U	0.203 U	0.203 U	0.203 U	**2.04**	**23**	**0.028**	**0.197**	**0.156**	**0.655**	**1.48**	**1.58**	**2.06**	**1.13**	**1.21**	**0.837**	**2.06**	**0.369**
SD-38	MK-SD-38-3.5/4.5	3.5	4.5	11/8/2016	**2.6**	**0.22 J**	**0.608**	0.168 U	0.168 U	0.168 U	0.168 U	0.168 U	0.168 U	**1.73**	**51.6**	**0.0451**	**0.417**	**0.264**	**1.26**	**4.37**	**2.58**	**5.6**	**1.82**	**2.03**	**1.29**	**3.38**	**0.629**
SD-38	MK-SD-38-4.5/6.5	4.5	6.5	11/8/2016	**11.5**	1.06 U	**2 J**	1.06 U	1.06 U	1.06 U	1.06 U	1.06 U	1.06 U	**9.46**	**71.2**	**0.0774**	**0.799**	**0.451**	**2.08**	**5.43**	**3.24**	**6.7**	**2.32**	**2.71**	**1.83**	**7.25**	**0.854**
SD-38	MK-SD-38-6.5/8.5	6.5	8.5	11/8/2016	**26.8**	1.22 U	1.22 U	1.22 U	1.22 U	1.22 U	1.22 U	1.22 U	1.22 U	**26.8**	**51**	**0.229 J**	**0.691**	**0.36**	**1.55**	**3.62**	**2.49**	**3.31**	**1.9**	**2.01**	**1.52**	**3.47**	**0.632**
SD-38	MK-SD-38-8.5/10.5	8.5	10.5	11/8/2016	**4.1**	0.439 U	**1.35**	0.439 U	0.439 U	0.439 U	0.439 U	0.439 U	0.439 U	**2.73 J**	**52.4**	**0.166**	**0.575**	**0.255**	**1.65**	**4.28**	**2.34**	**5.16**	**1.7**	**1.76**	**1.2**	**5.8**	**0.628**
SD-38	MK-SD-38-10.5/12.5	10.5	12.5	11/8/2016	**0.14**	**0.05 J**	**0.0887 J**	0.0459 U	0.0459 U	0.0459 U	0.0459 U	0.0459 U	0.0459 U	**0.0459 U**	**35.1**	**0.12**	**0.326**	**0.205**	**0.859**	**2.9**	**1.95**	**4.09**	**1.51**	**1.58**	**1.2**	**2.69**	**0.5**
SD-38	MK-SD-38-12.5/14.8	12.5	14.8	11/8/2016	**0.93**	**0.105 J-**	**0.304 J-**	0.0902 UJ	0.0902 UJ	0.0902 UJ	0.0902 UJ	0.0902 UJ	0.0902 UJ	**0.521 J-**	**50.8**	**0.202**	**0.488**	**0.26**	**1.3**	**3.97**	**2.37**	**4.86**	**1.76**	**1.91**	**1.33**	**5.36**	**0.631**

Appendix A
Milwaukee River Downtown Reach - Sediment Analytical Results Summary
Focused Feasibity Study, Milwaukee Estuary AOC, Milwaukee, Wisconsin

Analyte Group					PAH						Metals								Metals								Physical Parameters							
Analyte					Fluoranthene	Fluorene	Indeno(1,2,3-Cd)Pyrene	Naphthalene	Phenanthrene	Pyrene	Chromium	Mercury	Lead	Iron	Manganese	Potassium	Sodium	Thallium	Antimony	Beryllium	Cobalt	Calcium	Cyanide	Magnesium	Vanadium	TOC	Gravel	Sand	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Fines
Unit					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	%	%	%	%	%	%
WI CBSQG PEC											110	1.1	130	40000	1100				25														
WI CBSQG PEC 3x											330	3.3	390	120000	3300				75														
WI CBSQG PEC 5x											550	5.5	650	200000	5500				125														
TSCA																																	
Location code	Sample ID	Start Depth (feet)	End Depth (feet)	Date	Fluoranthene	Fluorene	Indeno(1,2,3-Cd)Pyrene	Naphthalene	Phenanthrene	Pyrene	Chromium	Mercury	Lead	Iron	Manganese	Potassium	Sodium	Thallium	Antimony	Beryllium	Cobalt	Calcium	Cyanide	Magnesium	Vanadium	TOC	Gravel	Sand	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Fines
SD-34X	MK-SD-34X-4.7/5.5	4.7	5.5	7/26/2018							54.4 J	0.261 J-	191 J													40900								
SD-34X	MK-SD-34X-8.7/9.7	8.7	9.7	7/26/2018							357 J	0.457 J-	407 J													43000								
SD-34X	MK-SD-34X-9.7/10.7	9.7	10.7	7/26/2018							5850 J	1.2 J-	415 J													45900								
SD-34X	MK-SD-34X-10.7/11.7	10.7	11.7	7/26/2018							1760	1.44 J-	504													65100								
SD-34X	MK-SD-34X-11.7/12.9	11.7	12.9	7/26/2018							292	5.85 J-	431													67900								
SD-34X	MK-SD-34X-13.7/14.7	13.7	14.7	7/26/2018							146 J	0.285 J-	167 J													49900								
SD-34X	MK-SD-34X-14.7/15.7	14.7	15.7	7/26/2018							138 J	11.4 J-	249 J													42600								
SD-34X	MK-SD-34X-15.7/16.7	15.7	16.7	7/26/2018							256 J	7.81 J-	369 J													35400								
SD-34X	MK-SD-34X-16.7/17.7	16.7	17.7	7/26/2018							132 J	0.654 J-	239 J													45400								
SD-34X	MK-SD-34X-18.7/19.7	18.7	19.7	7/26/2018							646 J	2.34 J-	325 J													55200								
SD-34X	MK-SD-34X-19.7/20.7	19.7	20.7	7/26/2018							427 J	1.89 J-	225 J													58900								
SD-34X	MK-SD-34X-20.7/21.7	20.7	21.7	7/26/2018							353 J	1.44 J-	258 J													55100								
SD-34X	MK-SD-34X-21.7/22.8	21.7	22.8	7/26/2018							329 J	1.22 J-	143 J													53800								
SD-35	MK-SD-35-0.0./0.5	0	0.5	11/9/2016	0.407	0.0137	0.125	0.0021 J	0.18	0.317	33.7	0.13	61.3													33900 J	0	35						65
SD-35	MK-SD-35-0.5/1.5	0.5	1.5	11/9/2016	0.409	0.0143	0.118	0.0011 J	0.182	0.334	44.6	0.16	51													29400 J	0	37						63
SD-35	MK-SD-35-1.5/2.5	1.5	2.5	11/9/2016	0.537	0.0203	0.141	0.0023 J	0.257	0.435	40.9	0.38	65.7													41000 J	0	12						88
SD-35	MK-SD-35-2.5/3.5	2.5	3.5	11/9/2016	1.99	0.097	0.389	0.0077	1.08	1.51	111	0.32 J+	177 J													40100 J	0	16						84
SD-35	MK-SD-35-3.5/4.5	3.5	4.5	11/9/2016	1.91	0.0783	0.414	0.0043	0.92	1.55	105	0.47 J+	302 J													47800 J	0	11						89
SD-35	MK-SD-35-4.5/6.5	4.5	6.5	11/9/2016	2.55	0.144	0.522	0.0084	1.42	1.79	877	0.88 J+	329 J													47000 J	0	15						85
SD-35	MK-SD-35-6.5/8.5	6.5	8.5	11/9/2016	7.3	0.42	1.65	0.0169	4.18	5.58	808	1.8 J+	405 J													61000 J	0	10						90
SD-35	MK-SD-35-8.5/10.5	8.5	10.5	11/9/2016	5.77	0.311	1.32	0.0216	2.9	4.53	298	2 J+	425 J													45900	0	9						91
SD-35	MK-SD-35-10.5/12.5	10.5	12.5	11/9/2016	6.44	0.345	1.49	0.059	3.4	5.03	189	1.2	308													47600 J	0	7						93
SD-35	MK-SD-35-12.5/14.5	12.5	145	11/9/2016	5.89	0.265	1.48	0.0702	2.9	4.69	327	2.1	428													63100 J	0	11						89
SD-35X	MK-SD-35X-14.9/15.9	14.9	15.9	7/25/2018	0.118	0.022 U	0.0287	0.0245	0.0763	0.0958	8.86 J	0.0986 R	5.85													40800								
SD-36	MK-SD-36-0.0/0.5	0	0.5	11/9/2016	1.67	0.0663	0.423	0.0051	0.637	1.41	99.5	0.41 J+	152 J													43200								
SD-36	MK-SD-36-0.5/1.5	0.5	1.5	11/9/2016	3.17	0.156	0.671	0.0088	1.55	2.55	2390	0.55 J+	336 J													56300								
SD-36	MK-SD-36-1.5/2.5	1.5	2.5	11/9/2016	5.66	0.329	1.23	0.0136	3.03	4.19	3450	1.3 J+	552 J													69500								
SD-36	MK-SD-36-2.5/3.5	2.5	3.5	11/9/2016	3.66	0.213	0.819	0.0093	1.84	2.72	827	1.2 J+	410 J													52400								
SD-36	MK-SD-36-3.5/4.5	3.5	4.5	11/9/2016	3.99	0.274	0.864	0.0098	2.19	3.11	157	1.2 J+	304 J													53300								
SD-36	MK-SD-36-4.5/6.5	4.5	6.5	11/9/2016	0.351 J-	0.0189 J-	0.0793 J-	0.0055 J-	0.172 J-	0.257 J-	156	0.93 J+	337 J													78400								
SD-36	MK-SD-36-6.5/8.2	6.5	8.2	11/9/2016	5.69	0.355	1.25	0.194	3.24	4.65	201	1.9 J+	456 J													125000								
SD-36X	MK-SD-36X-6.8/7.8	6.8	7.8	7/25/2018	3.81	0.207	0.751	0.0939	1.89	2.76	132	0.649 J-	147													65500 J								
SD-36X	MK-SD-36X-7.8/8.8	7.8	8.8	7/25/2018	9.9	1.21	1.83	0.781	8.48	8.15	333	1.97 J-	186													49700 J								
SD-36X	MK-SD-36X-8.8/9.5	8.8	9.5	7/25/2018	1.56	0.131	0.327	0.184	1.16	1.44	88.3	0.804 J-	50.7													80100 J								
SD-36X	MK-SD-36X-11.8/12.8	11.8	12.8	7/25/2018	0.555	0.0418	0.0813	0.0394	0.356 J	0.463 J	26.1	0.374 J-	26.6													164000 J								
SD-36X	MK-SD-36X-12.8/13.8	12.8	13.8	7/25/2018	0.0589	0.00604	0.00945	0.00397	0.0341	0.0488	4.98	0.0309 J-	3.65													44200 J								
SD-36X	MK-SD-36X-13.8/14.7	13.8	14.7	7/25/2018	0.00249	0.00318	0.00222 U	0.00302	0.00508	0.00232	5.15	0.0965 UJ	3.46													47800 J								
SD-36X	MK-SD-36X-14.7/15.4	14.7	15.4	7/25/2018	0.00809	0.00299	0.0023	0.00343	0.00727	0.00927	8.44	0.092 UJ	7.55													17800 J								
SD-37	MK-SD-37-0.0/0.5	0	0.5	11/8/2016	3.88	0.384	0.747	0.158 U	3.21	2.62	122	0.34	218													3620	0	97.5						2.5
SD-37	MK-SD-37-0.5/1.5	0.5	1.5	11/8/2016	0.51	0.0181 J	0.124	0.0151 U	0.225	0.372	105	0.25	181													26400	8	50						42
SD-37	MK-SD-37-1.5/2.5	1.5	2.5	11/8/2016	1.11	0.0515 J	0.3	0.0352 U	0.571	0.792	204	0.42	365													42100	4	46						50
SD-37	MK-SD-37-2.5/3.5	2.5	3.5	11/8/2016	1.87	0.0754 J	0.467	0.0698 U	0.884	1.33	899	0.48	540													42400	7	51						42
SD-37	MK-SD-37-3.5/4.5	3.5	4.5	11/8/2016	1.93	0.0946 J	0.51	0.083 U	0.963	1.42	4580	1.6	632													61200	9	49						42
SD-37	MK-SD-37-4.5/6.5	4.5	6.5	11/8/2016	2.42	0.123 J	0.548	0.116 U	1.24	1.73	1110	1.7	448													50200	12	42						46
SD-37	MK-SD-37-6.5/8.5	6.5	8.5	11/8/2016	1.96	0.112 J	0.327	0.112 J	1.06	1.42	286	2	676													95900	26	36						38
SD-37	MK-SD-37-8.5/10.0	8.5	10	11/8/2016	6.97	0.4	1.42	0.477 J	3.98	5.06	381	2.2	605													108000	15	37						48
SD-37X	MK-SD-37X-8.8/9.8	8.8	9.8	7/24/2018	7.32	0.73	1.6	0.491	4.84	5.54	313 J	1.82	471 J													60000								
SD-37X	MK-SD-37X-9.8/10.8	9.8	10.8	7/24/2018	152	17	17	25.9	162	110	274 J	2.02	223 J													67400								
SD-37X	MK-SD-37X-10.8/11.8	10.8	11.8	7/24/2018	0.219 J	0.0252	0.0404	0.0226	0.21 J	0.198 J	24 J	0.0383 J	25 J													38900								
SD-37X	MK-SD-37X-11.8/12.5	11.8	12.5	7/24/2018	0.0135 J	0.0036	0.00254	0.0093	0.0141 J	0.0136 J	6.11 J	0.0803 U	261 J													46000								
SD-37X	MK-SD-37X-13.8/14.8	13.8	14.8	7/24/2018	0.0722	0.00705	0.0163	0.0068	0.0431	0.0579	11.1 J	0.0846 U	6.6 J													47100								
SD-37X	MK-SD-37X-14.8/15.8	14.8	15.8	7/24/2018	0.00758 J	0.00316	0.00157 J	0.00661	0.00742 J	0.00656 J	3.66 J	0.0996 U	3.06 J													43100								
SD-37X	MK-SD-37X-15.8/16.8	15.8	16.8	7/24/2018	0.0052 J	0.00221 UJ	0.00221 U	0.00221 U	0.00399 J	0.00476 J	4.04 J	0.0808 U	2.09 J													44300								
SD-37X	MK-SD-37X-18.8/19.8	18.8	19.8	7/24/2018	0.0134 J	0.00221 UJ	0.00229	0.00221 UJ	0.00746 J	0.0119 J	5.81 J	0.091 R	3.91 J													55800								
SD-37X	MK-SD-37X-19.8/20.8	19.8	20.8	7/24/2018	0.00608 J	0.00222 UJ	0.00222 U	0.00222 U	0.00387 J	0.00568 J	4.56 J	0.0883 U	3.04 J													44300								
SD-37X	MK-SD-37X-20.8/21.8	20.8	21.8	7/24/2018	0.00247 J	0.00221 U	0.00221 U	0.00226	0.00221 U	0.00266 J	7.13 J	0.0931 U	4.41 J													43100								
SD-37X	MK-SD-37X-21.8/22.5	21.8	22.5	7/24/2018	0.00254 J	0.00222 UJ	0.00222 U	0.00222 U	0.00222 UJ	0.00222 UJ	6.82 J	0.0826 U	4.47 J													39200								
SD-37X	MK-SD-37X-23.8/24.8	23.8	24.8	7/24/2018	0.282 J	0.0226 J-	0.0677 J	0.00703	0.177 J	0.227 J	19.9 J	0.0315 J	27.2 J													28200								
SD-37X	MK-SD-37X-24.8/25.9	24.8	25.9	7/24/2018	0.00267 J	0.00197 J	0.00217 U	0.00283	0.00512 J	0.00277 J	6.45 J	0.0911 U	3.11 J													34300								
SD-38	MK-SD-38-0.0/0.5	0	0.5	11/8/2016	0.331	0.0174	0.137	0.0025 J	0.186	0.281	30.7 J	0.14	51.7 J													44700								
SD-38	MK-SD-38-0.5/1.5	0.5	1.5	11/8/2016	2.37	0.11	0.507 J-	0.0139 J	1.17	1.29	36.7 J	0.14	80.2 J													19200								
SD-38	MK-SD-38-1.5/2.5	1.5	2.5	11/8/2016	3.32	0.143	0.858 J-	0.0461	1.49	2.61	71.8 J	0.23	140 J													38200								
SD-38	MK-SD-38-2.5/3.5	2.5	3.5	11/8/2016	4.43	0.217	1.11	0.0367	2.11	3.32	511	0.31	225													47500								
SD-38	MK-SD-38-3.5/4.5	3.5	4.5	11/8/2016	10.2	0.452	1.85	0.0526	7.88	7.51	474	0.52	417													55500								
SD-38	MK-SD-38-4.5/6.5	4.5	6.5	11/8/2016	12.7	0.931	2.37	0.0535	11.8	9.59	870	0.59	306													59900								
SD-38	MK-SD-38-6.5/8.5	6.5	8.5	11/8/2016	10.1	0.777	1.88	0.044	9.11	7.26	3440	1.4	664													76200								
SD-38	MK-SD-38-8.5/10.5	8.5	10.5	11/8/2016	9.11	0.749	1.65	0.0682	8.55	6.78	588	1.1	267													60100								
SD-38	MK-SD-38-10.5/12.5	10.5	12.5	11/8/2016	6.93	0.402	1.4	0.19	2.93	5.33	258 J	1.6	304 J													74100								
SD-38	MK-SD-38-12.5/14.8	12.5	14.8	11/8/2016	8.93	0.646	1.71	0.27	7.92	6.86	184	1.8	312													65600								

Appendix A
Milwaukee River Downtown Reach - Sediment Analytical Results Summary
Focused Feasibity Study, Milwaukee Estuary AOC, Milwaukee, Wisconsin

Analyte Group					PCB											PAH												
Analyte					Total PCB	Aroclor 1260	Aroclor 1254	Aroclor 1268	Aroclor 1221	Aroclor 1232	Aroclor 1248	Aroclor 1016	Aroclor 1262	Aroclor 1242	Total PAH	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b)-fluoranthene	Benzo(e)pyrene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h)anthracene
Unit					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
WI CBSQG PEC					1										22.8												
WI CBSQG PEC 3x					3										68.4												
WI CBSQG PEC 5x					5										114												
TSCA					50																						
Location code	Sample ID	Start Depth (feet)	End Depth (feet)	Date	Total PCB	Aroclor 1260	Aroclor 1254	Aroclor 1268	Aroclor 1221	Aroclor 1232	Aroclor 1248	Aroclor 1016	Aroclor 1262	Aroclor 1242	Total PAH	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b)-fluoranthene	Benzo(e)pyrene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h)anthracene
SD-38X	MK-SD-38X-14.4/15.4	14.4	15.4	7/19/2018	0.11 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 UJ	0.22 U	0.22 U	0.22 U	**73.4**	**0.294**	**0.595**	**0.138**	**1.37**	**5.12**	**5.14**	**8.21**	**4.16**	**2.98**	**2.64**	**6.24**	**0.875**
SD-38X	MK-SD-38X-15.4/16.4	15.4	16.4	7/19/2018	0.055 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 UJ	0.109 U	0.109 U	0.109 U	**60.2**	**0.258**	**0.534**	**0.172**	**1.06**	**4.26**	**4.09**	**6.68**	**3.36**	**2.3**	**2.23**	**5.1**	**0.743**
SD-38X	MK-SD-38X-16.4/17.4	16.4	17.4	7/19/2018	**0.019**	0.0218 U	**0.0188 J**	0.0218 U	0.0218 U	0.0218 U	0.0218 UJ	0.0218 U	0.0218 U	0.0218 U	**37**	**0.119**	**0.247**	**0.0466**	**0.654**	**2.59**	**2.59**	**4.3**	**2.1**	**1.49**	**1.45**	**3.17**	**0.462**
SD-38X	MK-SD-38X-17.4/17.9	17.4	17.9	7/19/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 UJ	0.0222 U	0.0222 U	0.0222 U	**52.2**	**0.24**	**0.501**	**0.119**	**1.04**	**3.77**	**3.72**	**5.87**	**2.98**	**2.05**	**1.97**	**4.42**	**0.632**
SD-38X	MK-SD-38X-19.4/20.4	19.4	20.4	7/19/2018	**0.23**	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	**0.226 J**	**43**	**0.211**	**0.407**	**0.172**	**0.939 J**	**3.16**	**2.83 J**	**4.58**	**2.44**	**2**	**1.48 J**	**3.89**	**0.663**
SD-38X	MK-SD-38X-20.4/21.4	20.4	21.4	7/19/2018	0.11 U	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	0.222 UJ	0.222 U	0.222 U	0.222 U	**28.5**	**0.205**	**0.731**	**0.0594**	**1.18 J**	**1.93**	**1.66 J**	**2.34**	**1.2**	**1.04**	**0.83 J**	**2.05**	**0.302**
SD-38X	MK-SD-38X-21.4/22.4	21.4	22.4	7/19/2018	0.011 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 UJ	0.0219 U	0.0219 U	0.0219 U	**10.1**	**0.171**	**0.222 J**	0.0221 U	**0.324 J**	**0.693 J**	**0.799 J**	**0.963 J**	**0.501 J**	**0.426 J**	**0.343 J**	**0.676 J**	**0.117 J**
SD-38X	MK-SD-38X-22.4/23.0	22.4	23	7/19/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 UJ	0.0222 U	0.0222 U	0.0222 U	**0.099**	**0.00296**	0.00222 U	0.00222 U	**0.0018 J**	**0.00561**	**0.00391**	**0.00714**	**0.00412**	**0.00419**	**0.00228**	**0.00917**	0.00222 U
SD-38X	MK-SD-38X-24.4/25.4	24.4	25.4	7/19/2018	**0.057**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 UJ	0.022 U	0.022 U	**0.0567**	**1.7**	**0.00769**	**0.014**	**0.00458**	**0.0413**	**0.118**	**0.117**	**0.192**	**0.1**	**0.0881**	**0.0648**	**0.149**	**0.0245**
SD-38X	MK-SD-38X-25.4/26.4	25.4	26.4	7/19/2018	0.011 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 UJ	0.0218 U	0.0218 U	0.0218 U	**0.17**	**0.0027**	**0.00192 J**	0.00216 U	**0.00334**	**0.0107**	**0.0076**	**0.0136**	**0.00695**	**0.00551**	**0.0043**	**0.0145**	0.00216 U
SD-38X	MK-SD-38X-26.4/27.4	26.4	27.4	7/19/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 UJ	0.0221 U	0.0221 U	0.0221 U	**0.2**	**0.00317**	**0.00192 J**	0.00218 U	**0.00286**	**0.0117**	**0.0123**	**0.0223**	**0.0124**	**0.0113**	**0.0074**	**0.0166**	**0.00158 J**
SD-38X	MK-SD-38X-27.4/28.4	27.4	28.4	7/19/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 UJ	0.0222 U	0.0222 U	0.0222 U	**0.032**	0.00222 U	0.00222 U	0.00222 U	0.00222 U	0.00222 U	0.00222 U	0.00222 U	0.0022 U	0.00222 U	0.00222 U	0.00222 U	0.00222 U
SD-39	MK-SD-39-0.0/0.5	0	0.5	11/8/2016	**2.6**	**0.19 J**	**0.533**	0.118 U	0.118 U	0.118 U	0.118 U	0.118 U	0.118 U	**1.91**	**11.8**	0.0591 U	**0.0727 J**	0.039 U	**0.288**	**0.787**	**0.848**	**1.35**		**0.689**	**0.573**	**1.27**	**0.179**
SD-39	MK-SD-39-0.5/1.5	0.5	1.5	11/8/2016	**1.8**	**0.21 J**	**0.478 J**	0.114 U	0.114 U	0.114 U	0.114 U	0.114 U	0.114 U	**1.13 J**	**3.9**	0.0228 U	**0.0234 J**	0.015 U	**0.0791 J**	**0.23**	**0.25**	**0.454**		**0.256**	**0.201**	**0.437**	**0.0619**
SD-39	MK-SD-39-1.5/2.5	1.5	2.5	11/8/2016	**1.8**	**0.174 J**	**0.433**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**1.17**	**7.9**	0.0221 U	**0.0421 J**	**0.0155 J**	**0.159**	**0.533**	**0.643**	**1.03**		**0.463**	**0.41**	**0.767**	**0.117**
SD-39	MK-SD-39-2.5/3.5	2.5	3.5	11/8/2016	**4.2**	**0.357 J**	**0.965**	0.203 U	0.203 U	0.203 U	0.203 U	0.203 U	0.203 U	**2.87**	**17.3**	0.0812 U	**0.18 J**	0.0535 U	**0.524**	**1.05**	**1.07**	**1.8**		**0.799**	**0.801**	**1.75**	**0.21**
SD-39	MK-SD-39-3.5/4.5	3.5	4.5	11/8/2016	**10.3**	0.908 U	**1.22 J**	0.908 U	0.908 U	0.908 U	0.908 U	0.908 U	0.908 U	**9.07**	**16.7**	0.0908 U	**0.158 J**	0.0598 U	**0.567**	**1.01**	**0.904**	**1.75**		**0.818**	**0.725**	**1.66**	**0.217**
SD-39	MK-SD-39-4.5/6.5	4.5	6.5	11/8/2016	**2.9**	**0.186 J**	**0.71 J**	0.169 U	0.169 U	0.169 U	0.169 U	0.169 U	0.169 U	**2**	**10.4**	0.0339 U	**0.097**	0.0223 U	**0.285**	**0.738**	**0.756**	**1.23**		**0.43**	**0.506**	**1.01**	**0.132**
SD-39	MK-SD-39-6.5/9.0	6.5	9	11/8/2016	0.023 U	0.0454 U	0.0454 U	0.0454 U	0.0454 U	0.0454 U	0.0454 U	0.0454 U	0.0454 U	0.0454 U	**23.1**	**0.267 J**	**0.293 J**	**0.064 J**	**0.736 J**	**1.62 J**	**1.35 J**	**2.15 J**		**0.878 J**	**0.892 J**	**2.38 J**	**0.24 J**
SD-39X	MK-SD-39X-8.7/9.7	8.7	9.7	7/19/2018	**5.1**	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	**5.12**													
SD-39X	MK-SD-39X-9.7/10.7	9.7	10.7	7/19/2018	**0.64**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.638**													
SD-39X	MK-SD-39X-10.7/11.9	10.7	11.9	7/19/2018	**0.028**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.0275**													
SD-39X	MK-SD-39X-13.7/14.7	13.7	14.7	7/19/2018	**0.096**	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**0.0959**													
SD-39X	MK-SD-39X-14.7/15.7	14.7	15.7	7/19/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-39X	MK-SD-39X-15.7/16.2	15.7	16.2	7/19/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-39X	MK-SD-39X-18.7/19.8	18.7	19.8	7/19/2018	**0.054**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.0535 J**													
SD-40	MK-SD-40-0.0/0.5	0	0.5	11/8/2016	**3.3**	**0.305 J-**	**0.738 J-**	0.231 UJ	0.231 UJ	0.231 UJ	0.231 UJ	0.231 UJ	0.231 UJ	**2.27 J-**	**2.8**	**0.0147 J**	**0.0161 J**	**0.0099 J**	**0.0591**	**0.214**	**0.284**	**0.404**		**0.135**	**0.135**	**0.266**	**0.0325**
SD-40	MK-SD-40-0.5/1.5	0.5	1.5	11/8/2016	**3.1**	**0.304 J-**	**0.76 J-**	0.171 UJ	0.171 UJ	0.171 UJ	0.171 UJ	0.171 UJ	0.171 UJ	**2.02 J-**	**7.4**	0.0456 U	**0.0451 J**	0.03 U	**0.219**	**0.492**	**0.531**	**0.948**		**0.318**	**0.383**	**0.821**	**0.0836**
SD-40	MK-SD-40-1.5/2.5	1.5	2.5	11/8/2016	**2.3**	**0.258 J-**	**0.585 J-**	0.177 UJ	0.177 UJ	0.177 UJ	0.177 UJ	0.177 UJ	0.177 UJ	**1.49 J**	**7.5**	0.0471 U	**0.0535 J**	0.0311 U	**0.188**	**0.396**	**0.429**	**0.908**		**0.442**	**0.363**	**0.815**	**0.104**
SD-40	MK-SD-40-2.5/3.5	2.5	3.5	11/8/2016	**5.1**	**0.469 J-**	**1.22 J-**	0.227 UJ	0.227 UJ	0.227 UJ	0.227 UJ	0.227 UJ	0.227 UJ	**3.45 J**	**9.6**	0.0227 U	**0.0685**	**0.0201 J**	**0.248**	**0.608**	**0.667**	**1.16**		**0.489**	**0.47**	**0.917**	**0.125**
SD-40	MK-SD-40-3.5/4.5	3.5	4.5	11/8/2016	**29**	5.84 U	5.84 U	5.84 U	5.84 U	5.84 U	5.84 U	5.84 U	5.84 U	**29 J**	**10.1**	0.0468 U	**0.108 J**	0.0308 U	**0.302**	**0.57**	**0.612**	**1.11**		**0.519**	**0.449**	**1.05**	**0.139**
SD-40	MK-SD-40-4.5/6.5	4.5	6.5	11/8/2016	**18.9**	5.46 U	5.46 U	5.46 U	5.46 U	5.46 U	5.46 U	5.46 U	5.46 U	**18.9**	**6.7**	0.0218 U	**0.0508 J**	0.0144 U	**0.173**	**0.472**	**0.472**	**0.787**		**0.287**	**0.332**	**0.685**	**0.0815**
SD-40	MK-SD-40-6.5/8.5	6.5	8.5	11/8/2016	**0.058**	0.0469 UJ	0.0469 UJ	0.0469 UJ	0.0469 UJ	0.0469 UJ	0.0469 UJ	0.0469 UJ	0.0469 UJ	**0.058 J-**	**6.7**	0.0469 U	**0.0646 J**	0.0309 U	**0.202**	**0.47**	**0.416**	**0.65**		**0.324**	**0.29**	**0.683**	**0.0851**
SD-40	MK-SD-40-8.5/10.0	8.5	10	11/8/2016	0.015 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	**0.095**	**0.0216**	0.0047 U	0.004 U	0.0069 U	0.0038 U	0.003 U	0.0113 U		0.0024 U	0.003 U	0.004 U	0.0027 U
SD-41	MK-SD-41-0.0/0.5	0	0.5	11/8/2016	**5.8**	0.595 U	**0.996 J**	0.595 U	0.595 U	0.595 U	0.595 U	0.595 U	0.595 U	**4.76**	**7.2**	0.0476 U	**0.0594 J**	0.0314 U	**0.207**	**0.455**	**0.419**	**0.833**		**0.318**	**0.375**	**0.762**	**0.0851**
SD-41	MK-SD-41-0.5/1.5	0.5	1.5	11/8/2016	**28.4**	1.98 U	1.98 U	1.98 U	1.98 U	1.98 U	1.98 U	1.98 U	1.98 U	**28.4**	**14.8**	0.0527 U	**0.141**	0.0347 U	**0.401**	**0.91**	**1.01**	**1.72**		**0.634**	**0.733**	**1.5**	**0.183**
SD-41	MK-SD-41-1.5/2.5	1.5	2.5	11/8/2016	**25.1**	1.49 U	**2.35 J**	1.49 U	1.49 U	1.49 U	1.49 U	1.49 U	1.49 U	**22.7**	**23.9**	0.0794 U	**0.15 J**	0.0523 U	**0.566**	**1.48**	**1.78**	**3.03**		**1.52**	**1.18**	**2.46**	**0.392**
SD-41	MK-SD-41-2.5/3.5	2.5	3.5	11/8/2016	**0.59**	0.0525 U	**0.135 J**	0.0525 U	0.0525 U	0.0525 U	0.0525 U	0.0525 U	0.0525 U	**0.451**	**24.8**	**0.102 J**	**0.267**	**0.105 J**	**0.82**	**1.51**	**1.38**	**2.46**		**1.02**	**1.01**	**2.45**	**0.267**
SD-41	MK-SD-41-3.5/4.5	3.5	4.5	11/8/2016	**0.35**	0.0566 U	**0.093 J**	0.0566 U	0.0566 U	0.0566 U	0.0566 U	0.0566 U	0.0566 U	**0.255**	**9**	0.0453 U	**0.0761 J**	0.0298 U	**0.255**	**0.587**	**0.56**	**1.01**		**0.319**	**0.443**	**0.9**	**0.0981**
SD-41	MK-SD-41-4.5/6.5	4.5	6.5	11/8/2016	**0.094**	0.0464 U	0.0464 U	0.0464 U	0.0464 U	0.0464 U	0.0464 U	0.0464 U	0.0464 U	**0.0943 J**	**6.4**	0.0371 U	**0.0498 J**	0.0245 U	**0.157**	**0.399**	**0.419**	**0.813**		**0.267**	**0.32**	**0.674**	**0.0786**
SD-41	MK-SD-41-6.5/8.5	6.5	8.5	11/8/2016	**0.047**	0.0448 U	0.0448 U	0.0448 U	0.0448 U	0.0448 U	0.0448 U	0.0448 U	0.0448 U	**0.0471 J**	**10.6**	0.0716 U	**0.114 J**	0.0472 U	**0.373**	**0.628**	**0.524**	**0.992**		**0.492**	**0.399**	**1.07**	**0.126**
SD-41	MK-SD-41-8.5/10.0	8.5	10	11/8/2016	0.021 U	0.0426 U	0.0426 U	0.0426 U	0.0426 U	0.0426 U	0.0426 U	0.0426 U	0.0426 U	0.0426 U	**20**	**0.263**	**0.242**	**0.0608 J**	**0.627**	**1.38**	**1.3**	**1.77**		**0.969**	**0.69**	**1.66**	**0.241**
SD-41X	MK-SD-41X-11.9/12.9	11.9	12.9	7/18/2018	**0.0087**	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	**0.00871 J**	0.0217 U	0.0217 U	0.0217 U													
SD-41X	MK-SD-41X-12.9/13.9	12.9	13.9	7/18/2018	0.011 U	0.0211 U	0.0211 U	0.0211 U	0.0211 U	0.0211 U	0.0211 U	0.0211 U	0.0211 U	0.0211 U													
SD-42	MK-SD-42-0.0/0.5	0	0.5	11/7/2016	**1.6**	**0.188 J**	**0.369 J**	0.126 U	0.126 U	0.126 U	0.126 U	0.126 U	0.126 U	**1.04**	**7.1**	0.0252 U	**0.0437 J**	0.0166 U	**0.15**	**0.485**	**0.556**	**0.924**		**0.334**	**0.367**	**0.737**	**0.0924**
SD-42X	MK-SD-42X-0.5/1.5	0.5	1.5	7/17/2018	**2.1**	**0.38**	0.0221 UJ	0.0221 UJ	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**1.74**													
SD-42	MK-SD-42-0.5/1.6	0.5	1.6	11/7/2016	**3.3**	**0.333 J**	**0.739**	0.188 U	0.188 U	0.188 U	0.188 U	0.188 U	0.188 U	**2.23**	**8.4**	0.0502 UJ	**0.05 J-**	0.0331 UJ	**0.202**	**0.507**	**0.578**	**1.11**		**0.349**	**0.456**	**0.921**	**0.0992**
SD-42X	MK-SD-42X-4.1/5.1	4.1	5.1	7/17/2018	**0.092**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.0923**													
SD-42X	MK-SD-42X-5.1/6.1	5.1	6.1	7/17/2018	**0.023**	0.022 U	0.022 UJ	0.022 UJ	0.022 U	0.022 U	0.022 U	0.022 U	0.022 UJ	**0.0227 J**													
SD-42X	MK-SD-42X-6.1/7.1	6.1	7.1	7/17/2018	**0.06**	0.0219 U	**0.0082 J**	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**0.0518**													
SD-42X	MK-SD-42X-7.1/8.0	7.1	8	7/17/2018	**0.083**	0.0222 U	**0.0167 J**	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**0.0664**													
SD-42X	MK-SD-42X-9.1/10.1	9.1	10.1	7/17/2018	**0.084**	0.0221 U	**0.012 J**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.0723**													
SD-42X	MK-SD-42X-10.1/11.1	10.1	11.1	7/17/2018	0.011 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U													
SD-42X	MK-SD-42X-11.1/12.1	11.1	12.1	7/17/2018	0.011 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U													
SD-42X	MK-SD-42X-12.1/13.3	12.1	13.3	7/17/2018	0.011 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U													
SD-42X	MK-SD-42X-14.1/15.1	14.1	15.1	7/17/2018	**0.043**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.0434**													
SD-42X	MK-SD-42X-15.1/16.1	15.1	16.1	7/17/2018	0.011 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U													
SD-42X	MK-SD-42X-16.1/17.1	16.1	17.1	7/17/2018	0.011 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U													
SD-42X	MK-SD-42X-17.1/18.1	17.1	18.1	7/17/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-43	MK-SD-43-0.0/0.5	0	0.5	11/8/2016	**0.89**	**0.126 J-**	**0.238 J-**	0.126 UJ	0.126 UJ	0.126 UJ	0.126 UJ	0.126 UJ	0.126 UJ	**0.529 J**	**10.4**	**0.0094 J**	**0.063**	**0.0856**	**0.296**	**0.759**	**0.807**	**1.12**	**0.603**	**0.623**	**0.458**	**1.04**	**0.171**
SD-43	MK-SD-43-0.5/1.5	0.5	1.5	11/8/2016	**3.7**	**0.309 J-**	**0.741 J-**	0.227 UJ	0.227 UJ	0.227 UJ	0.227 UJ	0.227 UJ	0.227 UJ	**2.64 J**	**37.2**	**0.0355**	**0.278**	**0.295**	**1.04**	**3.19**	**2.42**	**3.01**	**1.76**	**1.98**	**1.45**	**3.08**	**0.588**
SD-43	MK-SD-43-1.5/2.5	1.5	2.5	11/8/2016	**2.5**	**0.314 J-**	**0.595 J-**	0.238 UJ	0.238 UJ	0.238 UJ	0.238 UJ	0.238 UJ	0.238 UJ	**1.63 J-**	**14**	**0.0164**	**0.113**	**0.112**	**0.348**	**1.05**	**1.16**	**1.53**	**0.822**	**0.821**	**0.665**	**1.24**	**0.234**
SD-43	MK-SD-43-2.5/3.5	2.5	3.5	11/8/2016	**2**	**0.367 J-**	**0.528 J-**	0.231 UJ	0.231 UJ	0.231 UJ	0.231 UJ	0.231 UJ	0.231 UJ	**1.1 J-**	**3.6**	**0.0042**	**0.0316**	**0.0325**	**0.107**	**0.243**	**0.272**	**0.363**	**0.201**	**0.22**	**0.155**	**0.35**	**0.0665**
SD-43	MK-SD-43-3.5/4.5	3.5	4.5	11/8/2016	**2.3**	**0.312 J-**	**0.64 J-**	0.112 UJ	0.112 UJ	0.112 UJ	0.112 UJ	0.112 UJ	0.112 UJ	**1.33 J-**	**12.2**	**0.0153**	**0.118**	**0.121**	**0.4**	**0.857**	**0.94**	**1.3**	**0.688**	**0.767**	**0.452**	**1.23**	**0.212**
SD-43	MK-SD-43-4.5/6.5	4.5	6.5	11/8/2016	**1.7**	**0.218**	**0.48**	0.104 U	0.104 U	0.104 U	0.104 U	0.104 U	0.104 U	**1.03 J**	**12.5**	**0.0628**	**0.199**	**0.197**	**0.562**	**0.891**	**0.867**	**1.12**	**0.599**	**0.605**	**0.474**	**1.13**	**0.203**
SD-43	MK-SD-43-6.5/8.0	6.5	8	11/8/2016	0.02 U	0.0397 UJ	0.0397 UJ	0.0397 UJ	0.0397 UJ	0.0397 UJ	0.0397 UJ	0.0397 UJ	0.0397 UJ	0.0397 UJ	**21.1**	**0.138**	**0.414**	**0.237**	**0.816**	**1.28**	**1.31**	**1.62**	**0.86**	**0.926**	**0.589**	**1.52**	**0.323**
SD-43	MK-SD-43-8.0/8.5	8	8.5	11/8/2016	0.017 U	0.0343 UJ	0.0343 UJ	0.0343 UJ	0.0343 UJ	0.0343 UJ	0.0343 UJ	0.0343 UJ	0.0343 UJ	0.0343 UJ	**1.4**	**0.03**	**0.0555**	**0.0155**	**0.0847**	**0.0844**	**0.0684**	**0.0835**	**0.0425**	**0.0474**	**0.0364**	**0.0976**	**0.0138**
SD-44	MK-SD-44-0.0/0.5	0	0.5	11/10/2016	**0.57**	**0.1 J**	**0.126 J**	0.0716 U	0.0716 U	0.0716 U	0.0716 U	0.0716 U	0.0716 U	**0.342 J**	**2.5**	**0.002 J**	**0.0093**	**0.0065**	**0.0418**	**0.166**	**0.22**	**0.354**		**0.167**	**0.135**	**0.246**	**0.036**
SD-44	MK-SD-44-0.5/1.5	0.5	1.5	11/10/2016	**0.67**	**0.0826 J**	**0.17**	0.0594 U	0.0594 U	0.0594 U	0.0594 U	0.0594 U	0.0594 U	**0.419 J**	**18.2**	**0.0178**	**0.11**	**0.0511**	**0.252**	**1.27**	**1.64**	**2.36**		**1.19**	**0.99**	**1.84**	0.00077 U
SD-44	MK-SD-44-1.5/2.5	1.5	2.5	11/10/2016	**1**	**0.121 J**	**0.234**	0.116 U	0.116 U	0.116 U	0.116 U	0.116 U	0.116 U	**0.653 J**	**16.4**	**0.0118**	**0.0834**	**0.0561**	**0.243**	**1.15**	**1.44**	**2.45**		**1.04**	**0.763**	**1.53**	0.0015 U
SD-44	MK-SD-44-2.5/3.5	2.5	3.5	11/10/2016	**0.85**	**0.163**	**0.217**	0.0605 U	0.0605 U	0.0605 U	0.0605 U	0.0605 U	0.0605 U	**0.467 J**	**17.8**	**0.0109**	**0.078**	**0.0539**	**0.252**	**1.1**	**1.54**	**2.7**		**1.12**	**0.963**	**1.56**	**0.347**
SD-44	MK-SD-44-3.5/4.5	3.5	4.5	11/10/2016	**0.69**	**0.0931 J**	**0.178 J**	0.0541 U	0.0541 U	0.0541 U	0.0541 U	0.0541 U	0.0541 U	**0.417 J**	**14.1**	**0.0105**	**0.0882**	**0.047**	**0.242**	**0.984**	**1.24**	**2**		**0.808**	**0.812**	**1.22**	**0.247**
SD-44	MK-SD-44-4.5/6.5	4.5	6.5	11/10/2016	**0.9**	**0.132**	**0.224**	0.0535 U	0.0535 U	0.0535 U	0.0535 U	0.0535 U	0.0535 U	**0.542 J**	**13**	**0.0108**	**0.0726**	**0.0472**	**0.205**	**0.85**	**1.11**	**1.93**		**0.727**	**0.663**	**1.16**	**0.245**
SD-44	MK-SD-44-6.5/8.5	6.5	8.5	11/10/2016	**1.2**	**0.171 J**	**0.297**	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.0526 U	**0.713 J**	**13.2**	**0.0121**	**0.088**	**0.044**	**0.239**	**0.922**	**1.14**	**1.96**		**0.712**	**0.642**	**1.19**	0.0014 U
SD-44	MK-SD-44-8.5/10.5	8.5	10.5	11/10/2016	**0.62**	**0.0988 J**	**0.16 J**	0.0535 U	0.0535 U	0.0535 U	0.0535 U	0.0535 U	0.0535 U	**0.361 J**	**4.6**	**0.004**	**0.027**	**0.0167**	**0.0746**	**0.32**	**0.416**	**0.58**		**0.311**	**0.27**	**0.428**	**0.0952**
SD-44	MK-SD-44-10.5/12.9	10.5	12.9	11/10/2016	**2.2**	0.253 U	**0.43 J**	0.253 U	0.253 U	0.253 U	0.253 U	0.253 U	0.253 U	**1.79**	**9.6**	**0.0115**	**0.0711**	**0.0402**	**0.174**	**0.706**	**0.856**	**1.19**		**0.573**	**0.548**	**0.889**	**0.183**

Appendix A
Milwaukee River Downtown Reach - Sediment Analytical Results Summary
Focused Feasibity Study, Milwaukee Estuary AOC, Milwaukee, Wisconsin

Analyte Group					PAH						Metals								Metals								Physical Parameters							
Analyte					Fluoranthene	Fluorene	Indeno(1,2,3-Cd)Pyrene	Naphthalene	Phenanthrene	Pyrene	Chromium	Mercury	Lead	Iron	Manganese	Potassium	Sodium	Thallium	Antimony	Beryllium	Cobalt	Calcium	Cyanide	Magnesium	Vanadium	TOC	Gravel	Sand	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Fines
Unit					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	%	%	%	%	%	%
WI CBSQG PEC											110	1.1	130	40000	1100				25														
WI CBSQG PEC 3x											330	3.3	390	120000	3300				75														
WI CBSQG PEC 5x											550	5.5	650	200000	5500				125														
TSCA																																	
Location code	Sample ID	Start Depth (feet)	End Depth (feet)	Date	Fluoranthene	Fluorene	Indeno(1,2,3-Cd)Pyrene	Naphthalene	Phenanthrene	Pyrene	Chromium	Mercury	Lead	Iron	Manganese	Potassium	Sodium	Thallium	Antimony	Beryllium	Cobalt	Calcium	Cyanide	Magnesium	Vanadium	TOC	Gravel	Sand	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Fines
SD-38X	MK-SD-38X-14.4/15.4	14.4	15.4	7/19/2018	**12.2**	**0.902**	**3.14**	**0.459**	**7.38**	**11.6**	**216**	**2.28**	**389**												**93600**								
SD-38X	MK-SD-38X-15.4/16.4	15.4	16.4	7/19/2018	**10.3**	**0.789**	**2.51**	**0.36**	**5.99**	**9.42**	**146**	**0.967**	**389**												**76300**								
SD-38X	MK-SD-38X-16.4/17.4	16.4	17.4	7/19/2018	**6.23**	**0.428**	**1.61**	**0.163**	**3.67**	**5.67**	**189**	**1.73**	**442**												**72800**								
SD-38X	MK-SD-38X-17.4/17.9	17.4	17.9	7/19/2018	**8.45**	**0.727**	**2.2**	**0.363**	**5.32**	**7.83**	**287**	**2.28**	**536**												**82500**								
SD-38X	MK-SD-38X-19.4/20.4	19.4	20.4	7/19/2018	**7.02**	**0.596**	**1.75**	**0.307** J	**4.23** J	**6.28**	**330**	**3.03**	**383**												**76400**								
SD-38X	MK-SD-38X-20.4/21.4	20.4	21.4	7/19/2018	**4.44**	**0.738**	**0.966**	**0.306** J	**4.43** J	**4.12**	**44.5**	**0.339** J	**77.6**												**67400**								
SD-38X	MK-SD-38X-21.4/22.4	21.4	22.4	7/19/2018	**1.25** J	**0.229** J	**0.423** J	**0.309** J	**1.27** J	**1.36** J	**12.9**	0.432 U	**18.4**												**59900**								
SD-38X	MK-SD-38X-22.4/23.0	22.4	23	7/19/2018	**0.0173**	**0.00324**	**0.00272**	**0.00466**	**0.0129**	**0.014**	**5.13**	0.447 U	**3.72**												**54700**								
SD-38X	MK-SD-38X-24.4/25.4	24.4	25.4	7/19/2018	**0.289**	**0.0244**	**0.0737**	**0.0134**	**0.178**	**0.25**	**12.2**	0.464 U	**19.8**												**50500**								
SD-38X	MK-SD-38X-25.4/26.4	25.4	26.4	7/19/2018	**0.0332**	**0.0036**	**0.00479**	**0.00404**	**0.0215**	**0.0259**	**6.9**	0.484 U	**4.56**												**73200**								
SD-38X	MK-SD-38X-26.4/27.4	26.4	27.4	7/19/2018	**0.0286**	**0.00298**	**0.00785**	**0.0098**	**0.0207**	**0.0293**	**6.78**	0.44 U	**7.5**												**49400**								
SD-38X	MK-SD-38X-27.4/28.4	27.4	28.4	7/19/2018	**0.00403**	0.00222 U	0.00222 U	**0.0027**	**0.00599**	**0.00333**	**7.21**	0.411 U	**7.45**												**28200**								
SD-39	MK-SD-39-0.0/0.5	0	0.5	11/8/2016	**2.26**	**0.087** J	**0.596**	0.0995 U	**1.07**	**1.64**	**435**	**0.38**	**281**												**47400**	J+	**35.1**	**47.9**					**17**
SD-39	MK-SD-39-0.5/1.5	0.5	1.5	11/8/2016	**0.746**	**0.0277** J	**0.21**	0.0383 U	**0.341**	**0.521**	**152**	**0.48**	**275**												**40100**	J+	**39.3**	**23.8**					**6.9**
SD-39	MK-SD-39-1.5/2.5	1.5	2.5	11/8/2016	**1.49**	**0.0539** J	**0.404**	0.0372 U	**0.669**	**1.04**	**352**	**0.46**	**397**												**48000**	J+	**32.6**	**58**					**9.4**
SD-39	MK-SD-39-2.5/3.5	2.5	3.5	11/8/2016	**3.51**	**0.185** J	**0.711**	0.137 U	**2.06**	**2.51**	**487**	**0.49**	**686**												**40200**	J+	**11.8**	**76.9**					**11.3**
SD-39	MK-SD-39-3.5/4.5	3.5	4.5	11/8/2016	**3.32**	**0.199** J	**0.732**	0.153 U	**2.07**	**2.39**	**1370**	**16**	**1240**												**52500**	J+	**12.3**	**75.4**					**12.3**
SD-39	MK-SD-39-4.5/6.5	4.5	6.5	11/8/2016	**1.94**	**0.116**	**0.395**	0.0571 U	**1.15**	**1.56**	**937**	**1.4**	**377**												**44400**	J+	**8.1**	**79.5**					**12.4**
SD-39	MK-SD-39-6.5/9.0	6.5	9	11/8/2016	**4.46**	**0.373** J	**0.752** J	**0.63** J	**2.89**	**3.1**	**812**	**5.4**	**760**												**78000**	J+	**4.6**	**77.1**					**18.3**
SD-39X	MK-SD-39X-8.7/9.7	8.7	9.7	7/19/2018							**406**	J+ **6.52**	**474**												**110000**	J							
SD-39X	MK-SD-39X-9.7/10.7	9.7	10.7	7/19/2018							**530**	J+ **4.94**	**559**												**91200**	J							
SD-39X	MK-SD-39X-10.7/11.9	10.7	11.9	7/19/2018							**61.1**	J+ **0.311**	**54.2**												**16200**	J							
SD-39X	MK-SD-39X-13.7/14.7	13.7	14.7	7/19/2018							**6.45**	J+ 0.0956 U	**21.9**												**27700**	J							
SD-39X	MK-SD-39X-14.7/15.7	14.7	15.7	7/19/2018							**3.37**	J+ 0.0986 U	**4.76**												**65300**	J							
SD-39X	MK-SD-39X-15.7/16.2	15.7	16.2	7/19/2018							**4.26**	J+ 0.0974 U	**2.5**												**71400**	J							
SD-39X	MK-SD-39X-18.7/19.8	18.7	19.8	7/19/2018							**13.1**	J+ **0.0324** J	**28.4**												**31400**	J							
SD-40	MK-SD-40-0.0/0.5	0	0.5	11/8/2016	**0.498**	**0.0197** J	**0.116**	**0.0254** J	**0.224**	**0.36**	**290**	**0.6**	**273**												**41100**								
SD-40	MK-SD-40-0.5/1.5	0.5	1.5	11/8/2016	**1.42**	**0.0585** J	**0.293**	0.0768 U	**0.673**	**1.06**	**246**	**0.41**	**347**												**39700**								
SD-40	MK-SD-40-1.5/2.5	1.5	2.5	11/8/2016	**1.48**	**0.0674** J	**0.378**	0.0793 U	**0.721**	**1.05**	**567**	**0.54**	**567**												**50200**								
SD-40	MK-SD-40-2.5/3.5	2.5	3.5	11/8/2016	**1.96**	**0.0897**	**0.436**	0.0382 U	**0.956**	**1.33**	**1020**	**4.5**	**657**												**49100**								
SD-40	MK-SD-40-3.5/4.5	3.5	4.5	11/8/2016	**2.01**	**0.125** J	**0.449**	0.0787 U	**1.22**	**1.39**	**1860**	**1.3**	**626**												**65300**								
SD-40	MK-SD-40-4.5/6.5	4.5	6.5	11/8/2016	**1.3**	**0.0727**	**0.254**	0.0368 U	**0.65**	**1.01**	**2470**	**3**	**677**												**76500**								
SD-40	MK-SD-40-6.5/8.5	6.5	8.5	11/8/2016	**1.27**	**0.0803** J	**0.263**	**0.0992** J	**0.822**	**0.94**	**943**	**11.1**	**828**												**85500**								
SD-40	MK-SD-40-8.5/10.0	8.5	10	11/8/2016	0.0062 U	0.005 U	0.0026 U	**0.0341**	0.014 U	0.0054 U	**15.5**	0.042 U	**7.3**												**2680**								
SD-41	MK-SD-41-0.0/0.5	0	0.5	11/8/2016	**1.41**	**0.0693** J	**0.288**	0.0801 U	**0.667**	**1.16**	**933**	**0.66**	**497**												**47200**	J+	**16.9**	**72.8**					**10.3**
SD-41	MK-SD-41-0.5/1.5	0.5	1.5	11/8/2016	**2.95**	**0.169**	**0.566**	0.0887 U	**1.55**	**2.22**	**1810**	**1.4**	**566**												**61800**	J+	**8.7**	**82.6**					**8.7**
SD-41	MK-SD-41-1.5/2.5	1.5	2.5	11/8/2016	**4.43**	**0.203** J	**1.27**	0.134 U	**2.17**	**3.17**	**1240**	**5.9**	**501**												**57200**	J+	**2.3**	**74.9**					**22.8**
SD-41	MK-SD-41-2.5/3.5	2.5	3.5	11/8/2016	**4.66**	**0.424**	**0.883**	**0.392** J	**3.41**	**3.61**	**305**	**3**	**478**												**75500**	J+	**8.6**	**77.3**					**14.1**
SD-41	MK-SD-41-3.5/4.5	3.5	4.5	11/8/2016	**1.72**	**0.115** J	**0.292**	0.0762 U	**1.14**	**1.42**	**426**	**1.7**	**558**												**79300**	J+	**11.1**	**80.2**					**8.7**
SD-41	MK-SD-41-4.5/6.5	4.5	6.5	11/8/2016	**1.19**	**0.067** J	**0.237**	0.0625 U	**0.654**	**0.984**	**300**	**6**	**532**												**73700**		**4.6**	**83.8**					**11.6**
SD-41	MK-SD-41-6.5/8.5	6.5	8.5	11/8/2016	**1.99**	**0.15** J	**0.429**	**0.306** J	**1.47**	**1.47**	**618**	**6.9**	**479**												**81300**		**2.8**	**78.4**					**18.8**
SD-41	MK-SD-41-8.5/10.0	8.5	10	11/8/2016	**3.16**	**0.271**	**0.784**	**1.49**	**2.48**	**2.59**	**509**	**4.1**	**406**												**76100**		**1.8**	**76.3**					**21.9**
SD-41X	MK-SD-41X-11.9/12.9	11.9	12.9	7/18/2018							**11**	**0.221**	**21**												**46400**								
SD-41X	MK-SD-41X-12.9/13.9	12.9	13.9	7/18/2018							**9.01**	0.0752 U	**7.02**												**33500**								
SD-42	MK-SD-42-0.0/0.5	0	0.5	11/7/2016	**1.35**	**0.0591** J	**0.299**	0.0425 U	**0.596**	**1.03**	**311**	**0.72**	**340**												**48600**								
SD-42X	MK-SD-42X-0.5/1.5	0.5	1.5	7/17/2018							**384**	**0.532**	**417**												**44400**								
SD-42	MK-SD-42-0.5/1.6	0.5	1.6	11/7/2016	**1.69**	**0.0593** J-	**0.315**	0.0845 UJ	**0.749**	**1.2**	**713**	**0.6**	**582**												**50600**								
SD-42X	MK-SD-42X-4.1/5.1	4.1	5.1	7/17/2018							**5.64**	**0.287**	**12.7**												**63400**								
SD-42X	MK-SD-42X-5.1/6.1	5.1	6.1	7/17/2018							**6.74**	0.0987 U	**7.63**												**57100**								
SD-42X	MK-SD-42X-6.1/7.1	6.1	7.1	7/17/2018							**5.52**	0.084 U	**8.72**												**48800**								
SD-42X	MK-SD-42X-7.1/8.0	7.1	8	7/17/2018							**4.5**	0.091 U	**10.1**												**63600**								
SD-42X	MK-SD-42X-9.1/10.1	9.1	10.1	7/17/2018							**5.51**	0.0888 U	**6.5**												**55900**								
SD-42X	MK-SD-42X-10.1/11.1	10.1	11.1	7/17/2018							**5.09**	0.0937 U	**4.03**												**58600**								
SD-42X	MK-SD-42X-11.1/12.1	11.1	12.1	7/17/2018							**5.43**	0.0943 U	**3.83**												**62300**								
SD-42X	MK-SD-42X-12.1/13.3	12.1	13.3	7/17/2018							**4.51**	0.087 U	**3.76**												**69900**								
SD-42X	MK-SD-42X-14.1/15.1	14.1	15.1	7/17/2018							**5.16**	0.0959 U	**4.15**												**63300**								
SD-42X	MK-SD-42X-15.1/16.1	15.1	16.1	7/17/2018							**4.13**	0.0814 U	**3.04**												**59300**								
SD-42X	MK-SD-42X-16.1/17.1	16.1	17.1	7/17/2018							**5.28**	0.0853 U	**3.49**												**58200**								
SD-42X	MK-SD-42X-17.1/18.1	17.1	18.1	7/17/2018							**4.1**	0.0838 U	**2.72**												**57000**								
SD-43	MK-SD-43-0.0/0.5	0	0.5	11/8/2016	**1.56**	**0.0744**	**0.571**	**0.0173** J	**0.91**	**1.28**	**61.1**	**0.26** J	**117**												**40000**		**11**	**40**					**49**
SD-43	MK-SD-43-0.5/1.5	0.5	1.5	11/8/2016	**7.39**	**0.324**	**1.72**	**0.187**	**3.11**	**5.39**	**262**	**0.5**	**224**												**49300**		**10**	**35**					**55**
SD-43	MK-SD-43-1.5/2.5	1.5	2.5	11/8/2016	**1.97**	**0.12**	**0.75**	**0.0156** J	**1.44**	**1.59**	**1040**	**0.38**	**270**												**50500**		**16**	**40**					**44**
SD-43	MK-SD-43-2.5/3.5	2.5	3.5	11/8/2016	**0.66**	**0.0346**	**0.194**	**0.006**	**0.307**	**0.359**	**170**	**0.4**	**270**												**48300**		**8**	**43**					**49**
SD-43	MK-SD-43-3.5/4.5	3.5	4.5	11/8/2016	**1.64**	**0.124**	**0.665**	**0.0206** J	**1.23**	**1.39**	**318**	**0.48**	**398**												**52300**		**11**	**42**					**47**
SD-43	MK-SD-43-4.5/6.5	4.5	6.5	11/8/2016	**1.62** J	**0.223**	**0.531**	**0.118** J	**1.69**	**1.43** J	**643**	**1.2**	**581**												**46200**		**9**	**52**					**39**
SD-43	MK-SD-43-6.5/8.0	6.5	8	11/8/2016	**3.88**	**0.377**	**0.862**	**0.397**	**2.11**	**3.4**	**197**	**3.1**	**527**												**70400**		**3**	**58**					**39**
SD-43	MK-SD-43-8.0/8.5	8	8.5	11/8/2016	**0.176**	**0.05**	**0.0429**	**0.0445**	**0.242**	**0.152**	**21.8**	**0.25**	**45.6**												**14700**		**2**	**27**					**71**
SD-44	MK-SD-44-0.0/0.5	0	0.5	11/10/2016	**0.426**	**0.0118**	**0.145**	**0.0022** J	**0.158**	**0.344**	**47.4**	**0.14**	**57.8** J												**47400**								
SD-44	MK-SD-44-0.5/1.5	0.5	1.5	11/10/2016	**3.24**	**0.136**	**1.01**	**0.024**	**1.38**	**2.64**	**46.4**	**0.15**	**66.7** J												**47600**								
SD-44	MK-SD-44-1.5/2.5	1.5	2.5	11/10/2016	**3.06**	**0.127**	**0.947**	**0.0139**	**1.09**	**2.38**	**47.3**	**0.15**	**71.8** J												**51000**								
SD-44	MK-SD-44-2.5/3.5	2.5	3.5	11/10/2016	**3.26**	**0.118**	**1.05**	**0.0152**	**1.08**	**2.58**	**56.9**	**0.22**	**81.5** J												**56200**								
SD-44	MK-SD-44-3.5/4.5	3.5	4.5	11/10/2016	**2.54**	**0.114**	**0.776**	**0.0127**	**0.967**	**2.04**	**50.8**	**0.19**	**69.1** J												**45600**								
SD-44	MK-SD-44-4.5/6.5	4.5	6.5	11/10/2016	**2.41**	**0.109**	**0.699**	**0.0168**	**0.887**	**1.88**	**54.5**	**0.24**	**85.9** J												**53500**								
SD-44	MK-SD-44-6.5/8.5	6.5	8.5	11/10/2016	**2.5**	**0.125**	**0.676**	**0.0153**	**0.966**	**2**	**60.6**	**0.28**	**97** J												**44600**								
SD-44	MK-SD-44-8.5/10.5	8.5	10.5	11/10/2016	**0.81**	**0.0387**	**0.279**	**0.0056**	**0.324**	**0.585**	**66.3**	**0.33**	**110** J												**50600**								
SD-44	MK-SD-44-10.5/12.9	10.5	12.9	11/10/2016	**1.75**	**0.0984**	**0.551**	**0.0178**	**0.748**	**1.24**	**76.3**	**0.29**	**110** J												**47600**								

Appendix A
Milwaukee River Downtown Reach - Sediment Analytical Results Summary
Focused Feasibity Study, Milwaukee Estuary AOC, Milwaukee, Wisconsin

					PCB										PAH												
Analyte Group																											
Analyte					Total PCB	Aroclor 1260	Aroclor 1254	Aroclor 1268	Aroclor 1221	Aroclor 1232	Aroclor 1248	Aroclor 1016	Aroclor 1262	Aroclor 1242	Total PAH	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b)-fluoranthene	Benzo(e)pyrene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h)ant hracene
Unit					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
WI CBSQG PEC					1										22.8												
WI CBSQG PEC 3x					3										68.4												
WI CBSQG PEC 5x					5										114												
TSCA					50																						
Location code	Sample ID	Start Depth (feet)	End Depth (feet)	Date	Total PCB	Aroclor 1260	Aroclor 1254	Aroclor 1268	Aroclor 1221	Aroclor 1232	Aroclor 1248	Aroclor 1016	Aroclor 1262	Aroclor 1242	Total PAH	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b)-fluoranthene	Benzo(e)pyrene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h)ant hracene
SD-45	MK-SD-45-0.0/0.5	0	0.5	7/17/2018	**0.31**	0.0222 U	**0.101**	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**0.21**	**20.5**	0.0222 UJ	**0.0508 J**	**0.0374 J**	**0.178 J**	**1.13 J**	**1.59 J**	**2.92 J**	**1.47 J**	**1.46 J**	**0.927 J**	**1.76 J**	**0.347 J**
SD-45	MK-SD-45-0.5/1.5	0.5	1.5	7/17/2018	**0.24**	0.0221 U	**0.0618**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.18**	**27.6**	**0.0265 J**	**0.125 J**	**0.0315 J**	**0.382 J**	**1.91 J**	**2.01 J**	**3.34 J**	**1.64 J**	**1.41 J**	**1.09 J**	**2.49 J**	**0.356 J**
SD-45	MK-SD-45-1.5/2.2	1.5	2.2	7/17/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**133**	**0.197 J**	**0.921 J**	**0.175 J**	**2.51 J**	**10.3 J**	**9.27 J**	**14.9 J**	**7.09 J**	**5.54 J**	**4.82 J**	**12 J**	**1.6 J**
SD-45	MK-SD-45-2.2/3.2	2.2	3.2	7/17/2018	0.011 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U													
SD-45	MK-SD-45-3.2/4.2	3.2	4.2	7/17/2018	0.011 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U													
SD-45	MK-SD-45-4.2/4.7	4.2	4.7	7/17/2018	0.22 U	0.442 U	0.442 U	0.442 U	0.442 U	0.442 U	0.442 U	0.442 U	0.442 U	0.442 U													
SD-45	MK-SD-45-7.2/8.5	7.2	8.5	7/17/2018	0.22 U	0.436 U	0.436 U	0.436 U	0.436 U	0.436 U	0.436 U	0.436 U	0.436 U	0.436 U													
SD-46	MK-SD-46-0.0/0.5	0	0.5	7/18/2018	**0.61**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**0.058 J**	**0.551**	**16.2**	**0.0233**	**0.0998**	**0.0875**	**0.357**	**1.24**	**1.27**	**1.78**	**0.9**	**0.794**	**0.605**	**1.33**	**0.194**
SD-46	MK-SD-46-0.5/1.0	0.5	1	7/18/2018	**0.47**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.465**	**8.9**	0.022 U	**0.0609**	0.022 U	**0.215**	**0.617**	**0.627**	**0.985**	**0.487**	**0.427**	**0.316**	**0.719**	**0.111**
SD-46	MK-SD-46-1.0/2.1	1	2.1	7/18/2018	**0.5**	0.0215 U	0.0215 U	0.0215 U	0.0215 U	0.0215 U	0.0215 U	0.0215 U	0.0215 U	**0.496**													
SD-46	MK-SD-46-1.1/2.1	1.1	2.1	7/30/2018																							
SD-46	MK-SD-46-6.0/7.0	6	7	7/18/2018	**1.8**	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	**1.78**													
SD-46	MK-SD-46-6.0/7.8	6	7.8	7/30/2018																							
SD-46	MK-SD-46-7.0/8.0	7	8	7/18/2018	**4.3**	0.216 U	0.216 U	0.216 U	0.216 U	0.216 U	0.216 U	0.216 U	0.216 U	**4.27**													
SD-47	MK-SD-47-0.0/0.5	0	0.5	7/18/2018	**0.58**	**0.102 J**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**0.477**													
SD-47	MK-SD-47-0.5/1.8	0.5	1.8	7/18/2018	**0.49**	**0.0848**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.404**													
SD-47	MK-SD-47-1.8/2.8	1.8	2.8	7/18/2018	**0.73**	**0.0818 J**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**0.646 J**													
SD-47	MK-SD-47-2.8/3.8	2.8	3.8	7/18/2018	**1.2**	0.218 U	0.218 U	0.218 U	0.218 U	0.218 U	0.218 U	0.218 U	0.218 U	**1.2**													
SD-47	MK-SD-47-3.8/4.8	3.8	4.8	7/18/2018	**3.2**	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	**3.24**													
SD-47	MK-SD-47-4.8/5.3	4.8	5.3	7/18/2018	**3.9**	0.442 U	0.442 U	0.442 U	0.442 U	0.442 U	0.442 U	0.442 U	0.442 U	**3.87**													
SD-47	MK-SD-47-6.8/7.8	6.8	7.8	7/18/2018	**2.6**	0.218 U	0.218 U	0.218 U	0.218 U	0.218 U	0.218 U	0.218 U	0.218 U	**2.64**													
SD-47	MK-SD-47-7.8/8.4	7.8	8.4	7/18/2018	**6.3**	0.432 U	**2.36**	0.432 U	0.432 U	0.432 U	0.432 U	0.432 U	0.432 U	**3.96**													
SD-48	MK-SD-48-0.0/0.5	0	0.5	7/18/2018	**0.27**	**0.053 J**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.22**													
SD-48	MK-SD-48-0.5/1.5	0.5	1.5	7/18/2018	**2.1**	**0.134**	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	**1.97**													
SD-48	MK-SD-48-1.5/2.0	1.5	2	7/18/2018	0.22 U	0.435 U	0.435 U	0.435 U	0.435 U	0.435 U	0.435 U	0.435 U	0.435 U	0.435 U													
SD-48	MK-SD-48-2.2/3.2	2.2	3.2	7/18/2018	**54.7**	**1.73 J**	2.21 U	2.21 U	2.21 U	2.21 U	2.21 U	2.21 U	2.21 U	**53 J**													
SD-48	MK-SD-48-3.2/4.2	3.2	4.2	7/18/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0137 U													
SD-48	MK-SD-48-4.2/5.1	4.2	5.1	7/18/2018	**0.3**	**0.1 J**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.196 J**													
SD-48	MK-SD-48-7.2/8.4	7.2	8.4	7/18/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-49	MK-SD-49-0.0/0.5	0	0.5	7/19/2018	**0.49**	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	**0.49**	**10.3**	**0.017 J**	**0.0588**	**0.0253**	**0.22**	**0.801**	**0.757**	**1.15**	**0.597**	**0.535**	**0.415**	**0.894**	**0.141**
SD-49	MK-SD-49-0.5/1.5	0.5	1.5	7/19/2018	**0.36**	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	**0.364**	**13.9**	**0.0823**	**0.145**	**0.0421**	**0.395**	**1.08**	**0.957**	**1.33**	**0.727**	**0.604**	**0.463**	**1.12**	**0.167**
SD-49	MK-SD-49-1.5/2.1	1.5	2.1	7/19/2018	**0.68**	0.0435 U	0.0435 U	0.0435 U	0.0435 U	0.0435 U	0.0435 U	0.0435 U	0.0435 U	**0.683**													
SD-49	MK-SD-49-5.0/6.0	5	6	7/19/2018	**0.64**	**0.0393 J**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.597 J**													
SD-49	MK-SD-49-6.0/7.0	6	7	7/19/2018	**5.6**	1.11 U	1.11 U	1.11 U	1.11 U	1.11 U	1.11 U	1.11 U	1.11 U	**5.6**													
SD-49	MK-SD-49-7.0/8.4	7	8.4	7/19/2018	**2.6**	**0.193**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**2.42**													
SD-49	MK-SD-49-10.0/11.0	10	11	7/19/2018	**1.2**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**1.16**													
SD-49	MK-SD-49-11.0/12.0	11	12	7/19/2018	**7.3**	**0.516**	0.438 U	0.438 U	0.438 U	0.438 U	0.438 U	0.438 U	0.438 U	**6.8**													
SD-49	MK-SD-49-12.0/13.0	12	13	7/19/2018	**86.1**	10.9 U	10.9 U	10.9 U	10.9 U	10.9 U	10.9 U	10.9 U	10.9 U	**86.1**													
SD-50	MK-SD-50-0.0/0.5	0	0.5	7/19/2018	**0.64**	**0.135 J+**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.504 J+**	0.0221 U	0.0221 U	0.0221 U	**10.7**	0.0222 U	**0.0337**	**0.0183 J**	**0.107**	**0.575**	**0.878**	**1.43**	**0.863**	**0.813**	**0.463**	**0.942**	**0.196**
SD-50	MK-SD-50-0.5/1.5	0.5	1.5	7/19/2018	**1.9**	**0.127**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**1.8 J**	**74.6**	**0.0801**	**0.673**	**0.0463**	**1.6**	**5.07**	**5.03**	**7.91**	**3.81**	**3.39**	**2.65**	**5.77**	**0.933**
SD-50	MK-SD-50-1.5/2.5	1.5	2.5	7/19/2018	**1.9**	**0.161**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**1.69 J**													
SD-50	MK-SD-50-2.5/3.4	2.5	3.4	7/19/2018	**149**	**4.07 J**	4.44 U	4.44 U	4.44 U	4.44 U	4.44 U	4.44 U	4.44 U	**145 J**													
SD-50	MK-SD-50-4.3/5.3	4.3	5.3	7/19/2018	**0.76**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**0.761 J**	0.111 U	0.111 U	0.111 U													
SD-50	MK-SD-50-5.3/6.3	5.3	6.3	7/19/2018	**0.23**	0.0221 U	**0.231 J+**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-50	MK-SD-50-6.3/7.3	6.3	7.3	7/19/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-50	MK-SD-50-7.3/8.3	7.3	8.3	7/19/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-50	MK-SD-50-9.3/9.8	9.3	9.8	7/19/2018	**1**	**0.0694 J**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**0.97 J**													
SD-51	MK-SD-51-0.0/0.5	0	0.5	7/20/2018	**0.37**	**0.0263 J**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.344 J**	**9.7**	**0.019 J**	**0.109**	**0.0201 J**	**0.334**	**0.726**	**0.641**	**0.951**	**0.489**	**0.43**	**0.319**	**0.749**	**0.122**
SD-51	MK-SD-51-0.5/1.1	0.5	1.1	7/20/2018	**1.5**	**0.13**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**1.36 J**	**23.1**	**0.0408 J**	**0.296 J**	**0.0469**	**0.754**	**1.71**	**1.48**	**2.3**	**1.14**	**0.944**	**0.783**	**1.87**	**0.254 J**
SD-51	MK-SD-51-1.8/2.8	1.8	2.8	7/20/2018	**2.5**	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	**2.45**													
SD-51	MK-SD-51-2.8/3.8	2.8	3.8	7/20/2018	**0.61**	**0.0532**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.558**													
SD-51	MK-SD-51-3.8/4.4	3.8	4.4	7/20/2018	**0.74**	**0.0427**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.701**													
SD-51	MK-SD-51-6.8/7.8	6.8	7.8	7/20/2018	**1.1**	**0.0774 J**	0.0434 U	0.0434 U	0.0434 U	0.0434 U	0.0434 U	0.0434 U	0.0434 U	**1.01 J**													
SD-51	MK-SD-51-7.8/8.8	7.8	8.8	7/20/2018	**4.6**	0.441 U	0.441 U	0.441 U	0.441 U	0.441 U	0.441 U	0.441 U	0.441 U	**4.57**													
SD-51	MK-SD-51-8.8/9.8	8.8	9.8	7/20/2018	**15.3**	1.09 U	1.09 U	1.09 U	1.09 U	1.09 U	1.09 U	1.09 U	1.09 U	**15.3**													
SD-51	MK-SD-51-9.8/10.5	9.8	10.5	7/20/2018	**156**	**3.48 J**	11 U	11 U	11 U	11 U	11 U	11 U	11 U	**153**													
SD-51	MK-SD-51-11.8/12.8	11.8	12.8	7/20/2018	**19.3**	**3.16 J**	1.11 U	1.11 U	1.11 U	1.11 U	1.11 U	1.11 U	1.11 U	**16.1 J**													
SD-51	MK-SD-51-12.8/13.8	12.8	13.8	7/20/2018	**0.45**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**0.445**													
SD-51	MK-SD-51-13.8/14.8	13.8	14.8	7/20/2018	0.056 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U													
SD-51	MK-SD-51-14.8/15.8	14.8	15.8	7/20/2018	**0.069**	0.11 U	0.11 U	**0.0688 J**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U													
SD-51	MK-SD-51-16.8/17.8	16.8	17.8	7/20/2018	0.011 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U													
SD-52	MK-SD-52-0.0/0.6	0	0.6	7/20/2018	**0.86**	**0.0523**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.806**	**12.8**	**0.033**	**0.13**	**0.0331**	**0.318**	**0.917**	**1.06**	**1.47**	**0.778**	**0.54**	**0.532**	**1.01**	**0.17**
SD-52	MK-SD-52-5.0/6.0	5	6	7/20/2018	**1.1**	**0.12 J**	0.0439 U	0.0439 U	0.0439 U	0.0439 U	0.0439 U	0.0439 U	0.0439 U	**0.991 J**													
SD-52	MK-SD-52-6.0/7.0	6	7	7/20/2018	**1.7**	**0.153 J**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**1.55 J**													
SD-52	MK-SD-52-7.0/8.0	7	8	7/20/2018	**4.1**	**0.233 J**	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	**3.91 J**													
SD-52	MK-SD-52-8.0/9.4	8	9.4	7/20/2018	**13.9**	**1.82 J**	0.432 U	0.432 U	0.432 U	0.432 U	0.432 U	0.432 U	0.432 U	**12.1 J**													
SD-52	MK-SD-52-10.0/11.0	10	11	7/20/2018	**26.9**	**2.63 J**	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	**24.3 J**													
SD-52	MK-SD-52-11.0/12.0	11	12	7/20/2018	**160**	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	**160 J**													
SD-52	MK-SD-52-12.0/13.1	12	13.1	7/20/2018	**106**	5.48 U	5.48 U	5.48 U	5.48 U	5.48 U	5.48 U	5.48 U	**4.25 J**	**102 J**													
SD-52	MK-SD-52-15.0/16.2	15	16.2	7/20/2018	**0.1**	0.11 U	0.11 U	**0.0321 J**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**0.0686 J**													
SD-52	MK-SD-52-16.2/16.9	16.2	16.9	7/20/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													

Appendix A
Milwaukee River Downtown Reach - Sediment Analytical Results Summary
Focused Feasibity Study, Milwaukee Estuary AOC, Milwaukee, Wisconsin

					PAH						Metals								Metals							Physical Parameters							
Analyte Group																																
Analyte					Fluoranthene	Fluorene	Indeno(1,2,3-Cd)Pyrene	Naphthalene	Phenanthrene	Pyrene	Chromium	Mercury	Lead	Iron	Manganese	Potassium	Sodium	Thallium	Antimony	Beryllium	Cobalt	Calcium	Cyanide	Magnesium	Vanadium	TOC	Gravel	Sand	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Fines
Unit					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	%	%	%	%	%	%
WI CBSQG PEC											110	1.1	130	40000	1100				25													
WI CBSQG PEC 3x											330	3.3	390	120000	3300				75													
WI CBSQG PEC 5x											550	5.5	650	200000	5500				125													
TSCA																																
Location code	Sample ID	Start Depth (feet)	End Depth (feet)	Date	Fluoranthene	Fluorene	Indeno(1,2,3-Cd)Pyrene	Naphthalene	Phenanthrene	Pyrene	Chromium	Mercury	Lead	Iron	Manganese	Potassium	Sodium	Thallium	Antimony	Beryllium	Cobalt	Calcium	Cyanide	Magnesium	Vanadium	TOC	Gravel	Sand	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Fines
SD-45	MK-SD-45-0.0/0.5	0	0.5	7/17/2018	**3.06** J	**0.0917** J	**1.39** J	0.0222 UJ	**1.21** J	**2.85** J	**25.5**	**0.14**	**55.6**													**55300**								
SD-45	MK-SD-45-0.5/1.5	0.5	1.5	7/17/2018	**4.6** J	**0.183** J	**1.38** J	**0.0275** J	**2.19** J	**4.39** J	**41.1**	**0.367**	**145**													**45000**								
SD-45	MK-SD-45-1.5/2.2	1.5	2.2	7/17/2018	**20.9** J	**1.46** J	**5.67** J	**0.249** J	**13.3** J	**21.9** J	**149**	**0.955**	**366**													**82600**								
SD-45	MK-SD-45-2.2/3.2	2.2	3.2	7/17/2018							**78.9**	**1.47**	**452**													**73500**								
SD-45	MK-SD-45-3.2/4.2	3.2	4.2	7/17/2018							**127**	**10.2**	**487**													**50000**								
SD-45	MK-SD-45-4.2/4.7	4.2	4.7	7/17/2018							**106** J	**4.02**	**601** J													**62100**								
SD-45	MK-SD-45-7.2/8.5	7.2	8.5	7/17/2018							**69.1** J	**1.64**	**281** J													**52700**								
SD-46	MK-SD-46-0.0/0.5	0	0.5	7/18/2018	**2.72**	**0.133**	**0.781**	**0.046**	**1.4**	**2.48**	**13.3**	**0.0314** J	**33.1**													**42900**	**3.9**	**92.5**						**3.6**
SD-46	MK-SD-46-0.5/1.0	0.5	1	7/18/2018	**1.6**	**0.0928**	**0.389**	0.022 U	**0.879**	**1.32**	**23**	**0.0656** J	**50.8**													**50600**								
SD-46	MK-SD-46-1.0/2.1	1	2.1	7/18/2018							**14.1**	**0.0318** J	**33.1**													**71600**								
SD-46	MK-SD-46-1.1/2.1	1.1	2.1	7/30/2018																							**10.7**	**89**						**0.3**
SD-46	MK-SD-46-6.0/7.0	6	7	7/18/2018							**28.6**	**0.176**	**123**													**55000**								
SD-46	MK-SD-46-6.0/7.8	6	7.8	7/30/2018																							**0.6**	**58**						**41.4**
SD-46	MK-SD-46-7.0/8.0	7	8	7/18/2018							**53.3**	**0.247**	**9.07**													**67300**								
SD-47	MK-SD-47-0.0/0.5	0	0.5	7/18/2018																						**66900**								
SD-47	MK-SD-47-0.5/1.8	0.5	1.8	7/18/2018																						**51500**								
SD-47	MK-SD-47-1.8/2.8	1.8	2.8	7/18/2018																						**35500**								
SD-47	MK-SD-47-2.8/3.8	2.8	3.8	7/18/2018																						**29900**								
SD-47	MK-SD-47-3.8/4.8	3.8	4.8	7/18/2018																						**66300**								
SD-47	MK-SD-47-4.8/5.3	4.8	5.3	7/18/2018																						**36800**								
SD-47	MK-SD-47-6.8/7.8	6.8	7.8	7/18/2018																						**42900**								
SD-47	MK-SD-47-7.8/8.4	7.8	8.4	7/18/2018																						**42100**								
SD-48	MK-SD-48-0.0/0.5	0	0.5	7/18/2018																						**60400**								
SD-48	MK-SD-48-0.5/1.5	0.5	1.5	7/18/2018																						**61700**								
SD-48	MK-SD-48-1.5/2.0	1.5	2	7/18/2018																						**86400**								
SD-48	MK-SD-48-2.2/3.2	2.2	3.2	7/18/2018																						**80600**								
SD-48	MK-SD-48-3.2/4.2	3.2	4.2	7/18/2018																						**177000**								
SD-48	MK-SD-48-4.2/5.1	4.2	5.1	7/18/2018																						**89200**								
SD-48	MK-SD-48-7.2/8.4	7.2	8.4	7/18/2018																						**85700**								
SD-49	MK-SD-49-0.0/0.5	0	0.5	7/19/2018	**1.87**	**0.0793**	**0.47**	**0.0342**	**0.795**	**1.42**	**11.2** J+	0.0954 U	**25.9**													**21700** J								
SD-49	MK-SD-49-0.5/1.5	0.5	1.5	7/19/2018	**2.39**	**0.195**	**0.485**	**0.121**	**1.48**	**2.08**	**10.9** J+	**0.111**	**36.5**													**28800** J								
SD-49	MK-SD-49-1.5/2.1	1.5	2.1	7/19/2018							**10.9** J+	**0.0329** J	**27.7**													**27900** J								
SD-49	MK-SD-49-5.0/6.0	5	6	7/19/2018							**12.5** J+	**0.0756** J	**34.2**													**22000** J								
SD-49	MK-SD-49-6.0/7.0	6	7	7/19/2018							**120** J+	**0.439**	**372**													**91500** J								
SD-49	MK-SD-49-7.0/8.4	7	8.4	7/19/2018							**33.9** J+	**0.179**	**115**													**36500** J								
SD-49	MK-SD-49-10.0/11.0	10	11	7/19/2018							**22.2** J+	**0.0875** J	**86.2**													**36400** J								
SD-49	MK-SD-49-11.0/12.0	11	12	7/19/2018							**73.3** J+	**0.394**	**195**													**50300** J								
SD-49	MK-SD-49-12.0/13.0	12	13	7/19/2018							**670** J+	**1.32**	**703**													**90200** J								
SD-50	MK-SD-50-0.0/0.5	0	0.5	7/19/2018	**1.55**	**0.0496**	**0.758**	0.0222 U	**0.634**	**1.39**	**27.2** J	**0.171**	**53.5**													**84800**								
SD-50	MK-SD-50-0.5/1.5	0.5	1.5	7/19/2018	**12.5**	**0.799**	**3.43**	**0.157**	**9.28**	**11.5**	**27.2** J	**0.14**	**61.9**													**64500**								
SD-50	MK-SD-50-1.5/2.5	1.5	2.5	7/19/2018							**24.2** J	**0.117**	**92.4**													**42200**								
SD-50	MK-SD-50-2.5/3.4	2.5	3.4	7/19/2018							**490** J	**0.585**	**473**													**75100**								
SD-50	MK-SD-50-4.3/5.3	4.3	5.3	7/19/2018							**166** J	**1.48**	**405**													**75900**								
SD-50	MK-SD-50-5.3/6.3	5.3	6.3	7/19/2018							**338** J	**0.701**	**418**													**100000**								
SD-50	MK-SD-50-6.3/7.3	6.3	7.3	7/19/2018							**448** J	**1.25**	**469**													**88100**								
SD-50	MK-SD-50-7.3/8.3	7.3	8.3	7/19/2018							**225** J	**1.53**	**584**													**89500**								
SD-50	MK-SD-50-9.3/9.8	9.3	9.8	7/19/2018							**93.2** J	**1.29**	**205**													**66400**								
SD-51	MK-SD-51-0.0/0.5	0	0.5	7/20/2018	**1.85**	**0.149**	**0.355**	**0.0199** J	**1.08**	**1.36**	**7.82** J+	0.0974 U	**30.7**													**27800** J								
SD-51	MK-SD-51-0.5/1.1	0.5	1.1	7/20/2018	**4.2**	**0.38** J	**0.792**	**0.0626** J	**2.7**	**3.39**	**17** J+	**0.0894** J	**61.4**													**72100** J								
SD-51	MK-SD-51-1.8/2.8	1.8	2.8	7/20/2018							**16.9**	**0.0664** J	**86.8**													**40800**								
SD-51	MK-SD-51-2.8/3.8	2.8	3.8	7/20/2018							**15.4**	**0.0651** J	**36.4**													**32300**								
SD-51	MK-SD-51-3.8/4.4	3.8	4.4	7/20/2018							**15.1**	**0.0599** J	**88.5**													**18900**								
SD-51	MK-SD-51-6.8/7.8	6.8	7.8	7/20/2018							**15.8**	**0.104**	**46.3**													**41600**								
SD-51	MK-SD-51-7.8/8.8	7.8	8.8	7/20/2018							**84.6**	**0.424**	**271**													**43400**								
SD-51	MK-SD-51-8.8/9.8	8.8	9.8	7/20/2018							**181**	**0.868**	**593**													**48500**								
SD-51	MK-SD-51-9.8/10.5	9.8	10.5	7/20/2018							**516**	**1.71**	**686**													**61200**								
SD-51	MK-SD-51-11.8/12.8	11.8	12.8	7/20/2018							**69.9**	**1.41**	**341**													**94200**								
SD-51	MK-SD-51-12.8/13.8	12.8	13.8	7/20/2018							**119**	**2.68**	**282**													**76100**								
SD-51	MK-SD-51-13.8/14.8	13.8	14.8	7/20/2018							**513**	**1.16**	**375**													**150000**								
SD-51	MK-SD-51-14.8/15.8	14.8	15.8	7/20/2018							**241**	**1.24**	**454**													**117000**								
SD-51	MK-SD-51-16.8/17.8	16.8	17.8	7/20/2018							**8.67**	0.0953 U	**9.19**													**34700**								
SD-52	MK-SD-52-0.0/0.6	0	0.6	7/20/2018	**2.07**	**0.176**	**0.577**	**0.039**	**1.17**	**1.73**	**10.7**	**0.0984**	**39.4**													**41800**								
SD-52	MK-SD-52-5.0/6.0	5	6	7/20/2018							**24.5**	**0.113**	**92.3**													**28200**								
SD-52	MK-SD-52-6.0/7.0	6	7	7/20/2018							**17.3**	**0.114**	**165**													**28200**								
SD-52	MK-SD-52-7.0/8.0	7	8	7/20/2018							**28.3**	**0.204**	**105**													**31200**								
SD-52	MK-SD-52-8.0/9.4	8	9.4	7/20/2018							**64.2**	**0.471**	**272**													**56900**								
SD-52	MK-SD-52-10.0/11.0	10	11	7/20/2018							**95.8**	**0.66**	**627**													**60800**								
SD-52	MK-SD-52-11.0/12.0	11	12	7/20/2018							**583**	**1.53**	**800**													**65700**								
SD-52	MK-SD-52-12.0/13.1	12	13.1	7/20/2018							**49.4**	**1.32**	**105** J													**54000**								
SD-52	MK-SD-52-15.0/16.2	15	16.2	7/20/2018							**558**	**1.28**	**456**													**89700**								
SD-52	MK-SD-52-16.2/16.9	16.2	16.9	7/20/2018							**26.1**	0.0871 U	**17.1**													**29400**								

Appendix A
Milwaukee River Downtown Reach - Sediment Analytical Results Summary
Focused Feasibity Study, Milwaukee Estuary AOC, Milwaukee, Wisconsin

Analyte Group					PCB											PAH												
Analyte					Total PCB	Aroclor 1260	Aroclor 1254	Aroclor 1268	Aroclor 1221	Aroclor 1232	Aroclor 1248	Aroclor 1016	Aroclor 1262	Aroclor 1242	Total PAH	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b)-fluoranthene	Benzo(e)pyrene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h)anthracene
Unit					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
WI CBSQG PEC					1										22.8												
WI CBSQG PEC 3x					3										68.4												
WI CBSQG PEC 5x					5										114												
TSCA					50																						
Location code	Sample ID	Start Depth (feet)	End Depth (feet)	Date	Total PCB	Aroclor 1260	Aroclor 1254	Aroclor 1268	Aroclor 1221	Aroclor 1232	Aroclor 1248	Aroclor 1016	Aroclor 1262	Aroclor 1242	Total PAH	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b)-fluoranthene	Benzo(e)pyrene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h)anthracene
SD-53	MK-SD-53-0.0/0.5	0	0.5	7/23/2018	**9.9**	0.549 U	0.549 U	0.549 U	0.549 U	0.549 U	0.549 U	0.549 U	0.549 U	**9.94**	**56.3**	**0.0882**	**0.601**	**0.0702**	**1.43**	**3.81**	**3.7**	**6.59**	**2.86**	**1.06**	**2.4**	**3.97**	**0.325**
SD-53	MK-SD-53-0.0/2.2	0	2.2	7/30/2018																							
SD-53	MK-SD-53-0.5/1.5	0.5	1.5	7/23/2018	**2.2**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**2.15 J**	**154**	**0.379 J**	**1.4**	**0.215**	**3.86**	**11.1**	**10.7**	**16.6**	**8.24**	**3.28**	**5.64**	**11.6**	**1.18**
SD-53	MK-SD-53-1.5/2.2	1.5	2.2	7/23/2018	**0.46**	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	**0.457**	0.109 U	0.109 U	0.109 U													
SD-53	MK-SD-53-3.0/4.0	3	4	7/23/2018	0.01 U	0.0209 U	0.0209 U	0.0209 U	0.0209 U	0.0209 U	0.0209 U	0.0209 U	0.0209 U	0.0209 U													
SD-53	MK-SD-53-3.0/4.8	3	4.8	7/30/2018																							
SD-53	MK-SD-53-4.0/5.0	4	5	7/23/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-53	MK-SD-53-4.8/5.7	4.8	5.7	7/30/2018																							
SD-53	MK-SD-53-5.0/5.7	5	5.7	7/23/2018	0.055 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U													
SD-53	MK-SD-53-8.0/10.0	8	10	7/30/2018																							
SD-53	MK-SD-53-8.0/9.0	8	9	7/23/2018	0.054 U	0.108 U	0.108 U	0.108 U	0.108 U	0.108 U	0.108 U	0.108 U	0.108 U	0.108 U													
SD-53	MK-SD-53-9.0/10.0	9	10	7/23/2018	0.055 U	0.109 U	0.109 UJ	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U													
SD-53	MK-SD-53-10.0/11.4	10	11.4	7/23/2018	0.055 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U													
SD-54	MK-SD-54-0.0/0.5	0	0.5	7/20/2018	**1.6**	**0.124 J**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**1.43 J**													
SD-54	MK-SD-54-0.5/1.5	0.5	1.5	7/20/2018	**0.83**	**0.047**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.782**													
SD-54	MK-SD-54-1.5/2.5	1.5	2.5	7/20/2018	**2.1**	**0.159 J**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**1.91 J**													
SD-54	MK-SD-54-5.0/6.0	5	6	7/20/2018	**7**	**0.878 J**	0.442 U	0.442 U	0.442 U	0.442 U	0.442 U	0.442 U	0.442 U	**6.11 J**													
SD-54	MK-SD-54-6.0/7.4	6	7.4	7/20/2018	**6.8**	**0.445 J**	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	**6.39 J**													
SD-55	MK-SD-55-0.0/0.5	0	0.5	7/20/2018	**2**	**0.156 J**	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	**1.85 J**													
SD-55	MK-SD-55-0.5/1.5	0.5	1.5	7/20/2018	**61.4**	**2.19 J**	5.44 U	5.44 U	5.44 U	5.44 U	5.44 U	5.44 U	5.44 U	**59.2 J**													
SD-55	MK-SD-55-1.5/2.5	1.5	2.5	7/20/2018	**29.8**	**1.36 J**	2.16 U	2.16 U	2.16 U	2.16 U	2.16 U	2.16 U	2.16 U	**28.4 J**													
SD-55	MK-SD-55-2.5/3.1	2.5	3.1	7/20/2018	**0.16**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**0.164**	0.11 U	0.11 U	0.11 U													
SD-55	MK-SD-55-4.1/5.1	4.1	5.1	7/20/2018	0.055 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U													
SD-55	MK-SD-55-5.1/6.1	5.1	6.1	7/20/2018	**0.84**	0.109 U	0.109 U	**0.838**	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U													
SD-55	MK-SD-55-6.1/7.5	6.1	7.5	7/20/2018	0.055 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U													
SD-56	MK-SD-56-0.0/0.5	0	0.5	7/23/2018	**0.36**	0.109 U	0.109 UJ	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	**0.357**	**5.2**	**0.0114**	**0.057**	**0.0138**	**0.165 J**	**0.346 J**	**0.319 J**	**0.569 J**	**0.285 J**	**0.0768**	**0.205**	**0.454**	**0.0322 J**
SD-56	MK-SD-56-0.5/1.5	0.5	1.5	7/23/2018	**0.56**	0.111 U	0.111 UJ	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**0.559**	**20.2**	**0.0379**	**0.221**	**0.0329**	**0.542**	**1.32**	**1.54**	**2.11**	**0.841**	**0.613**	**0.724**	**1.57**	**0.127**
SD-56	MK-SD-56-1.5/2.2	1.5	2.2	7/23/2018	**1.4**	0.11 U	**0.19 J**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**1.16**													
SD-56	MK-SD-56-5.0/6.0	5	6	7/23/2018	**15.9**	0.11 U	**2.47 J**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**13.4**													
SD-56	MK-SD-56-6.0/7.0	6	7	7/23/2018	**5.9**	0.11 U	**1.13 J**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**4.78**													
SD-56	MK-SD-56-7.0/8.2	7	8.2	7/23/2018	**12**	0.111 U	**2.03 J**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**9.97**													
SD-56	MK-SD-56-10.0/11.0	10	11	7/23/2018	**188**	**5.36 J**	22.1 UJ	22.1 U	22.1 U	22.1 U	22.1 U	22.1 U	22.1 U	**183**													
SD-56	MK-SD-56-11.0/12.0	11	12	7/23/2018	**8.9**	0.111 U	0.111 UJ	0.111 U	0.111 U	0.111 U	**8.87**	0.111 U	0.111 U	0.111 U													
SD-56	MK-SD-56-12.0/13.4	12	13.4	7/23/2018	**1.2**	0.111 U	**0.382 J**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**0.79**													
SD-57	MK-SD-57-0.0/0.5	0	0.5	7/23/2018	**0.21**	0.022 U	0.022 UJ	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.21**	**4.4**	**0.0152**	**0.038**	**0.0183**	**0.108 J**	**0.327 J**	**0.291 J**	**0.501 J**	**0.236 J**	**0.0666**	**0.2**	**0.395**	**0.0306 J**
SD-57	MK-SD-57-0.5/1.5	0.5	1.5	7/23/2018	**1.2**	0.0221 U	**0.147 J**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**1.06**	**56**	**0.117**	**0.456**	**0.0342**	**1.23**	**3.85**	**4.32**	**6.28**	**3.09**	**2.54**	**2.35**	**4.42**	**0.665**
SD-57	MK-SD-57-1.5/2.5	1.5	2.5	7/23/2018	0.011 U	0.0222 U	0.0222 UJ	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-57	MK-SD-57-2.5/3.5	2.5	3.5	7/23/2018	0.011 U	0.0221 U	0.0221 UJ	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-57	MK-SD-57-3.5/4.4	3.5	4.4	7/23/2018	0.011 U	0.022 U	0.022 UJ	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U													
SD-57	MK-SD-57-5.0/6.0	5	6	7/23/2018	**0.017**	0.0221 U	0.0221 UJ	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.017 J**													
SD-57	MK-SD-57-6.0/7.4	6	7.4	7/23/2018	0.011 U	0.0218 U	0.0218 UJ	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U													
SD-58	MK-SD-58-0.0/0.5	0	0.5	7/23/2018	**0.49**	0.0221 U	**0.0576**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.432**	**16.8**	**0.0217**	**0.169**	**0.0119**	**0.358**	**0.907**	**1.23**	**1.79**	**0.869 J+**	**0.755**	**0.616**	**1.35**	**0.189**
SD-58	MK-SD-58-0.0/1.5	0	1.5	7/30/2018																							
SD-58	MK-SD-58-0.5/1.5	0.5	1.5	7/23/2018	**0.83**	0.0444 U	**0.0957**	0.0444 U	0.0444 U	0.0444 U	0.0444 U	0.0444 U	0.0444 U	**0.733**	**89**	**0.109**	**0.523**	**0.0155**	**1.66**	**6.63**	**5.94**	**9.24**	**4.72 J+**	**3.08**	**3.01**	**7.61**	**1.13**
SD-58	MK-SD-58-1.5/2.0	1.5	2	7/23/2018	**0.88**	0.111 U	**0.156**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**0.725**													
SD-58	MK-SD-58-5.0/6.0	5	6	7/23/2018	**8.5**	0.545 U	**1.18**	0.545 U	0.545 U	0.545 U	0.545 U	0.545 U	0.545 U	**7.27**													
SD-58	MK-SD-58-5.5/6.9	5.5	6.9	7/30/2018																							
SD-58	MK-SD-58-6.0/7.2	6	7.2	7/23/2018	**11.4**	1.11 U	**2.48**	1.11 U	1.11 U	1.11 U	1.11 U	1.11 U	1.11 U	**8.94**													
SD-59	MK-SD-59-0.0/0.5	0	0.5	7/23/2018	**0.85**	0.0439 U	**0.0989**	0.0439 U	0.0439 U	0.0439 U	0.0439 U	0.0439 U	0.0439 U	**0.749**													
SD-59	MK-SD-59-0.5/1.5	0.5	1.5	7/23/2018	**0.51**	0.0222 U	**0.0664**	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**0.44**													
SD-59	MK-SD-59-1.5/2.5	1.5	2.5	7/23/2018	**0.78**	0.0443 U	**0.154**	0.0443 U	0.0443 U	0.0443 U	0.0443 U	0.0443 U	0.0443 U	**0.627**													
SD-59	MK-SD-59-2.5/3.2	2.5	3.2	7/23/2018	**1.8**	0.11 U	**0.267**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**1.58**													
SD-59	MK-SD-59-5.0/6.0	5	6	7/23/2018	**0.69**	0.111 U	**0.135**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**0.559**													
SD-59	MK-SD-59-6.0/6.8	6	6.8	7/23/2018	**1.2**	0.111 U	**0.184**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**1.04**													
SD-60	MK-SD-60-0.0/0.5	0	0.5	7/23/2018	**0.36**	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	**0.361**													
SD-60	MK-SD-60-0.5/1.5	0.5	1.5	7/23/2018	**3.1**	0.111 U	**0.613**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**2.51**													
SD-60	MK-SD-60-1.5/2.5	1.5	2.5	7/23/2018	**10.9**	1.1 U	**1.92**	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	**9.02**													
SD-60	MK-SD-60-2.5/3.0	2.5	3	7/23/2018	**52.3**	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	**52.3**													
SD-60	MK-SD-60-5.0/6.3	5	6.3	7/23/2018	**0.16**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.16**													
SD-61	MK-SD-61-0.0/0.5	0	0.5	7/24/2018	**0.32**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.316**	**80.4**	**0.388**	**1.21**	**0.0389**	**2.26**	**5.17**	**4.88**	**6.72**	**3.27 J+**	**2.75**	**2.21**	**5.41**	**0.665**
SD-61	MK-SD-61-0.5/1.5	0.5	1.5	7/24/2018	**0.33**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.328**	**5.7**	**0.0156**	**0.0798**	**0.0116**	**0.143**	**0.384**	**0.4**	**0.635**	**0.346 J+**	**0.282**	**0.196**	**0.541**	**0.0834**
SD-61	MK-SD-61-1.5/2.5	1.5	2.5	7/24/2018	**1.3**	**0.0613**	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	**1.28**													
SD-61	MK-SD-61-2.5/3.4	2.5	3.4	7/24/2018	**1.1**	**0.139**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**1**													
SD-61	MK-SD-61-5.0/6.0	5	6	7/24/2018	**2.6**	**0.341**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**2.21**													
SD-61	MK-SD-61-6.0/7.0	6	7	7/24/2018	**9.3**	**0.9**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**8.38**													
SD-61	MK-SD-61-7.0/8.0	7	8	7/24/2018	**43.4**	**1.14**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**42.3**													
SD-61	MK-SD-61-8.0/8.5	8	8.5	7/24/2018	**1.8**	**0.228**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**1.62**													
SD-61	MK-SD-61-10.0/11.0	10	11	7/24/2018	**0.48**	**0.0652 J**	0.108 U	0.108 U	0.108 U	0.108 U	0.108 U	0.108 U	0.108 U	**0.412**													
SD-61	MK-SD-61-11.0/12.0	11	12	7/24/2018	**0.12**	**0.115**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U													
SD-62	MK-SD-62-0.0/0.5	0	0.5	7/24/2018	**0.43**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.428**	**2.7**	**0.00567 J**	**0.0412**	**0.00763**	**0.0874**	**0.207**	**0.181**	**0.276**	**0.146**	**0.128**	**0.0826**	**0.229**	**0.0371**
SD-62	MK-SD-62-0.5/1.5	0.5	1.5	7/24/2018	**0.57**	**0.0359**	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**0.534**	**5**	**0.0104 J**	**0.0512**	**0.0203**	**0.124**	**0.373**	**0.367**	**0.578**	**0.299**	**0.28**	**0.193**	**0.443**	**0.0807**
SD-62	MK-SD-62-1.5/2.5	1.5	2.5	7/24/2018	**1.6**	**0.122**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**1.48**													
SD-62	MK-SD-62-2.5/3.1	2.5	3.1	7/24/2018	**3.4**	0.109 U	**0.768**	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	**2.6**													
SD-62	MK-SD-62-5.0/6.0	5	6	7/24/2018	**6**	0.11 U	**1.23**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**4.73**													
SD-62	MK-SD-62-6.0/7.0	6	7	7/24/2018	**11.3**	0.111 U	**2.19**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**9.1**													
SD-62	MK-SD-62-7.0/8.1	7	8.1	7/24/2018	**51.7**	0.111 U	**5.81**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**45.9**													
SD-62	MK-SD-62-10.0/10.7	10	10.7	7/24/2018	**0.045**	**0.0445 J**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U													
SD-62	MK-SD-62-10.7/11.1	10.7	11.1	7/24/2018	0.011 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U													

Appendix A
Milwaukee River Downtown Reach - Sediment Analytical Results Summary
Focused Feasibity Study, Milwaukee Estuary AOC, Milwaukee, Wisconsin

Analyte Group					PAH						Metals								Metals								Physical Parameters							
Analyte					Fluoranthene	Fluorene	Indeno(1,2,3-Cd)Pyrene	Naphthalene	Phenanthrene	Pyrene	Chromium	Mercury	Lead	Iron	Manganese	Potassium	Sodium	Thallium	Antimony	Beryllium	Cobalt	Calcium	Cyanide	Magnesium	Vanadium	TOC	Gravel	Sand	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Fines
Unit					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	%	%	%	%	%	%
WI CBSQG PEC											110	1.1	130	40000	1100				25														
WI CBSQG PEC 3x											330	3.3	390	120000	3300				75														
WI CBSQG PEC 5x											550	5.5	650	200000	5500				125														
TSCA																																	
Location code	Sample ID	Start Depth (feet)	End Depth (feet)	Date	Fluoranthene	Fluorene	Indeno(1,2,3-Cd)Pyrene	Naphthalene	Phenanthrene	Pyrene	Chromium	Mercury	Lead	Iron	Manganese	Potassium	Sodium	Thallium	Antimony	Beryllium	Cobalt	Calcium	Cyanide	Magnesium	Vanadium	TOC	Gravel	Sand	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Fines
SD-53	MK-SD-53-0.0/0.5	0	0.5	7/23/2018	**11.9**	**0.802**	**1.06**	**0.0791**	**6.14**	**9.39**	**73.1**	**0.586**	**247**													**56200**								
SD-53	MK-SD-53-0.0/2.2	0	2.2	7/30/2018																							**1.1**	**30.4**						**68.5**
SD-53	MK-SD-53-0.5/1.5	0.5	1.5	7/23/2018	**32.8**	**2.14**	**3.67**	**0.5** J	**16.9**	**23.6**	**101**	**1.12** J-	**312**													**80500**								
SD-53	MK-SD-53-1.5/2.2	1.5	2.2	7/23/2018							**92.7**	**1.1** J-	**299**													**73800**								
SD-53	MK-SD-53-3.0/4.0	3	4	7/23/2018							**18.7**	0.097 U	**27.6**													**36700**								
SD-53	MK-SD-53-3.0/4.8	3	4.8	7/30/2018																							**14.7**	**76.3**						**9**
SD-53	MK-SD-53-4.0/5.0	4	5	7/23/2018							**66.7**	**0.198**	**29.6**													**45000**								
SD-53	MK-SD-53-4.8/5.7	4.8	5.7	7/30/2018																							**0**	**14.4**						**85.6**
SD-53	MK-SD-53-5.0/5.7	5	5.7	7/23/2018							**249**	**0.747**	**302**													**109000**								
SD-53	MK-SD-53-8.0/10.0	8	10	7/30/2018																							**0**	**20.5**						**79.5**
SD-53	MK-SD-53-8.0/9.0	8	9	7/23/2018							**53.9**	**1.21** J-	**361**													**78100**								
SD-53	MK-SD-53-9.0/10.0	9	10	7/23/2018							**233**	**1.7**	**578**													**68100**								
SD-53	MK-SD-53-10.0/11.4	10	11.4	7/23/2018							**61.7**	**1.22** J-	**271**													**57700**								
SD-54	MK-SD-54-0.0/0.5	0	0.5	7/20/2018																						**33000**								
SD-54	MK-SD-54-0.5/1.5	0.5	1.5	7/20/2018																						**143000**								
SD-54	MK-SD-54-1.5/2.5	1.5	2.5	7/20/2018																						**27900**								
SD-54	MK-SD-54-5.0/6.0	5	6	7/20/2018																						**62400**								
SD-54	MK-SD-54-6.0/7.4	6	7.4	7/20/2018																						**88400**								
SD-55	MK-SD-55-0.0/0.5	0	0.5	7/20/2018																						**61300**								
SD-55	MK-SD-55-0.5/1.5	0.5	1.5	7/20/2018																						**65900**								
SD-55	MK-SD-55-1.5/2.5	1.5	2.5	7/20/2018																						**77800**								
SD-55	MK-SD-55-2.5/3.1	2.5	3.1	7/20/2018																						**72300**								
SD-55	MK-SD-55-4.1/5.1	4.1	5.1	7/20/2018																						**84100**								
SD-55	MK-SD-55-5.1/6.1	5.1	6.1	7/20/2018																						**90200**								
SD-55	MK-SD-55-6.1/7.5	6.1	7.5	7/20/2018																						**77700**								
SD-56	MK-SD-56-0.0/0.5	0	0.5	7/23/2018	**1.03**	**0.0774** J	**0.0859**	**0.0116**	**0.564**	**0.903**	**11.1**	**0.0367** J	**27.3**													**31700**								
SD-56	MK-SD-56-0.5/1.5	0.5	1.5	7/23/2018	**3.96**	**0.28**	**0.532**	**0.0393**	**2.41**	**3.25**	**12.9**	**0.042** J	**30.6**													**86900**								
SD-56	MK-SD-56-1.5/2.2	1.5	2.2	7/23/2018							**28.3**	**0.117**	**60.8**													**34700**								
SD-56	MK-SD-56-5.0/6.0	5	6	7/23/2018							**90.9**	**0.331**	**551**													**70000**								
SD-56	MK-SD-56-6.0/7.0	6	7	7/23/2018							**109**	**1.01**	**461**													**56400**								
SD-56	MK-SD-56-7.0/8.2	7	8.2	7/23/2018							**231**	**0.611**	**640**													**45900**								
SD-56	MK-SD-56-10.0/11.0	10	11	7/23/2018							**361**	**1.14**	**655**													**45900**								
SD-56	MK-SD-56-11.0/12.0	11	12	7/23/2018							**299**	**1.8**	**620**													**61300**								
SD-56	MK-SD-56-12.0/13.4	12	13.4	7/23/2018							**623**	**2.69**	**608**													**56400**								
SD-57	MK-SD-57-0.0/0.5	0	0.5	7/23/2018	**0.872**	**0.0514** J	**0.0779**	**0.0223**	**0.442**	**0.724**	**9.3**	**0.036** J	**165**													**30200**								
SD-57	MK-SD-57-0.5/1.5	0.5	1.5	7/23/2018	**9.58**	**0.667**	**2.43**	**0.18**	**6.03**	**7.79**	**72.1**	**0.52**	**228**													**15100**								
SD-57	MK-SD-57-1.5/2.5	1.5	2.5	7/23/2018							**184**	**1.18**	**368**													**44100**								
SD-57	MK-SD-57-2.5/3.5	2.5	3.5	7/23/2018							**319**	**1.84**	**353**													**47500**								
SD-57	MK-SD-57-3.5/4.4	3.5	4.4	7/23/2018							**631**	**0.896**	**169**													**31800**								
SD-57	MK-SD-57-5.0/6.0	5	6	7/23/2018							**44.2**	**0.0744** J	**45.9**													**26700**								
SD-57	MK-SD-57-6.0/7.4	6	7.4	7/23/2018							**1.02**	0.0945 U	**5.12**													**103000**								
SD-58	MK-SD-58-0.0/0.5	0	0.5	7/23/2018	**2.95**	**0.205**	**0.71**	**0.049**	**2.16**	**2.42**	**8.37** J	0.119 U	**17.6**													**65000**								
SD-58	MK-SD-58-0.0/1.5	0	1.5	7/30/2018																							**17.6**	**81.3**						**1.1**
SD-58	MK-SD-58-0.5/1.5	0.5	1.5	7/23/2018	**17**	**0.542**	**3.2**	**0.144**	**10.8**	**13.6**	**9.81** J	0.12 U	**20.7**													**10400**								
SD-58	MK-SD-58-1.5/2.0	1.5	2	7/23/2018							**21.2** J	**0.139** J	**99.4**													**18900**								
SD-58	MK-SD-58-5.0/6.0	5	6	7/23/2018							**55.6** J	**0.202**	**304**													**37100**								
SD-58	MK-SD-58-5.5/6.9	5.5	6.9	7/30/2018																							**12.2**	**32.9**						**54.9**
SD-58	MK-SD-58-6.0/7.2	6	7.2	7/23/2018							**60.6** J	**0.984**	**474**													**51400**								
SD-59	MK-SD-59-0.0/0.5	0	0.5	7/23/2018																						**30400**								
SD-59	MK-SD-59-0.5/1.5	0.5	1.5	7/23/2018																						**33000**								
SD-59	MK-SD-59-1.5/2.5	1.5	2.5	7/23/2018																						**38000**								
SD-59	MK-SD-59-2.5/3.2	2.5	3.2	7/23/2018																						**41000**								
SD-59	MK-SD-59-5.0/6.0	5	6	7/23/2018																						**30500**								
SD-59	MK-SD-59-6.0/6.8	6	6.8	7/23/2018																						**23000**								
SD-60	MK-SD-60-0.0/0.5	0	0.5	7/23/2018																						**54400**								
SD-60	MK-SD-60-0.5/1.5	0.5	1.5	7/23/2018																						**56500**								
SD-60	MK-SD-60-1.5/2.5	1.5	2.5	7/23/2018																						**62400**								
SD-60	MK-SD-60-2.5/3.0	2.5	3	7/23/2018																						**54300**								
SD-60	MK-SD-60-5.0/6.3	5	6.3	7/23/2018																						**22400**								
SD-61	MK-SD-61-0.0/0.5	0	0.5	7/24/2018	**13.9**	**1.3**	**2.65**	**0.99**	**14.5**	**12.1**	**20.6**	**0.0571** J	**37.2**													**20900**								
SD-61	MK-SD-61-0.5/1.5	0.5	1.5	7/24/2018	**0.857**	**0.0867**	**0.255**	**0.0187**	**0.502**	**0.879**	**9.91**	**0.0548** J	**244**													**67600** J								
SD-61	MK-SD-61-1.5/2.5	1.5	2.5	7/24/2018							**36.3**	**0.638**	**104**													**55100**								
SD-61	MK-SD-61-2.5/3.4	2.5	3.4	7/24/2018							**57.2**	**0.525**	**327**													**85300**								
SD-61	MK-SD-61-5.0/6.0	5	6	7/24/2018							**113**	**0.496**	**538**													**71300**								
SD-61	MK-SD-61-6.0/7.0	6	7	7/24/2018							**226**	**0.653** J-	**503**													**75400**								
SD-61	MK-SD-61-7.0/8.0	7	8	7/24/2018							**487**	**4.12** J-	**640**													**87000**								
SD-61	MK-SD-61-8.0/8.5	8	8.5	7/24/2018							**220**	**2.37** J-	**552**													**98600**								
SD-61	MK-SD-61-10.0/11.0	10	11	7/24/2018							**275**	**1.36** J-	**455**													**101000**								
SD-61	MK-SD-61-11.0/12.0	11	12	7/24/2018							**567**	**1.35** J-	**427**													**130000**								
SD-62	MK-SD-62-0.0/0.5	0	0.5	7/24/2018	**0.479**	**0.0458**	**0.112**	**0.0063** J	**0.248**	**0.423**	**13.5**	**0.0381** J	**19.2**													**33200** J								
SD-62	MK-SD-62-0.5/1.5	0.5	1.5	7/24/2018	**0.77**	**0.0677**	**0.238**	**0.0142** J	**0.42**	**0.692**	**16.6**	**0.12**	**192**													**34700**								
SD-62	MK-SD-62-1.5/2.5	1.5	2.5	7/24/2018							**28.2**	**0.526**	**131**													**38800**								
SD-62	MK-SD-62-2.5/3.1	2.5	3.1	7/24/2018							**59.9**	**0.876** J-	**264**													**59100**								
SD-62	MK-SD-62-5.0/6.0	5	6	7/24/2018							**123**	**0.666**	**518**													**83300**								
SD-62	MK-SD-62-6.0/7.0	6	7	7/24/2018							**291**	**0.75**	**560**													**74100**								
SD-62	MK-SD-62-7.0/8.1	7	8.1	7/24/2018							**525** J+	**1.3** J-	**659**													**79000**								
SD-62	MK-SD-62-10.0/10.7	10	10.7	7/24/2018							**698**	**1.07** J-	**437**													**70700**								
SD-62	MK-SD-62-10.7/11.1	10.7	11.1	7/24/2018							**132**	**0.186**	**66.8**													**42300**								

Appendix A
Milwaukee River Downtown Reach - Sediment Analytical Results Summary
Focused Feasibity Study, Milwaukee Estuary AOC, Milwaukee, Wisconsin

Analyte Group					PCB											PAH												
Analyte					Total PCB	Aroclor 1260	Aroclor 1254	Aroclor 1268	Aroclor 1221	Aroclor 1232	Aroclor 1248	Aroclor 1016	Aroclor 1262	Aroclor 1242	Total PAH	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b)-fluoranthene	Benzo(e)pyrene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h)anthracene
Unit					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
WI CBSQG PEC					1										22.8												
WI CBSQG PEC 3x					3										68.4												
WI CBSQG PEC 5x					5										114												
TSCA					50																						
Location code	Sample ID	Start Depth (feet)	End Depth (feet)	Date	Total PCB	Aroclor 1260	Aroclor 1254	Aroclor 1268	Aroclor 1221	Aroclor 1232	Aroclor 1248	Aroclor 1016	Aroclor 1262	Aroclor 1242	Total PAH	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b)-fluoranthene	Benzo(e)pyrene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h)anthracene
SD-63	MK-SD-63-0.0/0.5	0	0.5	7/24/2018	**0.37**	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	**0.372**	**39.7**	**0.171**	**0.577**	**0.048**	**1.11**	**2.85**	**2.9**	**3.89**	**1.31**	**1.19**	**0.918**	**3.04**	**0.379**
SD-63	MK-SD-63-0.5/1.8	0.5	1.8	7/24/2018	**23.2**	0.11 U	**1.51**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**21.7**	**106**	**0.113**	**0.679**	**0.0632**	**2.49**	**7.37**	**7.11** J	**11.1**	**5.2** J	**3.79** J	**3.93** J	**8.57**	**0.663**
SD-63	MK-SD-63-5.0/6.0	5	6	7/24/2018	**0.35**	**0.0599** J	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**0.295**	**130**	**0.36**	**0.924**	**0.247**	**3.08**	**8.96**	**8.46**	**12.6**	**7.08**	**5.65**	**4.15**	**11.2**	**1.67**
SD-63	MK-SD-63-6.0/7.0	6	7	7/24/2018	0.055 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**122**	**0.249**	**0.885**	**0.251**	**2.43**	**9.15**	**8.89**	**14.2**	**7.39**	**6.05**	**4.39**	**11**	**1.9**
SD-63	MK-SD-63-7.0/7.9	7	7.9	7/24/2018	0.056 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**56.4**	**0.172**	**0.48**	**0.104** J	**1.26**	**4.02**	**3.51**	**5.69**	**2.96**	**2.34**	**2.06**	**4.64**	**0.779**
SD-63	MK-SD-63-10.0/11.0	10	11	7/24/2018	0.055 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**33.9**	**0.222**	**0.404**	**0.125**	**0.876**	**2.23**	**1.92**	**2.77**	**1.51**	**1.28**	**0.945**	**2.59**	**0.397**
SD-63	MK-SD-63-11.0/12.0	11	12	7/24/2018	0.011 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**5**	**0.0506**	**0.0787**	**0.016**	**0.122**	**0.279**	**0.247**	**0.34**	**0.184**	**0.164**	**0.112**	**0.289**	**0.046**
SD-63	MK-SD-63-12.0/13.0	12	13	7/24/2018	0.011 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	**0.2**	**0.00633** J	**0.00447** J-	0.0022 UJ	**0.00319** J-	**0.00613**	**0.00556**	**0.00845**	**0.00469**	**0.00456**	**0.00316**	**0.00665**	0.0022 U
SD-64	MK-SD-64-0.0/0.5	0	0.5	7/24/2018	**0.22**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.216**	**6.6**	**0.00931**	**0.0866**	**0.012**	**0.167**	**0.495**	**0.474**	**0.741**	**0.378**	**0.307**	**0.237**	**0.564**	**0.0953**
SD-64	MK-SD-64-0.5/1.5	0.5	1.5	7/24/2018	**0.8**	**0.0606** J	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	**0.744**	**25**	**0.0939**	**0.66** J	**0.0225**	**0.865** J	**1.65** J	**1.46** J	**1.98** J	**1.02** J	**0.866** J	**0.741** J	**1.76** J	**0.232** J
SD-64	MK-SD-64-1.5/2.5	1.5	2.5	7/24/2018	**1.2**	**0.234**	0.0429 U	0.0429 U	0.0429 U	0.0429 U	0.0429 U	0.0429 U	0.0429 U	**1**	**19.1**	**0.0353**	**0.155**	**0.0514**	**0.347**	**1.37**	**1.37**	**2.18**	**1.15**	**1.01**	**0.648**	**1.68**	**0.291**
SD-64	MK-SD-64-5.0/6.0	5	6	7/24/2018	**4.5**	**0.487**	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	**3.97**	**11.9**	**0.0379**	**0.195**	**0.0308**	**0.302**	**0.79**	**0.667**	**1.08**	**0.548**	**0.43**	**0.317**	**0.907**	**0.128**
SD-64	MK-SD-64-6.0/7.2	6	7.2	7/24/2018	**4.2**	**0.469**	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	**3.7**	**19.6**	**0.036**	**0.258**	**0.0445**	**0.455**	**1.2**	**1.07**	**1.81**	**0.925**	**0.811**	**0.535**	**1.5**	**0.216**
SD-64	MK-SD-64-10.0/11.0	10	11	7/24/2018	**5.1**	**1.15**	0.437 U	0.437 U	0.437 U	0.437 U	0.437 U	0.437 U	0.437 U	**3.95**	**196**	**0.23**	**1.69**	**0.272**	**3.73**	**11.6**	**9.52**	**26.2**	**8.04**	**6.04**	**5.81**	**19.3**	**2.07**
SD-64	MK-SD-64-11.0/12.0	11	12	7/24/2018	**1**	0.218 U	0.218 U	**0.143** J	0.218 U	0.218 U	0.218 U	0.218 U	0.218 U	**0.881**	**133**	**0.312**	**0.884**	**0.165**	**2.26**	**8.09**	**7.29**	**11.6**	**6.16**	**4.74**	**3.53**	**10.6**	**1.49**
SD-64	MK-SD-64-12.0/12.5	12	12.5	7/24/2018	0.055 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**73.8**	**0.206**	**0.599**	**0.131**	**1.6**	**5.25**	**4.51**	**7.12**	**3.82**	**3.06**	**2.56**	**6.61**	**0.957**
SD-64	MK-SD-64-12.5/12.7	12.5	12.7	7/24/2018	0.011 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	**1.2**	**0.0434** J	**0.0544**	0.0443 U	0.0443 U	**0.0445**	0.0443 U	**0.0535**	0.0439 U	0.0443 U	0.0443 U	**0.0537**	0.0443 U
SD-65	MK-SD-65-0.0/0.5	0	0.5	7/24/2018	**0.87**	**0.138**	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**0.735**	**17**	**0.0546**	**0.144**	**0.0472**	**0.743**	**1.42**	**1.08**	**1.49**	**0.791**	**0.635**	**0.48**	**1.39**	**0.198**
SD-65	MK-SD-65-0.5/1.5	0.5	1.5	7/24/2018	**0.37**	**0.0434**	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	**0.324**	**9.9**	**0.0201** J	**0.0789**	**0.0278**	**0.189**	**0.704**	**0.687**	**1.11**	**0.598**	**0.52**	**0.346**	**0.862**	**0.136**
SD-65	MK-SD-65-0.7/2.7	0.7	2.7	7/30/2018																							
SD-65	MK-SD-65-1.5/2.7	1.5	2.7	7/24/2018	**2**	**0.191**	0.108 U	0.108 U	0.108 U	0.108 U	0.108 U	0.108 U	0.108 U	**1.79**													
SD-65	MK-SD-65-5.0/6.0	5	6	7/24/2018	**69**	**2.02** J	5.49 U	5.49 U	5.49 U	5.49 U	5.49 U	5.49 U	5.49 U	**67**													
SD-65	MK-SD-65-6.0/7.0	6	7	7/24/2018	**5.2**	**0.797**	0.219 U	0.219 U	0.219 U	0.219 U	0.219 U	0.219 U	0.219 U	**4.43**													
SD-65	MK-SD-65-7.0/8.0	7	8	7/24/2018	**2.1**	**0.441**	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	**1.67**													
SD-65	MK-SD-65-7.0/9.0	7	9	7/30/2018																							
SD-65	MK-SD-65-8.0/9.0	8	9	7/24/2018	**0.25**	**0.026** J-	**0.0218** R	**0.0218** R	**0.0218** R	**0.0218** R	**0.0218** R	**0.0218** R	**0.0218** R	**0.0677** J-													
SD-65	MK-SD-65-10.0/11.4	10	11.4	7/24/2018	**0.064**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**0.0642** J													
SD-65	MK-SD-65-11.4/11.5	11.4	11.5	7/24/2018	0.011 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U													
SD-66	MK-SD-66-0.0/0.5	0	0.5	7/24/2018	**0.47**	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**0.472**	**10**	**0.0124**	**0.0948**	**0.00431**	**0.329**	**0.742**	**0.754**	**0.992**	**0.529** J+	**0.452**	**0.476**	**0.887**	**0.109**
SD-66	MK-SD-66-0.5/1.5	0.5	1.5	7/24/2018	**0.4**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.398**	**10**	**0.0282**	**0.198**	**0.00627**	**0.443**	**0.627**	**0.517**	**0.719**	**0.378** J+	**0.328**	**0.239**	**0.652**	**0.103**
SD-66	MK-SD-66-1.5/2.5	1.5	2.5	7/24/2018	**0.28**	**0.0287**	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	**0.256**													
SD-66	MK-SD-66-2.5/3.1	2.5	3.1	7/24/2018	**0.47**	**0.0299**	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**0.444**													
SD-66	MK-SD-66-5.0/6.0	5	6	7/24/2018	**2**	**0.249**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**1.77**													
SD-66	MK-SD-66-6.0/7.0	6	7	7/24/2018	**28.9**	**1.02**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**27.9**													
SD-66	MK-SD-66-7.0/8.0	7	8	7/24/2018	**8**	**0.481** J	0.107 U	0.107 U	0.107 U	0.107 U	0.107 U	0.107 U	0.107 U	**7.53**													
SD-66	MK-SD-66-8.0/8.5	8	8.5	7/24/2018	**4.8**	0.108 U	**2.67**	0.108 U	0.108 U	0.108 U	0.108 U	0.108 U	0.108 U	**2.12**													
SD-67	MK-SD-67-0.0/0.5	0	0.5	7/25/2018	**0.53**	**0.0205** J	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.511**													
SD-67	MK-SD-67-0.5/1.5	0.5	1.5	7/25/2018	**0.4**	**0.0111** J	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**0.384**													
SD-67	MK-SD-67-1.5/2.2	1.5	2.2	7/25/2018	**0.55**	0.0222 U	**0.0849**	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**0.462**													
SD-67	MK-SD-67-5.0/6.2	5	6.2	7/25/2018	**2.8**	0.0221 U	**0.297**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**2.46**													
SD-68	MK-SD-68-0.0/0.5	0	0.5	7/25/2018	**0.35**	**0.0216** J	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.332**													
SD-68	MK-SD-68-0.5/1.5	0.5	1.5	7/25/2018	**0.56**	0.0222 U	**0.0877**	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**0.468**													
SD-68	MK-SD-68-1.5/2.5	1.5	2.5	7/25/2018	**1.6**	0.0218 U	**0.262**	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	**1.33**													
SD-68	MK-SD-68-2.5/3.0	2.5	3	7/25/2018	**2.2**	0.0221 U	**0.345**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**1.88**													
SD-69	MK-SD-69-0.0/0.5	0	0.5	7/25/2018	**0.53**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.528**	**24**	**0.0366** J-	**0.347**	**0.0356**	**0.724**	**1.75**	**1.49**	**2.18**	**1.04**	**0.793**	**0.664**	**1.76**	**0.247**
SD-69	MK-SD-69-0.5/1.5	0.5	1.5	7/25/2018	**0.82**	0.0439 U	**0.0984**	0.0439 U	0.0439 U	0.0439 U	0.0439 U	0.0439 U	0.0439 U	**0.722**	**28.8**	**0.137** J-	**0.464**	**0.0526**	**0.761**	**2.04**	**1.91**	**2.81**	**1.31**	**1.02**	**0.95**	**2.21**	**0.307**
SD-69	MK-SD-69-5.0/6.1	5	6.1	7/25/2018	**0.8**	0.0219 U	**0.214**	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**0.588**													
SD-69	MK-SD-69-10.0/11.0	10	11	7/25/2018	**5.8**	0.109 U	**0.98**	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	**4.8**													
SD-69	MK-SD-69-11.0/12.3	11	12.3	7/25/2018	**55.6**	0.109 U	**7.02**	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	**48.6**													
SD-69	MK-SD-69-15.0/16.0	15	16	7/25/2018	**9.6**	0.109 U	**1.63**	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	**7.99**													
SD-69	MK-SD-69-16.0/17.1	16	17.1	7/25/2018	**0.036**	**0.0361** J	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U													
SD-70	MK-SD-70-0.0/0.5	0	0.5	7/26/2018	**0.59**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.591**	**3.3**	0.0222 U	**0.0466**	0.0222 U	**0.113**	**0.221**	**0.211**	**0.322**	**0.163**	**0.0622**	**0.121**	**0.271**	**0.0226**
SD-70	MK-SD-70-0.0/2.0	0	2	7/30/2018																							
SD-70	MK-SD-70-0.5/1.5	0.5	1.5	7/26/2018	**0.72**	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**0.718**	**48.6**	**0.138**	**0.918**	**0.025**	**1.49**	**3.14**	**3.11**	**4.64**	**2.34**	**0.798**	**1.99**	**3.81**	**0.294**
SD-70	MK-SD-70-1.5/2.5	1.5	2.5	7/26/2018	**0.59**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.588**	**7.9**	0.022 U	**0.0491**	**0.0293**	**0.177**	**0.588**	**0.616**	**0.955**	**0.484**	**0.171**	**0.422**	**0.695**	**0.0589**
SD-70	MK-SD-70-2.5/3.7	2.5	3.7	7/26/2018	**0.59**	**0.306**	0.11 U	0.11 UJ	0.11 U	0.11 U	0.11 U	0.11 U	0.11 UJ	**0.281**	**25.9**	**0.0625**	**0.271**	**0.0321**	**0.822**	**2.03**	**1.63**	**2.27**	**1.24**	**0.522**	**1.04**	**2.28**	0.044 U
SD-70	MK-SD-70-5.0/6.0	5	6	7/26/2018	**3.2**	0.11 U	**0.539**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**2.69**	**54**	**0.109**	**0.535**	**0.0856**	**1.33**	**4.22**	**3.59**	**5.54**	**2.88**	**1.06**	**2.26**	**5.03**	**0.376**
SD-70	MK-SD-70-5.0/7.0	5	7	7/30/2018																							
SD-70	MK-SD-70-6.0/7.0	6	7	7/26/2018	**4.3**	0.443 U	0.443 U	0.443 UJ	0.443 U	0.443 U	0.443 U	0.443 U	0.443 UJ	**4.28**	**44.7**	**0.0747**	**0.54**	**0.0668**	**1.22**	**3.34**	**2.98**	**4.34**	**2.28**	**0.862**	**1.73**	**3.85**	**0.3**
SD-70	MK-SD-70-7.0/8.0	7	8	7/26/2018	**4.5**	0.22 U	0.22 U	0.22 UJ	0.22 U	0.22 U	0.22 U	0.22 U	0.22 UJ	**4.52**	**31.7**	**0.063**	**0.327**	**0.079**	**0.674**	**2.23**	**2.13**	**3.67**	**1.85**	**0.606**	**1.4**	**2.9**	**0.222**
SD-70	MK-SD-70-8.0/9.0	8	9	7/26/2018	**2.8**	0.441 U	0.441 U	0.441 UJ	0.441 U	0.441 U	0.441 U	0.441 U	0.441 UJ	**2.83**	**54.3**	**0.0898**	**0.693**	**0.106**	**1.47**	**3.53**	**3.55**	**6.05**	**3.01**	**1.04**	**2.58**	**4.69**	**0.332**
SD-70	MK-SD-70-10.0/11.0	10	11	7/19/2018	**5.2**	**0.296** J	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	**4.87** J	**51.8**	**0.174**	**0.874**	**0.0354**	**1.64**	**3.44**	**2.82**	**4.75**	**2.28**	**0.616**	**1.99**	**4.01**	**0.26**
SD-70	MK-SD-70-10.0/12.0	10	12	7/30/2018																							
SD-70	MK-SD-70-11.0/12.0	11	12	7/26/2018	**6**	**0.42** J	0.439 U	0.439 U	0.439 U	0.439 U	0.439 U	0.439 U	0.439 U	**5.6** J	**30.8**	**0.0452**	**0.278**	**0.039**	**0.641**	**2.16**	**2.25**	**3.76**	**1.83**	**0.582**	**1.59**	**2.6**	**0.195**
SD-70	MK-SD-70-12.0/13.0	12	13	7/26/2018	**5.3**	**0.576** J	0.443 U	0.443 U	0.443 U	0.443 U	0.443 U	0.443 U	0.443 U	**4.72** J	**20.5**	**0.0271**	**0.157**	**0.0207** J	**0.372**	**1.37**	**1.37**	**2.53**	**1.21**	**0.354**	**0.975**	**1.8**	**0.127**
SD-70	MK-SD-70-13.0/14.2	13	14.2	7/26/2018	**5.4**	0.551 U	0.551 U	0.551 UJ	0.551 U	0.551 U	0.551 U	0.551 U	0.551 UJ	**5.38**	**64.6**	**0.0705**	**0.596**	**0.0804**	**1.27**	**4.57**	**4.28**	**6.39**	**3.64**	**1.46**	**2.73**	**5.4**	**0.452**
SD-70	MK-SD-70-15.0/16.0	15	16	7/26/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**171**	**0.594**	**1.61**	**0.221**	**4.76**	**12.6**	**10.8**	**17.1**	**9.16**	**3.46**	**7.01**	**16.1**	0.0439 U
SD-70	MK-SD-70-15.0/17.0	15	17	7/30/2018																							
SD-70	MK-SD-70-16.0/17.0	16	17	7/26/2018	0.011 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**63.8**	**0.253**	**0.653**	**0.12**	**1.63**	**4.93**	**3.94**	**6.03**	**3.28**	**1.32**	**3.02**	**6**	**0.484**
SD-70	MK-SD-70-17.0/18.4	17	18.4	7/26/2018	0.011 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	**91.9**	**0.42** J	**0.955**	**0.162** J	**2.57**	**6.73**	**5.68**	**8.53**	**4.69**	**1.73**	**4.31**	**8.48**	**0.646**

Appendix A
Milwaukee River Downtown Reach - Sediment Analytical Results Summary
Focused Feasibity Study, Milwaukee Estuary AOC, Milwaukee, Wisconsin

Analyte Group					PAH						Metals								Metals									Physical Parameters							
Analyte					Fluoranthene	Fluorene	Indeno(1,2,3-Cd)Pyrene	Naphthalene	Phenanthrene	Pyrene	Chromium	Mercury	Lead	Iron	Manganese	Potassium	Sodium	Thallium	Antimony	Beryllium	Cobalt	Calcium	Cyanide	Magnesium	Vanadium	TOC	Gravel	Sand	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Fines
Unit					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	%	%	%	%	%	%
WI CBSQG PEC											110	1.1	130	40000	1100				25														
WI CBSQG PEC 3x											330	3.3	390	120000	3300				75														
WI CBSQG PEC 5x											550	5.5	650	200000	5500				125														
TSCA																																	
Location code	Sample ID	Start Depth (feet)	End Depth (feet)	Date	Fluoranthene	Fluorene	Indeno(1,2,3-Cd)Pyrene	Naphthalene	Phenanthrene	Pyrene	Chromium	Mercury	Lead	Iron	Manganese	Potassium	Sodium	Thallium	Antimony	Beryllium	Cobalt	Calcium	Cyanide	Magnesium	Vanadium	TOC	Gravel	Sand	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Fines
SD-63	MK-SD-63-0.0/0.5	0	0.5	7/24/2018	7.94	0.598	1.07	0.267	6.09	5.32	127	0.053 J	50													42700								
SD-63	MK-SD-63-0.5/1.8	0.5	1.8	7/24/2018	22.7	0.979	3.96 J	0.128	13.1	13.8	161	0.981 J-	231													87100								
SD-63	MK-SD-63-5.0/6.0	5	6	7/24/2018	25.3	1.61	4.95	0.885	12.4	20.3	403	1.24 J-	404													97900								
SD-63	MK-SD-63-6.0/7.0	6	7	7/24/2018	21	1.52	5.33	0.853	11.5	15.4	204	1.17 J-	401													93700								
SD-63	MK-SD-63-7.0/7.9	7	7.9	7/24/2018	10.4	0.853	2.22	1.11	6.23	7.56	169	1.03 J-	359													87900								
SD-63	MK-SD-63-10.0/11.0	10	11	7/24/2018	5.41	0.575	1.15	3.47	3.73	4.28	604	2.84 J-	342													80400								
SD-63	MK-SD-63-11.0/12.0	11	12	7/24/2018	0.588	0.0777	0.139	1.17	0.471	0.578	257	0.412	50.2													54100								
SD-63	MK-SD-63-12.0/13.0	12	13	7/24/2018	0.0156 J-	0.00299 J-	0.00361	0.0359 J	0.0751 J	0.0142 J-	5.68	0.0879 U	4.63													92300								
SD-64	MK-SD-64-0.0/0.5	0	0.5	7/24/2018	1.09	0.0865	0.292	0.0186	0.577	0.948	11.3 J	0.0296 J	15.6 J													36700								
SD-64	MK-SD-64-0.5/1.5	0.5	1.5	7/24/2018	4.6 J	0.567 J	0.828 J	0.262	3.87 J	3.53 J	9.13	0.0322 J	34.9													4520 J								
SD-64	MK-SD-64-1.5/2.5	1.5	2.5	7/24/2018	3.24	0.21	0.92	0.0386	1.73	2.71	22.6	1.47	76.7													33600								
SD-64	MK-SD-64-5.0/6.0	5	6	7/24/2018	2.39	0.238	0.402	0.0341	1.58	1.85	62.1	0.387	275													42700								
SD-64	MK-SD-64-6.0/7.2	6	7.2	7/24/2018	4.04	0.331	0.743	0.0337	2.62	3.01	112	0.452	386													66700								
SD-64	MK-SD-64-10.0/11.0	10	11	7/24/2018	43.6	2.54	5.9	0.199	11.2	38.4	406	2.08	471													74500								
SD-64	MK-SD-64-11.0/12.0	11	12	7/24/2018	31.4	1.48	4.44	0.744	7.55	30.1	393	1.45	404													97600								
SD-64	MK-SD-64-12.0/12.5	12	12.5	7/24/2018	12.9	0.958	2.68	0.638	5.22	15	484	3.67	405													99200								
SD-64	MK-SD-64-12.5/12.7	12.5	12.7	7/24/2018	0.229	0.0583	0.0443 U	0.161	0.148	0.162	7.5	0.0957 U	9.43																					
SD-65	MK-SD-65-0.0/0.5	0	0.5	7/24/2018	3.22	0.236	0.598	0.0515	1.95	2.52	6.82	0.0305 J	18.1													48400								
SD-65	MK-SD-65-0.5/1.5	0.5	1.5	7/24/2018	1.82	0.106	0.464	0.0213 J	0.785	1.46	16.9	0.118	61.1													55700								
SD-65	MK-SD-65-0.7/2.7	0.7	2.7	7/30/2018																							1	25.1					75.9
SD-65	MK-SD-65-1.5/2.7	1.5	2.7	7/24/2018							91.9	0.428	216													64900								
SD-65	MK-SD-65-5.0/6.0	5	6	7/24/2018							390	1.79	432													86800								
SD-65	MK-SD-65-6.0/7.0	6	7	7/24/2018							188	1.43	371													74900								
SD-65	MK-SD-65-7.0/8.0	7	8	7/24/2018							162	0.829	344													91000								
SD-65	MK-SD-65-7.0/9.0	7	9	7/30/2018																							0	13.2					86.8
SD-65	MK-SD-65-8.0/9.0	8	9	7/24/2018							189	1.86	289													58300								
SD-65	MK-SD-65-10.0/11.4	10	11.4	7/24/2018							258	2.71	341													92900								
SD-65	MK-SD-65-11.4/11.5	11.4	11.5	7/24/2018							15.8	0.0677 J	20																					
SD-66	MK-SD-66-0.0/0.5	0	0.5	7/24/2018	1.87	0.0994	0.398	0.0231	0.681	1.58	9.92	0.0995 U	20													42600								
SD-66	MK-SD-66-0.5/1.5	0.5	1.5	7/24/2018	2.07	0.299	0.29	0.0304	1.3	1.74	10.2	0.0465 J	19													20200								
SD-66	MK-SD-66-1.5/2.5	1.5	2.5	7/24/2018							15.8	0.0929 J	69.4													24300								
SD-66	MK-SD-66-2.5/3.1	2.5	3.1	7/24/2018							14.2	0.107	59.2													27500								
SD-66	MK-SD-66-5.0/6.0	5	6	7/24/2018							1010	0.48	536													52600								
SD-66	MK-SD-66-6.0/7.0	6	7	7/24/2018							699	1.49 J-	1140													87200								
SD-66	MK-SD-66-7.0/8.0	7	8	7/24/2018							1080	10.7 J-	864													98000								
SD-66	MK-SD-66-8.0/8.5	8	8.5	7/24/2018							2250	2.67 J-	859													103000								
SD-67	MK-SD-67-0.0/0.5	0	0.5	7/25/2018																						49200 J								
SD-67	MK-SD-67-0.5/1.5	0.5	1.5	7/25/2018																						65200 J								
SD-67	MK-SD-67-1.5/2.2	1.5	2.2	7/25/2018																						19700 J								
SD-67	MK-SD-67-5.0/6.2	5	6.2	7/25/2018																						20300 J								
SD-68	MK-SD-68-0.0/0.5	0	0.5	7/25/2018																						15900								
SD-68	MK-SD-68-0.5/1.5	0.5	1.5	7/25/2018																						31600								
SD-68	MK-SD-68-1.5/2.5	1.5	2.5	7/25/2018																						57200								
SD-68	MK-SD-68-2.5/3.0	2.5	3	7/25/2018																						57100								
SD-69	MK-SD-69-0.0/0.5	0	0.5	7/25/2018	4.86	0.465	0.808	0.046 J-	3.61	3.15	7.72	0.0378 J	20.4													38000								
SD-69	MK-SD-69-0.5/1.5	0.5	1.5	7/25/2018	5.53	0.483	1.04	0.298 J-	3.73	3.71	10.3	0.0644 J	410													27400								
SD-69	MK-SD-69-5.0/6.1	5	6.1	7/25/2018							17.5	0.0762	87.3													36700								
SD-69	MK-SD-69-10.0/11.0	10	11	7/25/2018							89.7	0.336	447													74100								
SD-69	MK-SD-69-11.0/12.3	11	12.3	7/25/2018							1090	0.713	520													98100								
SD-69	MK-SD-69-15.0/16.0	15	16	7/25/2018							925	1.14 J-	651													112000								
SD-69	MK-SD-69-16.0/17.1	16	17.1	7/25/2018							282	0.794 J-	414													97400								
SD-70	MK-SD-70-0.0/0.5	0	0.5	7/26/2018	0.723	0.0528	0.0685	0.0222 U	0.336	0.556	13.6	0.0438 J-	16.5													40600								
SD-70	MK-SD-70-0.0/2.0	0	2	7/30/2018																							3.6	94.3					2.1
SD-70	MK-SD-70-0.5/1.5	0.5	1.5	7/26/2018	9.08	0.896	0.925	0.376	7.4	7.26	12.8	0.0564 J-	29.5													18800								
SD-70	MK-SD-70-1.5/2.5	1.5	2.5	7/26/2018	1.48	0.0719	0.189	0.028	0.643	1.22	15.9	0.0861 J-	51.8													25200								
SD-70	MK-SD-70-2.5/3.7	2.5	3.7	7/26/2018	4.5	0.394	0.566	0.121	3.21	4.89	53.6	0.192 J-	144													48700								
SD-70	MK-SD-70-5.0/6.0	5	6	7/26/2018	10.5	0.734	1.16	0.112	6.04	8.45	147	0.344 J-	349													78300								
SD-70	MK-SD-70-5.0/7.0	5	7	7/30/2018																							3.3	26.3					70.4
SD-70	MK-SD-70-6.0/7.0	6	7	7/26/2018	8.87	0.672	0.968	0.119	5.36	7.11	161	0.725 J-	373													74500								
SD-70	MK-SD-70-7.0/8.0	7	8	7/26/2018	5.7	0.457	0.667	0.0572	3.66	4.96	196	0.508 J-	478													86800								
SD-70	MK-SD-70-8.0/9.0	8	9	7/26/2018	10.6	0.894	1.14	0.0956	5.96	8.43	409	0.432 J-	832													93100								
SD-70	MK-SD-70-10.0/11.0	10	11	7/19/2018	10.2	1.06	0.721	0.366	8.06	8.54	128	0.304 J-	234													34400								
SD-70	MK-SD-70-10.0/12.0	10	12	7/30/2018																							2.9	29.2					67.9
SD-70	MK-SD-70-11.0/12.0	11	12	7/26/2018	5.74	0.348	0.638	0.0484	3.28	4.74	25.7	0.526 J-	166													74800								
SD-70	MK-SD-70-12.0/13.0	12	13	7/26/2018	4.04	0.21	0.41	0.032	2.18	3.29	67.6	0.506 J-	339													65300								
SD-70	MK-SD-70-13.0/14.2	13	14.2	7/26/2018	13.2	0.782	1.56	0.0824 J	7.54	10.5	226	0.424 J-	577													78600								
SD-70	MK-SD-70-15.0/16.0	15	16	7/26/2018	36.2	2.54	3.82	1.11	19.6	24.7	402	1.32 J-	772													128000								
SD-70	MK-SD-70-15.0/17.0	15	17	7/30/2018																							4.4	32.8					62.8
SD-70	MK-SD-70-16.0/17.0	16	17	7/26/2018	11.9	1.06	1.45	0.712	7.54	9.48	730	1.69 J-	485													92100								
SD-70	MK-SD-70-17.0/18.4	17	18.4	7/26/2018	17.1	1.65	1.91	0.988	11.6	13.7	1080	2.33 J-	826													100000								

Appendix A
Milwaukee River Downtown Reach - Sediment Analytical Results Summary
Focused Feasibity Study, Milwaukee Estuary AOC, Milwaukee, Wisconsin

Analyte Group					PCB											PAH												
Analyte					Total PCB	Aroclor 1260	Aroclor 1254	Aroclor 1268	Aroclor 1221	Aroclor 1232	Aroclor 1248	Aroclor 1016	Aroclor 1262	Aroclor 1242	Total PAH	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b)-fluoranthene	Benzo(e)pyrene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h)anthracene
Unit					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
WI CBSQG PEC					1										22.8												
WI CBSQG PEC 3x					3										68.4												
WI CBSQG PEC 5x					5										114												
TSCA					50																						
Location code	Sample ID	Start Depth (feet)	End Depth (feet)	Date	Total PCB	Aroclor 1260	Aroclor 1254	Aroclor 1268	Aroclor 1221	Aroclor 1232	Aroclor 1248	Aroclor 1016	Aroclor 1262	Aroclor 1242	Total PAH	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b)-fluoranthene	Benzo(e)pyrene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h)anthracene
SD-71	MK-SD-71-0.0/0.5	0	0.5	7/25/2018	**0.23**	0.11 U	**0.227**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**0.8**	0.0111 U	0.0111 U	0.0111 U	0.0111 U	**0.0446**	**0.0609**	**0.113**	**0.0604**	**0.0264**	**0.0403**	**0.0748**	0.0111 U
SD-71	MK-SD-71-0.5/1.5	0.5	1.5	7/25/2018	**29**	**1.66 J**	2.21 U	2.21 U	2.21 U	2.21 U	2.21 U	2.21 U	2.21 U	**27.3 J**	**2.5**	0.0111 UJ	**0.0314 J**	0.0111 UJ	**0.0531 J**	**0.152**	**0.159**	**0.261**	**0.135**	**0.0535 J**	**0.0999**	**0.204**	**0.0191 J**
SD-71	MK-SD-71-1.5/2.6	1.5	2.6	7/25/2018	**58.2**	**2.8 J**	5.51 U	5.51 U	5.51 U	5.51 U	5.51 U	5.51 U	5.51 U	**55.4**													
SD-71	MK-SD-71-6.0/7.0	6	7	7/25/2018	**0.41**	0.11 U	**0.411**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U													
SD-71	MK-SD-71-7.0/8.0	7	8	7/25/2018	0.056 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U													
SD-71	MK-SD-71-8.0/9.2	8	9.2	7/25/2018	0.055 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U													
SD-71	MK-SD-71-11.0/12.0	11	12	7/25/2018	**0.047**	**0.0469 J**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U													
SD-71	MK-SD-71-12.0/13.0	12	13	7/25/2018	0.055 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U													
SD-71	MK-SD-71-13.0/14.0	13	14	7/25/2018	0.056 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U													
SD-71	MK-SD-71-14.0/14.8	14	14.8	7/25/2018	0.011 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U													
SD-71	MK-SD-71-16.0/17.0	16	17	7/25/2018	0.055 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U													
SD-71	MK-SD-71-17.0/18.0	17	18	7/25/2018	0.055 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U													
SD-71	MK-SD-71-18.0/19.0	18	19	7/25/2018	0.011 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U													
SD-71	MK-SD-71-19.0/19.5	19	19.5	7/25/2018	0.011 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U													
SD-72	MK-SD-72-0.0/0.5	0	0.5	7/26/2018	**35.8**	5.52 U	5.52 U	5.52 UJ	5.52 U	5.52 U	5.52 U	5.52 U	5.52 UJ	**35.8**	**48.6**	**0.0474**	**0.481**	**0.0639**	**1.32**	**3.08**	**2.94**	**5.17**	**2.57**	**0.765**	**2.31**	**4.23**	**0.27**
SD-72	MK-SD-72-0.5/1.8	0.5	1.8	7/26/2018	**3.6**	0.439 UJ	**0.913 J**	0.439 UJ	0.439 UJ	0.439 UJ	0.439 UJ	0.439 UJ	0.439 UJ	**2.7 J**	**86.6**	**0.132 J**	**0.684**	**0.135**	**1.93**	**6.16**	**5.64**	**10.1**	**4.95**	**1.37**	**4.64**	**8.29**	**0.532**
SD-72	MK-SD-72-5.4/6.4	5.4	6.4	7/26/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**112**	**0.243**	**0.738**	**0.119**	**2.38**	**7.68**	**7.71**	**12.8**	**6.86**	**2.6**	**5.16**	**10.4**	**0.877**
SD-72	MK-SD-72-6.4/7.4	6.4	7.4	7/26/2018	0.011 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**111**	**0.314**	**0.717**	**0.141**	**1.98**	**7.39**	**7.47**	**12.1**	**7.03**	**2.08**	**5.56**	**10.4**	**0.759**
SD-72	MK-SD-72-7.4/8.6	7.4	8.6	7/26/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**114**	**0.319**	**0.843**	**0.123**	**2.46**	**8.19**	**7.68**	**12.1**	**6.71**	**2**	**6.01**	**10.6**	**0.817**
SD-72	MK-SD-72-10.4/11.4	10.4	11.4	7/26/2018	0.011 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	**163**	**0.5**	**1.54**	**0.205**	**4.41**	**11.9**	**10**	**17.6**	**8.41**	**2.19**	**7.02**	**14.4**	**0.865**
SD-72	MK-SD-72-11.4/12.4	11.4	12.4	7/26/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**135**	**0.677**	**2.07**	**0.326**	**5.05**	**14.4**	**12.4**	**22.6**	**10.5**	**2.45**	**8.98**	**17.6**	0.0439 U
SD-72	MK-SD-72-12.4/13.4	12.4	13.4	7/26/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**72.8**	**0.188**	**0.64**	**0.135**	**1.83**	**5.37**	**4.51**	**8.04**	**3.96**	**0.926**	**3.39**	**6.96**	0.0443 U
SD-72	MK-SD-72-13.4/14.6	13.4	14.6	7/26/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**46.5**	**0.186**	**0.586**	**0.135**	**1.44**	**4.1**	**3.67**	**6.61**	**3.17**	**0.748**	**3.22**	**5.3**	**0.298**
SD-72	MK-SD-72-15.4/16.4	15.4	16.4	7/26/2018	**0.21**	0.0221 U	**0.129 J+**	**0.0793 J+**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**95.9**	**0.241**	**0.803**	**0.133**	**2.24**	**6.94**	**6.04**	**11.4**	**5.32**	**1.21**	**4.49**	**8.94**	**0.487**
SD-72	MK-SD-72-16.4/17.4	16.4	17.4	7/26/2018	0.011 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**69**	**0.276**	**0.831**	**0.142**	**2.34**	**6.06**	**5.13**	**9.23**	**4.38**	**0.925**	**4.52**	**7.51**	**0.4**
SD-72	MK-SD-72-17.4/18.7	17.4	18.7	7/26/2018	0.011 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**107**	**0.329**	**1.19**	**0.176**	**3.19**	**7.67**	**6.64**	**11.8**	**5.59**	**1.25**	**4.96**	**9.4**	**0.489**
SD-72	MK-SD-72-20.4/21.4	20.4	21.4	7/26/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**82.3**	**0.427**	**1.18**	**0.207**	**1.99**	**5.63**	**4.39**	**6.98**	**3.48**	**2.83**	**2.28**	**6.63**	**0.902**
SD-72	MK-SD-72-21.4/22.4	21.4	22.4	7/26/2018	0.011 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**89.3**	**0.275**	**0.828**	**0.227**	**2.05**	**6.27**	**5.09**	**7.59**	**4.07**	**3.39**	**2.5**	**7.5**	**1.08**
SD-72	MK-SD-72-22.4/23.4	22.4	23.4	7/26/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.15**	0.00221 U	**0.00532 J**	0.00221 U	**0.00432**	**0.0106**	**0.00822**	**0.0131**	**0.00701**	**0.00644**	**0.00494**	**0.0121**	**0.00222**
SD-72	MK-SD-72-23.4/24.2	23.4	24.2	7/19/2018	0.011 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	**0.037**	**0.00282 J**	**0.00349 J**	0.00221 U	0.00221 U	0.00221 U	0.00221 U	0.00221 U	0.00219 U	0.00221 U	0.00221 U	0.00221 U	0.00221 U
SD-73	MK-SD-73-0.0/0.5	0	0.5	7/26/2018	**0.53**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.532**	**204**	**1.33**	**6.41**	**0.054**	**8.83**	**12.9**	**10.4**	**16.5**	**7**	**5.64**	**5.17**	**12.5**	**2.05**
SD-73	MK-SD-73-0.5/1.5	0.5	1.5	7/26/2018	**1.1**	**0.171**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.946**	**7.3**	**0.0245**	**0.0701**	**0.0174 J**	**0.133**	**0.497**	**0.438**	**0.781**	**0.396**	**0.301**	**0.264**	**0.622**	**0.0893**
SD-73	MK-SD-73-1.5/2.3	1.5	2.3	7/26/2018	**4.1**	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**4.14**	**16**	**0.0376**	**0.183**	**0.0265**	**0.508**	**1.18**	**0.878**	**1.42**	**0.739**	**0.531**	**0.502**	**1.31**	**0.167**
SD-73	MK-SD-73-5.0/6.0	5	6	7/26/2018	**1.6**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**1.64**	**4.4**	**0.0202 J**	**0.0639**	**0.0305**	**0.0956**	**0.292**	**0.269**	**0.433**	**0.224**	**0.205**	**0.135**	**0.344**	**0.0605**
SD-73	MK-SD-73-6.0/7.0	6	7	7/26/2018	**6.5**	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	**6.52 J**	**107**	**0.238**	**0.92**	**0.161**	**1.94**	**6.31**	**7.93**	**12.2**	**6.64**	**4.92**	**4.89**	**8.45**	**1.34**
SD-73	MK-SD-73-7.0/8.2	7	8.2	7/26/2018	**51.1**	2.22 U	2.22 U	2.22 U	2.22 U	2.22 U	2.22 U	2.22 U	2.22 U	**51.1 J**	**110**	**0.351**	**1.39**	**0.159**	**2.84**	**6.92**	**5.6**	**11**	**5.03**	**1.39**	**4.41**	**9.22**	**0.485**
SD-73	MK-SD-73-10.0/11.0	10	11	7/26/2018	**0.63**	0.0222 U	**0.448 J+**	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**0.185 J+**	**126**	**0.286**	**0.767**	**0.256**	**2.77**	**8.06**	**7.38**	**11.6**	**6.51**	**5.56**	**3.88**	**10.9**	**1.59**
SD-73	MK-SD-73-11.0/12.0	11	12	7/26/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**54.4**	**0.2**	**0.469**	**0.0749**	**1.21**	**3.84**	**2.92**	**5.29**	**2.69**	**1.85**	**1.89**	**5.17**	**0.612**
SD-73	MK-SD-73-12.0/13.1	12	13.1	7/26/2018	0.011 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**68**	**0.402 J**	**0.683**	**0.147 J**	**1.23**	**4.93**	**4.25**	**7.15**	**3.73**	**2.96**	**2.16**	**6.68**	**0.926**
SD-73	MK-SD-73-15.0/16.0	15	16	7/26/2018	0.011 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**52.4**	**0.19**	**0.387**	**0.116**	**0.897**	**3.81**	**3.31**	**5.55**	**2.96**	**2.39**	**1.75**	**5.02**	**0.756**
SD-73	MK-SD-73-16.0/17.0	16	17	7/26/2018	0.011 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**105**	**0.921**	**1.46**	**0.176**	**2.38**	**7.04**	**5.61**	**9.11**	**4.66**	**3.55**	**3.01**	**8.67**	**1.17**
SD-73	MK-SD-73-17.0/18.0	17	18	7/26/2018	0.011 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**193**	**0.599**	**1.47**	**0.339**	**3.98**	**13**	**10.6**	**21.2**	**8.66**	**7.26**	**5.58**	**18.6**	**2.38**
SD-73	MK-SD-73-18.0/19.1	18	19.1	7/26/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**61.7**	**0.811 J**	**1.6 J**	**0.388**	**4.37 J**	**0.724 J**	**10.8 J**	**1.04 J**	**8.96 J**	**7.09 J**	**6.3 J**	**0.942 J**	**2.52 J**
SD-73	MK-SD-73-20.0/21.0	20	21	7/26/2018	0.011 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**66.8**	**1.25**	**2.19**	**0.426**	**4.89**	**0.0716 J**	**13.2**	0.11 U	**11.3**	**9.03**	**6.99**	0.11 U	**3.07**
SD-73	MK-SD-73-21.0/22.0	21	22	7/26/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**100**	**0.297**	**0.806**	**0.0985**	**2.46**	**7.08**	**6.25**	**10.4**	**5.37**	**1.81**	**4.2**	**9.18**	**0.779**
SD-73	MK-SD-73-22.0/23.0	22	23	7/26/2018	0.011 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	**115**	**0.379**	**0.846**	**0.175**	**2.72**	**8.2**	**7.57**	**12.6**	**6.52**	**2**	**5.42**	**10.6**	**0.791**
SD-73	MK-SD-73-23.0/24.0	23	24	7/26/2018	0.011 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**16.2**	**0.0645**	**0.168**	**0.0606**	**0.389**	**1.2**	**0.97**	**1.53**	**0.784**	**0.633**	**0.534**	**1.36**	**0.209**
SD-74	MK-SD-74-0.0/0.5	0	0.5	7/26/2018	**0.38**	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**0.375 J**	**4.6**	0.0443 U	**0.048**	0.0443 U	**0.13**	0.0443 U	**0.383**	**0.64**	**0.313**	**0.11**	**0.261**	**0.0553**	**0.0429 J**
SD-74	MK-SD-74-0.5/1.5	0.5	1.5	7/26/2018	**1**	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	**1.01 J**	**85.4**	**0.13**	**1.1**	**0.0667**	**3.45**	**6.24**	**5.25**	**8.58**	**4.03**	**1.07**	**3.67**	**6.6**	0.0444 U
SD-74	MK-SD-74-1.5/2.6	1.5	2.6	7/26/2018	**83.9**	4.38 U	4.38 U	4.38 U	4.38 U	4.38 U	4.38 U	4.38 U	4.38 U	**83.9 J**													
SD-74	MK-SD-74-5.0/6.0	5	6	7/26/2018	**4.3**	0.439 U	0.439 U	0.439 U	0.439 U	0.439 U	**4.29 J**	0.439 U	0.439 U	0.439 U													
SD-74	MK-SD-74-6.0/7.0	6	7	7/26/2018	**2.7**	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	**2.73**	0.221 U	0.221 U	0.221 U													
SD-74	MK-SD-74-7.0/8.0	7	8	7/26/2018	**1.7**	**0.526**	0.0218 U	0.0218 U	0.0218 U	0.0218 U	**1.13 J**	0.0218 U	0.0218 U	0.0218 U													
SD-74	MK-SD-74-10.0/11.0	10	11	7/26/2018	**0.39**	0.0218 U	**0.388 J+**	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U													
SD-74	MK-SD-74-11.0/12.0	11	12	7/26/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-74	MK-SD-74-12.0/13.3	12	13.3	7/26/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-74	MK-SD-74-15.0/16.0	15	16	7/26/2018	**0.045**	**0.0452 J**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-74	MK-SD-74-16.0/17.0	16	17	7/26/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-74	MK-SD-74-17.0/17.6	17	17.6	7/26/2018	0.011 U	0.0215 U	0.0215 U	0.0215 U	0.0215 U	0.0215 U	0.0215 U	0.0215 U	0.0215 U	0.0215 U													
SD-75	MK-SD-75-0.0/0.5	0	0.5	7/26/2018	**0.29**	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	**0.289**	**5**	0.0221 U	**0.0324**	**0.023**	**0.0793**	**0.336**	**0.364**	**0.614**	**0.323**	**0.311**	**0.199**	**0.428**	**0.0824**
SD-75	MK-SD-75-0.0/1.1	0	1.1	7/30/2018																							
SD-75	MK-SD-75-0.5/1.5	0.5	1.5	7/26/2018	**0.65**	0.0222 U	**0.179**	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**0.475 J**	**8.8**	0.0219 U	**0.0582**	**0.0297**	**0.137**	**0.602**	**0.639**	**1.05**	**0.545**	**0.517**	**0.331**	**0.76**	**0.141**
SD-75	MK-SD-75-1.1/3.1	1.1	3.1	7/30/2018																							
SD-75	MK-SD-75-1.5/2.5	1.5	2.5	7/26/2018	**0.56**	0.0219 U	**0.133**	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**0.43**													
SD-75	MK-SD-75-2.5/3.5	2.5	3.5	7/26/2018	**6.7**	**0.533 J**	0.442 U	0.442 U	0.442 U	0.442 U	0.442 U	0.442 U	0.442 U	**6.21 J**													
SD-75	MK-SD-75-3.5/4.2	3.5	4.2	7/26/2018	**28.7**	**1.75 J**	2.22 U	2.22 U	2.22 U	2.22 U	2.22 U	2.22 U	2.22 U	**26.9 J**													
SD-75	MK-SD-75-7.3/7.7	7.3	7.7	7/30/2018																							
SD-75	MK-SD-75-7.3/8.3	7.3	8.3	7/26/2018	**1.4**	**0.312 J**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**1.12 J**													
SD-75	MK-SD-75-7.7/9.7	7.7	9.7	7/30/2018																							
SD-75	MK-SD-75-8.3/9.3	8.3	9.3	7/26/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-75	MK-SD-75-9.3/10.2	9.3	10.2	7/26/2018	0.011 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U													
SD-75	MK-SD-75-12.3/13.3	12.3	13.3	7/26/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-75	MK-SD-75-12.3/14.3	12.3	14.3	7/30/2018																							
SD-75	MK-SD-75-13.3/14.3	13.3	14.3	7/26/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-75	MK-SD-75-14.3/15.3	14.3	15.3	7/26/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-75	MK-SD-75-15.3/16.3	15.3	16.3	7/26/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-75	MK-SD-75-15.7/16.0	15.7	16	7/30/2018																							
SD-75	MK-SD-75-16.0/16.3	16	16.3	7/30/2018																							
SD-75	MK-SD-75-17.3/18.3	17.3	18.3	7/26/2018	0.011 U	0.0214 U	0.0214 U	0.0214 U	0.0214 U	0.0214 U	0.0214 U	0.0214 U	0.0214 U	0.0214 U													
SD-75	MK-SD-75-18.3/19.3	18.3	19.3	7/26/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-75	MK-SD-75-19.3/20.3	19.3	20.3	7/26/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-75	MK-SD-75-19.3/21.3	19.3	21.3	7/30/2018																							
SD-75	MK-SD-75-20.3/21.3	20.3	21.3	7/26/2018	0.011 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U													

Appendix A
Milwaukee River Downtown Reach - Sediment Analytical Results Summary
Focused Feasibity Study, Milwaukee Estuary AOC, Milwaukee, Wisconsin

Analyte Group					PAH						Metals								Metals								Physical Parameters							
Analyte					Fluoranthene	Fluorene	Indeno(1,2,3-Cd)Pyrene	Naphthalene	Phenanthrene	Pyrene	Chromium	Mercury	Lead	Iron	Manganese	Potassium	Sodium	Thallium	Antimony	Beryllium	Cobalt	Calcium	Cyanide	Magnesium	Vanadium	TOC	Gravel	Sand	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Fines
Unit					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	%	%	%	%	%	%
WI CBSQG PEC											110	1.1	130	40000	1100				25														
WI CBSQG PEC 3x											330	3.3	390	120000	3300				75														
WI CBSQG PEC 5x											550	5.5	650	200000	5500				125														
TSCA																																	
Location code	Sample ID	Start Depth (feet)	End Depth (feet)	Date	Fluoranthene	Fluorene	Indeno(1,2,3-Cd)Pyrene	Naphthalene	Phenanthrene	Pyrene	Chromium	Mercury	Lead	Iron	Manganese	Potassium	Sodium	Thallium	Antimony	Beryllium	Cobalt	Calcium	Cyanide	Magnesium	Vanadium	TOC	Gravel	Sand	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Fines
SD-71	MK-SD-71-0.0/0.5	0	0.5	7/25/2018	**0.145**	0.0111 U	**0.0285**	0.0111 U	**0.0538**	**0.111**	**0.303** J	**0.082** J-	**0.785**													**71000**								
SD-71	MK-SD-71-0.5/1.5	0.5	1.5	7/25/2018	**0.515** J	**0.0412** J	**0.0588** J	0.0111 UJ	**0.326** J	**0.397** J	**1480** J	**0.745** J-	**346**													**79700**								
SD-71	MK-SD-71-1.5/2.6	1.5	2.6	7/25/2018							**0.144** J	**1.13** J-	**0.448**													**73600**								
SD-71	MK-SD-71-6.0/7.0	6	7	7/25/2018							**636** J	**1.89** J-	**400**													**84100**								
SD-71	MK-SD-71-7.0/8.0	7	8	7/25/2018							**515** J	**1.63** J-	**476**													**96800**								
SD-71	MK-SD-71-8.0/9.2	8	9.2	7/25/2018							**297** J	**1.78** J-	**484**													**98000**								
SD-71	MK-SD-71-11.0/12.0	11	12	7/25/2018							**451** J	**1.85** J-	**652**													**68200**								
SD-71	MK-SD-71-12.0/13.0	12	13	7/25/2018							**772** J	**1.9** J-	**538**													**79600**								
SD-71	MK-SD-71-13.0/14.0	13	14	7/25/2018							**1140** J	**3.09** J-	**532**													**67000**								
SD-71	MK-SD-71-14.0/14.8	14	14.8	7/25/2018							**126** J	**0.89** J-	**198**													**27000**								
SD-71	MK-SD-71-16.0/17.0	16	17	7/25/2018							**1180** J	**4.89** J-	**292**													**29500**								
SD-71	MK-SD-71-17.0/18.0	17	18	7/25/2018							**155** J	**2.71** J-	**193**													**35400**								
SD-71	MK-SD-71-18.0/19.0	18	19	7/25/2018							**444** J	**1.06** J-	**98**													**11600**								
SD-71	MK-SD-71-19.0/19.5	19	19.5	7/25/2018							**37.7** J	**0.0937** J-	**11.2**													**43400**								
SD-72	MK-SD-72-0.0/0.5	0	0.5	7/26/2018	**10**	**0.719**	**0.871**	**0.0282** J	**6.01**	**7.68**	**4740** J	**2.72** J-	**454**													**82200**								
SD-72	MK-SD-72-0.5/1.8	0.5	1.8	7/26/2018	**16.6**	**1.1**	**1.6**	**0.112** J	**9.36**	**13.3**	**522**	**1.3** J-	**659**													**86800**								
SD-72	MK-SD-72-5.4/6.4	5.4	6.4	7/26/2018	**20.5**	**1.25**	**2.8**	**0.363**	**11.8**	**17.7**	**241**	**1.04** J-	**370**													**82200**								
SD-72	MK-SD-72-6.4/7.4	6.4	7.4	7/26/2018	**20.9**	**1.24**	**2.27**	**0.421**	**11.8**	**18.5**	**546**	**1.54** J-	**422**													**75300**								
SD-72	MK-SD-72-7.4/8.6	7.4	8.6	7/26/2018	**22.1**	**1.46**	**2.4**	**0.542**	**12.4**	**17.4**	**132**	**1** J-	**402**													**65400**								
SD-72	MK-SD-72-10.4/11.4	10.4	11.4	7/26/2018	**33.1**	**2.6**	**2.52**	**0.934**	**20.4**	**24.8**	**271**	**1.54** J-	**584**													**98900**								
SD-72	MK-SD-72-11.4/12.4	11.4	12.4	7/26/2018	**4.08**	**3.3**	**2.85**	**1.28**	**23.2**	**3.45**	**403**	**1.82** J-	**768**													**105000**								
SD-72	MK-SD-72-12.4/13.4	12.4	13.4	7/26/2018	**15**	**1.16**	**1.12**	**0.416**	**7.03**	**12.1**	**574**	**1.59** J-	**685**													**99700**								
SD-72	MK-SD-72-13.4/14.6	13.4	14.6	7/26/2018	**0.248** J	**0.958**	**0.882**	**0.513**	**5.08**	**9.36**	**469** J	**2.38** J-	**545** J													**92700**								
SD-72	MK-SD-72-15.4/16.4	15.4	16.4	7/26/2018	**18.3**	**1.29**	**1.43**	**0.352**	**10.6**	**15.7**	**321**	**1.11** J-	**564**													**102000**								
SD-72	MK-SD-72-16.4/17.4	16.4	17.4	7/26/2018	**0.295**	**1.43**	**1.12**	**0.523**	**10.4**	**13.5**	**322**	**0.808** J-	**595**													**86100**								
SD-72	MK-SD-72-17.4/18.7	17.4	18.7	7/26/2018	**19.9**	**1.9**	**1.45**	**0.799**	**12.3**	**17.6**	**763**	**8.17** J-	**646**													**75700**								
SD-72	MK-SD-72-20.4/21.4	20.4	21.4	7/26/2018	**17.7**	**1.68**	**2.66**	**1.05**	**7.37**	**14.9**	**566** J	**0.239** J-	**511** J													**67800**								
SD-72	MK-SD-72-21.4/22.4	21.4	22.4	7/26/2018	**20.5**	**1.18**	**3.09**	**0.879**	**6.82**	**16**	**213** J	**0.921** J-	**158** J													**101000**								
SD-72	MK-SD-72-22.4/23.4	22.4	23.4	7/26/2018	**0.0288**	**0.00383** J	0.00555	**0.00298** J	**0.0137** J	**0.0233**	**4.93** J	**0.093** R	**5.9** J													**67200**								
SD-72	MK-SD-72-23.4/24.2	23.4	24.2	7/19/2018	**0.00243** J	**0.00292** J	0.00221 U	**0.00464** J	**0.00599** J	**0.00256**	**3.96** J	**0.0939** R	**9.48** J													**60900**								
SD-73	MK-SD-73-0.0/0.5	0	0.5	7/26/2018	**34.5**	**6.63**	**5.26**	**2.88**	**36.7**	**29**	**25.3** J	**0.0445** J-	**36.3** J													**18700**								
SD-73	MK-SD-73-0.5/1.5	0.5	1.5	7/26/2018	**1.48**	**0.0936**	**0.265**	**0.0354**	**0.736**	**1.1**	**32.2** J	**0.176** J-	**139** J													**59200**								
SD-73	MK-SD-73-1.5/2.3	1.5	2.3	7/26/2018	**3.16**	**0.297**	**0.485**	**0.0411**	**2.11**	**2.43**	**55.2** J	**0.3** J-	**192** J													**41600**								
SD-73	MK-SD-73-5.0/6.0	5	6	7/26/2018	**0.828**	**0.0762**	**0.181**	**0.0198** J	**0.459**	**0.643**	**64.3** J	**0.383** J-	**304** J													**41900**								
SD-73	MK-SD-73-6.0/7.0	6	7	7/26/2018	**17.7**	**1.27**	**4.79**	**0.138**	**10.4**	**16.4**	**626**	**0.511** J-	**472** J													**75600**								
SD-73	MK-SD-73-7.0/8.2	7	8.2	7/26/2018	**22.8**	**1.84**	**1.54**	**0.132**	**15.9**	**19.3**	**4640**	**2.37** J-	**692** J													**82100**								
SD-73	MK-SD-73-10.0/11.0	10	11	7/26/2018	**25.7**	**1.38**	**4.82**	**0.353**	**11.4**	**22.7**	**356** J	**1.76** J-	**597** J													**87900**								
SD-73	MK-SD-73-11.0/12.0	11	12	7/26/2018	**11**	**0.74**	**1.79**	**0.285**	**6.28**	**8.13**	**506** J	**1.89** J-	**574** J													**104000**								
SD-73	MK-SD-73-12.0/13.1	12	13.1	7/26/2018	**12.2**	**0.838**	**2.65**	**0.48** J	**6.68**	**9.88**	**468** J	**1.48** J-	**604** J													**87000**								
SD-73	MK-SD-73-15.0/16.0	15	16	7/26/2018	**9.27**	**0.597**	**2.11**	**0.223**	**5.13**	**7.9**	**477** J	**1.64** J-	**566** J													**94700**								
SD-73	MK-SD-73-16.0/17.0	16	17	7/26/2018	**21.4**	**1.6**	**3.39**	**1.44**	**10.9**	**18.3**	**116** J	**1.93** J-	**283** J													**111000**								
SD-73	MK-SD-73-17.0/18.0	17	18	7/26/2018	**36.7**	**2.45**	**6.44**	**1.65**	**22.3**	**29.5**	**248** J	**1.64** J-	**500** J													**97800**								
SD-73	MK-SD-73-18.0/19.1	18	19.1	7/26/2018	**2.05** J	**2.93** J	**6.85** J	**1.49** J	**1.28** J	**1.6** J	**189** J	**2** J-	**236** J													**78300**								
SD-73	MK-SD-73-20.0/21.0	20	21	7/26/2018	**0.15**	**3.18**	**8.75**	**2.05**	0.11 U	**0.0994** J	**341** J	**1.3** J-	**418** J													**68000**								
SD-73	MK-SD-73-21.0/22.0	21	22	7/26/2018	**19.9**	**1.48**	**2.05**	**1.02**	**12.4**	**14.9**	**212** J	**1.4** J-	**374** J													**61000**								
SD-73	MK-SD-73-22.0/23.0	22	23	7/26/2018	**20.7**	**1.81**	**2.25**	**0.631**	**14.5**	**17.6**	**299** J	**1.32** J-	**397** J													**58000**								
SD-73	MK-SD-73-23.0/24.0	23	24	7/26/2018	**2.92**	**0.256**	**0.59**	**0.384**	**1.8**	**2.36**	**277** J	**1.96** J-	**163** J													**50300**								
SD-74	MK-SD-74-0.0/0.5	0	0.5	7/26/2018	**1.05**	**0.0552**	**0.121**	0.0443 U	**0.407**	**0.857**	**9.93**	**0.0954** R	**21.9** J													**21700**								
SD-74	MK-SD-74-0.5/1.5	0.5	1.5	7/26/2018	**16.1**	**1.67**	**1.24**	**0.0938**	**12**	**14.1**	**48.3**	**0.118** J-	**88.8** J													**35900**								
SD-74	MK-SD-74-1.5/2.6	1.5	2.6	7/26/2018							**6710**	**1.01** J-	**548** J													**77600**								
SD-74	MK-SD-74-5.0/6.0	5	6	7/26/2018							**301**	**1.27** J-	**332** J													**71600**								
SD-74	MK-SD-74-6.0/7.0	6	7	7/26/2018							**272**	**1.33** J-	**474** J													**77700**								
SD-74	MK-SD-74-7.0/8.0	7	8	7/26/2018							**188**	**1.68** J-	**416** J													**62700**								
SD-74	MK-SD-74-10.0/11.0	10	11	7/26/2018							**374**	**0.956** J-	**381** J													**86200**								
SD-74	MK-SD-74-11.0/12.0	11	12	7/26/2018							**669**	**1.51** J-	**431** J													**101000**								
SD-74	MK-SD-74-12.0/13.3	12	13.3	7/26/2018							**244**	**1.02** J-	**351** J													**88100**								
SD-74	MK-SD-74-15.0/16.0	15	16	7/26/2018							**199**	**0.954** J-	**353** J													**77200**								
SD-74	MK-SD-74-16.0/17.0	16	17	7/26/2018							**179**	**1.51** J-	**176** J													**49700**								
SD-74	MK-SD-74-17.0/17.6	17	17.6	7/26/2018							**3.25**	**0.0987** R	**2.4** J													**53300**								
SD-75	MK-SD-75-0.0/0.5	0	0.5	7/26/2018	**0.892**	**0.0488**	**0.279**	0.0221 U	**0.342**	**0.654**	**20.4** J	**0.0749** J-	**80.3** J													**25600**								
SD-75	MK-SD-75-0.0/1.1	0	1.1	7/30/2018																							**0**	**97.8**					**2.2**
SD-75	MK-SD-75-0.5/1.5	0.5	1.5	7/26/2018	**1.56**	**0.0797**	**0.444**	0.0219 U	**0.669**	**1.18**	**18.5** J	**0.0769** J-	**34.8** J													**32100**								
SD-75	MK-SD-75-1.1/3.1	1.1	3.1	7/30/2018																							**0.1**	**12.6**					**87.3**
SD-75	MK-SD-75-1.5/2.5	1.5	2.5	7/26/2018							**38.1** J	**0.158** J-	**77.9** J													**51900**								
SD-75	MK-SD-75-2.5/3.5	2.5	3.5	7/26/2018							**180**	**0.279** J-	**233**													**46700**								
SD-75	MK-SD-75-3.5/4.2	3.5	4.2	7/26/2018							**3620**	**1.46** J-	**578**													**65100**								
SD-75	MK-SD-75-7.3/7.7	7.3	7.7	7/30/2018																							**0**	**38.1**					**61.9**
SD-75	MK-SD-75-7.3/8.3	7.3	8.3	7/26/2018							**200**	**0.916** J-	**320**													**82600**								
SD-75	MK-SD-75-7.7/9.7	7.7	9.7	7/30/2018																							**0**	**28.6**					**71.4**
SD-75	MK-SD-75-8.3/9.3	8.3	9.3	7/26/2018							**259**	**1.58** J-	**503**													**112000**								
SD-75	MK-SD-75-9.3/10.2	9.3	10.2	7/26/2018							**234**	**1.56** J-	**447**													**89800**								
SD-75	MK-SD-75-12.3/13.3	12.3	13.3	7/26/2018							**493** J	**3.41** J-	**348** J													**73300**								
SD-75	MK-SD-75-12.3/14.3	12.3	14.3	7/30/2018																							**0.9**	**45.2**					**53.9**
SD-75	MK-SD-75-13.3/14.3	13.3	14.3	7/26/2018							**618** J	**4.09** J-	**379** J													**77400**								
SD-75	MK-SD-75-14.3/15.3	14.3	15.3	7/26/2018							**659** J	**7.61** J-	**484** J													**73500**								
SD-75	MK-SD-75-15.3/16.3	15.3	16.3	7/26/2018							**506** J	**3.93** J-	**384** J													**66800**								
SD-75	MK-SD-75-15.7/16.0	15.7	16	7/30/2018																							**2.4**	**61.1**					**36.5**
SD-75	MK-SD-75-16.0/16.3	16	16.3	7/30/2018																							**2.5**	**85**					**12.5**
SD-75	MK-SD-75-17.3/18.3	17.3	18.3	7/26/2018							**2.94** J	**0.988** R	**3.92** J													**33800**								
SD-75	MK-SD-75-18.3/19.3	18.3	19.3	7/26/2018							**5.57**	**0.0944** R	**3.79**													**29800** J								
SD-75	MK-SD-75-19.3/20.3	19.3	20.3	7/26/2018							**4.1**	**0.179** J-	**2.03**													**55200**								
SD-75	MK-SD-75-19.3/21.3	19.3	21.3	7/30/2018																							**48.6**	**46.1**					**5.3**
SD-75	MK-SD-75-20.3/21.3	20.3	21.3	7/26/2018							**4.62**	**0.0881** R	**2.38**													**46100**								

Appendix A
Milwaukee River Downtown Reach - Sediment Analytical Results Summary
Focused Feasibity Study, Milwaukee Estuary AOC, Milwaukee, Wisconsin

					PCB										PAH												
Analyte Group																											
Analyte					Total PCB	Aroclor 1260	Aroclor 1254	Aroclor 1268	Aroclor 1221	Aroclor 1232	Aroclor 1248	Aroclor 1016	Aroclor 1262	Aroclor 1242	Total PAH	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b)-fluoranthene	Benzo(e)pyrene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h)ant hracene
Unit					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
WI CBSQG PEC					1										22.8												
WI CBSQG PEC 3x					3										68.4												
WI CBSQG PEC 5x					5										114												
TSCA					50																						
Location code	Sample ID	Start Depth (feet)	End Depth (feet)	Date	Total PCB	Aroclor 1260	Aroclor 1254	Aroclor 1268	Aroclor 1221	Aroclor 1232	Aroclor 1248	Aroclor 1016	Aroclor 1262	Aroclor 1242	Total PAH	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b)-fluoranthene	Benzo(e)pyrene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h)ant hracene
SD-76	MK-SD-76-0.0/0.5	0	0.5	7/26/2018	**0.81**	**0.113**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**0.694 J**	**23.8**	0.11 U	**0.116**	0.11 U	**0.234**	**1.39**	**1.77**	**2.87**	**1.68**	**1.37**	**1.03**	**2.18**	**0.345**
SD-76	MK-SD-76-0.5/1.5	0.5	1.5	7/26/2018	**1.3**	**0.128**	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	**1.2 J**	**18.7**	**0.0246**	**0.0963**	**0.0236**	**0.249**	**1.27**	**1.48**	**2.69**	**1.34**	**0.39**	**1.02**	**1.8**	**0.136**
SD-76	MK-SD-76-1.5/2.5	1.5	2.5	7/26/2018	**1.4**	**0.169**	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	**1.2 J**													
SD-76	MK-SD-76-2.5/3.5	2.5	3.5	7/26/2018	**2.1**	0.0222 U	**0.449**	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**1.67**													
SD-76	MK-SD-76-3.5/4.5	3.5	4.5	7/26/2018	**2.9**	0.0221 U	**0.74**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**2.19**													
SD-76	MK-SD-76-7.8/8.8	7.8	8.8	7/26/2018	**12.9**	1.09 U	**2.49**	1.09 U	1.09 U	1.09 U	1.09 U	1.09 U	1.09 U	**10.4**													
SD-76	MK-SD-76-8.8/9.8	8.8	9.8	7/26/2018	**15.9**	0.0219 U	**2.56**	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**13.3**													
SD-76	MK-SD-76-9.8/11.1	9.8	11.1	7/26/2018	**48.5**	0.0222 U	**5.45**	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**43**													
SD-76	MK-SD-76-12.8/13.8	12.8	13.8	7/26/2018	**1.2**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**1.18**	0.11 U	0.11 U	0.11 U													
SD-76	MK-SD-76-13.8/14.8	13.8	14.8	7/26/2018	**0.46**	0.0218 U	0.109 U	0.0218 U	0.0218 U	0.0218 U	**0.462**	0.0218 U	0.0218 U	0.109 U													
SD-76	MK-SD-76-14.8/15.8	14.8	15.8	7/26/2018	**0.73**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**0.727**	0.111 U	0.111 U	0.111 U													
SD-76	MK-SD-76-15.8/16.6	15.8	16.6	7/26/2018	**0.14**	0.022 U	0.11 U	0.022 U	0.022 U	0.022 U	**0.141 J**	0.022 U	0.022 U	0.11 U													
SD-76	MK-SD-76-17.8/18.8	17.8	18.8	7/26/2018	**0.14**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.141**													
SD-76	MK-SD-76-18.8/19.8	18.8	19.8	7/26/2018	0.011 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U													
SD-76	MK-SD-76-19.8/20.8	19.8	20.8	7/26/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-76	MK-SD-76-20.8/21.8	20.8	21.8	7/26/2018	**0.023**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.0229**													
SD-76	MK-SD-76-22.8/23.8	22.8	23.8	7/26/2018	**0.073**	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	**0.0732**													
SD-76	MK-SD-76-23.8/24.8	23.8	24.8	7/26/2018	0.011 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U													
SD-76	MK-SD-76-24.8/26.2	24.8	26.2	7/26/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-77	MK-SD-77-0.0/0.5	0	0.5	7/25/2018	**0.51**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.507**	**13.6**	**0.0153 J**	**0.06**	**0.025**	**0.21**	**1.02**	**1.1**	**1.61**	**0.919**	**0.518**	**0.683**	**1.31**	**0.156**
SD-77	MK-SD-77-0.5/1.5	0.5	1.5	7/25/2018	**2.2**	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**2.17**	0.0222 U	0.0222 U	0.0222 U	**13.3**	0.0221 U	**0.126**	0.0221 U	**0.276**	**0.887**	**0.796**	**1.24**	**0.666**	**0.295**	**0.471**	**1.15**	**0.099**
SD-77	MK-SD-77-1.5/2.5	1.5	2.5	7/25/2018	**2.7**	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**2.72**	0.0219 U	0.0219 U	0.0219 U													
SD-77	MK-SD-77-2.5/3.5	2.5	3.5	7/25/2018	**20.1**	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	**20.1**													
SD-77	MK-SD-77-3.5/4.5	3.5	4.5	7/25/2018	**133**	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	**133**													
SD-77	MK-SD-77-4.5/5.5	4.5	5.5	7/25/2018	**65.4**	5.5 U	5.5 U	5.5 U	5.5 U	5.5 U	5.5 U	5.5 U	5.5 U	**65.4**													
SD-77	MK-SD-77-7.1/8.1	7.1	8.1	7/25/2018	**1.5**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**1.54 J**													
SD-77	MK-SD-77-8.1/9.5	8.1	9.5	7/25/2018	**0.69**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**0.688 J**	0.111 U	0.111 U	0.111 U													
SD-77	MK-SD-77-12.1/13.1	12.1	13.1	7/25/2018	0.011 U	0.0215 U	0.0215 U	0.0215 U	0.0215 U	0.0215 U	0.0215 U	0.0215 U	0.0215 U	0.0215 U													
SD-77	MK-SD-77-13.1/14.1	13.1	14.1	7/25/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-77	MK-SD-77-14.1/15.2	14.1	15.2	7/25/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-77	MK-SD-77-17.1/18.1	17.1	18.1	7/25/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-77	MK-SD-77-18.1/19.1	18.1	19.1	7/25/2018	0.011 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U													
SD-77	MK-SD-77-19.1/20.0	19.1	20	7/25/2018	0.011 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U													
SD-77	MK-SD-77-20.0/21.0	20	21	7/25/2018	0.011 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U													
SD-78	MK-SD-78-0.0/0.5	0	0.5	7/25/2018	**0.44**	**0.0421**	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**0.398**	**10**	**0.0755 J**	**0.0769**	0.0221 U	**0.191**	**0.638**	**0.675**	**1.09**	**0.545**	**0.449**	**0.351**	**0.781**	**0.115**
SD-78	MK-SD-78-0.5/1.5	0.5	1.5	7/25/2018	**0.7**	0.0219 U	**0.124**	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**0.575**	**8.4**	**0.0266 J**	**0.0407 J**	0.0221 U	**0.0873 J**	**0.497 J**	**0.627**	**1.12**	**0.556**	**0.469 J**	**0.361 J**	**0.727**	**0.116 J**
SD-78	MK-SD-78-1.5/2.5	1.5	2.5	7/25/2018	**1.8**	0.0219 U	**0.45**	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**1.34**													
SD-78	MK-SD-78-2.5/3.5	2.5	3.5	7/25/2018	**17.9**	2.19 U	**2.85**	2.19 U	2.19 U	2.19 U	2.19 U	2.19 U	2.19 U	**15**													
SD-78	MK-SD-78-3.5/4.5	3.5	4.5	7/25/2018	**84**	11 U	**8.71 J**	11 U	11 U	11 U	11 U	11 U	11 U	**75.3**													
SD-78	MK-SD-78-4.5/5.0	4.5	5	7/25/2018	**4.5**	0.443 U	0.443 U	0.443 U	0.443 U	0.443 U	0.443 U	0.443 U	0.443 U	**4.5**													
SD-78	MK-SD-78-7.1/8.1	7.1	8.1	7/25/2018	**5.7**	**0.497**	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	**5.16**													
SD-78	MK-SD-78-8.1/9.1	8.1	9.1	7/25/2018	**0.85**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**0.845**	0.11 U	0.11 U	0.11 U													
SD-78	MK-SD-78-9.1/10.1	9.1	10.1	7/25/2018	**0.39**	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**0.389**	0.0219 U	0.0219 U	0.0219 U													
SD-78	MK-SD-78-10.1/10.9	10.1	10.9	7/25/2018	**1.4**	**0.104**	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**1.28**													
SD-78	MK-SD-78-12.1/13.1	12.1	13.1	7/25/2018	**0.031**	0.022 U	**0.031**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U													
SD-78	MK-SD-78-13.1/14.2	13.1	14.2	7/25/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-79	MK-SD-79-0.0/0.5	0	0.5	7/25/2018	**0.48**	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**0.477 J**	**6.1**	0.0221 U	**0.0423**	**0.0189 J**	**0.0825**	**0.416**	**0.447**	**0.776**	**0.391**	**0.351**	**0.235**	**0.533**	**0.0992**
SD-79	MK-SD-79-0.5/1.5	0.5	1.5	7/25/2018	**3.8**	**0.231**	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	**3.6**	**22.7**	**0.0355**	**0.144**	**0.0622**	**0.353**	**1.66**	**1.67**	**2.68**	**1.39**	**1.27**	**0.822**	**2.05**	**0.344**
SD-79	MK-SD-79-1.5/2.5	1.5	2.5	7/25/2018	**3.4**	**0.398**	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	**2.99**													
SD-79	MK-SD-79-2.5/3.5	2.5	3.5	7/25/2018	**7.6**	**0.825**	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	**6.76**													
SD-79	MK-SD-79-3.5/4.3	3.5	4.3	7/25/2018	**32.1**	**1.33 J**	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	**30.8**													
SD-79	MK-SD-79-7.4/8.4	7.4	8.4	7/25/2018	**1.8**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**1.8 J**	0.11 U	0.11 U	0.11 U													
SD-79	MK-SD-79-8.4/9.4	8.4	9.4	7/25/2018	**0.51**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**0.505 J**	0.11 U	0.11 U	0.11 U													
SD-79	MK-SD-79-9.4/10.7	9.4	10.7	7/25/2018	0.056 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U													
SD-79	MK-SD-79-10.7/11.7	10.7	11.7	7/25/2018	0.011 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U													
SD-80	MK-SD-80-0.0/0.5	0	0.5	7/25/2018	**65.4**	**1.7 J**	5.53 U	5.53 U	5.53 U	5.53 U	5.53 U	5.53 U	5.53 U	**63.7**	**17.9**	**0.0608**	**0.237**	0.0222 U	**0.457**	**0.941**	**0.72**	**1.27**	**0.705**	**0.339**	**0.497**	**1.36**	**0.11**
SD-80	MK-SD-80-0.5/1.5	0.5	1.5	7/25/2018	**67.9**	**1.8 J**	5.42 U	5.42 U	5.42 U	5.42 U	5.42 U	5.42 U	5.42 U	**66.1**	**8.5**	**0.0249**	**0.149**	0.0222 U	**0.285**	**0.399**	**0.288**	**0.479**	**0.282**	**0.143**	**0.199**	**0.57**	**0.0491**
SD-80	MK-SD-80-0.5/2.5	0.5	2.5	7/30/2018																							
SD-80	MK-SD-80-1.5/2.9	1.5	2.9	7/25/2018	**2.5**	**0.371**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**2.08**													
SD-80	MK-SD-80-5.8/6.8	5.8	6.8	7/25/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-80	MK-SD-80-5.8/7.8	5.8	7.8	7/30/2018																							
SD-81	MK-SD-81-0.0/0.5	0	0.5	7/25/2018	**0.25**	**0.0423 J**	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**0.209**	**34**	**0.0702**	**0.122**	**0.0699**	**0.329**	**1.88**	**2.61**	**4.85**	**2.47**	**1.75**	**1.52**	**3.02**	**0.451**
SD-81	MK-SD-81-0.5/1.5	0.5	1.5	7/25/2018	**0.44**	**0.0475**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.39**	**5.7**	0.0222 U	**0.0469**	0.0222 U	**0.0887**	**0.329**	**0.319**	**0.574**	**0.299**	**0.182**	**0.169**	**0.465**	**0.0415**
SD-81	MK-SD-81-1.5/2.5	1.5	2.5	7/25/2018	**0.61**	0.0221 U	**0.117**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.493**													
SD-81	MK-SD-81-2.8/3.8	2.8	3.8	7/25/2018	**0.64**	0.109 U	**0.635**	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U													
SD-81	MK-SD-81-3.8/4.6	3.8	4.6	7/25/2018	**0.12**	0.111 U	**0.116**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U													
SD-81	MK-SD-81-7.8/8.8	7.8	8.8	7/25/2018	0.011 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U													
SD-81	MK-SD-81-8.8/9.8	8.8	9.8	7/25/2018	0.011 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U													
SD-81	MK-SD-81-9.8/10.6	9.8	10.6	7/25/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-81	MK-SD-81-12.8/13.8	12.8	13.8	7/25/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-81	MK-SD-81-13.8/14.8	13.8	14.8	7/25/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-81	MK-SD-81-14.8/15.7	14.8	15.7	7/25/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-81	MK-SD-81-17.8/18.8	17.8	18.8	7/25/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-81	MK-SD-81-18.8/20.5	18.8	20.5	7/25/2018	0.011 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U													
SD-81	MK-SD-81-20.5/21.3	20.5	21.3	7/25/2018	0.011 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U													

Appendix A
Milwaukee River Downtown Reach - Sediment Analytical Results Summary
Focused Feasibity Study, Milwaukee Estuary AOC, Milwaukee, Wisconsin

Analyte Group					PAH						Metals								Metals								Physical Parameters							
Analyte					Fluoranthene	Fluorene	Indeno(1,2,3-Cd)Pyrene	Naphthalene	Phenanthrene	Pyrene	Chromium	Mercury	Lead	Iron	Manganese	Potassium	Sodium	Thallium	Antimony	Beryllium	Cobalt	Calcium	Cyanide	Magnesium	Vanadium	TOC	Gravel	Sand	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Fines
Unit					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	%	%	%	%	%	%
WI CBSQG PEC											110	1.1	130	40000	1100				25														
WI CBSQG PEC 3x											330	3.3	390	120000	3300				75														
WI CBSQG PEC 5x											550	5.5	650	200000	5500				125														
TSCA																																	
Location code	Sample ID	Start Depth (feet)	End Depth (feet)	Date	Fluoranthene	Fluorene	Indeno(1,2,3-Cd)Pyrene	Naphthalene	Phenanthrene	Pyrene	Chromium	Mercury	Lead	Iron	Manganese	Potassium	Sodium	Thallium	Antimony	Beryllium	Cobalt	Calcium	Cyanide	Magnesium	Vanadium	TOC	Gravel	Sand	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Fines
SD-76	MK-SD-76-0.0/0.5	0	0.5	7/26/2018	**4.25**	**0.14**	**1.26**	0.11 U	**1.55**	**3.43**	**23**	**0.15** J-	**65** J													**68200**								
SD-76	MK-SD-76-0.5/1.5	0.5	1.5	7/26/2018	**3.41**	**0.123**	**0.455**	**0.0278**	**1.45**	**2.7**	**22.4**	**0.153** J-	**61.3** J													**78400**								
SD-76	MK-SD-76-1.5/2.5	1.5	2.5	7/26/2018							**41.6**	**0.251** J-	**110** J													**61800**								
SD-76	MK-SD-76-2.5/3.5	2.5	3.5	7/26/2018							**37.4** J+	**0.25** J-	**95.7**													**75600**								
SD-76	MK-SD-76-3.5/4.5	3.5	4.5	7/26/2018							**146** J+	**0.337** J-	**240**													**46400**								
SD-76	MK-SD-76-7.8/8.8	7.8	8.8	7/26/2018							**478** J+	**0.79** J-	**346**													**49300**								
SD-76	MK-SD-76-8.8/9.8	8.8	9.8	7/26/2018							**692** J+	**0.455** J-	**266**													**37900**								
SD-76	MK-SD-76-9.8/11.1	9.8	11.1	7/26/2018							**2090** J	**1.47** J-	**608**													**58800**								
SD-76	MK-SD-76-12.8/13.8	12.8	13.8	7/26/2018							**77.8** J+	**1.3** J-	**208**													**67000**								
SD-76	MK-SD-76-13.8/14.8	13.8	14.8	7/26/2018							**125** J+	**1.59** J-	**288**													**65200**								
SD-76	MK-SD-76-14.8/15.8	14.8	15.8	7/26/2018							**123** J+	**1.37** J-	**230**													**70600**								
SD-76	MK-SD-76-15.8/16.6	15.8	16.6	7/26/2018							**269** J+	**1.55** J-	**415**													**84600**								
SD-76	MK-SD-76-17.8/18.8	17.8	18.8	7/26/2018							**340** J+	**2.83** J-	**457**													**110000**								
SD-76	MK-SD-76-18.8/19.8	18.8	19.8	7/26/2018							**728** J+	**4.48** J-	**578**													**80100**								
SD-76	MK-SD-76-19.8/20.8	19.8	20.8	7/26/2018							**437** J+	**4.43** J-	**275**													**87100**								
SD-76	MK-SD-76-20.8/21.8	20.8	21.8	7/26/2018							**345** J+	**2.7** J-	**238**													**118000**								
SD-76	MK-SD-76-22.8/23.8	22.8	23.8	7/26/2018							**19.8** J+	**0.0693** J-	**19.6**													**69700**								
SD-76	MK-SD-76-23.8/24.8	23.8	24.8	7/26/2018							**7.11** J+	**0.0929** R	**4.29**													**58800**								
SD-76	MK-SD-76-24.8/26.2	24.8	26.2	7/26/2018							**3.49** J+	**0.0982** R	**1.92**													**56400**								
SD-77	MK-SD-77-0.0/0.5	0	0.5	7/25/2018	**2.37**	**0.0783**	**0.524**	**0.0198** J	**0.889**	**2.14**	**21** J	**0.0812** J-	**77.3** J													**35100**								
SD-77	MK-SD-77-0.5/1.5	0.5	1.5	7/25/2018	**3**	**0.159**	**0.311**	**0.0249**	**1.64**	**2.18**	**85** J	**0.263** J-	**272** J													**54400**								
SD-77	MK-SD-77-1.5/2.5	1.5	2.5	7/25/2018							**252** J	**0.303** J-	**401** J													**41300**								
SD-77	MK-SD-77-2.5/3.5	2.5	3.5	7/25/2018							**2100**	**0.682** J-	**477**													**50200**								
SD-77	MK-SD-77-3.5/4.5	3.5	4.5	7/25/2018							**3720**	**3.24** J-	**490**													**77800**								
SD-77	MK-SD-77-4.5/5.5	4.5	5.5	7/25/2018							**1140**	**2.55** J-	**428**													**58500**								
SD-77	MK-SD-77-7.1/8.1	7.1	8.1	7/25/2018							**193**	**1.27** J-	**348**													**47900**								
SD-77	MK-SD-77-8.1/9.5	8.1	9.5	7/25/2018							**299**	**1.3** J-	**477**													**88600**								
SD-77	MK-SD-77-12.1/13.1	12.1	13.1	7/25/2018							**465** J	**4.07** J-	**495** J													**59900**								
SD-77	MK-SD-77-13.1/14.1	13.1	14.1	7/25/2018							**584** J	**6.34** J-	**566** J													**77300**								
SD-77	MK-SD-77-14.1/15.2	14.1	15.2	7/25/2018							**662** J	**6.45** J-	**500** J													**61500**								
SD-77	MK-SD-77-17.1/18.1	17.1	18.1	7/25/2018							**33.8** J	**0.0661** J-	**29.9** J													**39300**								
SD-77	MK-SD-77-18.1/19.1	18.1	19.1	7/25/2018							**0.4086** J+	**0.0977** R	**0.337** J+													**62500**								
SD-77	MK-SD-77-19.1/20.0	19.1	20	7/25/2018							**0.4086** J+	**0.0938** R	**0.337** J+													**47700**								
SD-77	MK-SD-77-20.0/21.0	20	21	7/25/2018							**6.56**	**0.099** R	**8.16**													**29600**								
SD-78	MK-SD-78-0.0/0.5	0	0.5	7/25/2018	**2.03**	**0.0792**	**0.436**	**0.165** J	**0.924**	**1.33**	**19.6**	**0.057** J	**40**													**33800**								
SD-78	MK-SD-78-0.5/1.5	0.5	1.5	7/25/2018	**1.51**	**0.049** J	**0.453** J	**0.042** J	**0.57**	**1.17**	**32.5**	**0.0965**	**70.6**													**55900**								
SD-78	MK-SD-78-1.5/2.5	1.5	2.5	7/25/2018							**150**	**0.278**	**268**													**62400**								
SD-78	MK-SD-78-2.5/3.5	2.5	3.5	7/25/2018							**4470**	**0.579**	**560**													**76100**								
SD-78	MK-SD-78-3.5/4.5	3.5	4.5	7/25/2018							**2450**	**1.58** J-	**685**													**69500**								
SD-78	MK-SD-78-4.5/5.0	4.5	5	7/25/2018							**226**	**1.22** J-	**399**													**88700**								
SD-78	MK-SD-78-7.1/8.1	7.1	8.1	7/25/2018							**458**	**1.4** J-	**515**													**113000**								
SD-78	MK-SD-78-8.1/9.1	8.1	9.1	7/25/2018							**126** J	**1.33** J-	**301** J													**41900**								
SD-78	MK-SD-78-9.1/10.1	9.1	10.1	7/25/2018							**288** J	**2.36** J-	**448** J													**70100**								
SD-78	MK-SD-78-10.1/10.9	10.1	10.9	7/25/2018							**271**	**1.17** J-	**424**													**93900**								
SD-78	MK-SD-78-12.1/13.1	12.1	13.1	7/25/2018							**248**	**1.29** J-	**457**													**124000**								
SD-78	MK-SD-78-13.1/14.2	13.1	14.2	7/25/2018							**176**	**1.67** J-	**348**													**107000**								
SD-79	MK-SD-79-0.0/0.5	0	0.5	7/25/2018	**1.09**	**0.054**	**0.322**	0.0221 U	**0.396**	**0.796**	**37.8**	**0.155** J-	**107**													**38200**								
SD-79	MK-SD-79-0.5/1.5	0.5	1.5	7/25/2018	**3.93**	**0.204**	**1.16**	**0.0332**	**1.79**	**3.1**	**54.9**	**2.27** J-	**152**													**45900**								
SD-79	MK-SD-79-1.5/2.5	1.5	2.5	7/25/2018							**74.6**	**0.338** J-	**251**													**63100**								
SD-79	MK-SD-79-2.5/3.5	2.5	3.5	7/25/2018							**50.1**	**0.361** J-	**376**													**45600**								
SD-79	MK-SD-79-3.5/4.3	3.5	4.3	7/25/2018							**1850**	**0.962** J-	**379**													**77400**								
SD-79	MK-SD-79-7.4/8.4	7.4	8.4	7/25/2018							**238**	**1.55** J-	**410**													**80800**								
SD-79	MK-SD-79-8.4/9.4	8.4	9.4	7/25/2018							**196**	**1.12** J-	**327**													**95100**								
SD-79	MK-SD-79-9.4/10.7	9.4	10.7	7/25/2018							**446**	**1.29** J-	**382**													**132000**								
SD-79	MK-SD-79-10.7/11.7	10.7	11.7	7/25/2018							**10.9**	**0.092** R	**8.88**													**37000**								
SD-80	MK-SD-80-0.0/0.5	0	0.5	7/25/2018	**4.46**	**0.33**	**0.345**	**0.0333**	**2.81**	**3.21**	**3150** J	**1.11** J-	**510**													**41300**								
SD-80	MK-SD-80-0.5/1.5	0.5	1.5	7/25/2018	**2.13**	**0.207**	**0.142**	**0.0258**	**1.67**	**1.48**	**1380** J	**1.12** J-	**380**													**47000**								
SD-80	MK-SD-80-0.5/2.5	0.5	2.5	7/30/2018																							**0**	**22.5**					**77.5**
SD-80	MK-SD-80-1.5/2.9	1.5	2.9	7/25/2018							**248** J	**2.17** J-	**434**													**67800**								
SD-80	MK-SD-80-5.8/6.8	5.8	6.8	7/25/2018							**10.4** J	**0.0953** R	**7.17**													**34100**								
SD-80	MK-SD-80-5.8/7.8	5.8	7.8	7/30/2018																							**0**	**0.1**					**99.9**
SD-81	MK-SD-81-0.0/0.5	0	0.5	7/25/2018	**6.02**	**0.248**	**1.78**	**0.0331**	**2.3**	**4.5**	**26.8**	**0.151** J-	**46.2**													**70000** J								
SD-81	MK-SD-81-0.5/1.5	0.5	1.5	7/25/2018	**1.35**	**0.0535**	**0.179**	0.0222 U	**0.609**	**0.921**	**38.2**	**0.153** J-	**68.3**													**63300** J								
SD-81	MK-SD-81-1.5/2.5	1.5	2.5	7/25/2018							**33.6**	**0.176** J-	**72.1**													**76200** J								
SD-81	MK-SD-81-2.8/3.8	2.8	3.8	7/25/2018							**115**	**1.33** J-	**269**													**67600**								
SD-81	MK-SD-81-3.8/4.6	3.8	4.6	7/25/2018							**94.5**	**0.834** J-	**240**													**73300**								
SD-81	MK-SD-81-7.8/8.8	7.8	8.8	7/25/2018							**3.42**	**0.0782** R	**2.4**													**44100**								
SD-81	MK-SD-81-8.8/9.8	8.8	9.8	7/25/2018							**2.87**	**0.0648** R	**2.19**													**45300**								
SD-81	MK-SD-81-9.8/10.6	9.8	10.6	7/25/2018							**2.71**	**0.0817** R	**2.28**													**35300**								
SD-81	MK-SD-81-12.8/13.8	12.8	13.8	7/25/2018							**3.7**	**0.0934** R	**2.25**													**32600** J								
SD-81	MK-SD-81-13.8/14.8	13.8	14.8	7/25/2018							**4.24**	**0.087** R	**2.45**													**33600** J								
SD-81	MK-SD-81-14.8/15.7	14.8	15.7	7/25/2018							**4.55**	**0.0978** R	**2.6**													**51800** J								
SD-81	MK-SD-81-17.8/18.8	17.8	18.8	7/25/2018							**4.14**	**0.08** R	**4.38** J+													**61100**								
SD-81	MK-SD-81-18.8/20.5	18.8	20.5	7/25/2018							**4.2**	**0.0845** R	**4.24**													**64400**								
SD-81	MK-SD-81-20.5/21.3	20.5	21.3	7/25/2018							**5.95**	**0.0924** R	**7.18**													**42200**								

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Focused Feasibity Study, Milwaukee Estuary AOC, Milwaukee, Wisconsin

					PCB										PAH												
Analyte Group																											
Analyte					Total PCB	Aroclor 1260	Aroclor 1254	Aroclor 1268	Aroclor 1221	Aroclor 1232	Aroclor 1248	Aroclor 1016	Aroclor 1262	Aroclor 1242	Total PAH	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b)-fluoranthene	Benzo(e)pyrene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h)anthracene
Unit					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
WI CBSQG PEC					1										22.8												
WI CBSQG PEC 3x					3										68.4												
WI CBSQG PEC 5x					5										114												
TSCA					50																						
Location code	Sample ID	Start Depth (feet)	End Depth (feet)	Date	Total PCB	Aroclor 1260	Aroclor 1254	Aroclor 1268	Aroclor 1221	Aroclor 1232	Aroclor 1248	Aroclor 1016	Aroclor 1262	Aroclor 1242	Total PAH	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b)-fluoranthene	Benzo(e)pyrene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h)anthracene
SD-82	MK-SD-82-0.0/0.5	0	0.5	7/19/2018	**0.92**	**0.0833**	0.0442 U	0.0442 U	0.0442 U	0.0442 U	0.0442 U	0.0442 U	0.0442 U	**0.836 J**	**21.2**	**0.0252**	**0.146**	**0.027**	**0.357**	**1.5**	**1.49**	**2.36**	**1.14**	**0.907**	**0.843**	**1.77**	**0.236**
SD-82	MK-SD-82-0.5/1.5	0.5	1.5	7/19/2018	**2.5**	**0.335**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**2.14 J**	**29.7**	**0.0271**	**0.184**	**0.0608**	**0.427**	**2.02**	**2.26**	**3.45**	**1.72**	**1.63**	**1.13**	**2.42**	**0.42**
SD-82	MK-SD-82-1.5/2.5	1.5	2.5	7/19/2018	**91**	**3.01 J**	4.43 U	4.43 U	4.43 U	4.43 U	4.43 U	4.43 U	4.43 U	**88 J**													
SD-82	MK-SD-82-2.5/3.5	2.5	3.5	7/19/2018	**1.4**	0.00269 U	**0.335**	0.00269 U	0.00269 U	0.00269 U	0.00269 U	0.00269 U	0.00269 U	**1.03**													
SD-82	MK-SD-82-3.5/4.9	3.5	4.9	7/19/2018	**0.87**	0.0218 U	**0.295**	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	**0.578**													
SD-82	MK-SD-82-6.1/7.1	6.1	7.1	7/19/2018	**0.096**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.0959**													
SD-82	MK-SD-82-7.1/8.1	7.1	8.1	7/19/2018	0.011 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U													
SD-82	MK-SD-82-8.1/8.7	8.1	8.7	7/19/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-82	MK-SD-82-11.1/12.1	11.1	12.1	7/19/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-82	MK-SD-82-12.1/13.1	12.1	13.1	7/19/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-82	MK-SD-82-13.1/14.1	13.1	14.1	7/19/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-82	MK-SD-82-14.1/15.3	14.1	15.3	7/19/2018	0.011 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U													
SD-82	MK-SD-82-16.1/17.1	16.1	17.1	7/19/2018	**0.17**	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**0.17**													
SD-82	MK-SD-82-17.1/18.1	17.1	18.1	7/19/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-82	MK-SD-82-18.1/19.1	18.1	19.1	7/19/2018	0.011 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U													
SD-82	MK-SD-82-19.1/20.2	19.1	20.2	7/19/2018	0.0088 U	0.0176 U	0.0176 U	0.0176 U	0.0176 U	0.0176 U	0.0176 U	0.0176 U	0.0176 U	0.0176 U													
SD-82	MK-SD-82-21.1/22.1	21.1	22.1	7/19/2018	0.011 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U													
SD-82	MK-SD-82-22.1/23.1	22.1	23.1	7/19/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-82	MK-SD-82-23.1/24.5	23.1	24.5	7/19/2018	0.011 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U													
SD-83	MK-SD-83-0.0/0.5	0	0.5	7/20/2018	**7.5**	**0.943**	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	**6.59**	**73.5**	**0.499**	**1.36**	**0.156**	**2.95**	**8.24**	**7.89**	**12.5**	**5.96**	**4.49**	**4.36**	**9.39**	**1.31**
SD-83	MK-SD-83-0.5/1.5	0.5	1.5	7/20/2018	**3.4**	**0.472 J**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**2.88 J**	**42.5**	**0.212 J**	**0.499 J**	**0.0609**	**1.19 J**	**2.8**	**2.57**	**4.25**	**2.01**	**1.42 J**	**1.37 J**	**3.3**	**0.413 J**
SD-83	MK-SD-83-1.5/2.5	1.5	2.5	7/20/2018	**2.6**	**0.311**	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	**2.26**													
SD-83	MK-SD-83-1.5/3.5	1.5	3.5	7/30/2018																							
SD-83	MK-SD-83-2.5/3.5	2.5	3.5	7/20/2018	**3.8**	0.0221 U	**0.906 J**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**2.88**													
SD-83	MK-SD-83-3.5/4.5	3.5	4.5	7/20/2018	**0.38**	**0.0474 J**	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**0.334**													
SD-83	MK-SD-83-4.5/5.8	4.5	5.8	7/20/2018	0.011 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U													
SD-83	MK-SD-83-7.1/8.1	7.1	8.1	7/20/2018	**0.069**	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**0.0691**													
SD-83	MK-SD-83-8.1/9.1	8.1	9.1	7/20/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-83	MK-SD-83-9.1/10.3	9.1	10.3	7/20/2018	0.011 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U													
SD-83	MK-SD-83-12.1/13.1	12.1	13.1	7/20/2018	**0.078**	**0.0198 J**	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**0.0582**													
SD-83	MK-SD-83-12.1/14.1	12.1	14.1	7/30/2018																							
SD-83	MK-SD-83-13.1/14.1	13.1	14.1	7/20/2018	0.011 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U													
SD-83	MK-SD-83-14.1/14.8	14.1	14.8	7/20/2018	0.011 U	0.0215 U	0.0215 U	0.0215 U	0.0215 U	0.0215 U	0.0215 U	0.0215 U	0.0215 U	0.0215 U													
SD-83	MK-SD-83-17.1/18.1	17.1	18.1	7/20/2018	0.011 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U													
SD-83	MK-SD-83-18.1/19.1	18.1	19.1	7/20/2018	0.011 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U	0.0218 U													
SD-83	MK-SD-83-18.1/20.1	18.1	20.1	7/30/2018																							
SD-83	MK-SD-83-19.1/20.1	19.1	20.1	7/20/2018	0.011 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U													
SD-83	MK-SD-83-20.1/21.3	20.1	21.3	7/20/2018	0.011 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U	0.0217 U													
SD-83	MK-SD-83-22.1/22.8	22.1	22.8	7/20/2018	**1.8**	0.022 U	**0.448 J**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**1.33**													
SD-83	MK-SD-83-22.8/23.7	22.8	23.7	7/20/2018	0.011 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U	0.0216 U													
SD-84	MK-SD-84-0.0/0.5	0	0.5	7/19/2018	**2**	0.11 U	**0.534**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**1.43**	**17.8**	**0.0182**	**0.0953**	**0.0482**	**0.266**	**1.16**	**1.35**	**2.41**	**1.21**	**1.12**	**0.752**	**1.41**	**0.318**
SD-84	MK-SD-84-0.5/1.5	0.5	1.5	7/19/2018	**4.7**	0.0221 U	**1.12**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**3.53**	**35.9**	**0.0338**	**0.236**	**0.0606**	**0.597**	**2.2**	**2.42**	**4.52**	**2.22**	**1.85**	**1.5**	**2.91**	**0.514**
SD-84	MK-SD-84-1.5/2.1	1.5	2.1	7/19/2018	**25**	0.0221 U	**1.71 J**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**23.3**													
SD-84	MK-SD-84-3.5/4.5	3.5	4.5	7/19/2018	**0.28**	0.022 U	**0.046**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.233**													
SD-84	MK-SD-84-4.5/5.5	4.5	5.5	7/19/2018	**0.075**	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**0.0747**													
SD-84	MK-SD-84-5.5/6.5	5.5	6.5	7/19/2018	**0.025**	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	0.0219 U	**0.0252**													
SD-84	MK-SD-84-6.5/7.4	6.5	7.4	7/19/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 UJ	0.0222 U	0.0222 U	0.0222 U													
SD-84	MK-SD-84-8.5/9.5	8.5	9.5	7/19/2018	0.11 U	0.219 U	0.219 U	0.219 U	0.219 U	0.219 U	0.219 UJ	0.219 U	0.219 U	0.219 U													
SD-84	MK-SD-84-9.5/10.5	9.5	10.5	7/19/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 UJ	0.0221 U	0.0221 U	0.0221 U													
SD-84	MK-SD-84-10.5/11.5	10.5	11.5	7/19/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-84	MK-SD-84-11.5/12.1	11.5	12.1	7/19/2018	0.011 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U													
SD-85	MK-SD-85-0.0/0.5	0	0.5	7/18/2018	**0.57**	**0.144 J**	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**0.427 J**	**24**	**0.0373 J**	**0.104 J**	**0.027 J**	**0.239 J**	**1.5 J**	**1.96 J**	**3.84 J**	**1.78 J**	**0.617 J**	**1.28 J**	**1.93 J**	0.022 UJ
SD-85	MK-SD-85-0.5/1.5	0.5	1.5	7/18/2018	**1.1**	**0.18 J**	0.0444 U	0.0444 U	0.0444 U	0.0444 U	0.0444 U	0.0444 U	0.0444 U	**0.879 J**	**19.5**	**0.0185 J**	**0.0849**	**0.0395**	**0.224**	**1.2**	**1.52**	**2.55**	**1.27**	**1.22**	**0.874**	**1.72**	**0.267**
SD-85	MK-SD-85-1.5/2.5	1.5	2.5	7/18/2018	**1.9**	**0.314 J**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**1.6 J**													
SD-85	MK-SD-85-2.5/3.5	2.5	3.5	7/18/2018	**1.9**	**0.258 J**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**1.66 J**													
SD-85	MK-SD-85-3.5/4.4	3.5	4.4	7/18/2018	**1.8**	**0.315 J**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**1.52 J**													
SD-85	MK-SD-85-4.6/5.6	4.6	5.6	7/18/2018	**3.6**	**0.436 J**	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	**3.12 J**													
SD-85	MK-SD-85-5.6/6.6	5.6	6.6	7/18/2018	**3.9**	**0.475 J**	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	**3.4 J**													
SD-85	MK-SD-85-6.6/7.4	6.6	7.4	7/18/2018	**3.9**	**0.446 J**	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	**3.41 J**													
SD-85	MK-SD-85-9.6/10.6	9.6	10.6	7/18/2018	**2.9**	**0.43 J**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**2.42 J**													
SD-85	MK-SD-85-10.6/11.6	10.6	11.6	7/18/2018	**1.1**	**0.135 J**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**0.93 J**													
SD-85	MK-SD-85-11.6/12.6	11.6	12.6	7/18/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-85	MK-SD-85-12.6/13.3	12.6	13.3	7/18/2018	0.011 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U													
SD-85	MK-SD-85-14.6/15.6	14.6	15.6	7/18/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0122 U													
SD-85	MK-SD-85-15.6/16.6	15.6	16.6	7/18/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-85	MK-SD-85-16.6/17.6	16.6	17.6	7/18/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-85	MK-SD-85-19.1/20.1	19.1	20.1	7/18/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-85	MK-SD-85-20.1/21.5	20.1	21.5	7/18/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-85	MK-SD-85-24.1/25.0	24.1	25	7/18/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-86	MK-SD-86-0.0/0.5	0	0.5	7/18/2018	**0.8**	**0.13 J**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**0.671 J**	**30.2**	**0.0304**	**0.156**	**0.0288**	**0.429**	**2.13**	**2.44**	**3.79**	**1.99**	**1.93**	**1.35**	**2.51**	**0.143**
SD-86	MK-SD-86-0.0/2.0	0	2	7/30/2018																							
SD-86	MK-SD-86-0.5/1.5	0.5	1.5	7/18/2018	**2.7**	**0.239 J**	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	0.111 U	**2.42 J**	**41.8**	**0.0415**	**0.226**	**0.0843**	**0.61**	**2.87**	**3.29**	**5.03**	**2.55**	**2.44**	**1.67**	**3.51**	**0.564**
SD-86	MK-SD-88-0.5/2.5	0.5	2.5	7/30/2018																							
SD-86	MK-SD-86-1.5/2.5	1.5	2.5	7/18/2018	**4.6**	**0.509 J**	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	**4.11 J**													
SD-86	MK-SD-86-2.5/3.5	2.5	3.5	7/18/2018	**6.5**	**0.713 J**	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	0.221 U	**5.8 J**													
SD-86	MK-SD-88-2.5/4.5	2.5	4.5	7/30/2018																							
SD-86	MK-SD-86-3.5/4.5	3.5	4.5	7/18/2018	**4**	**0.622 J**	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	**3.35 J**													
SD-86	MK-SD-86-4.5/5.8	4.5	5.8	7/18/2018	**5.5**	**0.83 J**	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	0.222 U	**4.62 J**													
SD-86	MK-SD-86-7.3/8.4	7.3	8.4	7/18/2018	**4.9**	2.21 U	2.21 U	2.21 U	2.21 U	2.21 U	2.21 U	2.21 U	2.21 U	**4.93 J**													
SD-86	MK-SD-86-8.4/9.4	8.4	9.4	7/18/2018	**0.052**	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	**0.0524**													

Appendix A
Milwaukee River Downtown Reach - Sediment Analytical Results Summary
Focused Feasibity Study, Milwaukee Estuary AOC, Milwaukee, Wisconsin

					PAH						Metals																Metals								Physical Parameters							
Analyte Group																																									
Analyte					Fluoranthene	Fluorene	Indeno(1,2,3-Cd)Pyrene	Naphthalene	Phenanthrene	Pyrene	Chromium	Mercury	Lead	Iron	Manganese	Potassium	Sodium	Thallium	Antimony	Beryllium	Cobalt	Calcium	Cyanide	Magnesium	Vanadium	TOC	Gravel	Sand	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Fines
Unit					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	%	%	%	%	%	%	%
WI CBSQG PEC											110	1.1	130	40000	1100				25																
WI CBSQG PEC 3x											330	3.3	390	120000	3300				75																
WI CBSQG PEC 5x											550	5.5	650	200000	5500				125																
TSCA																																								
Location code	Sample ID	Start Depth (feet)	End Depth (feet)	Date	Fluoranthene	Fluorene	Indeno(1,2,3-Cd)Pyrene	Naphthalene	Phenanthrene	Pyrene	Chromium	Mercury	Lead	Iron	Manganese	Potassium	Sodium	Thallium	Antimony	Beryllium	Cobalt	Calcium	Cyanide	Magnesium	Vanadium	TOC	Gravel	Sand	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Fines
SD-82	MK-SD-82-0.0/0.5	0	0.5	7/19/2018	**3.82**	**0.178**	**0.919**	**0.0546**	**1.94**	**3.44**	**50.7** J	**0.205**	**194**													**62200**								
SD-82	MK-SD-82-0.5/1.5	0.5	1.5	7/19/2018	**4.97**	**0.253**	**1.6**	**0.0223**	**2.46**	**4.63**	**425** J	**0.36**	**323**													**72600**								
SD-82	MK-SD-82-1.5/2.5	1.5	2.5	7/19/2018							**2120** J	**4.57**	**586**													**83900**								
SD-82	MK-SD-82-2.5/3.5	2.5	3.5	7/19/2018							**1040** J+	**1.4**	**518**													**67600**								
SD-82	MK-SD-82-3.5/4.9	3.5	4.9	7/19/2018							**629**	**1.24**	**637**													**78700**								
SD-82	MK-SD-82-6.1/7.1	6.1	7.1	7/19/2018							**426**	**2.46**	**590**													**91800**								
SD-82	MK-SD-82-7.1/8.1	7.1	8.1	7/19/2018							**1040** J+	**7.57**	**919**													**103000**								
SD-82	MK-SD-82-8.1/8.7	8.1	8.7	7/19/2018							**745** J+	**7.71**	**591**													**120000**								
SD-82	MK-SD-82-11.1/12.1	11.1	12.1	7/19/2018							**521** J	**3.38**	**363**													**90500**								
SD-82	MK-SD-82-12.1/13.1	12.1	13.1	7/19/2018							**153** J	**0.648**	**129**													**59900**								
SD-82	MK-SD-82-13.1/14.1	13.1	14.1	7/19/2018							**11.1** J	**0.0249** J	**8.59**													**76500**								
SD-82	MK-SD-82-14.1/15.3	14.1	15.3	7/19/2018							**5.75** J	0.0874 U	**3.61**													**61200**								
SD-82	MK-SD-82-16.1/17.1	16.1	17.1	7/19/2018							**33.2** J	**0.179**	**43.5**													**62200**								
SD-82	MK-SD-82-17.1/18.1	17.1	18.1	7/19/2018							**4.88** J	0.0631 U	**3.09**													**47400**								
SD-82	MK-SD-82-18.1/19.1	18.1	19.1	7/19/2018							**3.63** J	0.0788 U	**2.54**													**52400**								
SD-82	MK-SD-82-19.1/20.2	19.1	20.2	7/19/2018							**4.56** J+	0.0989 U	**2.94**													**31900**								
SD-82	MK-SD-82-21.1/22.1	21.1	22.1	7/19/2018							**6.74** J+	0.0955 U	**6.86**													**44600**								
SD-82	MK-SD-82-22.1/23.1	22.1	23.1	7/19/2018							**5.13** J+	0.0989 U	**3.85**													**70100**								
SD-82	MK-SD-82-23.1/24.5	23.1	24.5	7/19/2018							**4.65** J+	0.0983 U	**2.92**													**39500**								
SD-83	MK-SD-83-0.0/0.5	0	0.5	7/20/2018	**2.68**	**1.99**	**4.7**	**0.82**	**2.09**	**2.16**	**400**	**7.79**	**585**													**63500**								
SD-83	MK-SD-83-0.5/1.5	0.5	1.5	7/20/2018	**7.84**	**0.774** J	**1.48** J	**0.265** J	**5.77**	**6.25**	**255**	**2.19**	**458**													**91100**								
SD-83	MK-SD-83-1.5/2.5	1.5	2.5	7/20/2018							**236**	**3.54**	**505**													**79700**								
SD-83	MK-SD-83-1.5/3.5	1.5	3.5	7/30/2018																							**0.4**	**18.3**						**81.3**
SD-83	MK-SD-83-2.5/3.5	2.5	3.5	7/20/2018							**273**	**1.72**	**455** J													**70200**								
SD-83	MK-SD-83-3.5/4.5	3.5	4.5	7/20/2018							**9.03** J	**3.77**	**8.61** J													**87200**								
SD-83	MK-SD-83-4.5/5.8	4.5	5.8	7/20/2018							**312**	**4.67**	**721**													**89500**								
SD-83	MK-SD-83-7.1/8.1	7.1	8.1	7/20/2018							**214**	**1.76**	**446** J													**48800**								
SD-83	MK-SD-83-8.1/9.1	8.1	9.1	7/20/2018							**85.3**	**5.3**	**186**													**62500**	**0**	**27.4**						**72.6**
SD-83	MK-SD-83-9.1/10.3	9.1	10.3	7/20/2018							**277**	**2.89**	**430**													**61600**	**0.1**	**64.7**						**35.2**
SD-83	MK-SD-83-12.1/13.1	12.1	13.1	7/20/2018							**28.7** J	**0.441**	**115** J													**33600**								
SD-83	MK-SD-83-12.1/14.1	12.1	14.1	7/30/2018																							**2.3**	**89.5**						**8.2**
SD-83	MK-SD-83-13.1/14.1	13.1	14.1	7/20/2018							**3.82**	0.0931 U	**2.57**													**38400**								
SD-83	MK-SD-83-14.1/14.8	14.1	14.8	7/20/2018							**2.58**	0.0989 U	**1.67**													**26100**								
SD-83	MK-SD-83-17.1/18.1	17.1	18.1	7/20/2018							**24.9**	**0.129**	**44.1**													**18800**								
SD-83	MK-SD-83-18.1/19.1	18.1	19.1	7/20/2018							**3.63**	0.0985 U	**2.65**													**29800**								
SD-83	MK-SD-83-18.1/20.1	18.1	20.1	7/30/2018																							**0.2**	**71.2**						**28.6**
SD-83	MK-SD-83-19.1/20.1	19.1	20.1	7/20/2018							**3.54**	0.0994 U	**2.61**													**31500**								
SD-83	MK-SD-83-20.1/21.3	20.1	21.3	7/20/2018							**3.61** J	0.0905 U	**2.04** J													**27100**								
SD-83	MK-SD-83-22.1/22.8	22.1	22.8	7/20/2018							**2.82**	**0.322**	**1.73**													**57300**								
SD-83	MK-SD-83-22.8/23.7	22.8	23.7	7/20/2018							**20.5**	0.0977 U	**30**													**47500**	**3**	**17.5**						**79.5**
SD-84	MK-SD-84-0.0/0.5	0	0.5	7/19/2018	**3.08**	**0.135**	**1.05**	**0.0211**	**1.2**	**2.17**	**229**	**0.309**	**363**													**59100**								
SD-84	MK-SD-84-0.5/1.5	0.5	1.5	7/19/2018	**6.87**	**0.312**	**1.77**	**0.0345**	**3.07**	**4.78**	**580**	**0.384**	**392**													**45800**								
SD-84	MK-SD-84-1.5/2.1	1.5	2.1	7/19/2018							**901**	**1.28**	**192**													**71200**								
SD-84	MK-SD-84-3.5/4.5	3.5	4.5	7/19/2018							**37.4** J+	**0.633**	**72**													**62100**								
SD-84	MK-SD-84-4.5/5.5	4.5	5.5	7/19/2018							**9.79** J+	**0.0564** J	**11.4**													**52000**								
SD-84	MK-SD-84-5.5/6.5	5.5	6.5	7/19/2018							**4.79** J+	0.0971 U	**3.63**													**41900**								
SD-84	MK-SD-84-6.5/7.4	6.5	7.4	7/19/2018							**6.39**	0.437 U	**4.43**													**72500**								
SD-84	MK-SD-84-8.5/9.5	8.5	9.5	7/19/2018							**12**	0.496 U	**17.5**													**57500**								
SD-84	MK-SD-84-9.5/10.5	9.5	10.5	7/19/2018							**6.88**	0.461 U	**4.83**													**73700**								
SD-84	MK-SD-84-10.5/11.5	10.5	11.5	7/19/2018							**6.41** J+	0.0982 U	**4.76**													**56300**								
SD-84	MK-SD-84-11.5/12.1	11.5	12.1	7/19/2018							**7.06** J+	0.0985 U	**11**													**67700**								
SD-85	MK-SD-85-0.0/0.5	0	0.5	7/18/2018	**4.43** J	**0.137** J	**0.656** J	**0.0389** J	**1.63** J	**3.77** J	**33.5**	**0.163**	**61.4**													**58000**								
SD-85	MK-SD-85-0.5/1.5	0.5	1.5	7/18/2018	**3.16**	**0.116**	**1.18**	**0.0249**	**1.35**	**2.7**	**44.9**	**0.194**	**79.9**													**46700**								
SD-85	MK-SD-85-1.5/2.5	1.5	2.5	7/18/2018							**55**	**0.357**	**114**													**41000**								
SD-85	MK-SD-85-2.5/3.5	2.5	3.5	7/18/2018							**78.3**	**0.399** J+	**142**													**42100**								
SD-85	MK-SD-85-3.5/4.4	3.5	4.4	7/18/2018							**48.4**	**0.352** J	**109**													**52400**								
SD-85	MK-SD-85-4.6/5.6	4.6	5.6	7/18/2018							**130**	**0.448** J+	**202**													**63100**								
SD-85	MK-SD-85-5.6/6.6	5.6	6.6	7/18/2018							**236**	**0.555** J+	**252**													**55800**								
SD-85	MK-SD-85-6.6/7.4	6.6	7.4	7/18/2018							**1290**	**0.692** J+	**293**													**69800**								
SD-85	MK-SD-85-9.6/10.6	9.6	10.6	7/18/2018							**288**	**0.391** J	**309**													**58800**								
SD-85	MK-SD-85-10.6/11.6	10.6	11.6	7/18/2018							**59.8**	**0.0536** J	**58.9**													**40000**								
SD-85	MK-SD-85-11.6/12.6	11.6	12.6	7/18/2018							**3.97**	0.083 U	**2.56**													**46600**								
SD-85	MK-SD-85-12.6/13.3	12.6	13.3	7/18/2018							**6.61**	0.0891 U	**4.85**													**35500**								
SD-85	MK-SD-85-14.6/15.6	14.6	15.6	7/18/2018							**4.92**	0.0842 U	**3.17**													**16100**								
SD-85	MK-SD-85-15.6/16.6	15.6	16.6	7/18/2018							**7.35**	0.089 U	**5.56**													**22400**								
SD-85	MK-SD-85-16.6/17.6	16.6	17.6	7/18/2018							**4.39**	0.0992 U	**2.68**													**24500**								
SD-85	MK-SD-85-19.1/20.1	19.1	20.1	7/18/2018							**3.84**	0.0983 U	**2.29**													**23400**								
SD-85	MK-SD-85-20.1/21.5	20.1	21.5	7/18/2018							**2.59**	0.0899 U	**2.04**													**38500**								
SD-85	MK-SD-85-24.1/25.0	24.1	25	7/18/2018							**4.13**	0.093 U	**6.61**													**27900**								
SD-86	MK-SD-86-0.0/0.5	0	0.5	7/18/2018	**5.08**	**0.208**	**1.65**	**0.045**	**2.13**	**4.19**	**38.4**	**0.144** J+	**106**													**32600**								
SD-86	MK-SD-86-0.0/2.0	0	2	7/30/2018																							**0**	**8.6**						**91.4**
SD-86	MK-SD-86-0.5/1.5	0.5	1.5	7/18/2018	**6.5**	**0.318**	**2.38**	**0.0462**	**3.3**	**6.35**	**82.6**	**0.403** J	**170**													**14800**								
SD-86	MK-SD-88-0.5/2.5	0.5	2.5	7/30/2018																							**0**	**11.1**						**88.9**
SD-86	MK-SD-86-1.5/2.5	1.5	2.5	7/18/2018							**30.3**	**0.414** J	**52.2**													**57700**								
SD-86	MK-SD-86-2.5/3.5	2.5	3.5	7/18/2018							**310**	**0.371** J+	**211**													**72400**								
SD-86	MK-SD-88-2.5/4.5	2.5	4.5	7/30/2018																							**0**	**16.2**						**83.8**
SD-86	MK-SD-86-3.5/4.5	3.5	4.5	7/18/2018							**240**	**0.364** J	**247**													**26400**								
SD-86	MK-SD-86-4.5/5.8	4.5	5.8	7/18/2018							**380**	**0.571** J+	**470**													**59700**								
SD-86	MK-SD-86-7.3/8.4	7.3	8.4	7/18/2018							**2170**	**1.76** J+	**674**													**65900**	**22.6**	**21**						**56.4**
SD-86	MK-SD-86-8.4/9.4	8.4	9.4	7/18/2018							**14.3** J	0.0838 U	**11.4**													**53200**	**0.4**	**21.7**						**77.9**

Appendix A
Milwaukee River Downtown Reach - Sediment Analytical Results Summary
Focused Feasibity Study, Milwaukee Estuary AOC, Milwaukee, Wisconsin

					PCB										PAH												
Analyte Group																											
Analyte					Total PCB	Aroclor 1260	Aroclor 1254	Aroclor 1268	Aroclor 1221	Aroclor 1232	Aroclor 1248	Aroclor 1016	Aroclor 1262	Aroclor 1242	Total PAH	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b)-fluoranthene	Benzo(e)pyrene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h)ant hracene
Unit					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
WI CBSQG PEC					1										22.8												
WI CBSQG PEC 3x					3										68.4												
WI CBSQG PEC 5x					5										114												
TSCA					50																						
Location code	Sample ID	Start Depth (feet)	End Depth (feet)	Date	Total PCB	Aroclor 1260	Aroclor 1254	Aroclor 1268	Aroclor 1221	Aroclor 1232	Aroclor 1248	Aroclor 1016	Aroclor 1262	Aroclor 1242	Total PAH	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b)-fluoranthene	Benzo(e)pyrene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h)ant hracene
SD-87	MK-SD-87-0.0/0.5	0	0.5	7/18/2018	**14.1**	**11.3**	0.552 U	0.552 U	0.552 U	0.552 U	0.552 U	0.552 U	0.552 U	**2.83 J**	**25.8**	**0.0878**	**0.732**	**0.0713**	**0.629**	**1.69**	**1.46**	**2.35**	**1.15**	**0.882**	**0.799**	**1.97**	**0.232**
SD-87	MK-SD-87-0.5/1.5	0.5	1.5	7/18/2018	**0.24**	**0.0307 J**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.205 J**	**46.5**	**0.217**	**0.813**	**0.101**	**1.23**	**3.13**	**2.82**	**4.16**	**2.19**	**1.74**	**1.34**	**3.61**	**0.446**
SD-87	MK-SD-87-1.5/2.5	1.5	2.5	7/18/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-87	MK-SD-87-2.5/3.3	2.5	3.3	7/18/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-87	MK-SD-87-6.3/7.3	6.3	7.3	7/18/2018	**0.021**	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	**0.0207 J**													
SD-87	MK-SD-87-7.3/8.3	7.3	8.3	7/18/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-87	MK-SD-87-8.3/9.3	8.3	9.3	7/18/2018	0.011 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U													
SD-87	MK-SD-87-9.3/9.9	9.3	9.9	7/18/2018	0.011 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U	0.0221 U													
SD-88	MK-SD-88-0.0/0.5	0	0.5	7/26/2018	**0.58**	**0.14 J+**	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	0.0222 U	**0.44 J+**	**3.7**	0.0221 U	**0.0222**	0.0221 U	**0.0488**	**0.197**	**0.205**	**0.406**	**0.229**	**0.0991**	**0.134**	**0.352**	**0.0297**
SD-88	MK-SD-88-0.5/1.5	0.5	1.5	7/17/2018	4.4 U	8.82 U	8.82 U	8.82 U	8.82 U	8.82 U	8.82 U	8.82 U	8.82 U	8.82 U	**36.5**	**0.0443**	**0.319**	**0.0257**	**0.434**	**2.68**	**2.52**	**4.22**	**2.13**	**1.84**	**1.44**	**3.19**	**0.599**
SD-88	MK-SD-88-1.5/2.5	1.5	2.5	7/17/2018	**4.3**	8.87 U	8.87 U	8.87 U	8.87 U	8.87 U	**4.28 J**	8.87 U	8.87 U	8.87 U													
SD-88	MK-SD-88-2.5/3.5	2.5	3.5	7/17/2018	**2.2**	**0.542**	0.443 U	0.443 U	0.443 U	0.443 U	**1.66**	0.443 U	0.443 U	0.443 U													
SD-88	MK-SD-88-3.5/4.5	3.5	4.5	7/17/2018	**3.9**	**1.03**	0.429 U	0.429 U	0.429 U	0.429 U	**2.89**	0.429 U	0.429 U	0.429 U													
SD-88	MK-SD-88-4.5/5.1	4.5	5.1	7/17/2018	**14.7**	**3.57**	0.881 U	0.881 U	0.881 U	0.881 U	**11.1**	0.881 U	0.881 U	0.881 U													
SD-88	MK-SD-88-5.6/6.6	5.6	6.6	7/17/2018	**12.8**	**2.27**	0.886 U	0.886 U	0.886 U	0.886 U	**10.5**	0.886 U	0.886 U	0.886 U													
SD-88	MK-SD-88-6.6/7.6	6.6	7.6	7/17/2018	**16**	**2.53 J**	0.887 U	0.887 U	0.887 U	0.887 U	**13.5**	0.887 U	0.887 U	0.887 U													
SD-88	MK-SD-88-6.6/8.6	6.6	8.6	7/30/2018																							
SD-88	MK-SD-88-7.6/8.6	7.6	8.6	7/17/2018	0.44 U	0.877 U	0.877 U	0.877 U	0.877 U	0.877 U	0.877 U	0.877 U	0.877 U	0.877 U													
SD-88	MK-SD-88-8.6/9.6	8.6	9.6	7/17/2018	0.43 U	0.868 U	0.868 U	0.868 U	0.868 U	0.868 U	0.868 U	0.868 U	0.868 U	0.868 U													
SD-88	MK-SD-88-10.6/12.0	10.6	12	7/17/2018	**0.41**	**0.077 J**	0.436 U	0.436 U	0.436 U	0.436 U	**0.329 J**	0.436 U	0.436 U	0.436 U													
SD-88	MK-SD-88-12.0/12.8	12	12.8	7/17/2018	0.22 U	0.439 U	0.439 U	0.439 U	0.439 U	0.439 U	0.439 U	0.439 U	0.439 U	0.439 U													
MK-SD-89	MK-SD-89-0.0/1.0	0	1	10/16/2021	**0.25**	0.13 U	**0.094 J**	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	**0.16 J**													
MK-SD-89	MK-SD-89-1.0/2.0	1	2	10/16/2021	**6.1**	**0.35 J**	**1.1 J**	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	**4.6**													
MK-SD-89	MK-SD-89-2.0/3.0	2	3	10/16/2021	**54**	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	**54**													
MK-SD-89	MK-SD-89-3.0/4.0	3	4	10/16/2021	**0.39**	**0.028 J**	**0.16 J**	0.089 UJ	0.089 UJ	0.089 UJ	0.089 UJ	0.089 UJ	0.089 UJ	**0.2 J**													
MK-SD-89	MK-SD-89-4.0/5.0	4	5	10/16/2021	0.034 U	0.068 U	0.068 U	0.068 U	0.068 U	0.068 U	0.068 U	0.068 U	0.068 U	0.068 U													
MK-SD-89	MK-SD-89-5.0/6.0	5	6	10/16/2021	**0.08 J**	**0.038 J**	**0.042 J**	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U													
MK-SD-90	MK-SD-90-0.0/1.0	0	1	10/16/2021	**35**	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	**35**													
MK-SD-90	MK-SD-90-1.0/2.0	1	2	10/16/2021	**0.4**	0.11 UJ	**0.059 J**	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	**0.34 J-**													
MK-SD-90	MK-SD-90-2.0/3.0	2	3	10/16/2021	**0.15**	**0.036 J**	0.085 UJ	0.085 UJ	0.085 UJ	0.085 UJ	0.085 UJ	0.085 UJ	0.085 UJ	**0.11 J-**													
MK-SD-90	MK-SD-90-4.0/5.0	4	5	10/16/2021	**0.22**	0.091 U	**0.029 J**	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U	**0.19**													
MK-SD-91	MK-SD-91-0.0/1.0	0	1	10/16/2021	**1.9**	0.22 U	**0.31**	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	**1.6**													
MK-SD-91	MK-SD-91-1.0/2.0	1	2	10/16/2021	**23**	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	**23**													
MK-SD-91	MK-SD-91-2.0/3.0	2	3	10/16/2021	**0.24**	0.075 U	**0.034 J**	0.075 U	0.075 U	0.075 U	0.075 U	0.075 U	0.075 U	**0.21**													
MK-SD-91	MK-SD-91-3.0/4.0	3	4	10/16/2021	**0.054 J**	**0.054 J**	0.069 U	0.069 U	0.069 U	0.069 U	0.069 U	0.069 U	0.069 U	0.069 U													
MK-SD-91	MK-SD-91-4.0/5.0	4	5	10/16/2021	**0.081**	**0.081**	0.072 U	0.072 U	0.072 U	0.072 U	0.072 U	0.072 U	0.072 U	0.072 U													
MK-SD-91	MK-SD-91-5.0/6.2	5	6.2	10/16/2021	**0.029 J**	**0.029 J**	0.078 U	0.078 U	0.078 U	0.078 U	0.078 U	0.078 U	0.078 U	0.078 U													
MK-SD-92	MK-SD-92-4.0/5.0	4	5	10/18/2021	**0.033 J**	**0.033 J**	0.079 UJ	0.079 UJ	0.079 UJ	0.079 UJ	0.079 UJ	0.079 UJ	0.079 UJ	0.079 UJ													
MK-SD-92	MK-SD-92-5.0/5.6	5	5.6	10/18/2021	0.046 U	0.091 UJ	0.091 UJ	0.091 UJ	0.091 UJ	0.091 UJ	0.091 UJ	0.091 UJ	0.091 UJ	0.091 UJ													
MK-SD-92	MK-SD-92-7.0/8.0	7	8	10/18/2021	0.046 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U													
MK-SD-92	MK-SD-92-8.0/9.0	8	9	10/18/2021	0.035 U	0.069 U	0.069 U	0.069 U	0.069 U	0.069 U	0.069 U	0.069 U	0.069 U	0.069 U													
MK-SD-93	MK-SD-93-3.4/4.4	3.4	4.4	10/18/2021	0.045 U	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U													
MK-SD-93	MK-SD-93-4.4/5.4	4.4	5.4	10/18/2021	0.03 U	0.059 U	0.059 U	0.059 U	0.059 U	0.059 U	0.059 U	0.059 U	0.059 U	0.059 U													
MK-SD-93	MK-SD-93-5.4/6.4	5.4	6.4	10/18/2021	0.029 U	0.057 U	0.057 U	0.057 U	0.057 U	0.057 U	0.057 U	0.057 U	0.057 U	0.057 U													
MK-SD-93	MK-SD-93-6.4/7.4	6.4	7.4	10/18/2021	0.028 U	0.055 U	0.055 U	0.055 U	0.055 U	0.055 U	0.055 U	0.055 U	0.055 U	0.055 U													
MK-SD-93	MK-SD-93-7.4/8.4	7.4	8.4	10/18/2021	0.029 U	0.057 U	0.057 U	0.057 U	0.057 U	0.057 U	0.057 U	0.057 U	0.057 U	0.057 U													
MK-SD-94	MK-SD-94-4.0/5.0	4	5	10/20/2021	**0.67**	**0.018 J**	**0.1 J**	0.058 U	0.058 U	0.058 U	0.058 U	0.058 U	0.058 U	**0.55**													
MK-SD-94	MK-SD-94-5.0/5.7	5	5.7	10/20/2021	**0.39**	**0.02 J**	**0.068**	0.061 U	0.061 U	0.061 U	0.061 U	0.061 U	0.061 U	**0.3**													
MK-SD-94	MK-SD-94-7.0/8.0	7	8	10/20/2021	**4**	**0.19 J**	**0.84 J**	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	**3**													
MK-SD-94	MK-SD-94-8.0/9.0	8	9	10/20/2021	**5.4**	**0.24 J**	**1.1**	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	**4.1**													
MK-SD-94	MK-SD-94-9.0/10.0	9	10	10/20/2021	**22.6**	**0.8 J**	**3.8**	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	**18**													
MK-SD-94	MK-SD-94-10.0/10.6	10	10.6	10/20/2021	**93.6**	9.5 U	**8.6 J**	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U	**85**													
MK-SD-94	MK-SD-94-12.0/13.0	12	13	10/20/2021	**3.9 J**	**0.5 J**	**2 J**	0.3 UJ	0.3 UJ	0.3 UJ	0.3 UJ	0.3 UJ	0.3 UJ	**1.4 J**													
MK-SD-94	MK-SD-94-13.0/13.9	13	13.9	10/20/2021	**9.1 J**	**0.53 J**	**2.7 J**	0.48 UJ	0.48 UJ	0.48 UJ	**5.9 J**	0.48 UJ	0.48 UJ	0.48 UJ													
MK-SD-95	MK-SD-95-7.5/8.7	7.5	8.7	10/20/2021	0.036 U	0.072 U	0.072 U	0.072 U	0.072 U	0.072 U	0.072 U	0.072 U	0.072 U	0.072 U													
MK-SD-95	MK-SD-95-8.7/9.7	8.7	9.7	10/20/2021	0.042 U	0.084 U	0.084 U	0.084 U	0.084 U	0.084 U	0.084 U	0.084 U	0.084 U	0.084 U													
MK-SD-95	MK-SD-95-9.7/10.2	9.7	10.2	10/20/2021	0.029 U	0.057 U	0.057 U	0.057 U	0.057 U	0.057 U	0.057 U	0.057 U	0.057 U	0.057 U													
MK-SD-96	MK-SD-96-1.4/2.4	1.4	2.4	10/22/2021	**30.5**	**1.5 J**	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	**29**													
MK-SD-96	MK-SD-96-2.4/3.4	2.4	3.4	10/22/2021	**11.4**	**0.38 J**	**2.4 J**	0.96 U	0.96 U	0.96 U	0.96 U	0.96 U	0.96 U	**8.6**													
MK-SD-96	MK-SD-96-3.4/4.4	3.4	4.4	10/22/2021	**0.6**	**0.12**	**0.3 J**	0.087 U	0.087 U	0.087 U	0.087 U	0.087 U	0.087 U	0.087 U	**0.18 J**												
MK-SD-96	MK-SD-96-4.4/5.4	4.4	5.4	10/22/2021	**0.33**	**0.042 J**	**0.16 J**	0.095 U	0.095 U	0.095 U	0.095 U	0.095 U	0.095 U	0.095 U	**0.13 J**												
MK-SD-96	MK-SD-96-5.4/6.3	5.4	6.3	10/22/2021	**0.14**	0.099 U	**0.1**	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	**0.039 J**												
MK-SD-97	MK-SD-97-1.0/2.0	1	2	10/20/2021	**33.4**	11 U	**5.4 J**	11 U	11 U	11 U	11 U	11 U	11 U	11 U	**28**												
MK-SD-97	MK-SD-97-2.0/3.0	2	3	10/20/2021	**3.2**	**0.29 J**	**1.8 J**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**1.1 J**												
MK-SD-97	MK-SD-97-3.0/4.0	3	4	10/20/2021	**0.82**	**0.1**	**0.39 J**	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	**0.33 J**												
MK-SD-97	MK-SD-97-4.0/5.0	4	5	10/20/2021	**0.17**	0.096 U	**0.093 J**	0.096 U	0.096 U	0.096 U	0.096 U	0.096 U	0.096 U	0.096 U	**0.078 J**												
MK-SD-97	MK-SD-97-5.0/5.5	5	5.5	10/20/2021	**0.13**	**0.035 J**	**0.057 J**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.037 J**												
MK-SD-98	MK-SD-98-2.0/3.0	2	3	10/20/2021	**0.43**	**0.15**	**0.17 J**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.11 J**												
MK-SD-98	MK-SD-98-3.0/4.0	3	4	10/20/2021	**0.2**	**0.06 J**	**0.093 J**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.043 J**												
MK-SD-98	MK-SD-98-4.0/5.0	4	5	10/20/2021	**0.24**	**0.13**	**0.038 J**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**0.071 J**												
MK-SD-98	MK-SD-98-5.0/6.0	5	6	10/20/2021	**0.2**	**0.14**	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	**0.059 J**												
MK-SD-98	MK-SD-98-6.0/6.8	6	6.8	10/20/2021	**0.081 J**	**0.081 J**	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U													
MK-SD-98	MK-SD-98-7.0/8.0	7	8	10/20/2021	0.042 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U													
MK-SD-98	MK-SD-98-8.0/9.0	8	9	10/20/2021	0.042 U	0.084 U	0.084 U	0.084 U	0.084 U	0.084 U	0.084 U	0.084 U	0.084 U	0.084 U													
MK-SD-99	MK-SD-99-1.5/2.8	1.5	2.8	10/15/2021	**0.32**	**0.048 J**	**0.16 J**	0.098 U	0.098 U	0.098 U	0.098 U	0.098 U	0.098 U	0.098 U	**0.11 J**												
MK-SD-99	MK-SD-99-5.0/6.5	5	6.5	10/15/2021	**0.07 J**	**0.031 J**	**0.039 J**	0.095 UJ	0.095 UJ	0.095 UJ	0.095 UJ	0.095 UJ	0.095 UJ	0.095 UJ													

Appendix A
Milwaukee River Downtown Reach - Sediment Analytical Results Summary
Focused Feasibity Study, Milwaukee Estuary AOC, Milwaukee, Wisconsin

Analyte Group					PAH						Metals								Metals								Physical Parameters							
Analyte					Fluoranthene	Fluorene	Indeno(1,2,3-Cd)Pyrene	Naphthalene	Phenanthrene	Pyrene	Chromium	Mercury	Lead	Iron	Manganese	Potassium	Sodium	Thallium	Antimony	Beryllium	Cobalt	Calcium	Cyanide	Magnesium	Vanadium	TOC	Gravel	Sand	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Fines
Unit					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	%	%	%	%	%	%	%
WI CBSQG PEC											110	1.1	130	40000	1100				25															
WI CBSQG PEC 3x											330	3.3	390	120000	3300				75															
WI CBSQG PEC 5x											550	5.5	650	200000	5500				125															
TSCA																																		
Location code	Sample ID	Start Depth (feet)	End Depth (feet)	Date	Fluoranthene	Fluorene	Indeno(1,2,3-Cd)Pyrene	Naphthalene	Phenanthrene	Pyrene	Chromium	Mercury	Lead	Iron	Manganese	Potassium	Sodium	Thallium	Antimony	Beryllium	Cobalt	Calcium	Cyanide	Magnesium	Vanadium	TOC	Gravel	Sand	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Fines
SD-87	MK-SD-87-0.0/0.5	0	0.5	7/18/2018	**4.61**	**0.717**	**0.87**	**0.132**	**3.59**	**3.81**	**226**	**2.67**	**1140**													**60200**								
SD-87	MK-SD-87-0.5/1.5	0.5	1.5	7/18/2018	**8.17**	**0.938**	**1.71**	**0.471**	**6.32**	**7.11**	**382**	**4.69**	**426**													**42100**								
SD-87	MK-SD-87-1.5/2.5	1.5	2.5	7/18/2018							**162**	**2.16**	**311**													**96300**								
SD-87	MK-SD-87-2.5/3.3	2.5	3.3	7/18/2018							**6.72**	**0.0329 J**	**7.33**													**66900**								
SD-87	MK-SD-87-6.3/7.3	6.3	7.3	7/18/2018							**5.67**	**0.0256 J**	**4.6**													**60000**								
SD-87	MK-SD-87-7.3/8.3	7.3	8.3	7/18/2018							**4.59**	0.096 U	**3.16**													**62600**								
SD-87	MK-SD-87-8.3/9.3	8.3	9.3	7/18/2018							**2.62**	**0.0351 J**	**2.79**													**56900**								
SD-87	MK-SD-87-9.3/9.9	9.3	9.9	7/18/2018							**6.6**	0.0808 U	**5.55**													**63800**								
SD-88	MK-SD-88-0.0/0.5	0	0.5	7/26/2018	**0.886**	**0.0285**	**0.0996**	0.0221 U	**0.36**	**0.608**	**13.9**	**0.174 J-**	**29.5**													**57500**								
SD-88	MK-SD-88-0.5/1.5	0.5	1.5	7/17/2018	**6.42**	**0.447**	**1.62**	**0.0371**	**3.12**	**5.41**	**229 J**	**1.6**	**197 J**													**74700**								
SD-88	MK-SD-88-1.5/2.5	1.5	2.5	7/17/2018							**494 J**	**1.38**	**469 J**													**76700**								
SD-88	MK-SD-88-2.5/3.5	2.5	3.5	7/17/2018							**90.6 J**	**1.41**	**91.3 J**													**72200**								
SD-88	MK-SD-88-3.5/4.5	3.5	4.5	7/17/2018							**128 J**	**1.96**	**332 J**													**77900**								
SD-88	MK-SD-88-4.5/5.1	4.5	5.1	7/17/2018							**344 J**	**1.9**	**527 J**													**81400**								
SD-88	MK-SD-88-5.6/6.6	5.6	6.6	7/17/2018							**226 J**	**1.81**	**506 J**													**63000**								
SD-88	MK-SD-88-6.6/7.6	6.6	7.6	7/17/2018							**298 J**	**1.49**	**420 J**													**65200**								
SD-88	MK-SD-88-6.6/8.6	6.6	8.6	7/30/2018																							**0**	**5.2**						**94.8**
SD-88	MK-SD-88-7.6/8.6	7.6	8.6	7/17/2018							**257 J**	**1.45**	**329 J**													**54500**								
SD-88	MK-SD-88-8.6/9.6	8.6	9.6	7/17/2018							**373 J**	**1.79**	**456 J**													**79800**	**0.2**	**4.6**						**95.2**
SD-88	MK-SD-88-10.6/12.0	10.6	12	7/17/2018							**228 J**	**1.85**	**607 J**													**77300**	**1.4**	**11.4**						**87.2**
SD-88	MK-SD-88-12.0/12.8	12	12.8	7/17/2018							**12.8 J**	0.0715 U	**40.1 J**													**40100**	**0**	**5.1**						**94.9**
MK-SD-89	MK-SD-89-0.0/1.0	0	1	10/16/2021																														
MK-SD-89	MK-SD-89-1.0/2.0	1	2	10/16/2021																														
MK-SD-89	MK-SD-89-2.0/3.0	2	3	10/16/2021																														
MK-SD-89	MK-SD-89-3.0/4.0	3	4	10/16/2021																														
MK-SD-89	MK-SD-89-4.0/5.0	4	5	10/16/2021																														
MK-SD-89	MK-SD-89-5.0/6.0	5	6	10/16/2021																														
MK-SD-90	MK-SD-90-0.0/1.0	0	1	10/16/2021																														
MK-SD-90	MK-SD-90-1.0/2.0	1	2	10/16/2021																														
MK-SD-90	MK-SD-90-2.0/3.0	2	3	10/16/2021																														
MK-SD-90	MK-SD-90-4.0/5.0	4	5	10/16/2021																														
MK-SD-91	MK-SD-91-0.0/1.0	0	1	10/16/2021																														
MK-SD-91	MK-SD-91-1.0/2.0	1	2	10/16/2021																														
MK-SD-91	MK-SD-91-2.0/3.0	2	3	10/16/2021																														
MK-SD-91	MK-SD-91-3.0/4.0	3	4	10/16/2021																														
MK-SD-91	MK-SD-91-4.0/5.0	4	5	10/16/2021																														
MK-SD-91	MK-SD-91-5.0/6.2	5	6.2	10/16/2021																														
MK-SD-92	MK-SD-92-4.0/5.0	4	5	10/18/2021																														
MK-SD-92	MK-SD-92-5.0/5.6	5	5.6	10/18/2021																														
MK-SD-92	MK-SD-92-7.0/8.0	7	8	10/18/2021																														
MK-SD-92	MK-SD-92-8.0/9.0	8	9	10/18/2021																														
MK-SD-93	MK-SD-93-3.4/4.4	3.4	4.4	10/18/2021																														
MK-SD-93	MK-SD-93-4.4/5.4	4.4	5.4	10/18/2021																														
MK-SD-93	MK-SD-93-5.4/6.4	5.4	6.4	10/18/2021																														
MK-SD-93	MK-SD-93-6.4/7.4	6.4	7.4	10/18/2021																														
MK-SD-93	MK-SD-93-7.4/8.4	7.4	8.4	10/18/2021																														
MK-SD-94	MK-SD-94-4.0/5.0	4	5	10/20/2021																														
MK-SD-94	MK-SD-94-5.0/5.7	5	5.7	10/20/2021																														
MK-SD-94	MK-SD-94-7.0/8.0	7	8	10/20/2021																														
MK-SD-94	MK-SD-94-8.0/9.0	8	9	10/20/2021																														
MK-SD-94	MK-SD-94-9.0/10.0	9	10	10/20/2021																														
MK-SD-94	MK-SD-94-10.0/10.6	10	10.6	10/20/2021																														
MK-SD-94	MK-SD-94-12.0/13.0	12	13	10/20/2021																														
MK-SD-94	MK-SD-94-13.0/13.9	13	13.9	10/20/2021																														
MK-SD-95	MK-SD-95-7.5/8.7	7.5	8.7	10/20/2021																														
MK-SD-95	MK-SD-95-8.7/9.7	8.7	9.7	10/20/2021																														
MK-SD-95	MK-SD-95-9.7/10.2	9.7	10.2	10/20/2021																														
MK-SD-96	MK-SD-96-1.4/2.4	1.4	2.4	10/22/2021																														
MK-SD-96	MK-SD-96-2.4/3.4	2.4	3.4	10/22/2021																														
MK-SD-96	MK-SD-96-3.4/4.4	3.4	4.4	10/22/2021																														
MK-SD-96	MK-SD-96-4.4/5.4	4.4	5.4	10/22/2021																														
MK-SD-96	MK-SD-96-5.4/6.3	5.4	6.3	10/22/2021																														
MK-SD-97	MK-SD-97-1.0/2.0	1	2	10/20/2021																														
MK-SD-97	MK-SD-97-2.0/3.0	2	3	10/20/2021																														
MK-SD-97	MK-SD-97-3.0/4.0	3	4	10/20/2021																														
MK-SD-97	MK-SD-97-4.0/5.0	4	5	10/20/2021																														
MK-SD-97	MK-SD-97-5.0/5.5	5	5.5	10/20/2021																														
MK-SD-98	MK-SD-98-2.0/3.0	2	3	10/20/2021																														
MK-SD-98	MK-SD-98-3.0/4.0	3	4	10/20/2021																														
MK-SD-98	MK-SD-98-4.0/5.0	4	5	10/20/2021																														
MK-SD-98	MK-SD-98-5.0/6.0	5	6	10/20/2021																														
MK-SD-98	MK-SD-98-6.0/6.8	6	6.8	10/20/2021																														
MK-SD-98	MK-SD-98-7.0/8.0	7	8	10/20/2021																														
MK-SD-98	MK-SD-98-8.0/9.0	8	9	10/20/2021																														
MK-SD-99	MK-SD-99-1.5/2.8	1.5	2.8	10/15/2021																														
MK-SD-99	MK-SD-99-5.0/6.5	5	6.5	10/15/2021																														

Appendix A
Milwaukee River Downtown Reach - Sediment Analytical Results Summary
Focused Feasibity Study, Milwaukee Estuary AOC, Milwaukee, Wisconsin

				Analyte Group	PCB									
				Analyte	Total PCB	Aroclor 1260	Aroclor 1254	Aroclor 1268	Aroclor 1221	Aroclor 1232	Aroclor 1248	Aroclor 1016	Aroclor 1262	Aroclor 1242
				Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
				WI CBSQG PEC	1									
				WI CBSQG PEC 3x	3									
				WI CBSQG PEC 5x	5									
				TSCA	50									
Location code	Sample ID	Start Depth (feet)	End Depth (feet)	Date	Total PCB	Aroclor 1260	Aroclor 1254	Aroclor 1268	Aroclor 1221	Aroclor 1232	Aroclor 1248	Aroclor 1016	Aroclor 1262	Aroclor 1242
MK-SD-100	MK-SD-100-0.0/0.1	0	1	10/15/2021	**0.46**	**0.048** J	**0.23** J	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	**0.18** J
MK-SD-100	MK-SD-100-1.0/2.0	1	2	10/15/2021	**0.61**	**0.075** J	**0.27** J	0.095 U	0.095 U	0.095 U	0.095 U	0.095 U	0.095 U	**0.26** J
MK-SD-100	MK-SD-100-2.0/3.0	2	3	10/15/2021	**0.038** J	0.097 U	**0.038** J	0.097 U	0.097 U	0.097 U	0.097 U	0.097 U	0.097 U	0.097 U
MK-SD-100	MK-SD-100-5.0/6.0	5	6	10/15/2021	**0.91** J	**0.062** J	**0.22** J	0.089 UJ	0.089 UJ	0.089 UJ	0.089 UJ	0.089 UJ	0.089 UJ	**0.63** J
MK-SD-100	MK-SD-100-6.0/7.0	6	7	10/15/2021	**12.3** J	**0.83** J	**2.4** J	1.1 UJ	1.1 UJ	1.1 UJ	1.1 UJ	1.1 UJ	1.1 UJ	**9.1** J
MK-SD-101	MK-SD-101-5.0/6.0	5	6	10/15/2021	**1.7**	**0.19** J	**0.86** J-	0.091 UJ	0.091 UJ	0.091 UJ	0.091 UJ	0.091 UJ	0.091 UJ	**0.61** J
MK-SD-101	MK-SD-101-6.0/7.0	6	7	10/15/2021	**0.65**	**0.077** J	**0.34** J	0.097 UJ	0.097 UJ	0.097 UJ	0.097 UJ	0.097 UJ	0.097 UJ	**0.23** J
MK-SD-101	MK-SD-101-7.0/7.8	7	7.8	10/15/2021	0.034 U	0.067 UJ	0.067 UJ	0.067 UJ	0.067 UJ	0.067 UJ	0.067 UJ	0.067 UJ	0.067 UJ	0.067 UJ
MK-SD-101	MK-SD-101-10.0/11.0	10	11	10/15/2021	0.032 U	0.063 UJ	0.063 UJ	0.063 UJ	0.063 UJ	0.063 UJ	0.063 UJ	0.063 UJ	0.063 UJ	0.063 UJ
MK-SD-101	MK-SD-101-11.0/12.0	11	12	10/15/2021	0.031 U	0.061 UJ	0.061 UJ	0.061 UJ	0.061 UJ	0.061 UJ	0.061 UJ	0.061 UJ	0.061 UJ	0.061 UJ
MK-SD-102	MK-SD-102-0.0/1.0	0	1	10/15/2021	**0.59**	0.068 U	**0.1** J	0.068 U	0.068 U	0.068 U	0.068 U	0.068 U	0.068 U	**0.49**
MK-SD-102	MK-SD-102-1.0/2.0	1	2	10/15/2021	**0.33**	0.066 U	**0.074**	0.066 U	0.066 U	0.066 U	0.066 U	0.066 U	0.066 U	**0.26**
MK-SD-102	MK-SD-102-2.0/3.0	2	3	10/15/2021	**0.77**	0.066 UJ	**0.15** J	0.066 UJ	0.066 UJ	0.066 UJ	0.066 UJ	0.066 UJ	0.066 UJ	**0.62** J-
MK-SD-102	MK-SD-102-3.0/4.0	3	4	10/15/2021	**1.2**	**0.048** J	**0.23** J	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	**0.89**
MK-SD-102	MK-SD-102-6.0/7.0	6	7	10/15/2021	**1.6**	**0.06** J	**0.31** J-	0.086 UJ	0.086 UJ	0.086 UJ	0.086 UJ	0.086 UJ	0.086 UJ	**1.2** J-
MK-SD-103	MK-SD-103-4.2/5.3	4.2	5.3	10/14/2021	**0.75**	**0.088** J	**0.39** J	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	**0.27** J
MK-SD-103	MK-SD-103-7.0/8.2	7	8.2	10/14/2021	**0.39**	**0.056** J	**0.19** J	0.092 UJ	0.092 UJ	0.092 UJ	0.092 UJ	0.092 UJ	0.092 UJ	**0.14** J
MK-SD-103	MK-SD-103-8.2/9.2	8.2	9.2	10/14/2021	**0.15**	0.094 UJ	**0.086** J	0.094 UJ	0.094 UJ	0.094 UJ	0.094 UJ	0.094 UJ	0.094 UJ	**0.068** J
MK-SD-103	MK-SD-103-9.2/10.5	9.2	10.5	10/14/2021	0.041 U	0.082 UJ	0.082 UJ	0.082 UJ	0.082 UJ	0.082 UJ	0.082 UJ	0.082 UJ	0.082 UJ	0.082 UJ
MK-SD-104	MK-SD-104-3.0/4.0	3	4	10/15/2021	**27**	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	**27**
MK-SD-104	MK-SD-104-4.0/4.5	4	4.5	10/15/2021	**13.7**	1.6 U	**1.7** J	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	**12**
MK-SD-104	MK-SD-104-5.5/6.5	5.5	6.5	10/15/2021	**50**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	**50**
MK-SD-104	MK-SD-104-6.5/7.8	6.5	7.8	10/15/2021	**0.47**	0.08 UJ	**0.092** J	0.08 UJ	0.08 UJ	0.08 UJ	0.08 UJ	0.08 UJ	0.08 UJ	**0.38** J-
MK-SD-105	MK-SD-105-0.0/1.0	0	1	10/14/2021	**25.7** J	**0.73** J	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	**25** J
MK-SD-105	MK-SD-105-1.0/2.3	1	2.3	10/14/2021	**3.4**	**0.24** J	**1.2** J	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	**2**
MK-SD-105	MK-SD-105-5.0/6.0	5	6	10/14/2021	**0.72**	**0.078** J	**0.38** J	0.09 UJ	0.09 UJ	0.09 UJ	0.09 UJ	0.09 UJ	0.09 UJ	**0.26** J
MK-SD-106	MK-SD-106-0.0/1.0	0	1	10/15/2021	**62**	4.7 U	4.7 U	4.7 U	4.7 U	4.7 U	4.7 U	4.7 U	4.7 U	**62**
MK-SD-106	MK-SD-106-1.0/2.0	1	2	10/15/2021	**11.1**	**0.62** J	**3.2**	0.9 U	0.9 U	0.9 U	0.9 U	0.9 U	0.9 U	**7.3**
MK-SD-106	MK-SD-106-2.0/3.0	2	3	10/15/2021	**2**	**0.23** J	**0.89** J	0.092 UJ	0.092 UJ	0.092 UJ	0.092 UJ	0.092 UJ	0.092 UJ	**0.91** J
MK-SD-106	MK-SD-106-3.0/4.0	3	4	10/15/2021	**0.6**	**0.077** J	**0.29** J	0.093 UJ	0.093 UJ	0.093 UJ	0.093 UJ	0.093 UJ	0.093 UJ	**0.23** J
MK-SD-107	MK-SD-107-0.0/0.4	0	0.4	10/14/2021	**0.89** J	**0.054** J	**0.18** J	0.075 UJ	0.075 UJ	0.075 UJ	0.075 UJ	0.075 UJ	0.075 UJ	**0.66** J
MK-SD-107	MK-SD-107-0.4/1.4	0.4	1.4	10/14/2021	**2.4** J	**0.14** J	**0.47** J	0.26 UJ	0.26 UJ	0.26 UJ	0.26 UJ	0.26 UJ	0.26 UJ	**1.8** J
MK-SD-107	MK-SD-107-1.4/2.4	1.35	2.35	10/14/2021	**3.3** J	**0.24** J	**0.82** J	0.34 UJ	0.34 UJ	0.34 UJ	0.34 UJ	0.34 UJ	0.34 UJ	**2.2** J
MK-SD-107	MK-SD-107-2.4/3.4	2.4	3.4	10/14/2021	**0.12**	0.096 U	**0.069** J	0.096 U	0.096 U	0.096 U	0.096 U	0.096 U	0.096 U	**0.05** J
MK-SD-107	MK-SD-107-3.4/4.4	3.35	4.35	10/14/2021	0.043 U	0.085 UJ	0.085 UJ	0.085 UJ	0.085 UJ	0.085 UJ	0.085 UJ	0.085 UJ	0.085 UJ	0.085 UJ
MK-SD-107	MK-SD-107-4.4/5.4	4.35	5.35	10/14/2021	0.045 U	0.09 UJ	0.09 UJ	0.09 UJ	0.09 UJ	0.09 UJ	0.09 UJ	0.09 UJ	0.09 UJ	0.09 UJ
MK-SD-107	MK-SD-107-5.4/6.4	5.35	6.35	10/14/2021	0.043 U	0.085 UJ	0.085 UJ	0.085 UJ	0.085 UJ	0.085 UJ	0.085 UJ	0.085 UJ	0.085 UJ	0.085 UJ
MK-SD-107	MK-SD-107-7.0/8.0	7	8	10/14/2021	0.046 U	0.091 UJ	0.091 UJ	0.091 UJ	0.091 UJ	0.091 UJ	0.091 UJ	0.091 UJ	0.091 UJ	0.091 UJ
MK-SD-107	MK-SD-107-15.0/16.1	15	16.1	10/14/2021	0.039 U	0.078 U	0.078 U	0.078 U	0.078 U	0.078 U	0.078 U	0.078 U	0.078 U	0.078 U
MK-SD-108	MK-SD-108-0.0/0.8	0	0.8	10/14/2021	**1.5** J	**0.19** J	**0.74** J	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	**0.59** J
MK-SD-108	MK-SD-108-0.8/1.8	0.8	1.8	10/14/2021	**0.26** J	**0.049** J	**0.066** J	0.091 UJ	0.091 UJ	0.091 UJ	0.091 UJ	0.091 UJ	0.091 UJ	**0.14** J
MK-SD-108	MK-SD-108-1.8/2.8	1.8	2.8	10/14/2021	**0.033** J	**0.033** J	0.085 UJ	0.085 UJ	0.085 UJ	0.085 UJ	0.085 UJ	0.085 UJ	0.085 UJ	0.085 UJ
MK-SD-108	MK-SD-108-2.8/3.8	2.8	3.8	10/14/2021	0.045 U	0.09 UJ	0.09 UJ	0.09 UJ	0.09 UJ	0.09 UJ	0.09 UJ	0.09 UJ	0.09 UJ	0.09 UJ
MK-SD-108	MK-SD-108-3.8/4.8	3.8	4.8	10/14/2021	0.044 U	0.087 UJ	0.087 UJ	0.087 UJ	0.087 UJ	0.087 UJ	0.087 UJ	0.087 UJ	0.087 UJ	0.087 UJ
MK-SD-108	MK-SD-108-4.8/6.8	4.8	6.8	10/14/2021	0.044 U	0.087 UJ	0.087 UJ	0.087 UJ	0.087 UJ	0.087 UJ	0.087 UJ	0.087 UJ	0.087 UJ	0.087 UJ
MK-SD-108	MK-SD-108-6.8/7.8	6.8	7.8	10/14/2021	0.049 U	0.098 UJ	0.098 UJ	0.098 UJ	0.098 UJ	0.098 UJ	0.098 UJ	0.098 UJ	0.098 UJ	0.098 UJ

Analyte Group	PAH													
Analyte	Total PAH	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b)-fluoranthene	Benzo(e)pyrene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h)anthracene
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
WI CBSQG PEC	22.8												
WI CBSQG PEC 3x	68.4												
WI CBSQG PEC 5x	114												
	Total PAH	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b)-fluoranthene	Benzo(e)pyrene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h)anthracene

Appendix A
Milwaukee River Downtown Reach - Sediment Analytical Results Summary
Focused Feasibity Study, Milwaukee Estuary AOC, Milwaukee, Wisconsin

					PAH						Metals								Metals							Physical Parameters							
Analyte Group																																
Analyte					Fluoranthene	Fluorene	Indeno(1,2,3-Cd)Pyrene	Naphthalene	Phenanthrene	Pyrene	Chromium	Mercury	Lead	Iron	Manganese	Potassium	Sodium	Thallium	Antimony	Beryllium	Cobalt	Calcium	Cyanide	Magnesium	Vanadium	TOC	Gravel	Sand	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Fines
Unit					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	%	%	%	%	%	%
WI CBSQG PEC											110	1.1	130	40000	1100				25													
WI CBSQG PEC 3x											330	3.3	390	120000	3300				75													
WI CBSQG PEC 5x											550	5.5	650	200000	5500				125													
TSCA																																
Location code	Sample ID	Start Depth (feet)	End Depth (feet)	Date	Fluoranthene	Fluorene	Indeno(1,2,3-Cd)Pyrene	Naphthalene	Phenanthrene	Pyrene	Chromium	Mercury	Lead	Iron	Manganese	Potassium	Sodium	Thallium	Antimony	Beryllium	Cobalt	Calcium	Cyanide	Magnesium	Vanadium	TOC	Gravel	Sand	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Fines
MK-SD-100	MK-SD-100-0.0/0.1	0	1	10/15/2021																												
MK-SD-100	MK-SD-100-1.0/2.0	1	2	10/15/2021																												
MK-SD-100	MK-SD-100-2.0/3.0	2	3	10/15/2021																												
MK-SD-100	MK-SD-100-5.0/6.0	5	6	10/15/2021																												
MK-SD-100	MK-SD-100-6.0/7.0	6	7	10/15/2021																												
MK-SD-101	MK-SD-101-5.0/6.0	5	6	10/15/2021																												
MK-SD-101	MK-SD-101-6.0/7.0	6	7	10/15/2021																												
MK-SD-101	MK-SD-101-7.0/7.8	7	7.8	10/15/2021																												
MK-SD-101	MK-SD-101-10.0/11.0	10	11	10/15/2021																												
MK-SD-101	MK-SD-101-11.0/12.0	11	12	10/15/2021																												
MK-SD-102	MK-SD-102-0.0/1.0	0	1	10/15/2021																												
MK-SD-102	MK-SD-102-1.0/2.0	1	2	10/15/2021																												
MK-SD-102	MK-SD-102-2.0/3.0	2	3	10/15/2021																												
MK-SD-102	MK-SD-102-3.0/4.0	3	4	10/15/2021																												
MK-SD-102	MK-SD-102-6.0/7.0	6	7	10/15/2021																												
MK-SD-103	MK-SD-103-4.2/5.3	4.2	5.3	10/14/2021																												
MK-SD-103	MK-SD-103-7.0/8.2	7	8.2	10/14/2021																												
MK-SD-103	MK-SD-103-8.2/9.2	8.2	9.2	10/14/2021																												
MK-SD-103	MK-SD-103-9.2/10.5	9.2	10.5	10/14/2021																												
MK-SD-104	MK-SD-104-3.0/4.0	3	4	10/15/2021																												
MK-SD-104	MK-SD-104-4.0/4.5	4	4.5	10/15/2021																												
MK-SD-104	MK-SD-104-5.5/6.5	5.5	6.5	10/15/2021																												
MK-SD-104	MK-SD-104-6.5/7.8	6.5	7.8	10/15/2021																												
MK-SD-105	MK-SD-105-0.0/1.0	0	1	10/14/2021																												
MK-SD-105	MK-SD-105-1.0/2.3	1	2.3	10/14/2021																												
MK-SD-105	MK-SD-105-5.0/6.0	5	6	10/14/2021																												
MK-SD-106	MK-SD-106-0.0/1.0	0	1	10/15/2021																												
MK-SD-106	MK-SD-106-1.0/2.0	1	2	10/15/2021																												
MK-SD-106	MK-SD-106-2.0/3.0	2	3	10/15/2021																												
MK-SD-106	MK-SD-106-3.0/4.0	3	4	10/15/2021																												
MK-SD-107	MK-SD-107-0.0/0.4	0	0.4	10/14/2021																												
MK-SD-107	MK-SD-107-0.4/1.4	0.4	1.4	10/14/2021																												
MK-SD-107	MK-SD-107-1.4/2.4	1.35	2.35	10/14/2021																												
MK-SD-107	MK-SD-107-2.4/3.4	2.4	3.4	10/14/2021																												
MK-SD-107	MK-SD-107-3.4/4.4	3.35	4.35	10/14/2021																												
MK-SD-107	MK-SD-107-4.4/5.4	4.35	5.35	10/14/2021																												
MK-SD-107	MK-SD-107-5.4/6.4	5.35	6.35	10/14/2021																												
MK-SD-107	MK-SD-107-7.0/8.0	7	8	10/14/2021																												
MK-SD-107	MK-SD-107-15.0/16.1	15	16.1	10/14/2021																												
MK-SD-108	MK-SD-108-0.0/0.8	0	0.8	10/14/2021																												
MK-SD-108	MK-SD-108-0.8/1.8	0.8	1.8	10/14/2021																												
MK-SD-108	MK-SD-108-1.8/2.8	1.8	2.8	10/14/2021																												
MK-SD-108	MK-SD-108-2.8/3.8	2.8	3.8	10/14/2021																												
MK-SD-108	MK-SD-108-3.8/4.8	3.8	4.8	10/14/2021																												
MK-SD-108	MK-SD-108-4.8/6.8	4.8	6.8	10/14/2021																												
MK-SD-108	MK-SD-108-6.8/7.8	6.8	7.8	10/14/2021																												

Appendix B
Technical Memorandum: Focused List of Metals to Delineate the Nature and Extent of Sediment Contamination

Jacobs

Appendix B
Technical Memorandum

Subject	**Focused List of Metals to Delineate the Nature and Extent of Sediment Contamination**
Project Name	Milwaukee Estuary Area of Concern, City of Milwaukee, Milwaukee County, Wisconsin Task Order 68HE0520F0069, Contract No. 68HE0519D00007
From	Jacobs
Date	October 20, 2022

1. Introduction

This technical memorandum presents the rationale for using a focused list of metals (chromium, lead, and mercury) along with total polychlorinated biphenyls (PCBs) and total polycyclic aromatic hydrocarbons (PAHs) to delineate the nature and extent of contamination and establish remedial target areas (RTAs) in the focused feasibility studies (FFSs) for the Milwaukee Estuary Area of Concern (AOC). The work herein was completed for the U.S. Environmental Protection Agency (EPA) Great Lakes National Program Office by Jacobs[1], in accordance with Task Order 68HE0520F0069 under Contract No. 68HE0519D00007. Jacobs is preparing FFS documents for in-channel sediment for the Milwaukee River Downtown Reach and for portions of three additional project areas including the South Menomonee Canal, the Kinnickinnic (KK) River, and the Milwaukee Bay (MKE Bay). The data from these project areas and two additional project areas (Menomonee River and Milwaukee River Third Ward) were evaluated (Figure 1). Data from the Floodplains Reach Project Area are not included in this memorandum because a different approach was used to describe the nature and extent of contamination and delineate RTAs.

2. Data Evaluation Methods and Results

Previous documents prepared for the Milwaukee Estuary AOC reported that a subset of metals tended to exhibit more exceedances relative to screening values. For example, the *Focused Feasibility Study Report, Menomonee and Milwaukee Rivers* (CH2M 2019a) reported that in the Menomonee River and in the downstream end of the Milwaukee River (currently referred to as the Downtown Reach Project Area), cadmium, chromium, lead and mercury frequently exceeded their respective Probable Effect Concentration (PEC)[2] values, and lead and chromium exhibited the greatest frequency and magnitude of exceedance. The *Site Characterization Report, Milwaukee River Downstream Sediments* documented that in the Milwaukee River Downtown Reach, chromium, lead, and mercury most frequently exceeded their respective PEC values (CH2M 2019b). The *100% Final Site Investigation Report, Characterization of Sediments in South Menomonee Canal* (Anchor QEA 2021) concluded that lead, chromium, and copper were the metals with the greatest number of PEC exceedances.

[1] On December 15, 2017, CH2M HILL Companies Ltd. and its subsidiaries including CH2M HILL, Inc. became part of Jacobs.

[2] PECs from the Wisconsin Consensus-based Sediment Quality Guidelines or PCB screening levels are used for comparative purposes to evaluate the data.

This evaluation considers the AOC-wide sediment FFS data set that covers six project areas. Metals with corresponding PECs included in the data set are chromium, mercury, lead, nickel, arsenic, cadmium, copper, zinc, iron, manganese, and antimony.

Iron, manganese, and antimony were not included in this analysis. Antimony was not widely analyzed, and where the data are available, the concentrations do not exceed the antimony PEC. Iron and manganese were not analyzed in all investigations; where analyzed, PEC exceedances were limited to seven samples in the KK River (Table 1). Five of the iron or manganese PEC exceedances were in surface sediment samples collected along the KK River shoreline during the Solvay Coke Remedial Investigation (Arcadis 2016); PAH concentrations also exceeded the PEC in four of these samples. The remaining two samples were collected by the U.S. Army Corps of Engineers as part of the 2020 investigation of the KK federal navigation channel and the exceedances occur at 5 to 7 feet and 9 to 11.4 feet below the sediment surface (bss).

The co-occurrence of what is termed herein as the five primary chemicals of concern (COCs) (total PCBs, total PAHs, chromium, mercury, and lead) and the other nonprimary metals (arsenic, cadmium, copper, nickel, and zinc) was evaluated using the following stepwise process:

1. An exceedance factor was calculated for each COC in each sample by dividing the COC concentration by the corresponding PEC or the 1 milligram per kilogram (mg/kg) threshold level for PCBs.
2. The maximum exceedance factor was selected for each sample for the nonprimary metals (arsenic, cadmium, copper, nickel, and zinc).
3. The maximum exceedance factor was selected for each sample for the primary metals (chromium, lead, and mercury).
4. The maximum exceedance factor for the nonprimary metals was plotted against the maximum exceedance factor for the primary metals for each sample (Figure 2).

The plot shown on Figure 2 is divided into four quadrants where gridlines representing exceedance factors of 1 for primary and nonprimary metals intersect:

- Upper left quadrant: Samples plotting in this quadrant have a PEC exceedance for a nonprimary metal, but not for a primary metal.
- Upper right quadrant: Samples plotting in this quadrant have co-located PEC exceedances for primary and nonprimary metals.
- Lower left quadrant: Samples plotting in this quadrant have no PEC exceedances for primary or nonprimary metals.
- Lower right quadrant: Samples plotting in this quadrant have a PEC exceedance for a primary metal but not for a nonprimary metal.

Information on Figure 2 illustrates that a relatively small number of samples fall into the upper left quadrant (approximately 40 samples out of nearly 2,500 samples included in this evaluation). These are samples where PEC exceedances of a nonprimary metal are not co-located with an exceedance of a primary metal.

The analysis was then expanded to also include total PAHs and total PCBs as follows:

1. The maximum exceedance factor was determined for the five primary COCs for each sample (chromium, lead, mercury, total PCBs, and total PAHs).
2. The maximum exceedance factor for the nonprimary metals was plotted against the maximum exceedance factor for the five primary COCs for each sample (Figure 3).

As shown on Figure 3, the addition of total PAHs and total PCBs to the analysis reduces the number of samples plotting in the upper left quadrant to six. These samples are summarized in Table 2. Nickel, cadmium, copper, or zinc nominally exceed the PEC in these samples, with exceedance factors ranging from approximately 1.1 to 1.3.

3. Conclusion

The evaluation presented in this memorandum demonstrates that designation of chromium, lead, and mercury as primary COCs (along with total PAHs and total PCBs) is an appropriate and protective means of delineating RTAs for each of the five sediment project areas within the Milwaukee Estuary AOC. PEC exceedances of nonprimary metals are either not significant within the AOC (iron and manganese) or are predominantly co-located with chromium, lead, or mercury PEC exceedances (arsenic, cadmium, copper, nickel, and zinc). When co-occurrence with total PCBs and total PAHs is also considered, there are only six samples with nonprimary metal PEC exceedances that are not co-located with a primary COC PEC or PCB threshold level exceedance, and the PEC exceedance factors in these cases are all less than two.

4. References

Anchor QEA. 2021. *100% Final Site Investigation Report, Characterization of Sediments in South Menomonee Canal, Milwaukee, Wisconsin.* Prepared for Wisconsin Department of Natural Resources and U.S. Environmental Protection Agency Great Lakes National Program Office; EPA GLRI Grant No. GL-00E02392. August.

ARCADIS. 2016. *Milwaukee Solvay Coke & Gas Site Remedial Investigation Report.* 311 East Greenfield Avenue, Milwaukee, WI. August.

CH2M HILL, Inc. (CH2M). 2019a. *Focused Feasibility Study Report, Menomonee and Milwaukee Rivers, Milwaukee Estuary Area of Concern, Milwaukee, Wisconsin.* Prepared for U.S. Environmental Protection Agency Great Lakes National Program Office. Task Order No. 0029/Contract No. EP-R5-11-09. May.

CH2M HILL, Inc. (CH2M). 2019b. *Final Site Characterization Report, Milwaukee River Downstream Sediments, Milwaukee Estuary Area of Concern, Milwaukee, Wisconsin.* Prepared for U.S. Environmental Protection Agency Great Lakes National Program Office. Task Order No. 0029/Contract No. EP-R5-11-09. December.

Tables

Table 1. Summary of Iron and Manganese Results Exceeding PECs

Milwaukee Estuary AOC, Milwaukee, Wisconsin

							Total PCB mg/kg		Total PAH mg/kg		Metals: Chromium mg/kg		Metals: Mercury mg/kg		Metals: Lead mg/kg		Metals: Nickel mg/kg		Metals: Arsenic mg/kg		Metals: Cadmium mg/kg		Metals: Copper mg/kg		Metals: Zinc mg/kg		Metals: Iron mg/kg		Metals: Manganese mg/kg		Metals: Antimony mg/kg	
						WI CBSQG PEC	1		22.8		110		1.1		130		49		33		5		150		460		40000		1100		25	
						WI CBSQG PEC 3x	3		68.4		330		3.3		390		147		99		15		450		1380		120000		3300		75	
						WI CBSQG PEC 5x	5		114		550		5.5		650		245		165		25		750		2300		200000		5500		125	
						TSCA	50																									
Reach	**Investigation**	**Location Code**	**Sample ID**	**Start Depth (feet)**	**End Depth (feet)**	**Date**																										
Kinnickinnic River	Solvay Coke RI Report	P-3	P-3-0.0/0.0	0	0	11/7/2013			**72.8**		**24**		**0.14**	J	**160**						**2.1**				**650**		**52000**	J				
Kinnickinnic River	Solvay Coke RI Report	P-4	P-4-0.0/0.0	0	0	11/7/2013			**37.7**		**23**		**0.42**	J	**51**						**2.6**				**410**		**100000**	J				
Kinnickinnic River	Solvay Coke RI Report	P-1	P-1-0.0/0.0	0	0	11/7/2013			**26.2**		**48**		**0.14**	J	**110**						**0.65**				**120**		**470000**	J				
Kinnickinnic River	Solvay Coke RI Report	P-2	P-2-0.0/0.0	0	0	11/7/2013			**32**		**250**		**1.1**	J	**1200**						**3.8**				**1000**		**450000**	J				
Kinnickinnic River	Solvay Coke RI Report	P-4A	P-4A-0.0/0.0	0	0	11/7/2013			**1.3**		**78**		**0.0062**	J	**3.5**						**0.043**	J			**13**		**400000**	J				
Kinnickinnic River	2020 USACE KK River Navigation Channel	MKE-FNC09	MKE-NAV20-09-5-7	5	7	10/6/2020	**0.25**		**2.3**		**120**		**0.49**		**260**		**24**		**9.1**		**4.1**		**58**		**310**		**98000**		**590**			
Kinnickinnic River	2020 USACE KK River Navigation Channel	MKE-FNC45	MKE-NAV20-45-9-11.4	9	11.4	10/15/2020	0.005	U	**0.0077**		**23**		**0.026**	J	**10**		**21**		**2.1**		**0.2**		**14**		**53**		**29000**		**1600**			

Notes:

Wisconsin Consensus-based Sediment Quality Guidelines (WI CBSQG) Probable Effects Concentrations (PECs) or PCB threshold levels are used for comparative purposes to evaluate the data.

Aroclors and total PCBs from Solvay Coke RI Report not included due to discrepancies in source data

Blue shading = results greater than 1 mg/kg PCB screening level value or greater than PEC

Gold shading = results greater than 3 mg/kg PCB screening level value or 3x PEC

Orange shading = results greater than 5 mg/kg PCB screening level value or 5x PEC

Pink shading = results greater than TSCA concentration (50 mg/kg)

3x = 3 times

5x = 5 times

ID = identification

J = Estimated

KK = Kinnickinnic

mg/kg = milligram(s) per kilogram

PAH = polycyclic aromatic hydrocarbon

PCB = polychlorinated biphenyl

R = rejected

RI = Remedial Investigation

TOC = total organic carbon

TSCA = Toxic Substances Control Act

U = Nondetect

USACE = United States Army Corps of Engineers

Table 2. Summary of Samples with Non-Co-Located Exceedances of Non-Primary Metals

Milwaukee Estuary AOC, Milwaukee, Wisconsin

							Total PCB mg/kg		Total PAH mg/kg		Metals: Chromium mg/kg		Metals: Mercury mg/kg		Metals: Lead mg/kg		Metals: Nickel mg/kg		Metals: Arsenic mg/kg		Metals: Cadmium mg/kg		Metals: Copper mg/kg		Metals: Zinc mg/kg	
						WI CBSQG PEC	1		22.8		110		1.1		130		49		33		5		150		460	
						WI CBSQG PEC 3x	3		68.4		330		3.3		390		147		99		15		450		1380	
						WI CBSQG PEC 5x	5		114		550		5.5		650		245		165		25		750		2300	
						TSCA	50																			
Reach	**Investigation**	**Location Code**	**Sample ID**	**Start Depth (feet)**	**End Depth (feet)**	**Date**																				
Kinnickinnic River	2021 WDNR FFS Data Gap	KKR-21-060	KKR-21-060-07-09-210820	7	9	8/20/2021	0.0025	U	**5.6**		**14.8**	J	**0.2**		**54.8**		**11**		**3.5**		**0.34**		**170**		**170**	
Kinnickinnic River	2020 WDNR Kinnickinnic Sediment Characterization	KKR-20-002	KKR-20-002-C-01-03-200916	1	3	9/16/2020	**0.062**		**20.8**		**20**	J-	**0.054**		**37**		**11**	J	**4.2**		**5.2**		**27**	J	**240**	
Kinnickinnic River	2020 USACE KK River Navigation Channel	MKE-FNC16	MKE-NAV20-16-00-01	0	1	10/5/2020	0.0065	U	**0.1**		**77**		0.027	U	**16**		**59**		**6.9**		**0.33**		**170**		**200**	
Menomonee River	2015 GLNPO Menomonee River Site Characterization	R5-11	MR-SD-R5-11-0.0/0.5	0	0.5	11/3/2015	**0.33**		**12.2**		**61.4**		**0.245**	J	**117**		**31.2**		**6.92**	J	2.69	U	**120**		**499**	
Milwaukee Bay	2020 WDNR Milwaukee Bay Sediment Characterization	MKE-20-108	MKE-20-108-C-00-01-200922	0	1	9/22/2020	**0.014**		**4.5**		**33**	J	**0.045**	J-	**30.8**		**52.5**		**10**		**0.34**		**86.5**		**123**	
South Menomonee Canal	2021 WDNR FFS Data Gap	SMC-21-007	SMC-21-007-00-01-210821	0	1	8/21/2021	0.0027	U	**0.23**		**11.9**		**0.033**		**10.8**		**74.5**		**2.9**		**0.3**		**18.6**		**64.2**	J

Notes:

Wisconsin Consensus-based Sediment Quality Guidelines (WI CBSQG) Probable Effects Concentrations (PECs) or PCB screening levels are used for comparative purposes to evaluate the data.

Blue shading = results greater than 1 mg/kg PCB screening level value or greater than PEC

Gold shading = results greater than 3 mg/kg PCB screening level value or 3x PEC

Orange shading = results greater than 5 mg/kg PCB screening level value or 5x PEC

Pink shading = results greater than TSCA concentration (50 mg/kg)

3x = 3 times

5x = 5 times

FFS = Focus Feasibility Study

GLNPO = Great Lakes National Program Office

ID = identification

J = Estimated

KK = Kinnickinnic

mg/kg = milligram(s) per kilogram

PAH = polycyclic aromatic hydrocarbon

PCB = polychlorinated biphenyl

R = rejected

TOC = total organic carbon

TSCA = Toxic Substances Control Act

U = Nondetect

USACE = United States Army Corps of Engineers

WDNR = Wisconsin Department of Natural Resources

Figures

Milwaukee River Floodplains Reach

Milwaukee River Downtown Reach

Former North Avenue Dam

Menomonee River

Burnham Canal Superfund Alternative Site and Habitat Restoration

Milwaukee River - Third Ward

Milwaukee Bay

Kinnickinnic River

Grand Trunk Wetlands

Proposed DMMF Area

Jones Island CDF

Lake Michigan

W HAMPTON AVE
E HAMPTON AVE
ESTABROOK PKWY
N GREEN BAY AVE
N PORT WASHINGTON RD
W CAPITOL DR
N SHERMAN BLVD
N TEUTONIA AVE
Milwaukee River
N OAKLAND AVE
N LAKE DR
E BURLEIGH ST
N 40TH ST
W LOCUST ST
I-43 FWY
N MARTIN L KING JR DR
E LOCUST ST
145
W CENTER ST
N 27TH ST
N 20TH ST
E CENTER ST
N HUMBOLDT BLVD
N 35TH ST
W FOND DU LAC AVE
N HOLTON ST
W NORTH AVE
E NORTH AVE
Milwaukee River
W LISBON AVE
E BRADY ST
N VAN BUREN ST
N LINCOLN MEMORIAL DR
43
W JUNEAU AVE
N WATER ST
W STATE ST
E WELLS ST
18
E WISCONSIN AVE
W WISCONSIN AVE
Menomonee River
94
W CANAL ST
I-794 FWY
E ERIE ST
S 2ND ST
S 6TH ST
W NATIONAL AVE
S 1ST ST
S 35TH ST
W GREENFIELD AVE
S 27TH ST
Kinnickinnic River
W BURNHAM ST
W BECHER ST
94
W LINCOLN AVE
S KINNICKINNIC AVE
W CLEVELAND AVE
43
S 6TH ST

LEGEND

- Floodplain Area Boundary
- Milwaukee Bay
- Menomonee River
- Kinnickinnic River
- Milwaukee River Downtown
- Milwaukee River Floodplain
- Milwaukee River - Third Ward
- South Menomonee Canal
- Greater Milwaukee GLLA Project Agreement boundary

N

0 1500 3000

Feet

Notes:
1. CDF = confined disposal facility; DMMF = dredged materials management facility; GLLA = Great Lakes Legacy Act
2. 2022 Aerial Photography provided by Esri ArcGIS Online World Imagery.

Figure 1
Regional Features
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

\\dc1vs01\GISProj\E\EPA\681867_MKERiverDownstream\MapFiles\2022\Floodplain\Figure1-1_Milwaukee_Estuary_AOC_Regional_Features.mxd jhansen1 (9/11/2023)

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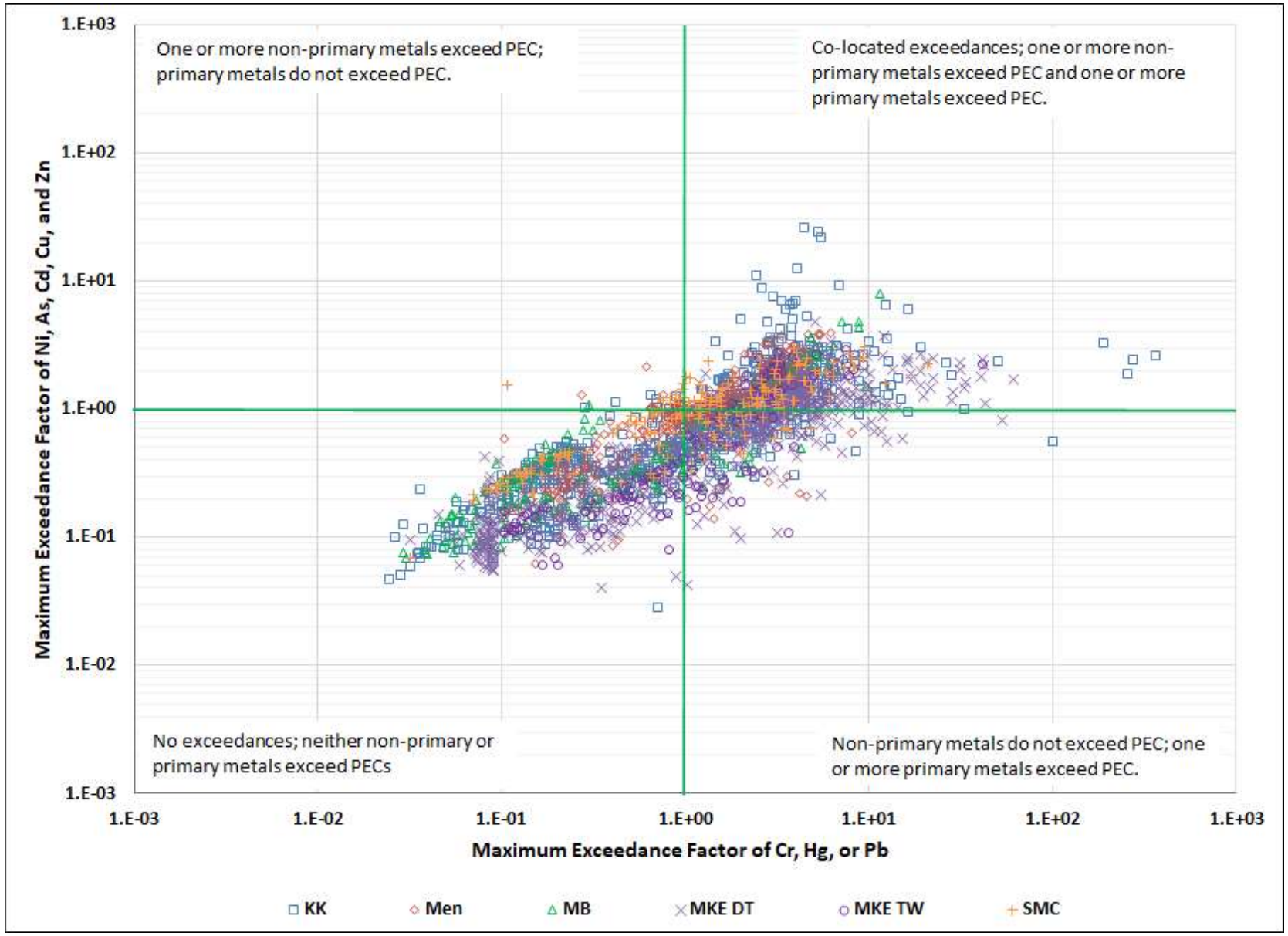

Notes:

KK – Kinnickinnic River
Men – Menomonee River
MB – Milwaukee Bay
MKE DT – Milwaukee River – Downtown
MKE TW – Milwaukee River – Third Ward
PEC – Probable Effect Concentration
SMC – South Menomonee Canal

As – arsenic
Cd – cadmium
Cr – chromium
Cu – copper
Hg – mercury
Ni – nickel
Pb – lead
Zn - zinc

Figure 2
Exceedance Factors: Non-Primary Metals vs. Primary Metals
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

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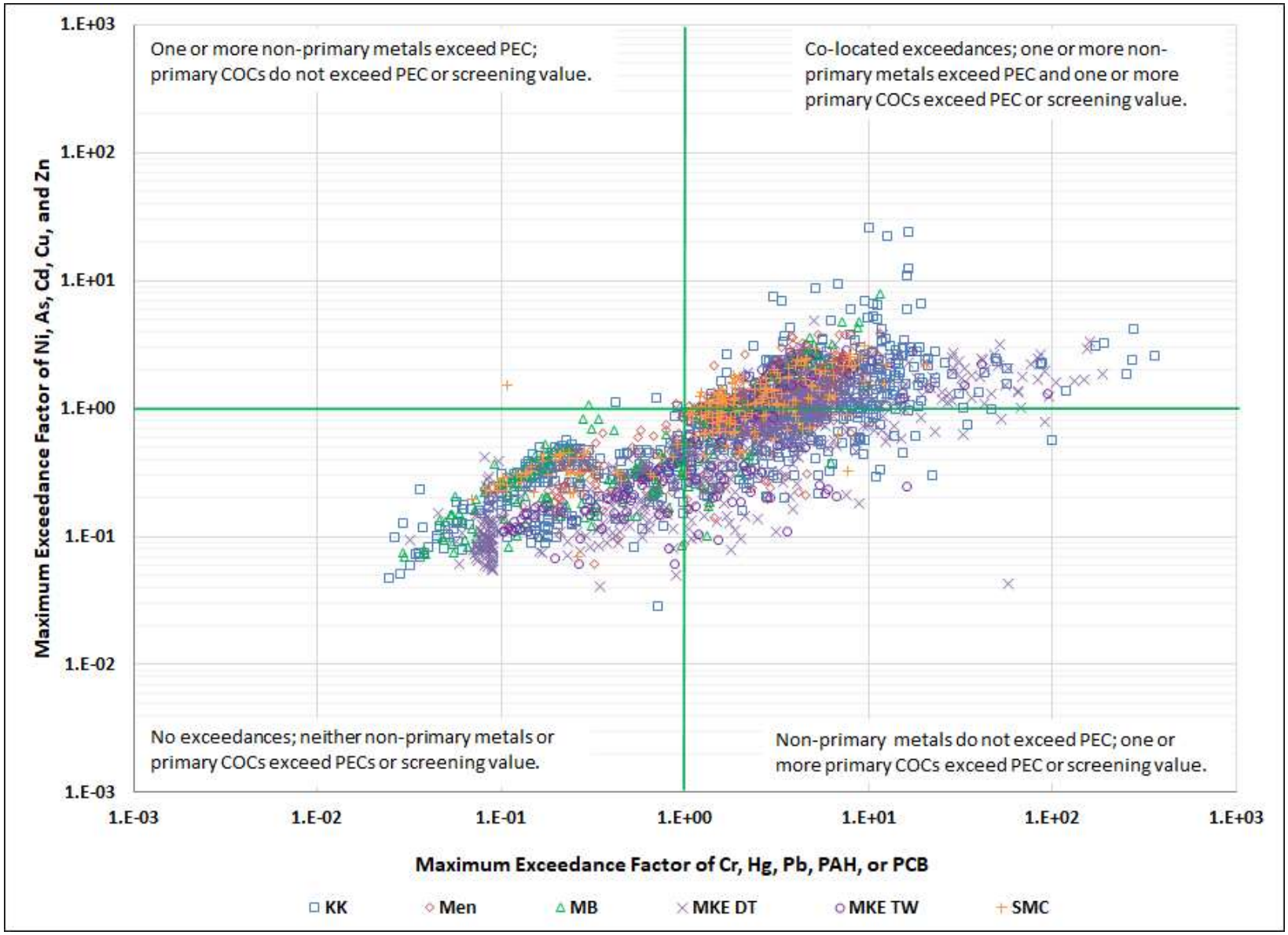

Notes:

COC – chemical of concern
KK – Kinnickinnic River
Men – Menomonee River
MB – Milwaukee Bay
MKE DT – Milwaukee River – Downtown
MKE TW – Milwaukee River – Third Ward
PEC – Probable Effect Concentration
SMC – South Menomonee Canal
As – arsenic
Cd – cadmium
Cr – chromium
Cu – copper
Hg – mercury
Ni – nickel
PAH – polycyclic aromatic hydrocarbon
Pb – lead
PCB – polychlorinated biphenyl
Zn - zinc

Figure 3
Exceedance Factors: Non-Primary Metals vs. Primary COCs
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

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Appendix C
Overview of Applicable Federal, State, and Local Permitting Requirements

Appendix C. Overview of Applicable Federal, State, and Local Permitting Requirements
Milwaukee River Downtown Reach
Milwaukee Estuary Area of Concern, Milwaukee, Wisconsin

Permit/Approval	Requirement/Purpose	Applicability to Project
Clean Water Act (CWA) Section 404 33 U.S. Code (USC) 1344 33 Code of Federal Regulations (CFR) 320 Rivers and Harbors Act of 1899 Section 10	Requires a permit from U.S. Army Corps of Engineers (USACE) for discharge of dredged or fill material into waters of the United States.	A CWA permit is anticipated to be required. Nationwide Permit (NWP) 38 – Cleanup of Hazardous and Toxic Waste (covers "specific activities required to effect the containment stabilization, or removal of hazardous or toxic waste materials that are performed, ordered or sponsored by a government agency with established legal or regulatory authority (USACE 2021). It is anticipated that project activities will be covered under NWP 38 as they are intended to contain or remove hazardous materials and the activities are sponsored by the U.S. Environmental Protection Agency (EPA). A preconstruction notification (PCN) will be required to gain coverage under NWP 38. If USACE determines that project activities are not able to be covered under NWP 38, an individual permit would be required.
CWA Section 401 Wisconsin Department of Natural Resources (WDNR's) NR 299 – Water Quality Certification (WQC)	Provides states with the authority to issue water quality certifications (WQCs) to ensure that federal agencies will not issue permits or licenses that violate the water quality standards of the state.	WQC is anticipated to be required. It is anticipated that the project will be covered under NWP 38. WDNR has conditionally issued WQC for projects authorized by NWP 38. It is anticipated that the project will meet the applicable state 401 WQC conditions.
Endangered Species Act of 1973, Section 7 Consultation 16 USC 1531 50 CFR 200	Requires that Federal agencies ensure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of any threatened or endangered species or destroy or adversely modify critical habitat.	Informal consultation with U.S. Fish and Wildlife Service is anticipated to be required as part of the CWA 404 permit authorization.
Fish and Wildlife Coordination Act 16 USC 661 et seq. Wisconsin Endangered Resources Review NR 27 – Endangered and Threatened Species	Requires consultation when a modification of a stream or other water body is proposed or authorized and requires protection of fish and wildlife from adverse effects of site action.	Consultation with the WDNR is anticipated to be required as part of the CWA 404 permit authorization.
Section 106 Concurrence National Historical Preservation Act of 1966 36 CFR Part 65 36 CFR 800	No activity is authorized under any NWP, which may have the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.	Consultation with the Wisconsin State Historic Preservation Office is anticipated be required as part of the CWA 404 permit authorization.
Section 408 Authorization to Alter USACE Civil Works Projects 33 USC 408	Requires that alterations to any USACE federally authorized Civil Works project be reviewed and approved before being undertaken.	A Section 408 permit is anticipated to be required. Construction and operation of a temporary water treatment plant for the Great Lakes Legacy Act sediment remediation project is anticipated to occur within a portion of the existing USACE dredged materials disposal facility (DMDF) because of the proximity to the future dredged materials management facility (DMMF), where dredged sediment will be disposed.

Permit/Approval	Requirement/Purpose	Applicability to Project
Wisconsin Statutes Chapter 30 - Navigable Waters, Harbors, and Navigation NR 345 – Dredging in Navigable Waterways	Establish procedures and limitations for exempt activities, general permits, and individual permits for removal of material from the beds of navigable waterways within Wisconsin.	A Lake or Stream Dredging Individual Permit is anticipated to be required. Applicable for activities including dredging and placement of structures (such as fill material, sheet pilings, coffer dams) on the bed of a river and placement of residual sand cover. Dredged material will contain contaminants at concentrations equal to or greater than the PEC concentration as published in WDNR (2003); if so, the discharge from the dredging activities would not qualify for exemptions or coverage under a general permit.
40 CFR 761.77 NR 700 – Investigation and Remediation of Environmental Contamination	TSCA sediment removal and disposal would be implemented under the WDNR One Cleanup Program Memorandum of Agreement (RR-786) dated November 2014.	The process allows for the approval of the remediation under WDNR lead and oversight, in coordination with the EPA, under state authority for the pathways addressed under the NR 700 rules series. Remediation performed under the requirements of NR 700 would be seen as equivalent to a TSCA cleanup for the environmental pathways addressed under the NR 700 rules series.
NR 216 – Storm Water Discharge Permit Construction Site Storm Water Runoff General Permit (Permit Number WI-S067831-6)	Wisconsin Pollutant Discharge Elimination System (WPDES) stormwater general permit authorizing stormwater discharge(s) from construction sites of one acre or more of land disturbance.	Coverage under the Wisconsin Construction Site Storm Water Runoff General Permit (WPDES Permit Number WI-S067831-6 is anticipated to be required. Applicable to stormwater runoff or other discharged water during construction activities that will disturb ≥1 acre.
WPDES Individual Discharge Permit	Individual (site-specific) permit authorizing discharge from dredging operations where carriage water or interstitial water from sediment dredging projects will be discharged to surface water.	An individual WPDES discharge permit is anticipated to be required. This permit applies for point source discharge of carriage and/or interstitial water to waters of the state from mechanical or hydraulic dredging operations that target sediment contaminants greater than the probable effect concentration (PEC) for sediment toxicity listed in the Consensus Based Sediment Quality Guidelines (WDNR 2003).
Federal Coastal Zone Management Act of 1972 16 USC 1451 et seq. Wisconsin Coastal Management Program (WCMP)	An applicant for a federal permit affecting any land, water use, or natural resource in the coastal zone must provide a consistency certification. The project proponent must certify that activities will comply with the approved policies of the WCMP and be conducted in a manner consistent with the policies.	A federal consistency determination is anticipated to be required. The Milwaukee Estuary AOC project area boundary is within the Wisconsin coastal zone (WCMP 2022).
Local Notice to Mariners 33 CFR 165 - Notification	Establishes procedures for controlled access areas and regulated navigation areas.	The notification is anticipated to be required. Applicable to in-water work being performed in waterways with commercial and/or recreational usage while project activities occur. Project is within the jurisdiction of U.S. Coast Guard District 9.

Sources:

U.S. Army Corps of Engineers (USACE). 2021. Nationwide Permits. 38 – Cleanup of Hazardous and Toxic Waste. Accessed October 18, 2022. https://www.mvp.usace.army.mil/Portals/57/docs/regulatory/NWPs/2021/NWP%2038%20terms%20and%20conditions%202021.pdf?ver=QtThnf6ZPFepxqlnjVbESQ%3d%3d

Wisconsin Coastal Management Program (WCMP). 2022. About Us. Accessed October 18, 2022. https://doa.wi.gov/Pages/LocalGovtsGrants/CoastalManagement.aspx

Wisconsin Department of Natural Resources (WDNR). 2003. *Wisconsin Consensus-based Sediment Quality Guidelines. Recommendations for Use and Application,* Interim Guidance RR-088. December.

Note:

The overview of permitting requirements included in this appendix is preliminary and may change during detailed design. Additional permits that are not listed here may be identified during detailed design.

≥ = greater or equal to

CFR = Code of Federal Regulations

CWA = Clean Water Act

DMDF = USACE's dredged materials disposal facility

DMMF = proposed dredged materials management facility to support the Milwaukee Estuary Area of Concern project

NHPA = National Historic Preservation Act

NWP = Nationwide Permit

PCN = pre-construction notification

PEC = Probable Effects Concentration per WDNR 2003

TSCA = Toxic Substances Control Act

USC = U.S. Code

USACE = U.S. Army Corps of Engineers

WCMP = Wisconsin Coastal Management Program

WDNR = Wisconsin Department of Natural Resources

WPDES = Wisconsin Pollutant Discharge Elimination System

WQC = Water Quality Certification

Appendix D
Estimated Costs
(Removed)

Appendix E
Surface Weighted Average Concentration (SWAC) Evaluation

Jacobs

Appendix E
Technical Memorandum

Subject	**Downtown Reach Surface-weighted Average Concentration (SWAC) Methodology and Results Summary**
Project Name	Milwaukee Estuary Area of Concern, City of Milwaukee, Milwaukee County, Wisconsin Task Order 68HE0520F0069, Contract No. 68HE0519D00007
From	Jacobs
Date	August 2023

Surface-weighted average concentrations (SWACs) were calculated to evaluate existing and post-remediation conditions in the Milwaukee River Downtown Reach within the Milwaukee Estuary Area of Concern (AOC) for the recommended Alternative 3A, which is described in Section 7 of the Focused Feasibility Study (FFS). The SWAC evaluation was performed to confirm the protectiveness of the recommended alternative. SWAC values representing the Downtown Reach Project Area were calculated for two scenarios for select contaminants of concern (COCs) (polychlorinated biphenyls [PCBs], polycyclic aromatic hydrocarbons [PAHs], chromium, lead, and mercury). SWAC calculations were performed using the three-dimensional (3D) contaminant model developed in Earth Volumetric Studio (EVS) software that was used to define remediation target areas (RTAs) for each remedial alternative (FFS Section 3.2). Several advantages unique to using the 3D EVS model surfaces for estimating the post-remedy SWAC values include:

- Incorporation of COC concentrations representing the residual sediment at the 3:1 side slopes from shoreline and in-water structure setbacks.
- Incorporation of residual sediment COC concentrations intersected when dredging to the maximum dredge elevation.

Two EVS 3D model surfaces of concentration data for each COC were exported from EVS into ArcGIS to calculate SWAC values representing the following:

- COC concentrations of the upper 0.5 feet of the existing sediment surface to represent existing sediment conditions.
- COC concentrations for the upper 0.5 feet of the Alternative 3A post-dredge surface with overdredge allowance to represent post-remedy conditions.

ArcGIS was then used for converting the 3D model concentration surfaces into a gridded network of 10-foot cells within the project area boundary, thereby creating an equally weighted COC concentration for each grid cell. The concentration values assigned to the 10-foot cells was averaged using the geometric center of each cell for calculation of the project area SWAC value.

For the purposes of calculating the Alternative 3A post-remedy SWAC value, several modifications to the exported EVS 3D model surface concentrations were required to account for the application of post-dredge residual sand cover and isolation cap materials within the RTA.

Cells located within the portion of the RTA designated for isolation cap (Figure 7-1 of the FFS) were assigned a cell value equal to the COC laboratory detection limit. Cells within the RTA boundary

designated for post-dredge residual sand cover following sediment removal were assigned a cell value equal to a 1:1 ratio of the COC laboratory detection limit to represent a 6-inch residual sand cover and residual sediment surface concentrations representative of post-dredge conditions, thereby assuming a post-dredge surface dilution factor of 50 percent following residual sand cover placement. Cells outside of the RTA where remediation is not required (where concentrations are less than cleanup goals [CUGs]) used existing sediment surface COC concentrations.

Exhibit E-1 summarizes the calculated SWAC values for Milwaukee River Downtown Reach sediment for existing conditions and post-remediation conditions after implementation of Alternative 3A. As indicated in Exhibit E-1, post-remediation SWAC values are less than the existing condition (pre-remediation), the CUGs, and probable effect concentrations (PECs).

Figures E-1 through E-5 present existing and post-remedy surface sediment concentrations of the gridded network of 10-foot cells. Further evaluation of post-remedy surface sediment COC concentrations will be performed to identify individual areas where post-remediation cell concentrations exceed CUGs in the Downtown Reach. Locations of cell concentrations with CUG exceedances will be further evaluated and prioritized for additional capping or sediment removal if sufficient dredged materials management facility (DMMF) capacity and project resources are available.

Exhibit E-1. Milwaukee River Downtown Reach – Surface-weighted Average Concentrations [a] for Existing and Post-Remediation Scenarios – Alternative 3A

Relevant Standards	**PCB**	**PAH**	**Chromium**	**Lead**	**Mercury**
PEC	0.67	22.8	110	130	1.1
CUG	1	68.4	330	390	3.3
SWAC Values	**PCB**	**PAH**	**Chromium**	**Lead**	**Mercury**
SWAC Values: Existing Condition	1.2	19	126	117	0.42
SWAC Values: Post-Remedy	0.23	2	21	26	0.17

[a] Values reported in milligrams per kilogram.

CUG = Clean up Goal

PAH = polycyclic aromatic hydrocarbons

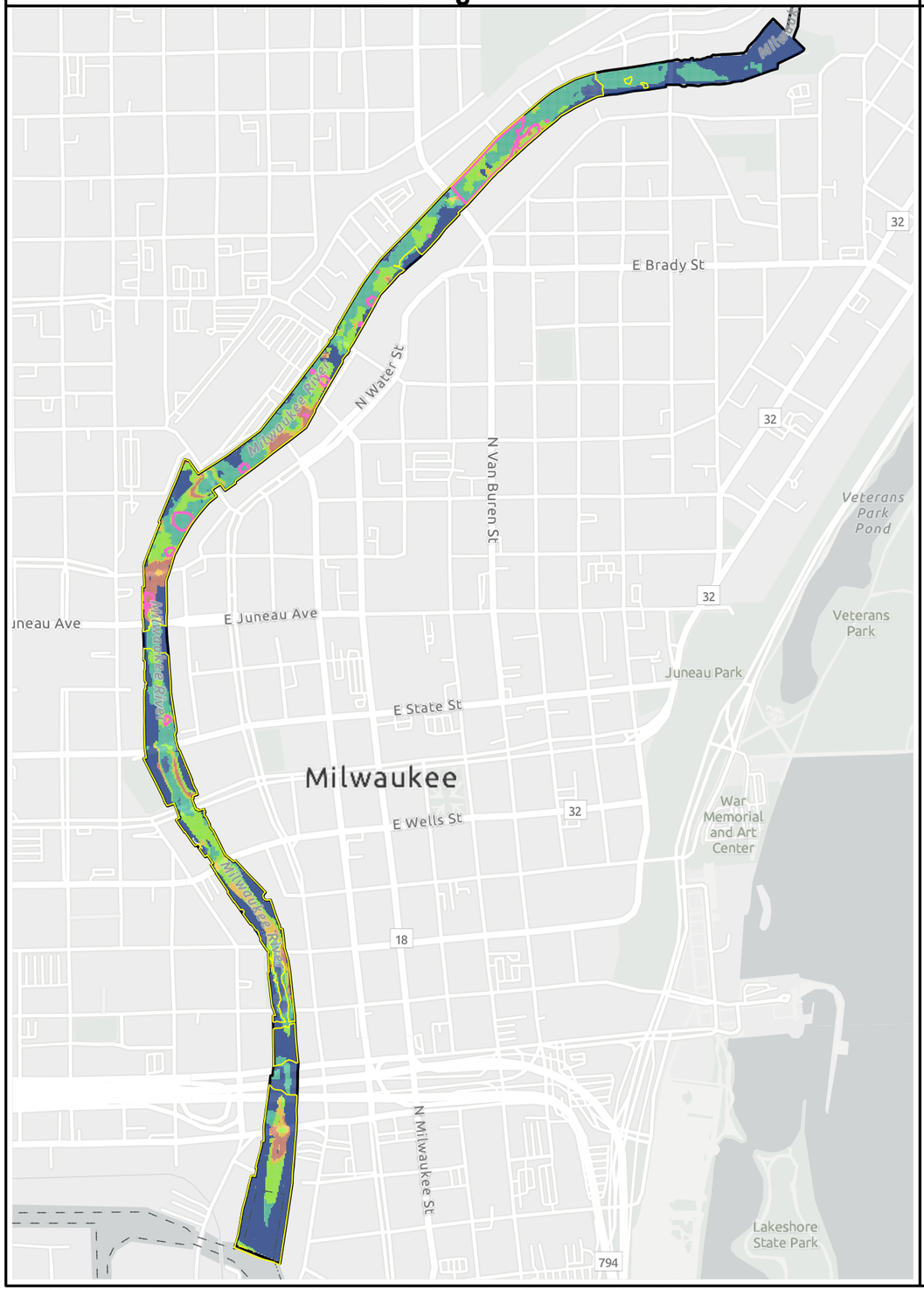
PCB = polychlorinated biphenyls

PEC = Probable Effect Concentration

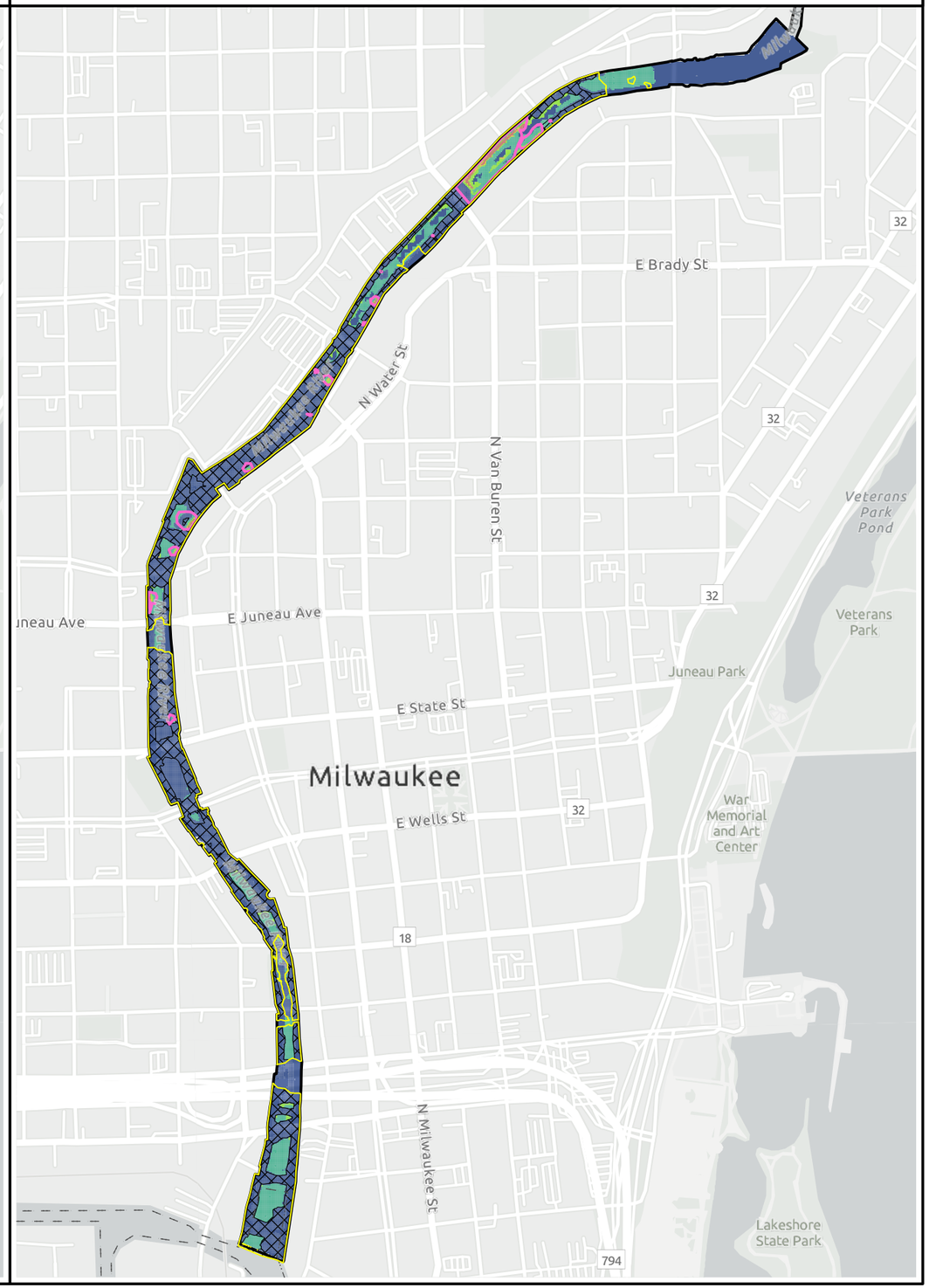
SWAC = surface-weighted average concentration

Figures

Existing SWAC



Post-Remediation SWAC



LEGEND

- Federal Navigation Channel (Source: United States Army Corps of Engineers)
- TSCA Dredge Limits
- Remedial Target Area
- Cap Extents
- Milwaukee River Downtown Reach Project Area

PCB Concentrations (mg/kg)

- < 0.059
- 0.059 - 1
- 1 - 3
- 3 - 5
- > 5

Notes:
1. Basemap source: Esri ArcGIS Online Light Gray Base Map
2. PCB = polychlorinated biphenyl; mg/kg = milligrams per kilogram; SWAC = Surface Weighted Average Concentration; TSCA = Toxic Substances Control Act (50 mg/kg)

N

0 1,000

Approximate scale in feet

Figure E1
Alternative 3A - PCB SWAC Summary
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Jacobs

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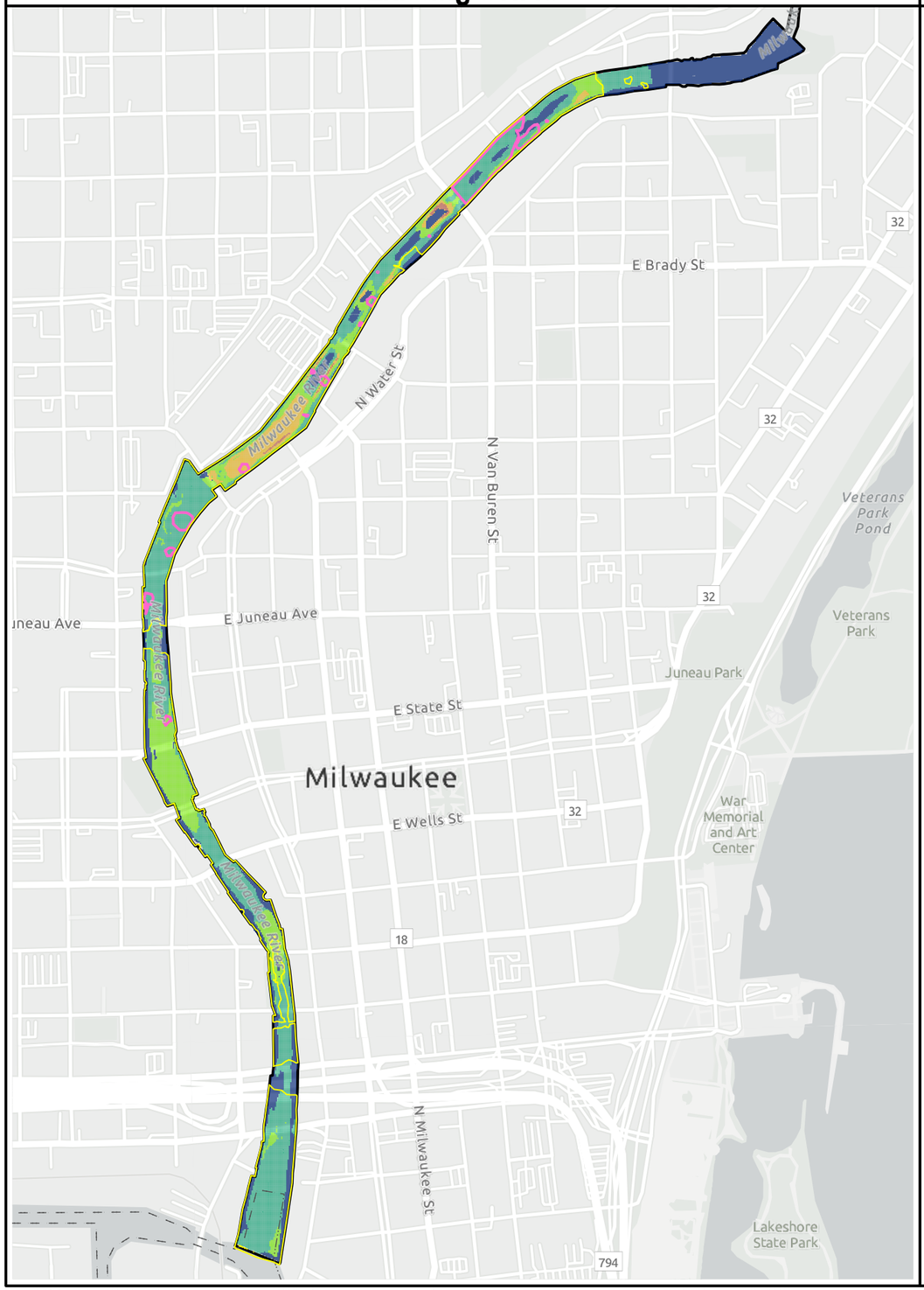
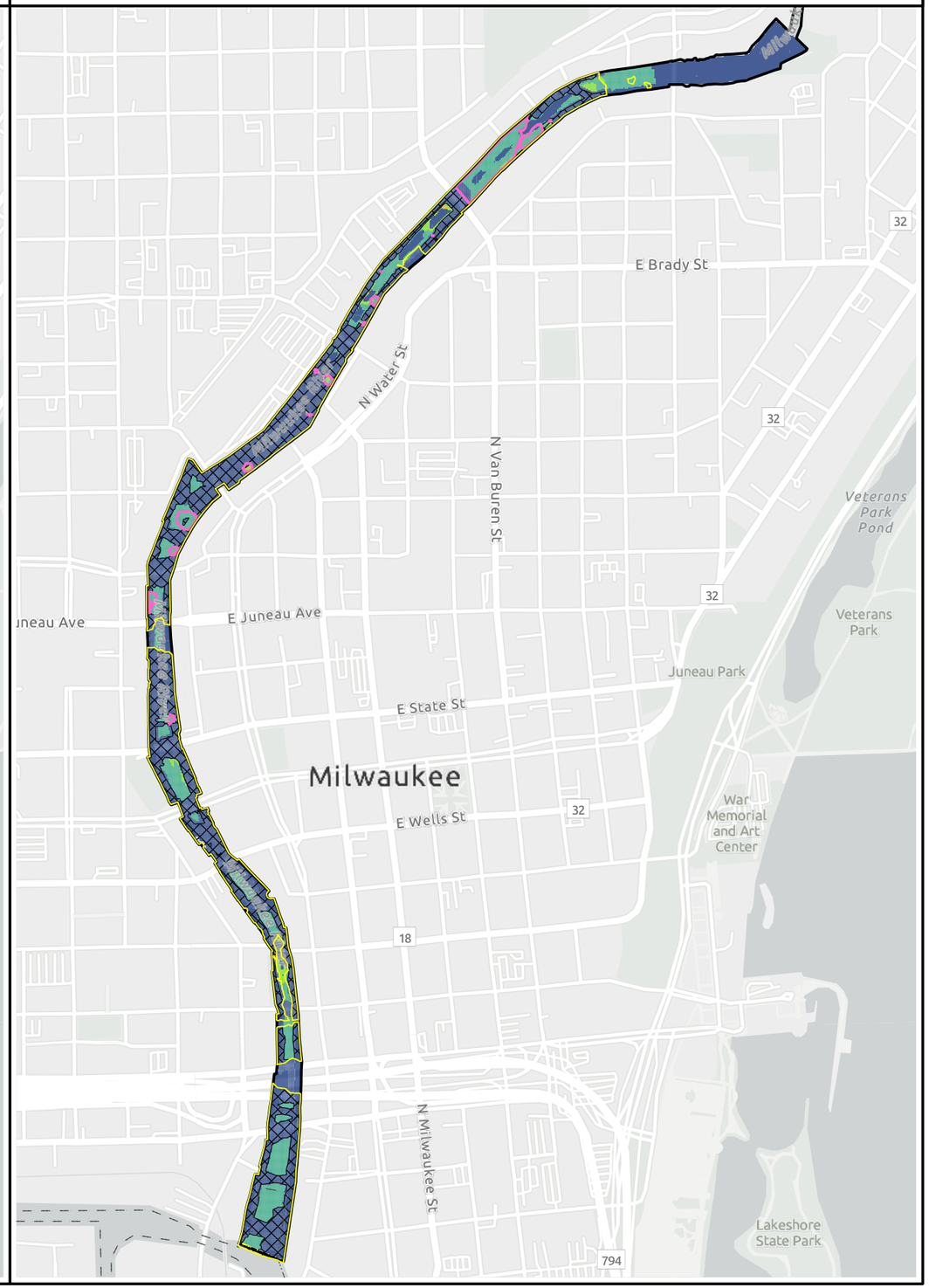
Existing SWAC



Post-Remediation SWAC



LEGEND

- Federal Navigation Channel (Source: United States Army Corps of Engineers)
- TSCA Dredge Limits
- Remedial Target Area
- Cap Extents
- Milwaukee River Downtown Reach Project Area

PAH Concentrations (mg/kg)

- < 0.015
- 0.015 - 22.8
- 22.8 - 68.4
- 68.4 - 114
- > 114

Notes:
1. Basemap source: Esri ArcGIS Online Light Gray Base Map
2. PAH = PAH = polycyclic aromatic hydrocarbon; mg/kg = milligrams per kilogram; SWAC = Surface Weighted Average Concentration; TSCA = Toxic Substances Control Act (50 mg/kg)

N

0 1,000

Approximate scale in feet

Figure E2
Alternative 3A - PAH SWAC Summary
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Jacobs

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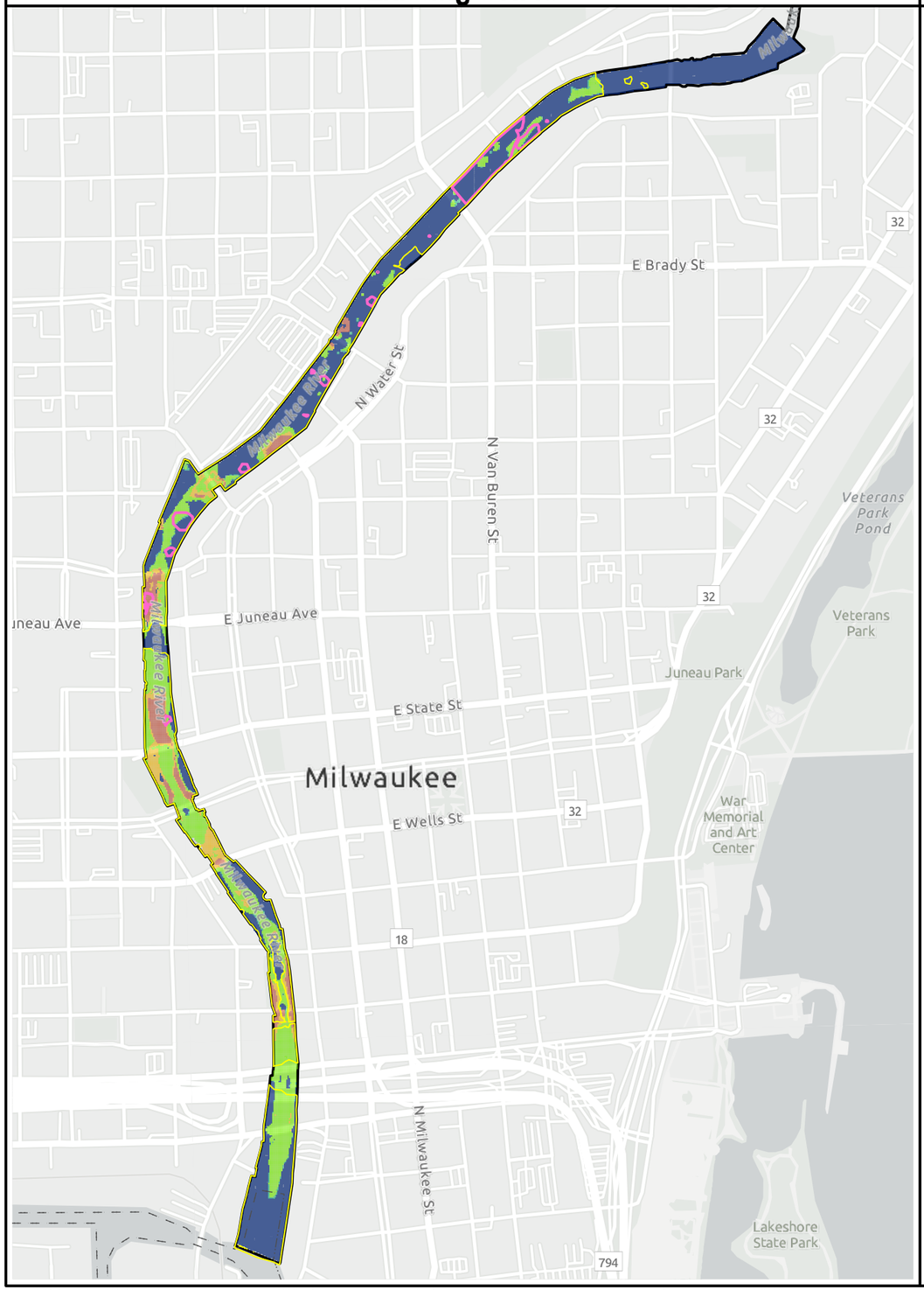
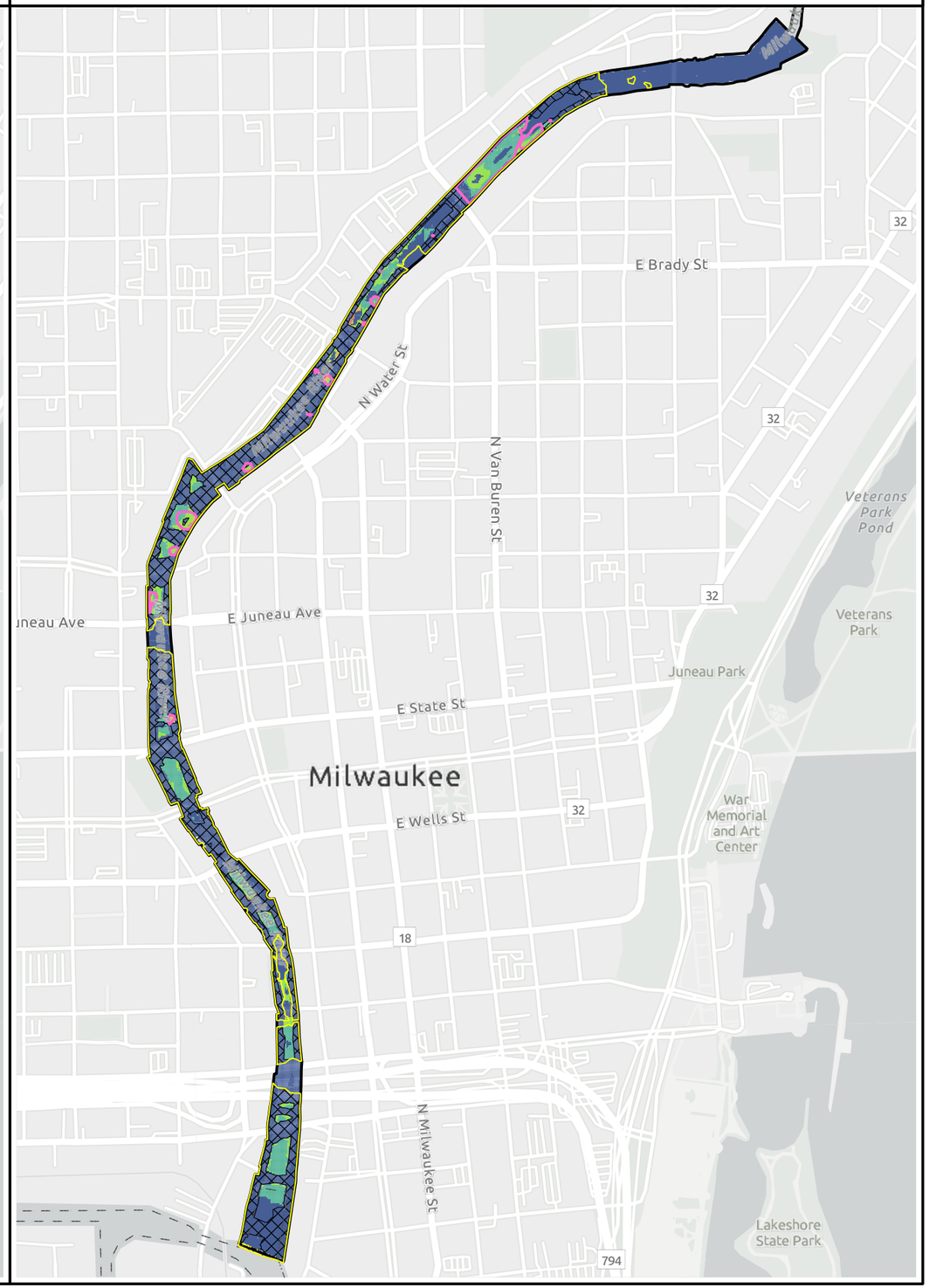
Existing SWAC



Post-Remediation SWAC



LEGEND

- Federal Navigation Channel (Source: United States Army Corps of Engineers)
- TSCA Dredge Limits
- Remedial Target Area
- Cap Extents
- Milwaukee River Downtown Reach Project Area

Chromium Concentrations (mg/kg)

- < 0.28
- 0.28 - 110
- 110 - 330
- 330 - 550
- > 550

Notes:
1. Basemap source: Esri ArcGIS Online Light Gray Base Map
2. mg/kg = milligrams per kilogram; SWAC = Surface Weighted Average Concentration; TSCA = Toxic Substances Control Act (50 mg/kg)

N

0 1,000

Approximate scale in feet

Figure E3
Alternative 3A - Chromium SWAC Summary
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Jacobs

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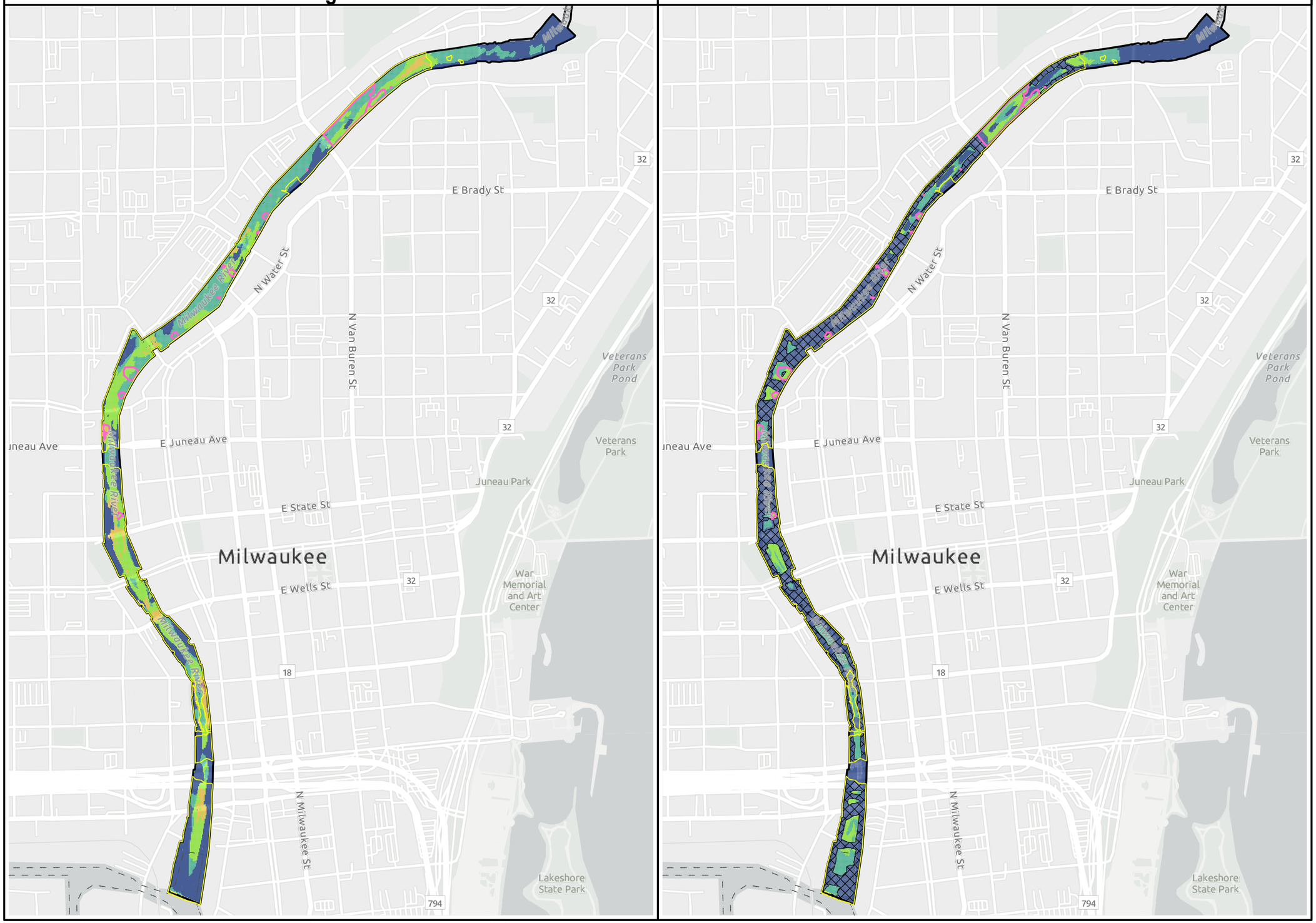
Existing SWAC

Post-Remediation SWAC



LEGEND

- Federal Navigation Channel (Source: United States Army Corps of Engineers)
- TSCA Dredge Limits
- Remedial Target Area
- Cap Extents
- Milwaukee River Downtown Reach Project Area

Lead Concentrations (mg/kg)

- < 0.60
- 0.60 - 130
- 130 - 390
- 390 - 650
- > 650

Notes:
1. Basemap source: Esri ArcGIS Online Light Gray Base Map
2. mg/kg = milligrams per kilogram; SWAC = Surface Weighted Average Concentration; TSCA = Toxic Substances Control Act (50 mg/kg)

N

0 1,000

Approximate scale in feet

Figure E4
Alternative 3A - Lead SWAC Summary
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Jacobs

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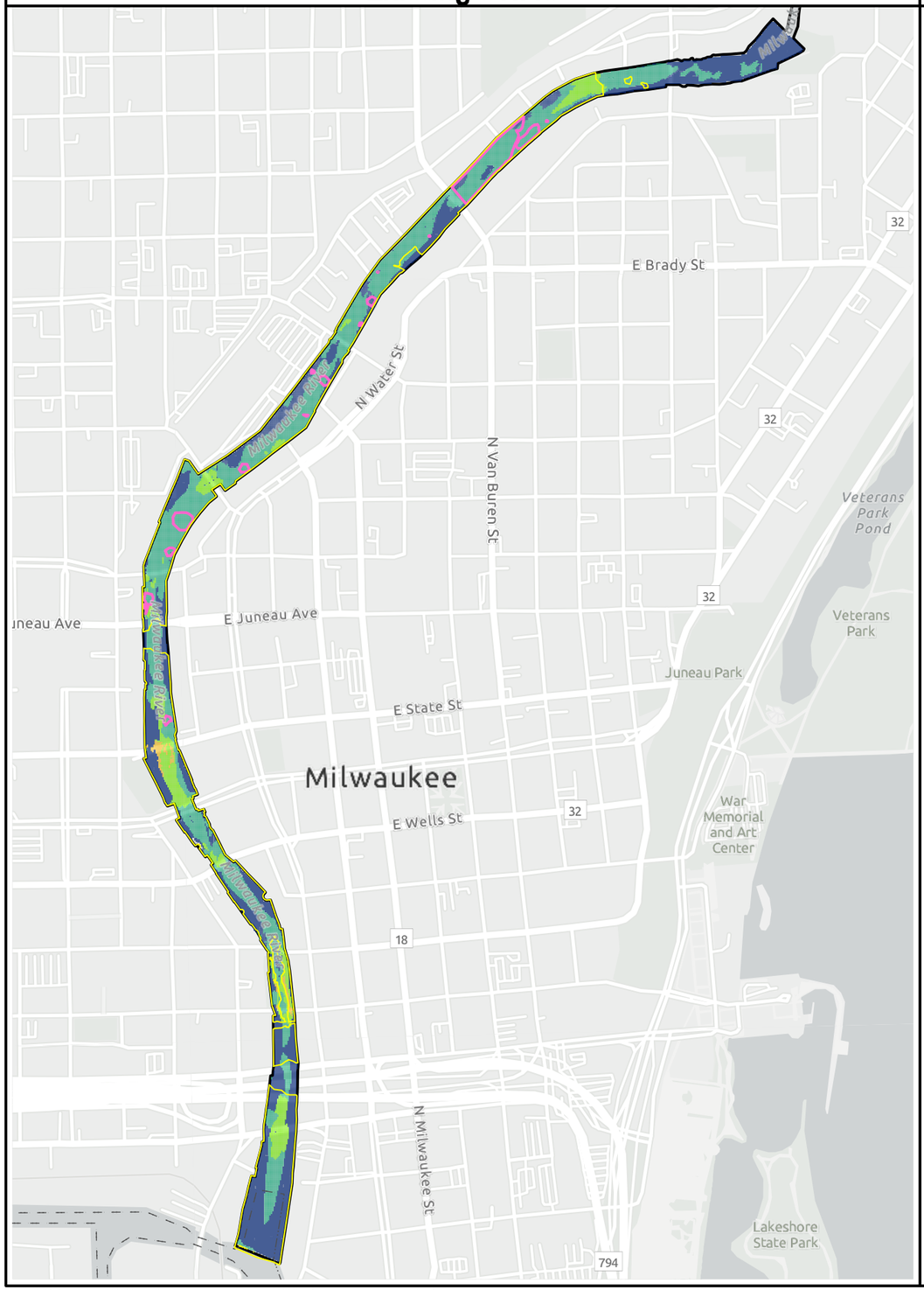
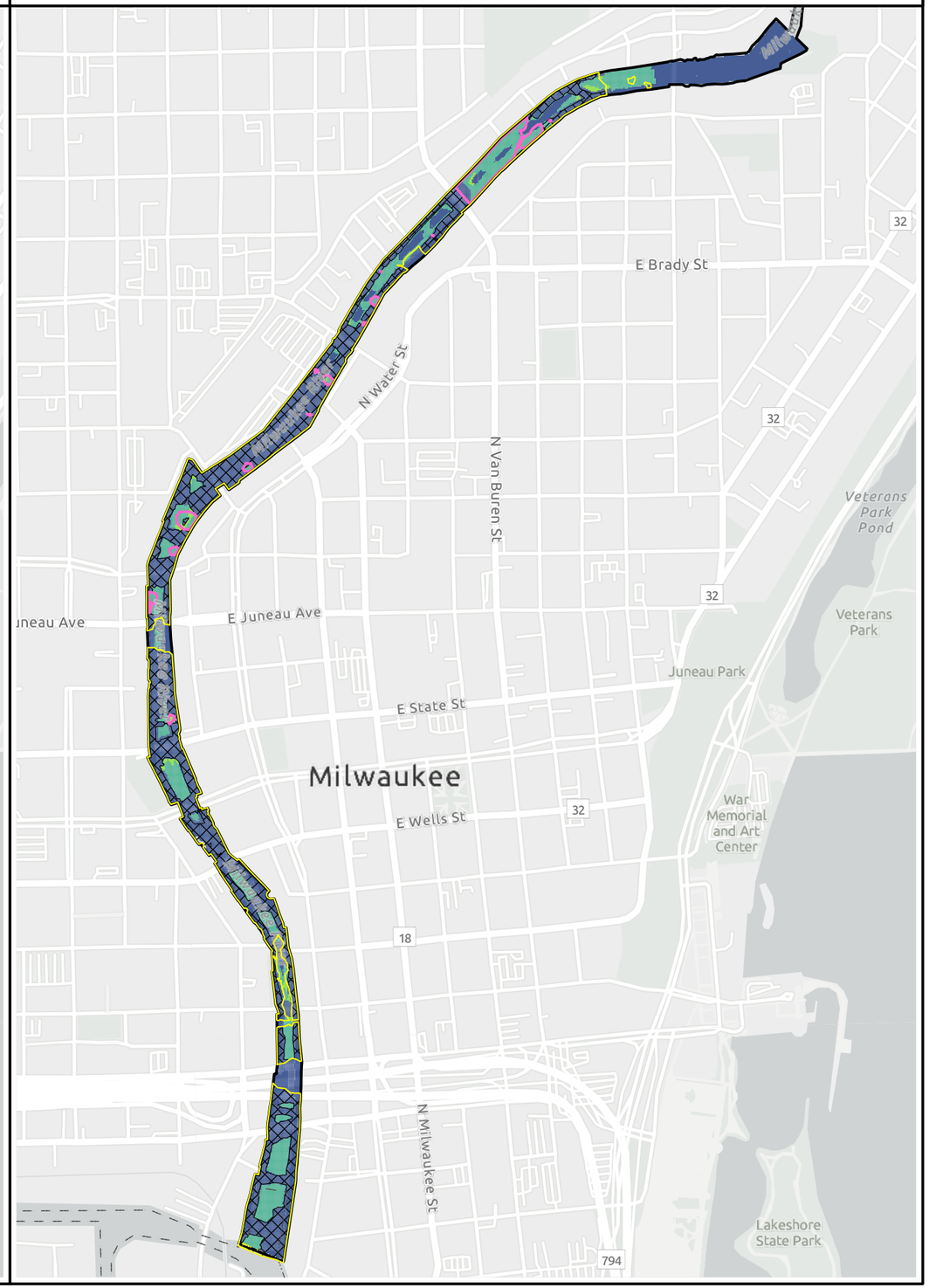
Existing SWAC



Post-Remediation SWAC



LEGEND

- Federal Navigation Channel (Source: United States Army Corps of Engineers)
- TSCA Dredge Limits
- Remedial Target Area
- Cap Extents
- Milwaukee River Downtown Reach Project Area

Mercury Concentrations (mg/kg)

- < 0.077
- 0.077 - 1.1
- 1.1 - 3.3
- 3.3 - 5.5
- >5.5

Notes:
1. Basemap source: Esri ArcGIS Online Light Gray Base Map
2. mg/kg = milligrams per kilogram; SWAC = Surface Weighted Average Concentration; TSCA = Toxic Substances Control Act (50 mg/kg)

N

0 1,000

Approximate scale in feet

Figure E5
Alternative 3A - Mercury SWAC Summary
Milwaukee Estuary Area of Concern
Milwaukee, Wisconsin

Jacobs

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Appendix F
Frequently Asked Questions

WATERWAY RESTORATION PARTNERSHIP
MILWAUKEE ESTUARY AREA OF CONCERN

Milwaukee Estuary Contaminated Sediment Cleanup Public Outreach Meetings: Frequently Asked Questions (FAQ)

This document summarizes questions and comments received in association with the public meetings held on November 2, 2023; February 15, 2024; April 25, 2024; and June 13, 2024. Additional information such as posters and technical details describing the contaminated sediment cleanup project are included in the Focused Feasibility Study Report. Please visit the Waterway Restoration Partnership website.

FAQ1: Will the sediment churned up during dredging be a problem downstream /elsewhere in the water?

Construction best management practices (BMPs) will be used during dredging to minimize the impacts from disturbing the sediment. Turbidity curtains will be used around the dredge areas to contain resuspended sediment, and monitoring will be conducted to confirm effectiveness and make modifications to the curtain if needed.

FAQ2: What are the general features of the Dredged Materials Management Facility construction, how is leakage of contamination into the lake prevented once material has been placed inside, and how long will the sediment be in the containment facility?

The Dredged Materials Management Facility (DMMF) has a design life of 100 years and will be a steel structure with an inner and outer wall. The walls will be tied together with steel tie rods and the space between the walls will be filled with aggregate (rock). In addition to the steel walls, there will also be another wall in the middle of the structure which will be 2.5 to 3-feet thick. That center wall, called a soil-mix wall, will be impermeable and will not allow water or contaminants to pass through. Sediment placed in the DMMF will permanently remain there. Sediment will not be filtered or amended in the facility. There will be a temporary water treatment facility during this cleanup project that will treat water that is currently inside the DMMF and precipitation that falls onto the DMMF.

FAQ3: Have fish consumption advisory posters been installed at public fishing locations along the river and Lake Michigan?

Fish consumption signage has been installed at various locations along the Milwaukee River from Lincoln Park to the former North Avenue Dam. Partners are working to identify the best locations for installing additional signs throughout the project areas. The signs provide information that was developed in collaboration with Wisconsin Department of Natural Services (WDNR) and the Wisconsin Department of Health Services (DHS).

For additional information on fish consumption advisories, please visit the Wisconsin Department of Natural Resources.

Publication Date: October 2, 2024
MKEWaterwayPartners.org

WATERWAY RESTORATION PARTNERSHIP
MILWAUKEE ESTUARY AREA OF CONCERN

FAQ4: During the actual "dredging" will there be foul odors in the air? Is there an airborne risk for workers and residential neighbors?

None of the contaminants found in the project areas are expected to produce odors during dredging or excavation. Some of the dredged sediment may contain decaying organic matter that has a distinctive odor. Best management practices (BMPs) will be used during construction to mitigate odors and dust.

FAQ5: Will the Milwaukee River be restored to conditions making the waters safe for swimming as a recreation?

The river and floodplains remedial actions are intended to address the Milwaukee Estuary Area of Concern (AOC) beneficial use impairments (BUIs) that are specific to legacy contaminants such as heavy metals, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). The remedial actions are not designed to address other water quality issues such as bacterial or viral contaminants that could affect safe swimming.

FAQ6: How will the funding of this project, including the habitat projects, be impacted by this being an election year?

Funding has already been appropriated and approved by congress for this project. Currently no impact on federal funding is anticipated.

FAQ7: Regarding the resuspension of sediment from propeller wash, how deep does dredging need to occur to not allow propeller wash?

The depth of influence of propeller wash is vessel-specific and will be evaluated as part of the design. Areas that are dredged and susceptible to propeller wash will be designed to be protective through adequate depths and placement of a cover material to minimize the risk of resuspension.

FAQ8: Has the amount of water displaced by the dredging been evaluated against the flow rate of the river?

A stream gauge located at Jones Island in Milwaukee, Wisconsin measures the flow of water in the Milwaukee River as it enters Lake Michigan. The main source of water to the river is precipitation, including snowmelt and storms. There are several tributaries that feed into the Milwaukee River, including the Menomonee River and the Kinnickinnic River. Seasonal trends show that flow is typically highest in the spring and lowest in the winter. The year over year average measured at the Jones Island gauge is approximately 3,000 cubic feet per second (cfs) with the maximum measured peak flow of 22,000 cfs. The anticipated flow rate for the dredging activities is 20 to 30 cfs, so only a small fraction of the total flow.

WATERWAY RESTORATION PARTNERSHIP
MILWAUKEE ESTUARY AREA OF CONCERN

FAQ9: What happens to the water after entering into the Dredged Materials Management Facility?

The solids settle within the Dredged Materials Management Facility and the water is removed and treated through a temporary water treatment plant to meet the State of Wisconsin discharge criteria. Treated water is then likely discharged to Lake Michigan. Testing is performed to confirm discharge criteria is being met.

FAQ10: How far will the hydraulic dredges be from the Dredged Materials Management Facility?

The farthest dredge from the Dredged Materials Management Facility (DMMF) will be 3.9 miles. Booster pumps will be used along the pipeline route to facilitate pumping the sediment to the DMMF. Much of the pipeline route will be submerged to avoid conflict with vessel traffic.

FAQ11: What is comprised of the sand layer? Can it survive turbulent storms?

The specific composition of the sand layer will be determined during remedial design. The sand layer is not intended to be an immobile engineered cap, and some movement may occur during large storms. However, engineered caps will be used where contaminated sediment is left in place.

FAQ12: What are the dredging depths?

The dredge depths are designed to remove contaminants which vary in depth across the project area and will be finalized during remedial design.

FAQ13: Are there plans to monitor the ecosystem afterwards?

The Milwaukee River Area of Concern (AOC) has 11 beneficial use impairments (BUIs), 7 of which are related to contaminated sediment. The Remedial Action Plan for the AOC includes a range of actions and monitoring processes for tracking the effectiveness of remedial measures and confirming the restoration of beneficial uses. The sediment remediation projects will contribute to the overall efforts to remove the BUIs and de-list the AOC.

FAQ14: What are the potential wildlife impacts that could be caused by the Dredged Materials Management Facility construction?

A waterfowl study was completed for the existing CDF facility. The area contains mostly migratory species that do not reside in the area permanently, which decreases the potential impact.

FAQ15: Will there be opportunities for hands-on activities and models for the community?

There is a potential to include hands-on activities in forthcoming public engagement activities.

WATERWAY RESTORATION PARTNERSHIP
MILWAUKEE ESTUARY AREA OF CONCERN

FAQ16: There is a historic wall on the Pleasant Valley Park side of the river. Will this feature be preserved during the construction?

The historic wall located within Gordon Park, associated with the former bath house, has been noted as a structure of cultural significance. Currently the area of remediation is not anticipated to interfere with the structure.

FAQ17: Have we engineered the Dredged Materials Management Facility to capture natural and unnatural surges?

The DMMF was designed for a range of water levels, wind and wave events, ice, rainfall, and climate change.

Have a question? Looking for a general project overview?

Check out this Fact Sheet for more information including project partner contact information.

Publication Date: October 2, 2024
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