

Report to the Manitowoc Plan Commission

Meeting Date: Wednesday, October 26, 2022

Request: PC 24-2022: Analysis of Brownfield Cleanup Alternatives at the former CN Peninsula site located at 1110 Buffalo Street, Manitowoc, Wisconsin and the FY23 USEPA Brownfield Cleanup Grant Application

Report: This public hearing is a requirement of the EPA's Brownfield Cleanup Grant. The grant requires that a public hearing be held to give the public an opportunity to provide input regarding the Analysis of Brownfield Cleanup Alternatives (ABCA) document. The ABCA is related to the phase 2, redevelopment work that is occurring in the Riverpoint District.

In the past Community Development staff held the public hearing at Community Development Authority meetings but due to timing issues the Plan Commission meeting was chosen for the public input.

The Plan Commission does not need to take any formal action on the ABCA.

To date, the Community Development has not received any requests to review the ABCA document.

The following text is from the EPA describing what an Analysis of Brownfield Cleanup Alternatives (ABCA) entails.

Prepare an analysis of brownfield cleanup alternatives, considering site characteristics, surrounding environment, land use restrictions, potential future uses, and cleanup goals for each site cleaned up with EPA funding. The ABCA must be signed by an authorized representative of the grant recipient and the ABCA must include:

- a. information about the site and contamination issues (e.g., exposure pathways, identification of contaminant sources, etc.), cleanup standards, applicable laws, alternatives considered, and the proposed cleanup;
- b. effectiveness, the ability to implement, and the cost of the proposed cleanup;
- c. evaluate the resilience of the remedial options to address potential adverse impacts caused by sea level rise, increased frequency and intensity of flooding and/or extreme weather events, etc.;
- d. an analysis of reasonable alternatives, including the alternative of taking no action. For cleanup of brownfield petroleum-only sites, an analysis of cleanup alternatives must include considering a range of proven cleanup methods including identification of contaminant sources, exposure pathways, and an evaluation of corrective measures. The cleanup method chosen must be based on this analysis; and
- e. the recipient may consider the degree to which the alternatives reduce greenhouse gas discharges, reduce energy use or employ alternative energy sources, reduce volume of wastewater generated/disposed, reduce volume of materials taken to landfills, and

recycle and re-use materials generated during the cleanup process to the maximum extent practicable.

Recommendation: No action is required by the Plan Commission.

City of Manitowoc, Wisconsin
Notice of Public Comment Period for Analysis of Brownfields Cleanup Alternatives and FY23 USEPA
Brownfield Cleanup Grant Application

Notice is hereby given that the City of Manitowoc is preparing an application to the USEPA for funds to support cleanup activities at the former CN Peninsula site located at 1110 Buffalo Street, Manitowoc, Wisconsin. A copy of the Analysis of Brownfield Cleanup Alternatives (ABCA) and the FY23 USEPA Brownfield Cleanup Grant Application (Application) is available for public review at the City of Manitowoc Community Development Department, 900 Quay Street. Verbal or written comments about the ABCA or Application may be submitted to Adam Tegen via email at ategen@manitowoc.org, via telephone at 920-686-6930, or can be mailed to 900 Quay Street, Manitowoc, WI 54220. Comments should be submitted by October 24, 2022.

A public hearing will be held in the Council Chambers of City Hall in the City of Manitowoc on Wednesday, October 26th, at 6:00 p.m. for the purpose of hearing any and all interested parties in the matters of the Analysis of Brownfield Cleanup Alternatives at the former CN Peninsula site located at 1110 Buffalo Street, Manitowoc, Wisconsin and the FY23 USEPA Brownfield Cleanup Grant Application.

If you need accommodation for this meeting, please notify the office of the City Clerk at least 48 hours in advance of the meeting (or as soon as possible after the meeting is posted, if posted less than 48 hours prior to the meeting time) at 920-686-6950.

Dated: October 5, 2022

Published October 10, 2022

Mackenzie Reed-Kadow, City Clerk

PUBLISHED BY AUTHORITY OF THE COMMON COUNCIL OF THE CITY OF MANITOWOC, WISCONSIN.

ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES

Phase 2 Redevelopment Area
River Point District, Manitowoc, Wisconsin

200 North 10th Street

BRRTS ID: 02-36-585591 (Open ERP), 02-36-00408 (Closed) and 07-36-583000 (LGU)
ACRES ID: 239715

1101 Buffalo Street

BRRTS ID: 02-36-585591 (Open ERP), 02-36-176478 (Closed) and 07-36-583000 (LGU)
ACRES ID: 239718

1110 Buffalo Street

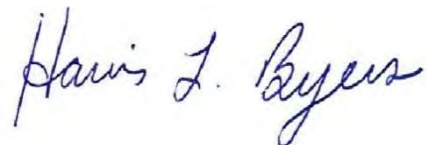
BRRTS ID: 02-36-585591 (Open ERP), 03-36-001962 (Closed) and 07-36-583000 (LGU)
ACRES ID: 239716

1103 Chicago Street

BRRTS ID: 02-36-585591 (Open ERP) and 07-36-583000 (LGU)
ACRES ID: 239717

1200 Buffalo Street

BRRTS ID: 02-36-585591 (Open ERP) and 07-36-583000 (LGU)
ACRES ID: 239719



Harris L. Byers, Ph.D.
Sr. Brownfields Project Manager



Whitney Cull
Geological Engineer in Training



October 18, 2022 (Rev 2)
Project Number 193708490

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GENERAL INFORMATION

FACILITY: Phase 2 Redevelopment Area, River Point District; Manitowoc, Wisconsin

**PARCEL IDs
(All or Portions of):** 173000, 173001, 173003, 173020, 173070, 173080, 173150, 173160 and 173170

SIZE: 6.1 Acres

**USEPA ACRES ID:
(All or Portions of):** 239715, 239716, 239717, 239718, and 239719

WDNR BRRTS NO.: 03-36-001962 (Closed), 07-36-583000 (LGU), and
02-36-585491 (Open ERP)

PROPERTY LOCATION: SE 1/4 of the SE 1/4 of Section 19, and the NE 1/4 of the NE 1/4 of Section 30;
Township 19 North, Range 24 East, Manitowoc, Manitowoc County, Wisconsin

PROPERTY OWNER: Community Development Authority of the City of Manitowoc
City of Manitowoc
900 Quay Street
Manitowoc, WI 54220-4543

Contact: Mr. Adam Tegen
Community Development Director
City of Manitowoc, Wisconsin
900 Quay Street
Manitowoc, WI 54220-4543
Phone: 920-686-6931
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CONSULTANT: Stantec Consulting Services Inc.
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Mequon, Wisconsin 53089

Contact: Harris Byers, Ph.D.
Sr. Brownfields Project Manager
Phone: 414-581-6476
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WDNR OVERSIGHT: Wisconsin Department of Natural Resources
2984 Shawano Avenue,
Green Bay, Wisconsin 54313

Contact: Mr. Tauren Beggs
Hydrogeologist
Phone: 920-662-5178
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ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES

Phase 2 Redevelopment Area, River Point District; Manitowoc, Wisconsin

1.0 EXECUTIVE SUMMARY

Stantec Consulting Services Inc. (Stantec) completed this Analysis of Brownfields Cleanup Alternatives (ABCA) on behalf of the City of Manitowoc (hereinafter referred to as the City) and the Community Development Authority of the City of Manitowoc (CDA; current owner) for the “Phase 2 Redevelopment Area” of the River Point District in the City of Manitowoc, Wisconsin (herein referred to as the “Phase 2 Redevelopment Area” or “the Property”). The Phase 2 Redevelopment Area consists of all or portions of nine contiguous parcels of land owned by the CDA totaling approximately 6.1 acres. The locations of the River Point District and the Phase 2 Redevelopment Area are illustrated on **Figure 1** and **Figure 2**. The delineation of the Phase 2 Redevelopment Area coincides with planned redevelopment activities in 2023-2024. For continuity with prior work, the Phase 2 Redevelopment Area consists of portions of former railroad/industrial property generally located at 200 North 10th Street, 1101 Buffalo Street, 1110 Buffalo Street, 1103 Chicago Street, and 1200 Buffalo Street. This ABCA was prepared utilizing the framework provided in ch. NR 722 Wisconsin Administrative Code (WAC) (NR 722) for a Remedial Action Options Report (RAOR).

The United States Environmental Protection Agency (USEPA) Assessment, Cleanup and Redevelopment Exchange System (ACRES) identification numbers associated with this Property are 239715, 239716, 239717, 239718, and 239719.

As documented in previous Stantec reports (2019 through 2022c), residual soil and groundwater impacts associated with prior commercial/industrial use and placement of historic fill are present and will complicate redevelopment, as summarized below.

Soil. Site investigation work confirmed the presence of a contiguous sitewide surficial granular fill unit extending from the ground surface downward up to seven feet in depth. A spatial model estimates there are 34,100 cubic yards of granular fill in the Phase 2 Redevelopment Area. A variety of hazardous substances and petroleum were detected in soil/fill at concentrations greater than health-based ch. NR 720 WAC residual contaminant levels (RCLs). Impacts associated with the sitewide surficial granular fill unit in the Phase 2 Redevelopment Area have not migrated downward to underlying native soils. Petroleum volatile organic compound (VOC) impacts to surficial fill and underlying native soils are likely associated with previous bulk petroleum storage/handling at the Property. Chlorinated solvents were previously detected in soil; however, solvents were not confirmed in soil during subsequent sampling events.

Groundwater. The potentiometric surface of shallow groundwater grades downward in a radial manner towards the Manitowoc River, which serves as a constant head boundary for groundwater. Groundwater sampling confirmed the presence of arsenic in groundwater, which is considered representative of background concentrations and not indicative of a release to groundwater. The concentration of 1,1,2,2-Tetrachloroethane in groundwater at MW-157 was greater than the ch. NR 140 WAC Enforcement Standard and the concentration of benzene in groundwater at MW-157 was slightly greater than the ch. NR 140 WAC Preventive Action Limit. MW-157 is located adjacent to a former oil house and bulk petroleum storage facility, which is the most likely source of residual groundwater impacts.

Vapor Intrusion. The Property is currently vacant. Therefore, the vapor intrusion pathway cannot be quantitatively evaluated at this point. Although vapor intrusion is not a focus of this ABCA, soil and/or groundwater with residual VOC impacts may extend beneath the proposed multi-family residential townhomes and restaurant redevelopments. If soil and/or groundwater impacts are not fully addressed as part of this cleanup, a sub-slab depressurization system (SSDS) may be warranted in new building construction.

Remedial action activities are warranted to facilitate redevelopment at the Property. Based on the evaluation described herein, the selected remedial approach includes:

- Limited excavation and offsite disposal of soil with heavy metal, VOC, and/or polycyclic aromatic hydrocarbon (PAH) impacts as a source control measure during utility installation in the rights of way;
- Construction of an engineered soil barrier for the proposed multi-family residential townhomes and restaurant to mitigate the potential for direct contact with residual soil impacts and reduce the risk for mobilization of soil impacts to groundwater;

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Phase 2 Redevelopment Area, River Point District; Manitowoc, Wisconsin

- Construction of an engineered soil barrier along the Manitowoc River to mitigate the risk for direct contact with impacted soil/fill, reduce the risk of mobilization of soil/fill impacts to the river through stormwater runoff, and reduce the potential for leaching of residual impacts to groundwater; and
- Establishing institutional controls, continuing obligations and maintenance plans to provide for long-term control of residual soil and groundwater impacts.

Additional remedial activities not evaluated in detail in this ABCA are likely to include:

- Construction of hardscaped features in the Project Area
- Post-construction groundwater monitoring;
- Installing clay plugs in new utility trenches;
- Installation of a SSDS in newly constructed buildings;
- Post-construction sub-slab vapor sampling; and/or
- Establishing additional institutional controls, continuing obligations and/or maintenance plans to provide for long-term operation of SSDSs.

2.0 BACKGROUND INFORMATION

Stantec Consulting Services Inc. (Stantec) completed this Analysis of Brownfields Cleanup Alternatives (ABCA) on behalf of the City of Manitowoc (herein referred to as the City) and the Community Redevelopment Authority of the City of Manitowoc (CDA; current owner) for the “Phase 2 Redevelopment Area” utilizing the framework provided in NR 722 for a Remedial Action Options Report (RAOR). The Phase 2 Redevelopment Area consists of all or portions of nine contiguous parcels of land owned by the CDA totaling approximately 6.1 acres and forming the western portion of the larger 21-acre former railroad/industrial peninsula referred to locally as the “River Point District”. The locations of the River Point District and the Phase 2 Redevelopment Area are illustrated on **Figure 1** and **Figure 2**. The delineation of the Phase 2 Redevelopment Area coincides with planned redevelopment activities in 2023-2024. For continuity with prior work, the Phase 2 Redevelopment Area consists of portions of former railroad/industrial property generally located at 200 North 10th Street, 1101 Buffalo Street, 1110 Buffalo Street, 1103 Chicago Street, and 1200 Buffalo Street. The location of the Phase 2 Redevelopment Area relative to other Redevelopment Areas is illustrated on **Figure 3**. As illustrated on **Figure 4**, the River Point District was recently rezoned “Central Business” with a Planned Unit Development to facilitate non-industrial redevelopment.

It is critical to realize that work proposed under this ABCA does not duplicate cleanup work previously completed in the River Point District using funds from a cleanup loan provided to the CDA from the City’s FY13 USEPA Brownfield RLF program. In addition, work proposed under this ABCA does not duplicate cleanup work funded under a United States Environmental Protection Agency (USEPA) Brownfield Cleanup Grant awarded to the City of Manitowoc in 2022 under Cooperative Agreement BF00E03197.

2.1 HISTORIC PROPERTY USE/OCCUPANCY

Past Ownership and Property Uses in the River Point District

As described in the Stantec (2019) Phase I Environmental Site Assessment (ESA), the River Point District consists of a 20.1-acre peninsula bound to the north, south, and west by the Manitowoc River and bound to the east by North 10th Street and North 11th Street (**Figure 1**). The River Point District appears undeveloped in 1835; however, the proximity of the peninsula to the Lake Michigan/Great Lakes shipping route facilitated initial development in the Phase 2 Redevelopment Area by 1868 to support the shipping industry (**Figure 5**). Although ownership records are not available, a panoramic map drawn in 1886 indicates the Phase 2 Redevelopment Area was fully developed and occupied by several large apparent industrial buildings and smaller apparent commercial buildings (**Figure 5**).

Historic records indicate the River Point District was transferred from the Manitowoc Terminal Company to the Manitowoc and Western Railroad Company on July 22, 1895, which is consistent with railroad development in the late 19th Century. Assessor records suggest the River Point District was later transferred to the Soo Line Railroad Company and ultimately transferred to Wisconsin Central, Ltd. (WCL) sometime during the latter half of the 20th Century. Railroad use of the River Point District ceased in the 1980s and the River Point District was formally decommissioned by the railroad in the 2000s. As summarized in the Stantec (2019) Phase I ESA, the PINs appear to correspond to leases between the previous owner and a variety of historic commercial/industrial tenants/occupants (discussed below).

Historic Uses/Tenants in the Phase 2 Redevelopment Area

The majority of the Phase 2 Redevelopment Area was developed for railroad use by 1895 and remained in railroad use through most of the 20th Century (Stantec, 2019). Key features include a long rectangular warehouse (“35” on **Figure 6**) and multiple railroad spur lines. The far northern portion of the Phase 2 Redevelopment Area includes portions of the River Point District formerly used by the Manitowoc Ship Building Company (“13” on **Figure 6**) and the Laird Lumber Company (“9” on **Figure 6**).

The eastern portion of the Phase 2 Redevelopment Area was developed for bulk petroleum storage/handling in the mid-20th Century (“15” on **Figure 6**). Petroleum handling features included a pump house, an oil house, and several large aboveground petroleum storage tanks. The former oil house slab and associated foundation walls were demolished by Stantec (2020b).

A grain elevator was constructed on the far eastern portion of the Phase 2 Construction Area between 1894 and 1900, with expansion between 1900 and 1919 by the “Northern Grain Co” (“19” on **Figure 6**). As noted in

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Stantec (2021a), the grain elevator fell into disrepair in the late 20th Century and was ultimately demolished in 2001.

Current Ownership of the River Point District and Property Use

A Phase I ESA was completed by Stantec (2019) per the All Appropriate Inquiries rule detailed in 40 CFR §312.21 on behalf of the current owner (CDA) on March 21, 2019. The current owner acquired the River Point District (which includes the Property) on April 12, 2019 for the purpose of blight elimination and subsequently received a Local Governmental Unit (LGU) Environmental Liability Exemption from the Wisconsin Department of Natural Resources (WDNR) per ch. 292.11(9) of the WAC on March 18, 2019 under WDNR Bureau for Remediation and Redevelopment Tracking System (BRRTS) Case Number 07-36-583000. To facilitate redevelopment of the Property, the City is conducting the subsurface investigation in a phased manner (Stantec 2019 through 2022c).

Since taking ownership, the CDA has maintained compliance with the required continuing obligations and no records have been identified indicating the CDA is considered potentially liable or known to be affiliated with any other person that is potentially liable for contamination at the Property. Proposed redevelopment for the Property is illustrated on **Figure 9** and includes road rights of way, riverwalk/green space, and multi-family residential townhomes, and a restaurant.

2.2 ENVIRONMENTAL SITE INVESTIGATIONS

Stantec (2019) Phase I ESA. As summarized in the Stantec (2019) Phase I ESA, Stantec identified the following recognized environmental conditions (RECs) associated with the River Point District:

- REC 1: Prior Railroad Use
- REC 2: Prior Industrial Use
- REC 3: Residual Impacts to Soil and Groundwater
- REC 4: Apparent Anthropogenic Fill
- REC 5: Storage/Dumping by Adjacent Property Owners
- REC 6: Residual Impacts to Soil and Groundwater from Nearby Properties

In addition to railroad use during the 20th Century, prior leases correspond to a multitude of prior industrial occupants/uses, including bulk coal transloading/storage, petroleum storage, ship building, grain storage/elevator, and transloading of stone. Historic features of specific environmental interest for the Phase 2 Redevelopment Area are illustrated on **Figures 5 and 6**.

Phase II ESAs, Construction Documentation Reports and Site Investigations. Stantec (2020a through 2022c) completed multiple Phase II ESAs, Construction Documentation Reports and Site Investigations at the River Point District using funds from a hazardous substance and a petroleum brownfield assessment grants awarded to the City by the USEPA in 2018 under Cooperative Agreement Number BF 00E02377, and in 2022 under Cooperative Agreement number BF 00E03040. Additional work was completed using funds from three Site Assessment Grants awarded to the City and CDA by the Wisconsin Economic Development Corporation in 2020 and 2021. Soil and groundwater sample locations performed in the Phase 2 Redevelopment Area are illustrated on **Figure 8**.

Soil. Site investigation work confirmed the presence of a contiguous sitewide surficial granular fill unit extending from the ground surface downward up to seven feet in depth. The vertical and horizontal extents of the fill unit area are illustrated on **Figure 7**. A spatial model of **Figure 7** estimates there are 34,100 cubic yards of granular fill in the Phase 2 Redevelopment Area.

As illustrated on **Figure 8**, a variety of hazardous substances and petroleum were detected in soil/fill at concentrations greater than health-based ch. NR 720 WAC residual contaminant levels (RCLs). Impacts associated with the sitewide surficial granular fill unit in the Phase 2 Redevelopment Area have not migrated downward to underlying native soils. Petroleum volatile organic compound (VOC) impacts to surficial fill and underlying native soils, though delineated, are identifiable in the Phase 2 Redevelopment Area (e.g., SB-157, SB-160) and are likely associated with previous bulk petroleum storage/handling at the Property. Chlorinated solvents were previously detected by Stantec (2020a) in soil; however, solvents were not confirmed in soil during subsequent sampling events.

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Groundwater. The potentiometric surface of shallow groundwater grades downward in a radial manner towards the Manitowoc River, which serves as a constant head boundary for groundwater. Groundwater sampling confirmed the presence of arsenic in groundwater, which is considered representative of background concentrations and not indicative of a release to groundwater. The concentration of 1,1,2,2-Tetrachloroethane in groundwater at MW-157 was greater than the ch. NR 140 WAC Enforcement Standard and the concentration of benzene in groundwater at MW-157 was slightly greater than the ch. NR 140 WAC Preventive Action Limit. MW-157 is located adjacent to a former oil house and bulk petroleum storage facility, which is the most likely source of residual groundwater impacts.

Vapor Intrusion. The Property is currently vacant. Therefore, the vapor intrusion pathway cannot be quantitatively evaluated at this point. Although vapor intrusion is not a focus of this ABCA, soil and/or groundwater with residual VOC impacts may extend beneath the proposed multi-family residential townhomes and restaurant redevelopments. If soil and/or groundwater impacts are not fully addressed as part of this cleanup, a SSDS may be warranted in new building construction.

3.0 REMEDIAL ACTION OPTIONS EVALUATION

3.1 PROPOSED PROPERTY REDEVELOPMENT – RIVER POINT DISTRICT TARGET AREA

The redevelopment of the River Point District has been part of the vision for the City for well over 20 years. More recently, the 2009 Comprehensive Plan targets redevelopment of the Target Area from Industrial to Planned Mixed Use. Also in 2009, the City adopted the Port of Manitowoc, Downtown & River Corridor Master Plan. Within that plan, the Property was shown as a redevelopment site. A third plan related to the path extension was adopted in 2009, Manitowoc Riverwalk Master Plan and Design Guidelines. The importance of the peninsula portion of the river walk was covered extensively in the document as was the overall site. In 2019, the City adopted a Downtown Master Plan with the peninsula redevelopment identified as one of four catalyst sites for redevelopment. The North Central River District Redevelopment Plan is substantially complete and focuses specifically on redevelopment of the Target Property. The City Council approved moving forward with design and construction documents for the necessary infrastructure to redevelop the peninsula, and the first phase of redevelopment began in Spring 2021.

Future public infrastructure investments at the River Point District will include streets, trails, utilities, lighting, and streetscape of over \$15M. It is estimated that the installation of the public improvements will lead to a mix of private investments ranging from residential condos and apartments to commercial and mixed-use buildings with a value of up to \$180M. With over 3,500 feet of river frontage, redevelopment of the River Point District also nearly doubles public pedestrian access to the Manitowoc River through trails and key nodes intended to serve as overlooks, trailheads and river access points to enhance connection to the river and the natural environment. The overall Property redevelopment also offers the unique distinction of being located immediately adjacent to the existing downtown core furthering the potential economic impact of the project. City support for the project includes acquisition of the property in 2019, infrastructure design and construction that are currently underway, brownfield assessment and cleanup, establishment of a new Tax Incremental Financing District and site preparation.

3.2 PROPOSED PROPERTY REDEVELOPMENT – PHASE 2 CLEANUP AREA

As previously stated, the 6.1 acre Phase 2 Redevelopment Area is part of the larger 20.1-acre River Point District Redevelopment Project. Conceptual redevelopment plans for the Phase 2 Redevelopment Area are illustrated on **Figure 9**, and include the following:

- 1.96 acres redeveloped for multi-family residential reuse (town homes);
- 5,000 square feet redeveloped for a restaurant;
- 1.76 acres of new greenspace/parkland, including 1,360 linear feet of new multi-modal trail; and
- 1,400 linear feet of new roadway with new utilities/infrastructure installed beneath the driving surfaces.

3.3 CLEANUP STANDARDS AND APPLICABLE LAWS

Although the City has an LGU exemption granted under ch. 292.11(9) WAC, remedial activities proposed under this ABCA will be completed per the requirements of ch. NR 700 WAC. The WDNR will provide regulatory oversight of the project, including reviewing/approving plans and reports described in Section 4 of this ABCA.

Cleanup soil quality standards are established in ch. NR 720 WAC and groundwater quality standards are established in ch. NR 140 WAC. Criteria for beneficial reuse of soil/fill at the Property are established under ch. NR 718 WAC. Toxicity thresholds specified in 40 CFR 261 will be used to determine proper waste/material management. Impacted soil/fill generated during excavation will be managed per ch. NR 600 WAC and ch. NR 500 WAC. The portion of project adjacent to the Manitowoc River will be permitted under ch. 30 Wis. Stats.

3.4 REMEDIAL ACTION OPTIONS EVALUATION

Based on impacts identified to date, remedial action activities are warranted to facilitate redevelopment at the Property described in Section 3.2. An evaluation of three remedial options was conducted utilizing criteria presented in ch. NR 722.07(4) WAC and ch. NR 722.09(2m) WAC to address legacy environmental impacts to facilitate redevelopment for non-industrial purposes. As summarized on **Table 1**, the remedial options evaluated under this ABCA included the following:

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1. Natural Attenuation (no action).
2. Excavate all impacted soils and transport offsite for disposal at a licensed solid waste landfill; backfill with clean fill materials to final grade; and establish an institutional control to manage residual groundwater impacts.
3. Limited excavation and offsite disposal of soil with heavy metal, VOC, and/or polycyclic aromatic hydrocarbon (PAH) impacts as a source control measure to facilitate utility installation in the rights of way; construction of a sitewide engineered barrier; and establishing institutional controls, continuing obligations and maintenance plans to provide for long-term control of residual soil and groundwater impacts.

In general, each remedial option is considered technically feasible; however, the short-term and long-term effectiveness of each remedial option's capability to be protective of public health, safety, or welfare or the environment, reasonableness of the alternative, the resilience to address potential adverse impacts caused by extreme weather events, and the cost associated with each approach varies greatly.

Alternative 1. Although the cost to implement remedial Alternative 1 is the least of the three options, constituents associated with residual impacts are considered recalcitrant to natural attenuation. The overall magnitude, mobility, and toxicity of impacts would not decrease, and Property restoration will not occur within a reasonable timeframe. Following redevelopment, impacts would be near sensitive receptors and impacts could be mobilized during extreme weather events. Therefore, Remedial Alternative 1 is not considered a prudent approach.

Alternative 2. Excavation and offsite disposal of impacted soils proposed in Alternative 2 will be effective in long-term elimination of the mobility, toxicity, and magnitude of residual soil impacts and would not be impacted by extreme weather events. However, the cost for Alternative 2 is excessive (estimated \$3.1MM). Further, Alternative 2 will require hauling a considerable volume of soil for disposal in a landfill (estimated 34,100 cubic yards) and require an extraordinary volume of clean fill to be imported to the Property just to bring the Property back to current grade. Therefore, Alternative 2 is not considered a sustainable option.

Alternative 3. Under Remedial Alternative 3, approximately 2,000 cubic yards of impacted soil will be excavated and disposed of at a licensed solid waste landfill. Following, clean fill will be placed to create a soil engineered barrier across the Property suitable to prevent direct contact with residual soil impacts while mitigating the risk for potential adverse impacts caused by extreme weather events (such as mobilization of impacts during flood events). Completion of the hardscape engineered barriers/caps outside of the scope of this ABCA is likely to include Property amenities (e.g., roadways, buildings, parking lots, sidewalks, trail, etc.), as illustrated on **Figure 9**.

Remedial Alternative 3 will cost-effectively provide for long-term reduction in the mobility, toxicity, and magnitude of impacts. Institutional controls will provide for long-term maintenance of the engineered barrier and will prevent groundwater consumption. Remedial Alternative 3 is considered the most reasonable and cost-effective approach to facilitate proposed redevelopment. Remedial Alternative 3 is the selected remedial alternative based on its short-term and long-term effectiveness, ability to be implemented within the proposed development, restoration time frame, economic feasibility, and sustainability.

4.0 SELECTED REMEDIAL ACTION OPTION

4.1 SELECTED REMEDIAL ACTION OPTION

The selected remedial action option includes up to eight elements described below:

Waste Characterization Sampling. Representative samples of soil targeted for offsite disposal will be collected and submitted to an analytical laboratory for waste characterization. Based on the results of the sampling, one or more waste profiles will be established with a licensed solid waste landfill.

Develop a Remedial Action Plan / Material Management Plan. A combined remedial action plan (RAP) and material management plan (MMP) will be completed and submitted to WDNR for approval. The RAP/MMP will describe the soils targeted for use in the engineered barrier (e.g., quality, placement location, placement depth, etc.) and outline contingency plans for managing fluids (e.g., infiltrated groundwater, stormwater, etc.) and/or other materials encountered during construction.

Excavation and Offsite Disposal of Impacted Soils. Soil generated during excavation activities (estimated 2,000 cubic yards) cannot be moved around the Property for beneficial reuse. Instead, this soil will be transported offsite for disposal at a licensed solid waste landfill. Select soil with perceived petroleum impacts may be placed on the landfill biopile to allow natural attenuation of residual petroleum impacts. Remediated soil will likely remain in the landfill for beneficial reuse.

Construction of a Vegetated Engineered Barrier along the Shoreline of the Manitowoc River. Suitable fill will be placed, compacted, graded, and seeded along the shoreline of the Manitowoc River to create a 1.76 acre vegetated engineered barrier.

Construction of a Vegetated Engineered Barrier at the Multi-Family Residential and Restaurant Redevelopment Areas. Suitable fill will be placed, compacted, graded, and seeded to construct an engineered barrier at the multi-family redevelopment area.

Construction Documentation Report. A documentation report will be prepared following excavation of offsite disposal of impacted soils and construction of the engineered barriers within the Phase 2 Redevelopment Area.

Establish Institutional Controls. Following construction of the engineered barrier, the Phase 2 Redevelopment Area will be listed on the WDNR Geographic Information System (GIS) Registry. The listing will serve as a continuing obligation/institutional control to restrict groundwater consumption and restrict disturbance of the engineered barrier. The GIS Registry will provide for notification of residual impacts to soil and groundwater and will include an annual engineered barrier maintenance plan.

Engineering, Permitting, Program Management, and Community Outreach. Engineering and design services, procurement of necessary permits to complete the proposed cleanup activities, onsite oversight of contractor work, and community outreach activities will be performed.

4.2 SCHEDULE

A proposed schedule for the implementation of Remedial Alternative 3 is presented on the table below.

Schedule for Remedial Alternative 3

Task #	Task Description	Weeks to Complete
1	Waste Characterization Sampling	1-2 Weeks
2	Develop a Remedial Action Plan / Material Management Plan	2-4 Weeks, pending the results of Task 1
3	Excavation and Offsite Disposal of Impacted Soils (2,000 cubic yards)	2-4 Weeks, depending on construction schedule
4	Construction of a Vegetated Engineered Barrier along the Shoreline of the Manitowoc River (1.76 acres)	1-2 Months, pending availability of a suitable quantity of fill

Task #	Task Description	Weeks to Complete
5	Construction of a Vegetated Engineered Barrier at the Multi-Family Residential and Restaurant Redevelopment Areas	1-2 Months, pending availability of a suitable quantity of fill and coordination with redeveloper
6	Construction Documentation Report	1-2 Weeks
7	Establish Institutional Controls	2-4 Weeks
8	Engineering, Permitting and Program Management, and Community Outreach	Duration of Remedial Alternative 3 (Anticipated to be 4-7 months)

4.3 ESTIMATED COST

A preliminary estimate of the total cost for implementation of Remedial Alternative 3 is presented on the table below. The source of funds to complete this work has not yet been determined but could be a combination of external and internal funds. The cost table does not include WDNR review fees, which could be up to \$5,850.

Cost Estimate for Remedial Alternative 3

Task #	Item	Potential Cost
1	Waste Characterization Sampling	\$18,000
2	Develop a Remedial Action Plan / Material Management Plan	\$6,500
3	Excavation and Offsite Disposal of Impacted Soils (2,000 cubic yards)	\$180,000
4	Construction of a Vegetated Engineered Barrier along the Shoreline of the Manitowoc River (1.75 acres)	\$102,600
5	Construction of a Vegetated Engineered Barrier at the Multi-Family Residential and Restaurant Redevelopment Areas	\$120,600
6	Construction Documentation Report	\$6,500
7	Establish Institutional Controls	\$5,000
8	Engineering, Permitting and Program Management, and Community Outreach	\$51,150
	Total remedial cost	\$490,350

4.4 RESTORATION TIME FRAME

As described in Section 4.2, implementation of Remedial Alternative 3 is anticipated to take 4-7 months to complete, as clean fill becomes available at the River Point District and developers construct building slab(s). Long-term maintenance may include annual inspections of the engineered barrier.

4.5 PERFORMANCE MEASURES

Confirmation samples will not be collected as part of the proposed work.

4.6 TREATMENT RESIDUALS

No additional treatment of residuals is anticipated as part of the proposed work.

4.7 SUSTAINABLE REMEDIAL ACTION CONSIDERATIONS

The described remedial approach relies on utilizing an engineered barrier, which will be constructed in part by raising the elevation of the Property to the proposed grade. This approach minimizes transporting of soil for offsite disposal in a landfill. Petroleum soils that are removed from the Property may be added to a biopile at the solid waste landfill to facilitate natural attenuation of residual impacts. Low sulfur diesel can be used, and a no-idle policy will reduce the carbon footprint.

4.8 ADDITIONAL REMEDIAL ACTIONS

This ABCA evaluated a set of remedial actions to address residual soil and groundwater impacts within the Phase 2 Redevelopment Area. Additional remedial actions to be discussed in a future RAP not described in this ABCA could, if required by WDNR, include:

- Construction of hardscape features illustrated on Figure 9;
- Post-construction groundwater monitoring;
- Installing clay plugs in new utility trenches;
- Installation of SSDSs in newly constructed buildings;
- Post-construction sub-slab vapor sampling; and/or
- Establishing institutional controls/continuing obligations and maintenance plans to provide for long-term operation of SSDSs.

5.0 REFERENCES

AECOM, 2020, Former CN Property Limited Site Investigation, 200 North 10th Street & 1110 Buffalo Street, Manitowoc, WI, May 8, 2020.

Stantec, 2019, 10th Street Railroad Property, Manitowoc, Wisconsin, Phase I Environmental Site Assessment, March 21, 2019.

Stantec, 2020a, Phase II Environmental Site Assessment, Riverpoint District; Manitowoc, Wisconsin, March 23, 2020.

Stantec, 2020b, Construction Documentation Report for Demolition and Removal of Structural Impediments, River Point District – Site 3, December 11, 2020.

Stantec, 2020c, Phase II Environmental Site Assessment, River Point District; Manitowoc, Wisconsin, Site 3, December 18, 2020.

Stantec, 2021a, Fire Department Response During Explosive Demolition of a Former Grain Elevator, 1101 Buffalo Street, River Point District – Phase I Construction Area; Manitowoc, Wisconsin, September 7, 2021.

Stantec, 2021b, NR 716 Site Investigation Report, River Point District Phase 1 Construction Area; Manitowoc, Wisconsin, July 19, 2021.

Stantec, 2021c, Remedial Action Plan & Materials Management Plan, River Point District, Phase 1 Construction Area; Manitowoc, Wisconsin, July 19, 2021.

Stantec, 2022a, Site Investigation Workplan, River Point District Phase 2 Construction Area, Manitowoc, Wisconsin, February 17, 2022.

Stantec, 2022b, Addendum to the Stantec (2021) Remedial Action Plan & Materials Management Plan, River Point District, Phase 1 Construction Area; Manitowoc, Wisconsin, July 29, 2022.

Stantec, 2022c, Site Investigation Status Update, Phase 2 Redevelopment Area, Manitowoc, Wisconsin, October 18, 2022.

FIGURES



Figure No.
1
 Title
Project Area and Regional Topography
 Client/Project
 Phase II Redevelopment Area
 River Point District
 City of Manitowoc
 Prepared by HLB on 10/15/2022

0 195 390 Feet

Legend

Phase II Cleanup Area

River Point District

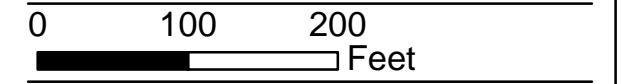
Notes
 1. Coordinate System: NAD 1983 HARN WISCRS Manitowoc County Feet
 2. Orthophotograph: Manitowoc County, 2020



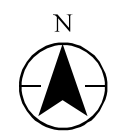





Figure No.
2
 Title
**Project Area and
 Parcel Identification Numbers**

Phase II Redevelopment Area
 River Point District
 City of Manitowoc
Prepared by HLB on 10/15/2022



Legend



-  Phase II Cleanup
-  River Point District
-  Parcel Identification Numbers

Notes
 1. Coordinate System: NAD 1983 HARN WISCRS Manitowoc County Feet
 2. Orthophotograph: Manitowoc County, 2020





Figure No.
3
 Title
**Project Area and
 Additional Cleanup Areas**

Client/Project
 Phase II Redevelopment Area
 River Point District
 City of Manitowoc

Prepared by HLB on 10/15/2022

0 130 260
 Feet

Legend

- Phase II Cleanup Area (2023-2024)
- Additional Redevelopment Areas**
- Phase I Redevelopment Area (2021-2023)
- Phase III Redevelopment Area (2024-2025)
- Phase IV Redevelopment Area (2025)

Notes
 1. Coordinate System: NAD 1983 HARN WISCRS Manitowoc County Feet
 2. Orthophotograph: Manitowoc County, 2020



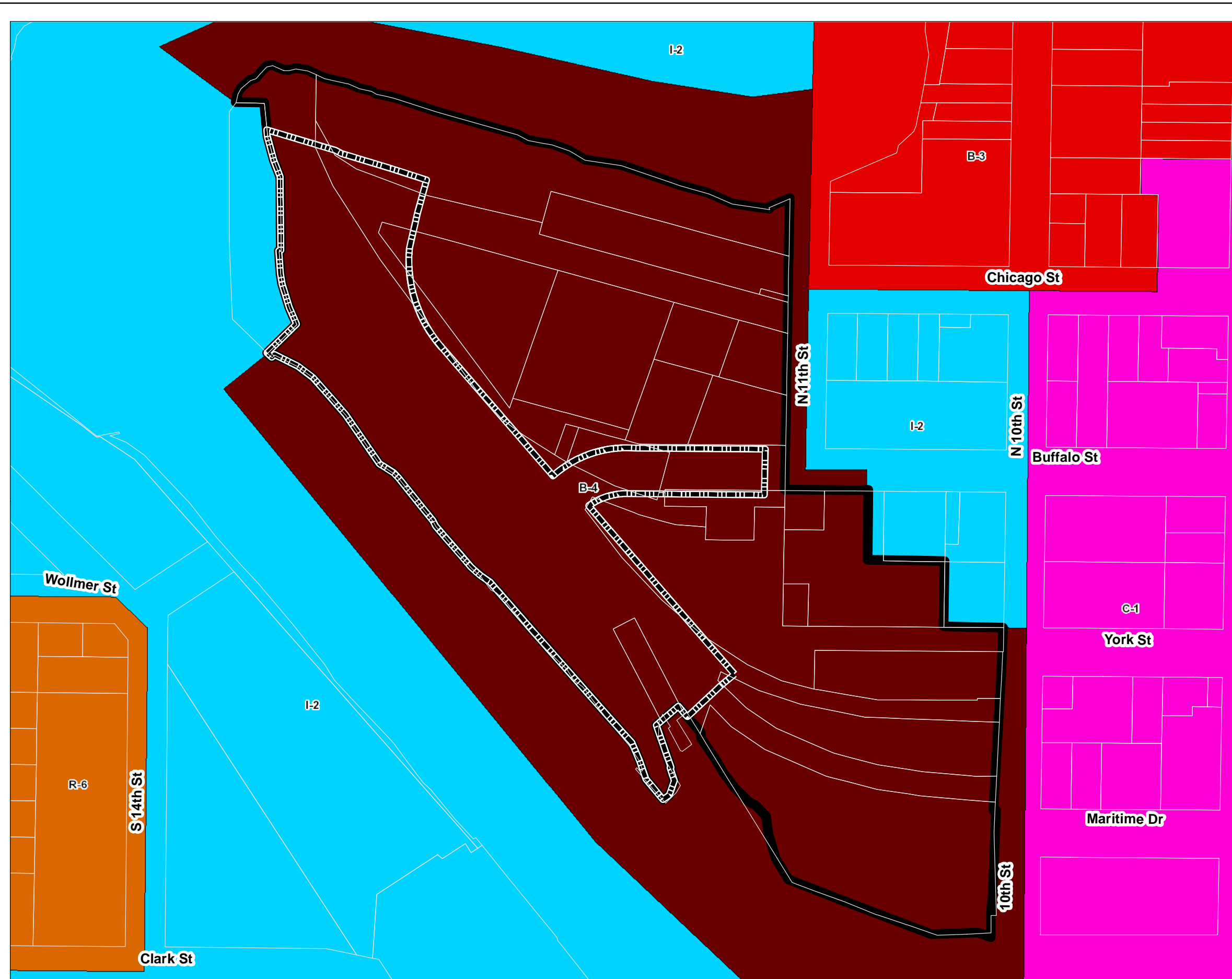
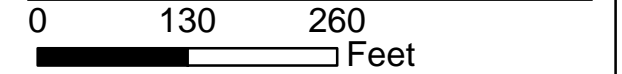
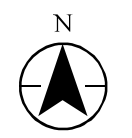


Figure No. **4**
 Title
Project Area and Zoning
 Client/Project
 Phase II Redevelopment Area
 River Point District
 City of Manitowoc
 Prepared by HLB on 10/15/2022



Legend

- Parcels
- Phase II Cleanup Area
- River Point District



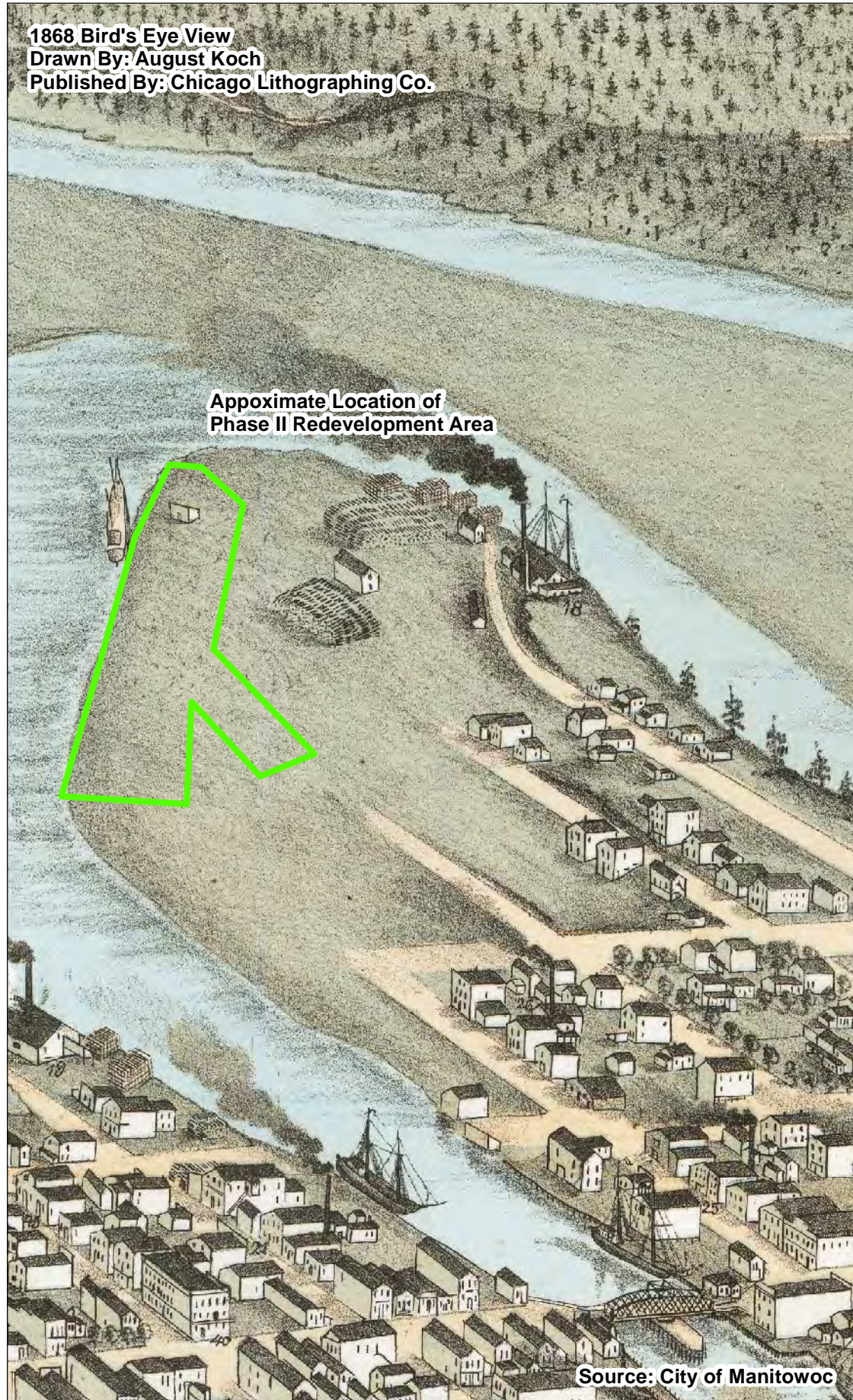
Zoning

- B-1 Office - Residential
- B-2 Neighborhood
- B-3 General
- B-4 Central
- C-1 Commercial
- I-1 Light Industrial
- I-2 Heavy Industrial
- P-1 Conservancy
- R-1 Residential - Agricultural
- R-2 Single Family
- R-3 Single Family
- R-4 Single and Two Family
- R-5 Low Density Multiple Family
- R-6 Multiple Family
- R-7 Central

Notes
 1. Coordinate System: NAD 1983 HARN WISCRS Manitowoc County Feet
 2. Orthophotograph: Manitowoc County, 2020



1868 Bird's Eye View
Drawn By: August Koch
Published By: Chicago Lithographing Co.



Approximate Location of
Phase II Redevelopment Area

Source: City of Manitowoc

1886 Bird's Eye View
Published By: Beck and Pauli Litho



Approximate Location of
Phase II Redevelopment Area

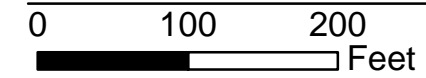
Source: Wisconsin Historical Society

Figure No.
5
Title
Project Area and
Features from the 19th Century
Client/Project
Phase II Redevelopment Area
River Point District
City of Manitowoc
Prepared by HLB on 10/15/2022



Figure No. **6**
 Title
Project Area and Features from the 20th Century

Client/Project
 Phase II Redevelopment Area
 River Point District
 City of Manitowoc
 Prepared by HLB on 10/15/2022

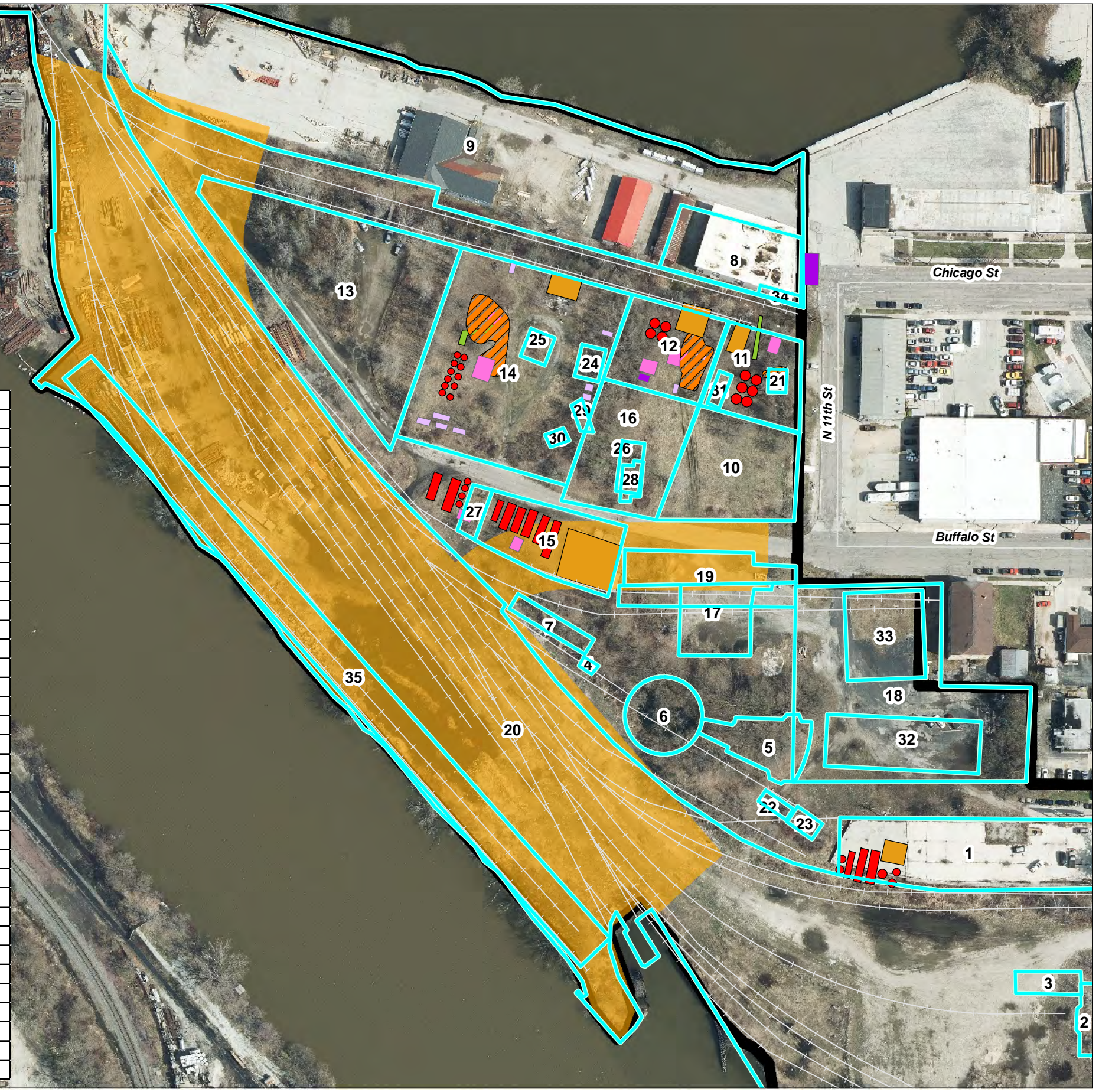


Legend

- Phase II Cleanup Area (2023-2024)
- River Point District
- Railroad Spurs
- Historic Site Features (see table for details)
- Prior Site Features (City Records)**
- Oil House
- Oil Tank (AST)
- Pump House
- UST
- Additional Site Features (WDNR Files)**
- Former UST
- Product Piping
- Pump House
- Soil Excavation



Key	Notes
1	Frank J. Kerscher Warehouse
2	Railroad Depot
3	Railroad Freight House
4	Cinder Pit
5	Railroad Roundhouse
6	Railroad Turntable
7	Coal Shed
8	Coal Storage
9	Laird Lumber Company
10	Manitowoc Shipbuilding Company
11	Stephani-Strupp Oil Co. (Bulk Oil Station)
12	William H. Froehlich (Bulk Oil Station)
13	Manitowoc Shipbuilding Company
14	Shell Oil Company (Bulk Oil Station)
15	Standard Oil Company (Bulk Oil Station)
16	CM Shaw (Residential ?)
17	Unk
18	Manitowoc Iron and Metal Company
19	Northern Elevator Company Grain Elevator
20	Valders Stone and Marble, Inc.
21	Garage
22	Railroad Tool House
23	Railroad Wash House
24	Storage
25	Unknown
26	Residential Dwelling
27	Lake Park Oil, Inc. (Bulk Oil Station)
28	Unknown Bldg
29	Unk (possible AST?)
30	Unk (possible AST?)
31	Unk (possible AST?)
32	Shredded Metal
33	Shredded Metal
34	Wisconsin Public Service Commission
35	Warehouse



Notes
 1. Coordinate System: NAD 1983 HARN WISCRS Manitowoc County Feet
 2. Orthophotograph: Manitowoc County, 2020



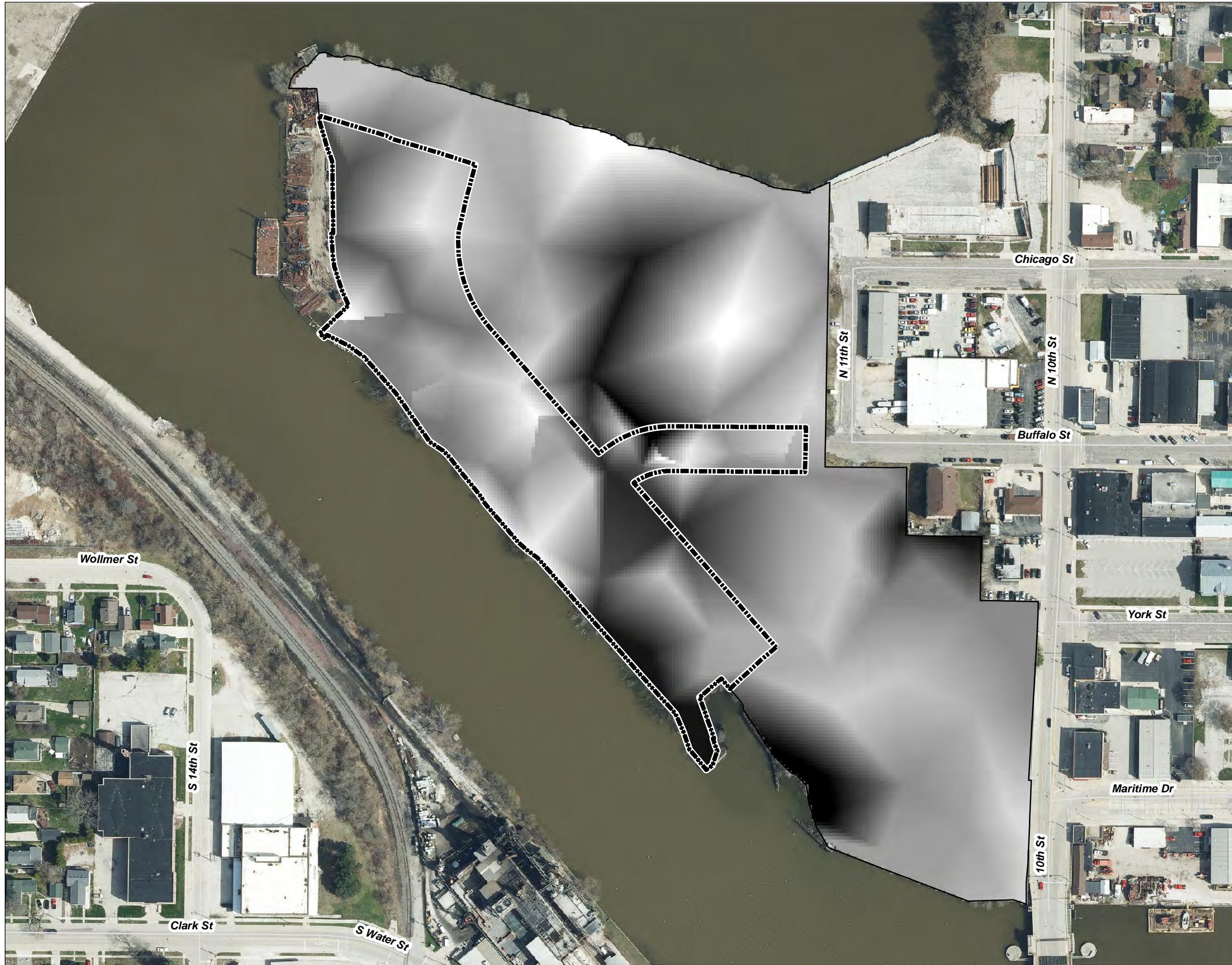


Figure No.
7
 Title
**Project Area and
 Thickness of Fill**
 Client/Project
 Phase II Redevelopment Area
 River Point District
 City of Manitowoc
 Prepared by HLB on 10/15/2022

0 135 270 Feet

Legend

River Point District
 Phase II Cleanup Area (2023-2024)

Fill Thickness (Feet)

Value

High : 8
 Low : 0.25

Notes
 1. Coordinate System: NAD 1983 HARN WISCRS Manitowoc County Feet
 2. Orthophotograph: Manitowoc County, 2020





Figure No.
8

Title
Project Area and
Subsurface Impacts

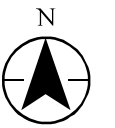
Client/Project
Phase II Redevelopment Area
River Point District
City of Manitowoc

Prepared by HLB on 10/15/2022

0 100 200
Feet

Legend

- Phase II Cleanup
- River Point District
- Petroleum Impacts to Soil
- Identified Groundwater Impacts**
- Polycyclic Aromatic Hydrocarbons
- Chlorinated VOCs
- Petroleum VOCs
- Arsenic > ES
- Benzo(b)fluoranthene and Chrysene > PAL (concentrations "J-Flagged")
- Benzene > ES
- Petroleum VOCs > PAL
- Benzo(a)pyrene > PAL (concentration "J-Flagged")



Notes

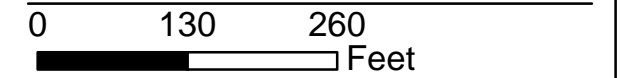
1. Coordinate System: NAD 1983 HARN WISCRS Manitowoc County Feet
2. Orthophotograph: Manitowoc County, 2020
3. PAL = ch. NR 140 Wisconsin Administrative Code (WAC) Preventive Action Limit; ES = ch. NR 140 WAC Enforcement Standard; VOC = Volatile Organic Compound; SVOC = Semi-Volatile Organic Compound; PAH = Polycyclic Aromatic Hydrocarbon



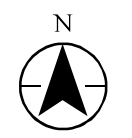


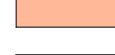
Figure No.
9
 Title
**Project Area and
 Proposed Redevelopment**

Client/Project
 Phase II Redevelopment Area
 River Point District
 City of Manitowoc
 Prepared by HLB on 10/15/2022



Legend



-  Phase II Cleanup
-  River Point District
- Proposed Redevelopment**
-  Restaurant (2023)
-  Town Homes (2023-2025)
-  Commercial (Finished)
-  Multi-Family (Finishing 2022)
-  Roadway (2021-2024)
-  Landscaping (2023-2025)
-  Floating Dock and Pier (2023)
-  Multi-Family Residential (2023-2024)
-  Sidewalk (2023-2024)
-  River Walk / Park (2023-2024)
-  Proposed Commercial (2024-2025)

Notes
 1. Coordinate System: NAD 1983 HARN WISCRS Manitowoc County Feet
 2. Orthophotograph: Manitowoc County, 2020



TABLE

Table 1
 Analysis of Brownfields Cleanup Alternatives to be Funded Under a FY2022 USEPA Brownfield Cleanup Grant
 Phase 2 Cleanup Area, River Point District
 Manitowoc, Wisconsin

Remedial Action Area Description:		The target remedial area consists of vacant land formerly developed as a railroad/industrial peninsula, which included former bulk petroleum storage. Residual heavy metal, petroleum, and/or solvent impacts are present in soil/fill across the Property at concentrations greater than health-based ch. NR 720 WAC non-industrial direct contact and/or ch. NR 720 WAC soil to groundwater residual contaminant levels (RCLs). In addition, residual volatile organic compound (VOC) impacts to groundwater remain at concentrations that exceed ch. NR 140 WAC groundwater enforcement standards (ESs) and/or preventive action limits (PALs).											
Exposure Routes of Concern (Check Boxes As Applicable):		Soil		Groundwater		Sub-Slab Vapor		Building Materials					
		Direct Contact	Yes	Soil to Groundwater	Yes	Consumption	Yes	Vapor Intrusion	Possibly; VOCs detected in soil/groundwater	Lead Paint	No	Asbestos	No
Remedial Action Options Evaluation													
Media	Remedial Alternative	Technical Feasibility - ch. NR 722.07(4)(a)						Economic Feasibility ch. NR 722.07(4)(b)		Sustainability ch. NR 722.09(2m)			
		<i>Long-Term Effectiveness</i>		<i>Short Term Effectiveness</i>		<i>Implementability</i>		<i>Restoration Time Frame</i>					
Soil and Groundwater	Alt 1 - Natural Attenuation	Natural attenuation of residual petroleum and solvent impacts to soil and groundwater is possible. However, heavy metal impacts in soil are considered recalcitrant to natural attenuation. Therefore natural attenuation would not reduce the overall heavy metal toxicity, mobility, and volume of impacts. Natural attenuation would not be protective of public health, safety, or welfare or the environment in the short-term or long-term time periods.				Implementation of Alt 1 is technically feasible; however, monitoring the effectiveness of the remedial action is impractical. Redevelopment potential would be impeded.		As heavy metal constituents associated with residual impacts are considered recalcitrant, the overall magnitude, mobility, and toxicity of impacts would not decrease and Site restoration will not occur within a reasonable timeframe.		Initial and capital costs to implement Alt 1 are minimal; however, future potential costs associated with monitoring natural attenuation could be significant as constituents are recalcitrant to natural attenuation.		The carbon footprint and energy use associated with Alt 1 is considered minimal. However, Alt 1 is not considered to be protective of health/safety/env. within a reasonable timeframe.	
	Alt 2 - Excavate all impacted soil; backfill excavation to proposed final grade; establish an institutional control to prevent groundwater consumption	Excavation of impacted soil/fill will provide for immediate and permanent reduction in the toxicity, mobility, and volume of contaminants and would protect public health, safety, welfare and the environment in a short-term time frame. An institutional control is considered effective for prevention of groundwater consumption while residual impacts naturally degrade.				Alt 2 is technically feasible and technology is available for implementation. Waste disposal approval will be needed from the landfill.		The Property would be restored concurrent with redevelopment. Institutional controls will be needed to provide for long-term control of residual impacts.		Source removal capital includes excavation and offsite disposal of a considerable volume of fill and backfilling the excavation to current grade with imported fill (34,100 cubic yards @ \$90 per yard = \$3,069,000). Establishing the institutional control to control groundwater consumption will occur with final closure (\$10,000).		Extraordinary energy and fuel use will be incurred with offsite disposal of building materials and backfilling the excavation; however low sulfur diesel can be used and a no-idle policy will reduce the carbon footprint. Alt. 2 will maximize energy use and soil disturbance. Alternative 2 allows for maximum reuse of the Property.	
	Alt 3 - Limited excavation and offsite disposal of soil with elevated impacts; constructing a sitewide engineered barrier to minimize sitewide direct contact with impacted soil/fill and reduce potential for leaching of residual impacts to groundwater; and establishing institutional controls/continuing obligations and maintenance plans to provide for long-term control of residual soil and groundwater impacts.	Excavation and removal of soil with elevated impacts is effective in both the short and long-term time frames. Construction of a sitewide engineered barrier would provide for short-term protection of public health, safety, welfare and the environment. However, long-term effectiveness will depend on maintenance of the engineered barrier. Residual groundwater impacts will be effectively managed by an institutional control.				Alt 3 is technically feasible and technology is available for implementation.		The Property would be restored concurrent with redevelopment. Institutional controls will be needed to provide for long-term control of residual impacts.		Soils with elevated heavy metal and VOC constituents disturbed during utility installation in the rights of way are proposed to be excavated as source control (estimated 2,000 cubic yards @ \$90 per yard = \$180,000). Petroleum impacted soils may be managed in a biopile at the solid waste landfill at a reduced fee, though hauling will still be needed. Fill may be available at no cost to the City pending future City project schedules, and pending approval the fill could be used to construct a portion of the engineered barriers proposed along the river front (1.76 acres, estimated cost of \$102,600) and future residential and restraint areas (2.06 acres, estimated cost \$120,600). Establishing the institutional control to control groundwater consumption will occur with final closure. Engineering support is estimated to be \$54,000.		Petroleum-impacted soil may be placed on the biopile at the solid waste landfill and later reused by the landfill. Energy and fuel use would be minimized; however, local infrastructure (roads) could be impacted during importation of soil; however low sulfur diesel can be used and a no-idle policy will reduce the carbon footprint.	

Note: Additional remedial actions to be discussed in a future RAP not described in the table above are summarized in Section 4.8 of the Stantec (2022) ABCA.