

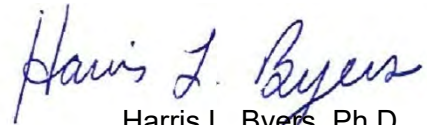
ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES

River Point District; Manitowoc, Wisconsin

1110 Buffalo Street (Site 3)

WDNR BRRTS ID: 03-36-001962 (Closed) and 07-36-583000 (LGU)

ACRES ID: 239716



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



Hiedi Ann Waller, P.E.
Professional Engineer



Richard J. Binder, PG
Project QA/QC Manager



June 24, 2020
Project Number 193706269

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CERTIFICATIONS
ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES
1110 BUFFALO STREET
MANITOWOC, WISCONSIN

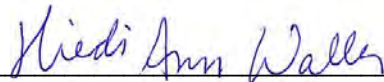
"I, Richard J. Binder, hereby certify that I am a hydrogeologist as that term is defined in s. NR 712.03 (1), Wis. Adm. Code, am registered in accordance with the requirements of ch. GHSS 2, Wis. Adm. Code, or licensed in accordance with the requirements of ch. GHSS 3, Wis. Adm. Code, and that, to the best of my knowledge, all of the information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wisconsin Administrative Code (WAC)."



Richard J. Binder, PG No. 734-013

June 24, 2020
Date

"I, Hiedi A. Waller, hereby certify that I am a registered professional engineer in the State of Wisconsin, registered in accordance with the requirements of ch. A-E8, WAC; that this document has been prepared in accordance with the Rules of Professional Conduct in cg. A-E8, WAC; and that to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR700 to 726, WAC."



Hiedi A. Waller, PE No. E-33741

June 24, 2020
Date

GENERAL INFORMATION
PHASE II ENVIRONMENTAL SITE ASSESSMENT

FACILITY: River Point District
Manitowoc, Wisconsin

PARCEL ID: 173020, 173030, 173060, 173170, 173022, 173040, 173070, 173023, 173150,
173110

SIZE: 5.1 Acres

USEPA ACRES ID: 239716

WDNR BRRTS NO.: 03-36-001962 (Closed), 07-36-583000 (LGU)

SITE LOCATION: N 1/2 of the NE 1/4 of Section 30, Township 19 North, Range 24 East, 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
Email: ategen@manitowoc.org

CONSULTANT: Stantec Consulting Services Inc.
12075 Corporate Parkway, Suite 200
Mequon, Wisconsin 53089

Contact: Harris Byers, Ph.D.
Sr. Brownfields Project Manager
Phone: 414-581-6476
Email: harris.byers@stantec.com

WDNR Oversight: Wisconsin Department of Natural Resources
2984 Shawano Avenue,
Green Bay, Wisconsin 54313

Contact: Mr. Tauren Beggs
Hydrogeologist
Phone: (920) 662-5178
Email: Tauren.Beggs@wisconsin.gov

1.0 EXECUTIVE SUMMARY

Stantec Consulting Services Inc. (Stantec) has completed this Analysis of Brownfields Cleanup Alternatives (ABCA) for the former bulk petroleum storage parcels located at 1110 Buffalo Street in Manitowoc, Wisconsin (herein referred to as the Property) utilizing the framework provided in ch. NR 722 Wisconsin Administrative Code (WAC) for a Remedial Action Options Report (RAOR). This ABCA was completed utilizing a brownfields revolving loan fund (RLF) grant funding provided to the City of Manitowoc (City) by the U.S. Environmental Protection Agency (USEPA) pursuant to the petroleum cleanup eligibility determination (Stantec, 2020b) approved by the Wisconsin Department of Natural Resources (WDNR) on June 3, 2020. The USEPA Assessment, Cleanup and Redevelopment Exchange System ID for the Site is 239716.

As noted in the Stantec (2020a) Phase II Environmental Site Assessment (ESA), 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. As summarized in the Phase II ESA, similar to previous investigations, select volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs)/polycyclic aromatic hydrocarbons (PAH), and heavy metals were detected in soil at concentrations greater than applicable NR 720 Residual Contaminant Levels (RCLs) and/or Background Threshold Values (BTVs). The Phase II ESA further identified and delineated multiple fill units, including a sitewide metals-rich heterogeneous granular black anthropogenic fill unit of varying quality. Ubiquitous soil impacts across the Property are largely attributable to the fill, which is present in thicknesses of up to eight feet.

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. Select VOCs, PAHs, and/or dissolved heavy metals were detected in groundwater at concentrations greater than applicable ch. NR 140 WAC (NR 140) Preventive Action Limits (PALs) and/or Enforcement Standards (ESs).

Supplemental assessment activities planned for Summer 2020 will remove the remaining petroleum infrastructure (e.g. slabs, etc.) and continue the subsurface investigation to further delineate impacts identified in the Phase II ESA. Based on impacts identified to date, remedial action activities are warranted to facilitate redevelopment at the Site. Based on the evaluation described herein, the selected remedial approach includes:

- Constructing a soil 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 and maintenance plans to provide for long-term control of residual soil and groundwater impacts.

2.0 BACKGROUND INFORMATION

Stantec Consulting Services Inc. (Stantec) has completed this Analysis of Brownfields Cleanup Alternatives (ABCA) for the former bulk petroleum storage parcels located at 1110 Buffalo Street in Manitowoc, Wisconsin (herein referred to as the Property) utilizing the framework provided in ch. NR 722 Wisconsin Administrative Code (WAC) for a Remedial Action Options Report (RAOR). This ABCA was completed utilizing a brownfields revolving loan fund (RLF) grant funding provided to the City of Manitowoc (City) by the U.S. Environmental Protection Agency (USEPA) pursuant to the petroleum cleanup eligibility determination (Stantec, 2020b) approved by the Wisconsin Department of Natural Resources (WDNR) on June 3, 2020. The USEPA Assessment, Cleanup and Redevelopment Exchange System ID for the Site is 239716.

2.1 HISTORIC PROPERTY USE/OCCUPANCY

Past Ownership and Site Uses – River Point District Area

As described in the Stantec (2019) Phase I ESA, the River Point District consist 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 peninsula appears undeveloped in 1835, with industrial development for coal transloading and lumber/sawmill occurring by 1868. 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 property was decommissioned in the 2000s.

The River Point District consists of 23 individual contiguous parcel identification numbers, and as summarized in the Stantec (2019) Phase I ESA, the current parcel identification numbers (PIN) appear to correspond to leases between the previous owner and a variety of historic commercial/industrial tenants/occupants.

Past Tenants and Property Uses – Target Property (1110 Buffalo Street)

The Target Property consists 5.1 acres of land within the larger 20.1-acre River Point District (Figures 1-6). The property consists of 10 individual contiguous parcels of land (Figure 3) with the following PINs:

173020	173030	173060	173170
173022	173040	173070	
173023	173150	173110	

As noted previously, it is critical to realize that the individual PINs corresponded to leases between the previous owner and a variety of bulk petroleum storage companies. Records suggest large portions of the Target Property were leased to a variety of bulk fuel storage companies operating under a variety of names during the early/mid-20th Century, including: Stephani-Strupp Oil Co, William H. Froehlich, Shell Oil, Lake Park Oil, Spindler Co., and the Standard Oil Company (Figure 4). Consolidation of bulk petroleum storage operations began at the Target Property in 1969 by the “Wingfield Oil Company” with continued consolidation through 1975. The Wingfield Oil Company was renamed “Holmes Oil Corporation” on August 4, 1976. The Holmes Oil Corporation appears to have vacated the Target Property concurrent with reported removal of the final petroleum storage tanks by 1997.

Historic Sanborn® fire insurance maps indicate use for bulk petroleum storage began between 1912 and 1919 when the Standard Oil Company installed four steel tanks, a 20,000-gallon iron oil tank, and a partially inground 20,000-gallon iron oil tank along a railroad spur. Standard Oil Co. expanded

operations at the Target Property through 1927 at which point the operation consisted of seven oil tanks and three oil houses. The Stephani-Strupp Oil Co. began operations at the Target Property by 1927 and the facility consisted of two oil tanks near North 11th Street, an oil house, and a pump house. Bulk petroleum storage in the central portion of the property expanded significantly in the 1940s-1960s, with continued expansion of the Standard Oil Co facility (twelve oil tanks, two pump houses, one oil house), construction of the Shell Oil Co. Inc. facility (five tanks, one oil house, one pump house), and construction of the Sinclair Refining Co. facility (nine oil tanks, two oil houses, one pump house). As noted above, bulk petroleum storage was consolidated by the Wingfield Oil Company (later renamed Holmes Oil Company) who continued to operate through the late 1990s. The Holmes Oil Corporation appears to have vacated the Target Property concurrent with removal of the final storage tanks by 1997.

Records indicate most of the petroleum stored/handled at Site 3 was fuel oil. However, state records indicate a significant quantity of leaded and unleaded gasoline, diesel fuel, kerosene, and used/waste motor oil may have been stored in bulk at the Site. It would be impractical to document specific fueling/storage operations dating across roughly 80 years of bulk petroleum storage at Site 3. The locations of known historic features associated with bulk fuel storage by tenants are illustrated on Figure 4 and Figure 5 and include 34 above-ground storage tanks (ASTs), 12 underground storage tanks (USTs), seven pump houses, four oil houses, and associated pipe runs.

Site Investigation activities were completed by WCL between 1996 and 1998. Through the competitive bidding process operated by Wisconsin Department of Commerce (WDCOMM), Northern Environmental Technologies Inc. (later acquired by Stantec) oversaw the excavation of 510 tons of petroleum-impacted soil from three locations at the Property (see extents illustrated on Figure 4) and completed post-remediation soil and groundwater sampling. Of note, approximately one-inch of free product accumulated in monitoring well MW-2 following soil removal. The free product was removed from the well with a bailer and reportedly did not reform during two subsequent groundwater monitoring events. WDCOMM issued a closure letter on October 17, 2005 and listed the property on the Wisconsin Department of Natural Resources (WDNR) Geographic Information System Registry of Closed Remediation Sites (GIS Registry) of closed remediation sites as an institutional control to manage residual petroleum impacts to soil and groundwater. At the time of closure, residual petroleum constituents remained in soil at the property following soil excavation at concentrations greater than applicable NR 720 RCLs.

Current Ownership and Site Use

A Phase I ESA was completed by Stantec (2019) per the All Appropriate Inquiries rule detailed in 40 CFR §312.21 utilizing ASTM E1527-13 on behalf of the current owner (Community Development Authority of the City of Manitowoc [CDA]) on March 21, 2019. The current owner acquired the property on April 12, 2019 for the purpose of blight elimination and subsequently received a Local Governmental Unit (LGU) Environmental Liability Exemption from WDNR per ch. 292.11(9) of the WAC on March 18, 2019 under the WDNR Bureau for Remediation and Redevelopment Tracking System Case Number 07-36-583000.

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 Site.

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 Property:

- 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 include bulk coal transloading/storage, petroleum storage, ship building, grain storage/elevator, metal/scrap/junk yard, and transloading of stone along the southern portion of the Property (Figure 4). Historic features of specific environmental interest summarized by Stantec (2018f, 2018g, 2018h, 2018i, 2018j, and 2019c) are illustrated on Figure 5.

Stantec (2020a) Phase II ESA. Site Investigation activities were completed by the previous owner (WCL) between 1996 and 1998. WDCOMM issued a closure letter on October 17, 2005 and listed the property on the WDNR GIS Registry as an institutional control to manage residual petroleum impacts to soil and groundwater. At the time of closure, residual petroleum constituents remained in soil at the property following soil excavation at concentrations greater than applicable NR 720 RCLs.

Stantec completed a Phase II ESA at the River Point District using funds from a hazardous substance and a petroleum brownfield assessment grant awarded to the City by the USEPA in 2018 under Cooperative Agreement Number BF 00E02377-0. Soil and groundwater sample locations relative to historic features are illustrated on Figure 5. Results of the Stantec (2020a) Phase II ESA investigation at the Target Property are summarized below.

Soil. Similar to previous investigations, select VOCs, SVOCs, PAHs, and heavy metals were detected in soil at concentrations greater than applicable NR 720 RCLs and/or BTVs. This investigation identified and delineated multiple fill units, including a sitewide heterogeneous granular black anthropogenic fill unit of varying quality. Ubiquitous soil impacts are largely attributable to the granular anthropogenic fill across the site, which is present in thicknesses of up to eight feet, and an estimated volume of approximately 41,000 cubic yards. Previously documented soil impacts associated with prior bulk petroleum storage by previous tenants was also confirmed.

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. Select VOCs, PAHs, and/or dissolved heavy metals were detected in groundwater at concentrations greater than applicable NR 140 PALs and/or ESs. Impacts to groundwater in former bulk petroleum storage areas is consistent with previous investigations.

Continued Site Assessment (Summer/Fall 2020). The CDA recently received a Site Assessment Grant (SAG) from the Wisconsin Economic Development Corporation (WEDC), which will be used to remove the remaining petroleum infrastructure and further delineate residual subsurface impacts at the Site. Implementation of the SAG is targeted for Summer/Fall 2020 and is anticipated to result in completing the required ch. NR 716 Site Investigation report.

3.0 REMEDIAL ACTION OPTIONS EVALUATION

3.1 PROPOSED SITE REDEVELOPMENT

As previously stated, the 5.1-acre Target Property is part of the larger 20.1-acre River Point District Redevelopment Project. Conceptual redevelopment plans for the Target Property relative to the larger River Point District are illustrated on Figure 6. However, as illustrated on Figure 7, a large quantity of fill (up to nine feet in thickness; estimated 47,400 cubic yards) will be needed to raise the Property from the current grade to match the proposed grade.

Future public infrastructure investments at the Target Property and the River Point District will include streets, trails, utilities, lighting and streetscape of over \$10M. 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 \$150M. With over 3,500 feet of river frontage, the project 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 site 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 that is currently underway, brownfield assessment and cleanup, establishment of a new Tax Incremental Financing District and site preparation. The site of the trail network and redevelopment is located on what was once one of the key economic drivers within the community that has fallen into blight and remained largely vacant since the 1980's.

The redevelopment of the former industrial peninsula has been part of the vision for the City for well over 20 years. More recently, the site was shown for redevelopment from Industrial to Planned Mixed Use in the 2009 Comprehensive Plan. 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 riverwalk was covered extensively in the document as was the overall site. Most recently, in 2019 the City adopted a Downtown Master Plan. Within the Plan, the peninsula redevelopment was identified as one of four catalyst sites for redevelopment. The City Council approved moving forward with design and construction documents for the necessary infrastructure to redevelop the peninsula in 2019. Attached is the concept plan on which the current site design and engineering is based. While no specific projects have been approved, interest in the project has been strong.

3.2 REMEDIAL ACTION OPTIONS EVALUATION

Supplemental assessment activities planned for Summer 2020 will remove the remaining petroleum infrastructure (e.g. slabs, etc.) and complete the ch. NR 716 Site Investigation. Based on impacts identified to date, remedial action activities are warranted to facilitate redevelopment at the Site. 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 multi-family residential purposes. As summarized on Table 1, the remedial options evaluated included the following:

1. Natural Attenuation (no action)
2. Excavate impacted soils and backfill with clean fill materials and establish an institutional control to manage residual groundwater impacts.
3. Construct an engineered barrier and establish institutional controls to manage residual soil and groundwater impacts.

Regardless of the selected remedial option, the Site will need to be enrolled in the Voluntary Party Liability Exemption (VPLE) program and appropriate insurance purchased through the program. 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 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 Site restoration will not occur within a reasonable timeframe. Following redevelopment, impacts would be near sensitive receptors. Therefore, Remedial Alternative 1 is not considered a prudent approach.

Alternative 2. Excavation of impacted soils proposed in Alternative 2 will be effective in long-term elimination of the mobility, toxicity, and magnitude of residual soil impacts. However, the cost for Alternative 2 is excessive. Further, it will require hauling a considerable volume of soil for disposal in a landfill and require an extraordinary volume of clean fill to be imported to the Site. Therefore, Alternative 2 is not considered a sustainable option.

Alternative 3. Under Remedial Alternative 3, clean fill will be placed to raise the grade of the Site, which will result in creating an engineered barrier suitable to prevent direct contact with residual soil impacts. Clean fill is being generated during ongoing infrastructure upgrades, which if approved for placement on the Property by the WDNR VPLE committee, could result in a considerable cost savings. 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, implementability, 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 six elements described below:

Enroll the Property in the VPLE Program and Purchase Insurance. As a requirement of acquisition, the Property must be enrolled in the VPLE program to facilitate non-industrial reuse of the Property. Per program guidelines, insurance must be purchased through the program.

Develop and Implement a Soil Characterization Workplan. A workplan to characterize soil prior to placement on the Property will need to be completed and approved by the VPLE committee. Fill soils targeted for use in constructing the engineered barrier will need to be sampled and the quality of fill approved by the VPLE committee prior to placement at the Property.

Develop a Remedial Action Plan / Material Management Plan. A combined remedial action plan and material management plan will need to be completed and approved by the VPLE committee. The plan 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.

Placement/Compaction/Grading of Fill to Construct the Engineered Barrier. Suitable fill will be placed/compacted/and graded at the property to raise the grade and construct the engineered barrier.

Construction Documentation Report. A documentation report will be prepared following construction of the engineered barrier.

Establish Institutional Controls. Following construction of the engineered barrier, the Property will be listed on the WDNR GIS Registry. Listing the Site on the GIS Registry will 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.

4.2 SCHEDULE

A proposed Schedule is provided below.

Task #	Task Description	Weeks to Complete
1	Enroll the Property in VPLE and Purchase Insurance	1-2 Weeks
2	Develop and Implement a Soil Characterization Workplan	1-2 Months, pending availability of a suitable quantity of fill
3	Develop a Remedial Action Plan / Material Management Plan	2-4 Weeks, pending the results of Task 3
4	Placement/Compaction/Grading of Fill to Construct Engineered Barrier	2-4 Months, pending availability of a suitable quantity of fill
5	Construction Documentation Report	1-2 Weeks
6	Establish Institutional Controls	2-4 Weeks

4.3 ESTIMATED COST

A preliminary estimate of the cost for implementation of Remedial Alternative 3 is presented on the table below.

Cost Estimate for Remedial Alternative 3

#	Item	Estimated or Assumed Value
1	Enroll the Property in VPLE and Purchase Insurance	\$4,000 application fee \$18,266 insurance
2	Develop and Implement a Soil Characterization Workplan	\$5,000 workplan \$15,000 sampling potential fill
3	Develop a Remedial Action Plan / Material Management Plan	\$8,000
4	Placement/Compaction/Grading of Fill to Construct Engineered Barrier	\$154,050 if fill is free and already onsite \$950,000 if fill is purchased
5	Construction Documentation Report	\$3,000
6	Establish Institutional Controls	\$10,000
	Total remedial cost	\$217,316 to \$1,013,266

4.4 RESTORATION TIME FRAME

As described in Section 4.2, implementation of Remedial Alternative 3 is anticipated to take 6-9 months to complete, as clean fill becomes available at the River Point District. If a developer is identified before initiation of Task 6, establishing institutional controls may be delayed until after construction of the final engineered barrier (e.g. building slab, roads, etc.). Long-term maintenance will include annual inspections of the engineered barrier.

4.5 PERFORMANCE MEASURES

Confirmation samples will not be collected.

4.6 TREATMENT RESIDUALS

Residual soil and groundwater impacts will not require further treatment. If impacted soils are encountered during installation of future infrastructure (e.g. utilities, building foundations, etc.), the material will be characterized for waste disposal purposes and likely hauled offsite for disposal at the appropriate landfill.

4.7 SUSTAINABLE REMEDIAL ACTION CONSIDERATIONS

The described remedial approach primarily relies on utilizing an engineered barrier, which will be constructed concurrent with raising the elevation of the Property to the proposed grade. This approach minimizes transporting of soil for offsite disposal in a landfill. Low sulfur diesel can be used and a no-idle policy will reduce the carbon footprint.

5.0 REFERENCES

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

Stantec, 2020a, Phase II ESA, March 21, 2019.

Stantec, 2020b, State Eligibility Determination for Federal Petroleum Assessment Grant, 1110 Buffalo Street, Manitowoc, Wisconsin, May 18, 2020.

FIGURES

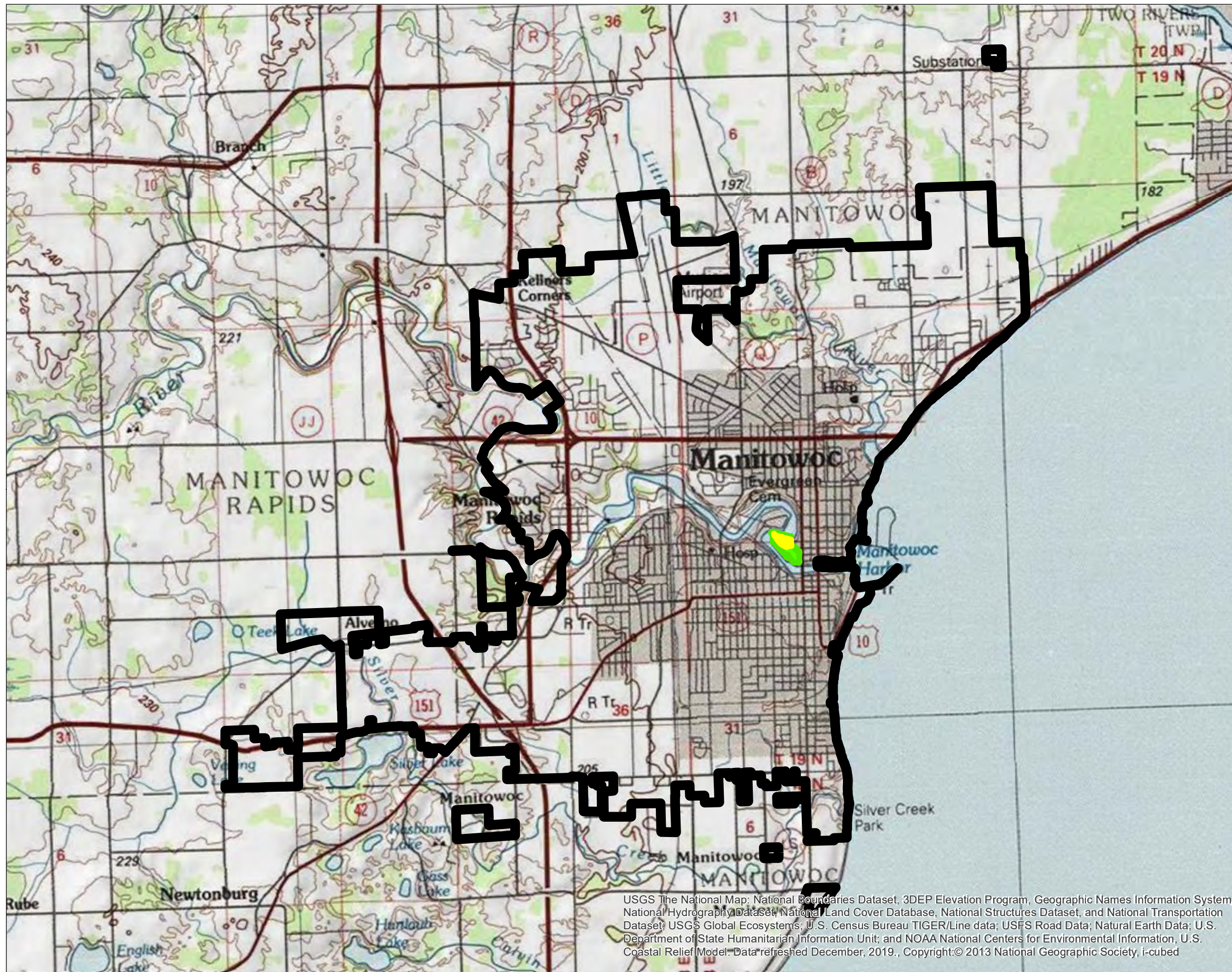


Figure No.

1




Title

Project Location and Local Topography

Client/Project
 River Point District Site 3
 1110 Buffalo Street
 City of Manitowoc

0 3,600 7,200 Feet
Prepared by HLB on 3/25/2020

Legend

-  City of Manitowoc
-  Site 3 - 1110 Buffalo Street
-  River Point District



Notes

1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet
2. Historic Site features illustrated on this figure were digitized from multiple historic maps/sources, including City Assessor files, WDNR files, and Sanborn (R) Fire Insurance Maps. These features are provided for illustration purposes only; Stantec makes no warranty as to the accuracy of these features.
3. Orthophotograph: Manitowoc County, 2017

USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed December, 2019. Copyright:© 2013 National Geographic Society, i-cubed



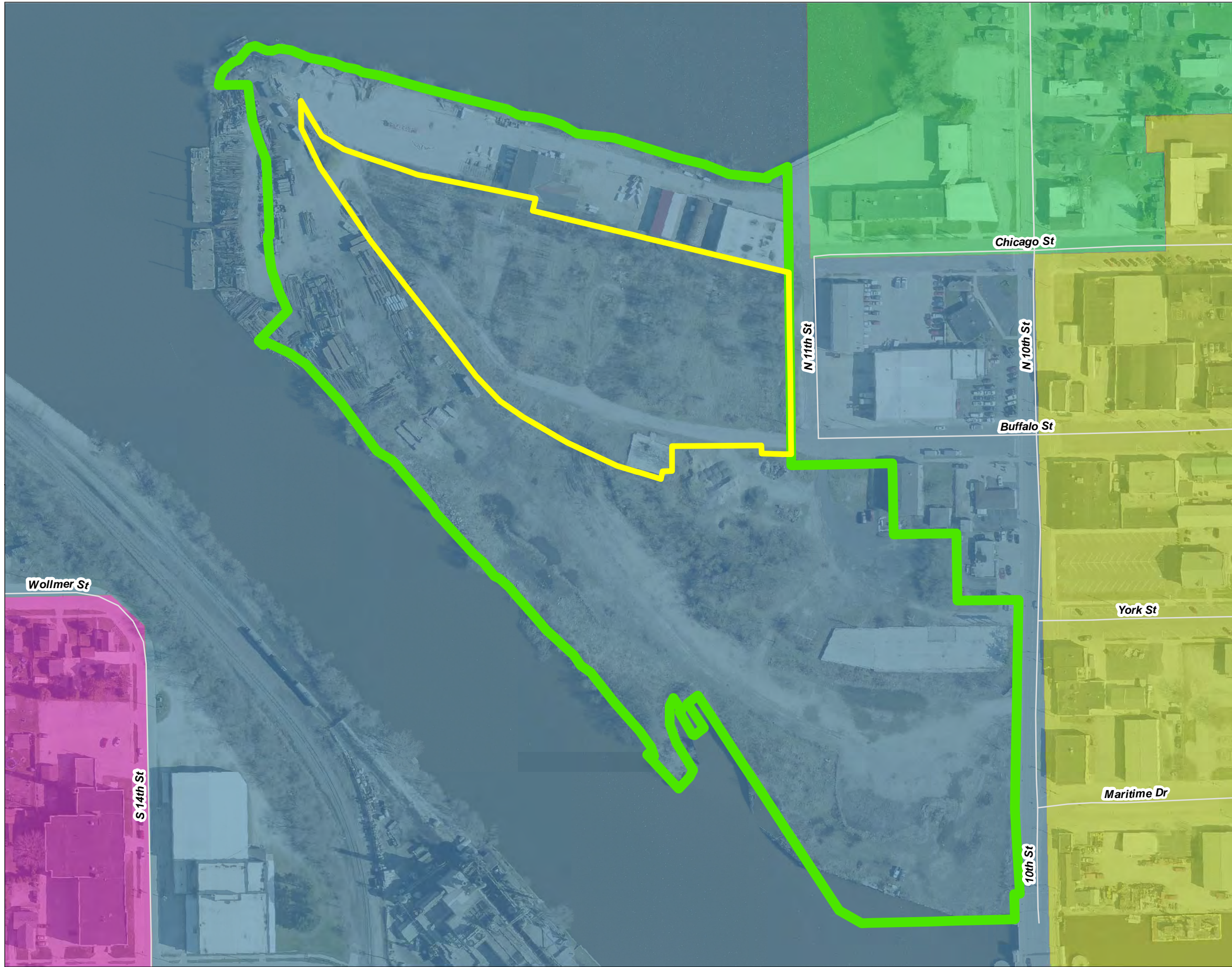


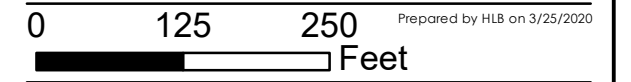
Figure No.

2

Title

Project Location and Current Zoning

Client/Project
 River Point District Site 3
 1110 Buffalo Street
 City of Manitowoc



Legend

- River Point District
- Site 3 - 1110 Buffalo Street

Zoning

- B-3
- C-1
- I-2
- R-6



Notes

1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet
2. Historic Site features illustrated on this figure were digitized from multiple historic maps/sources, including City Assessor files, WDNR files, and Sanborn (R) Fire Insurance Maps. These features are provided for illustration purposes only; Stantec makes no warranty as to the accuracy of these features.
3. Orthophotograph: Manitowoc County, 2017



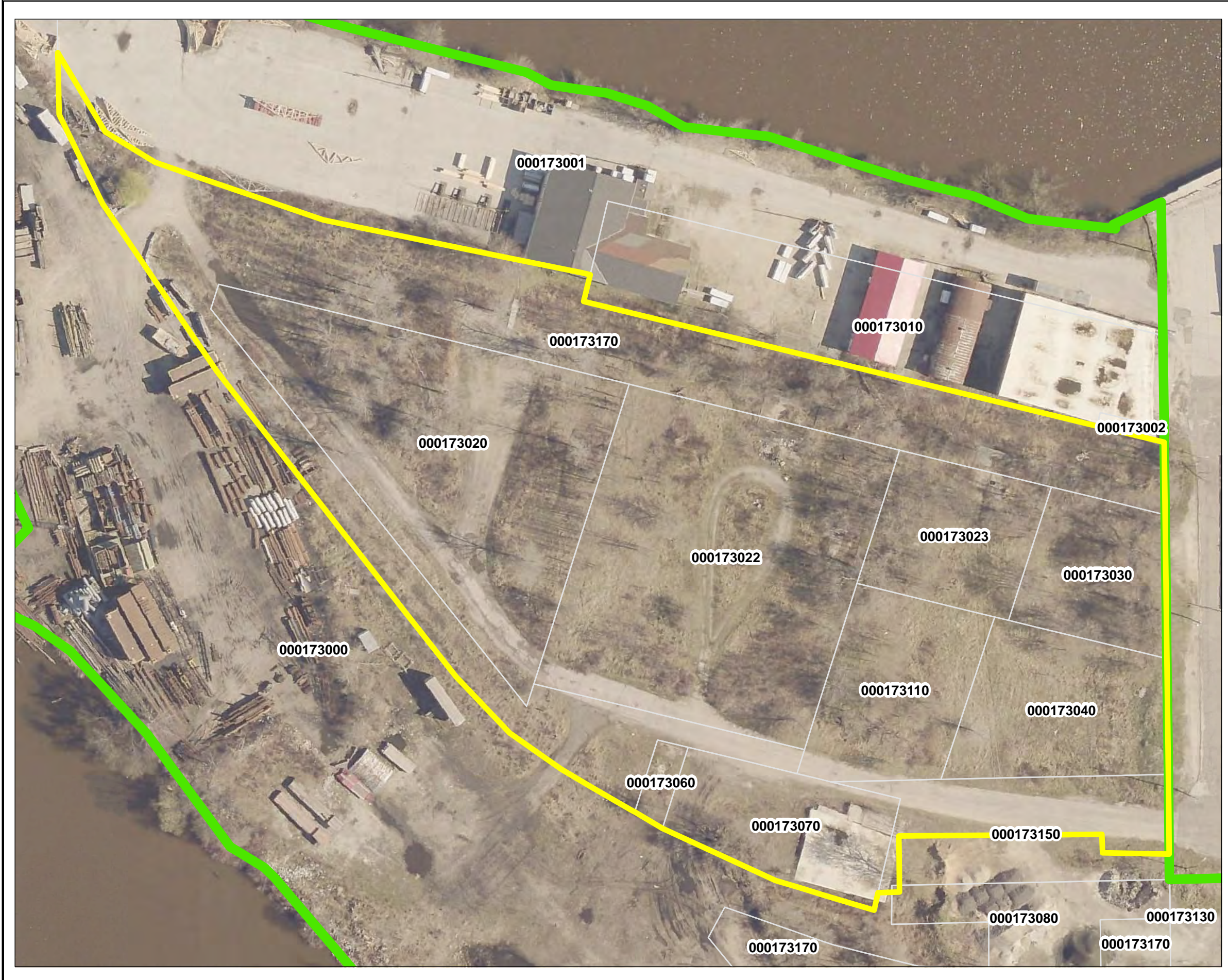



Figure No.
3
 Title
Site Location and Property Identification Numbers
 Client/Project
 River Point District Site 3
 1110 Buffalo Street City of Manitowoc
 0 55 110 Feet
 Prepared by HLB on 3/25/2020

Legend

- River Point District
- Site 3 - 1110 Buffalo Street Parcel
- Identification Numbers (17)



Notes

1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet
2. Historic Site features illustrated on this figure were digitized from multiple historic maps/sources, including City Assessor files, WDNR files, and Sanborn (R) Fire Insurance Maps. These features are provided for illustration purposes only; Stantec makes no warranty as to the accuracy of these features.
3. Orthophotograph: Manitowoc County, 2017



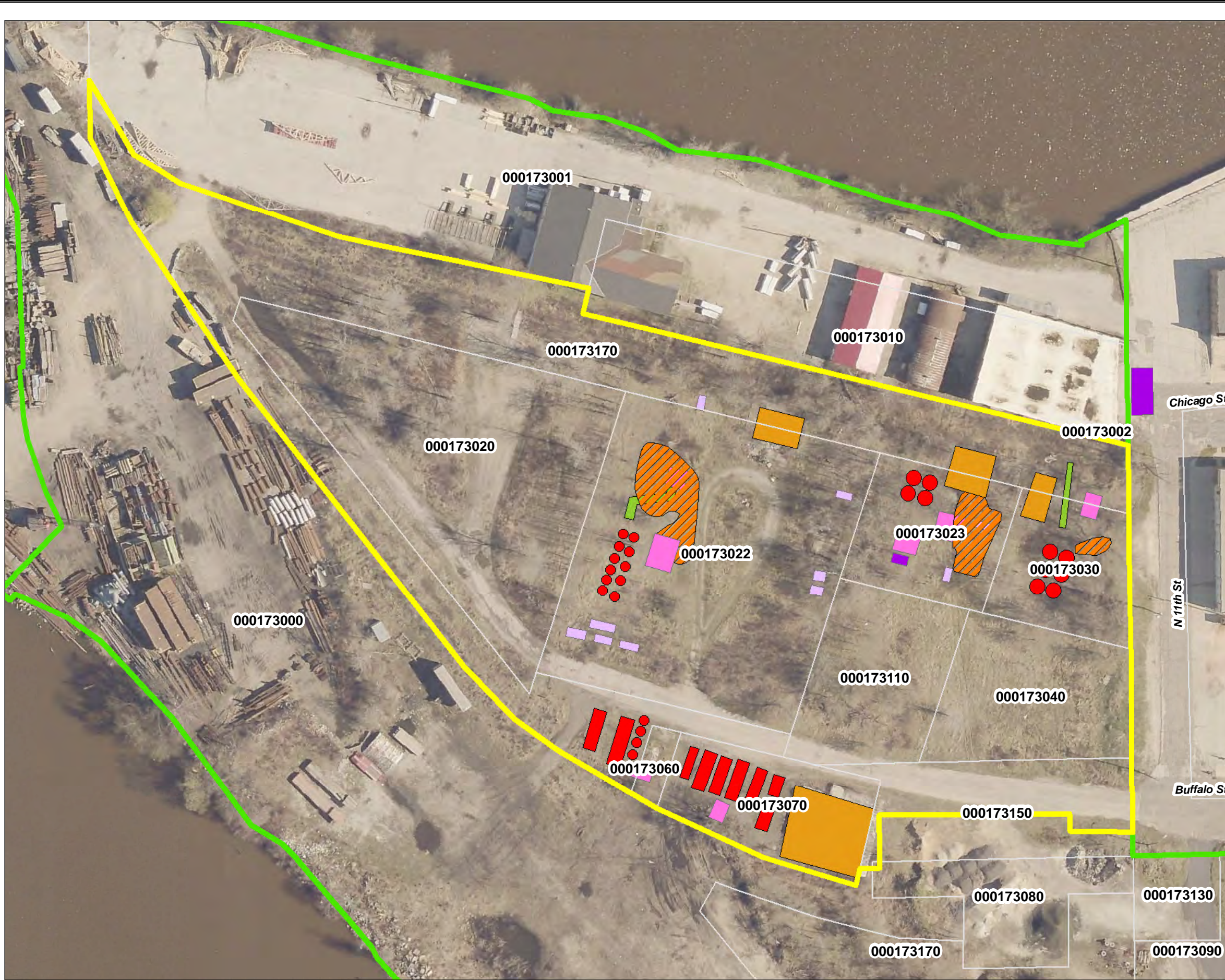


Figure No.
4
 Title
Site Locations and Site Features

Client/Project
 River Point District Site 3
 1110 Buffalo Street
 City of Manitowoc

0 60 120 Feet
Prepared by HLB on 3/25/2020

- Legend**
- Site 3 - 1110 Buffalo Street (1)
 - River Point District
- Prior Site Features (City Records)**
- Oil House (4)
 - Oil Tank (AST) (34)
 - Pump House (5)
 - UST (2)
- Additional Site Features (WDNR Files)**
- Former UST (10)
 - Product Piping (2)
 - Pump House (2)
 - Soil Excavation (3)



Notes

1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet
2. Historic Site features illustrated on this figure were digitized from multiple historic maps/sources, including City Assessor files, WDNR files, and Sanborn (R) Fire Insurance Maps. These features are provided for illustration purposes only; Stantec makes no warranty as to the accuracy of these features.
3. Orthophotograph: Manitowoc County, 2017



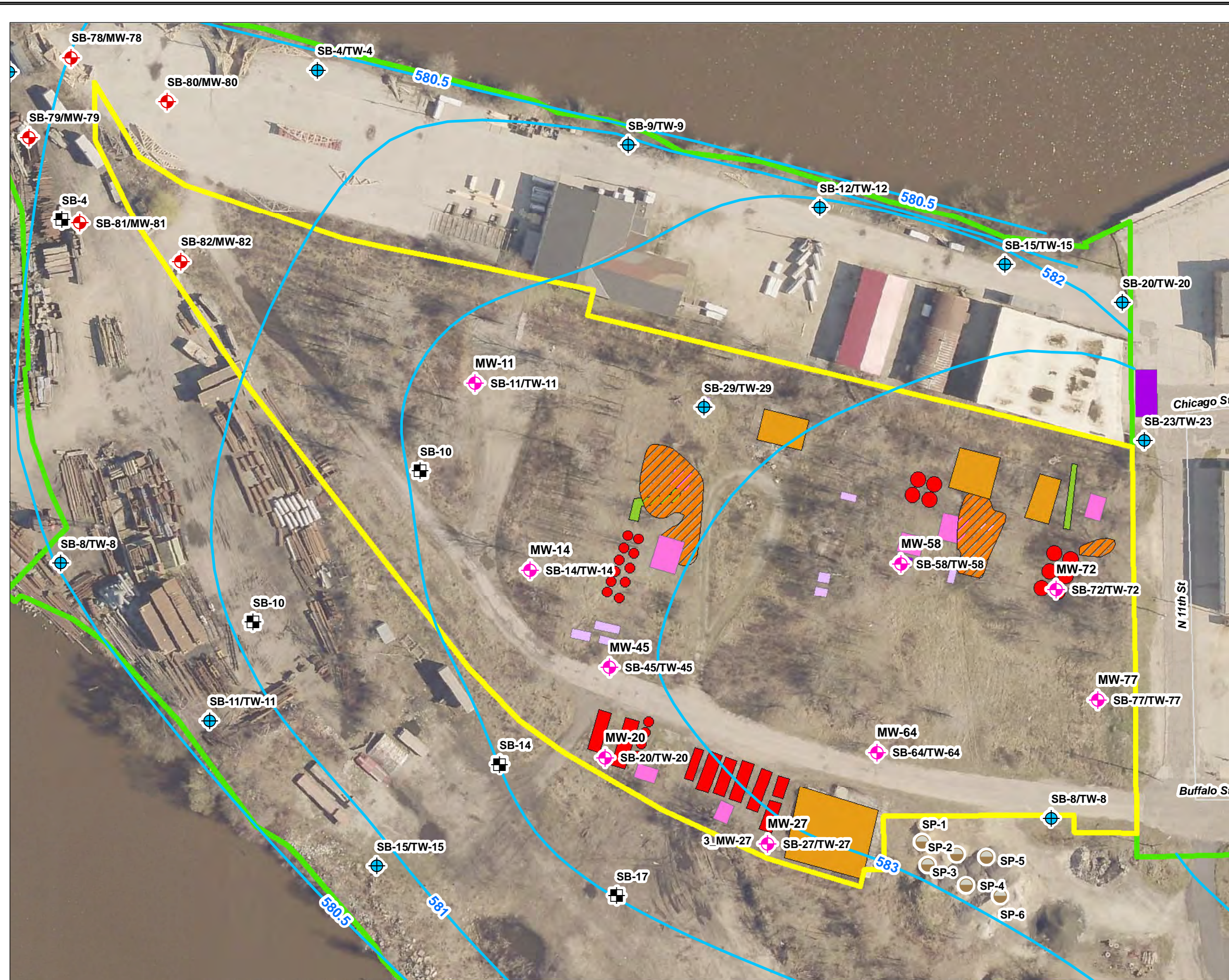


Figure No. **5**
 Title
Historic Site Features and Previous Sample Locations
 Client/Project
 River Point District Site 3
 1110 Buffalo Street
 City of Manitowoc
 0 60 120 Feet
 Prepared by HLB on 3/25/2020

- Legend**
- ◆ Groundwater Wells (AECOM, 2020) (9)
 - Soil Boring (5)
 - Surface Grab (6)
 - ⊕ Soil Boring/Temp Well (21)
 - ◆ Groundwater Monitoring Wells (7)
 - Groundwater Elevation
 - Site 3 - 1110 Buffalo Street
 - River Point District
 - Prior Site Features (City Records)**
 - Oil House (4)
 - Oil Tank (AST) (34)
 - Pump House (5)
 - UST (2)
 - Additional Site Features (WDNR Files)**
 - Former UST (10)
 - Product Piping (2)
 - Pump House (2)
 - Soil Excavation (3)

Notes

1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet
2. Historic Site features illustrated on this figure were digitized from multiple historic maps/sources, including City Assessor files, WDNR files, and Sanborn (R) Fire Insurance Maps. These features are provided for illustration purposes only; Stantec makes no warranty as to the accuracy of these features.
3. Orthophotograph: Manitowoc County, 2017





Figure No.

6

Title

Conceptual Reuse Plan

Client/Project
 River Point District Site 3
 1110 Buffalo Street
 City of Manitowoc

0 125 250 Feet Prepared by HLB on 7/11/18

Legend

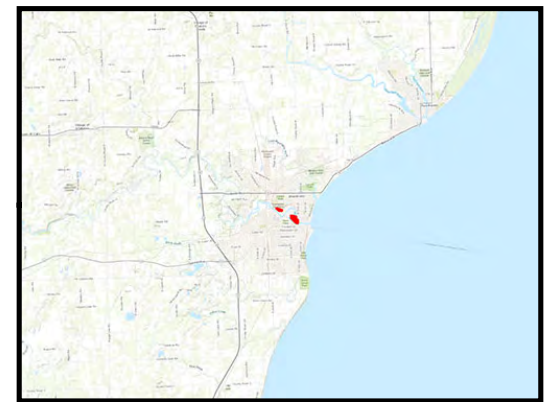
River Point District

Project Area

Site 3 - 1110 Buffalo Street

Proposed Reuse

- Commercial
- Greenspace
- Mixed-Use / Multi-Level Res
- Multi-Level Residential
- Town Home Residential
- Roadway/Sidewalk/Parking



Notes

1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet
2. Historic Site features illustrated on this figure were digitized from multiple historic maps/sources, including City Assessor files, WDNR files, and Sanborn (R) Fire Insurance Maps. These features are provided for illustration purposes only; Stantec makes no warranty as to the accuracy of these features.
3. Orthophotograph: Manitowoc County, 2017



THE CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS. DO NOT SCALE THE DRAWING. ANY ERRORS OR OMISSIONS SHALL BE REPORTED TO STANTEC WITHOUT DELAY. NO USE FOR ANY PURPOSE OTHER THAN THAT AUTHORIZED BY STANTEC IS FORBIDDEN.

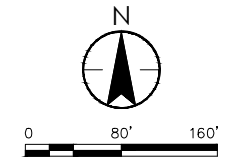
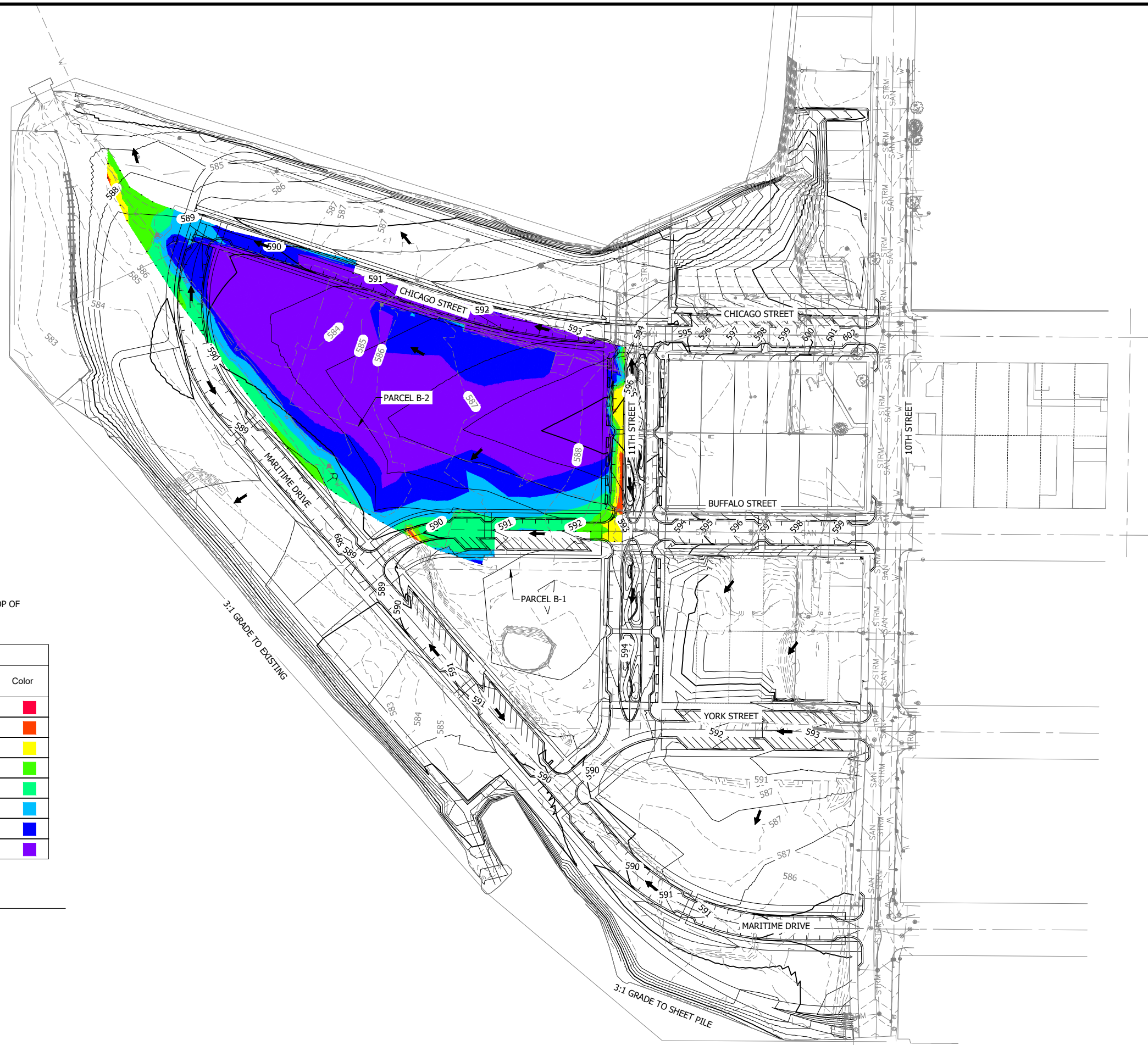
Plot Date: 06/25/2020 - 8:18am
 Drawing name: \\193805824\CAD\Dwg\Sheets\193805824_Grading\B1.dwg
 User: 193805824.XSNO.Border.193805824

NOTE:
 ALL CUT AND FILL NUMBERS ARE TO THE TOP OF PAVEMENT

Grading Analysis Table				
Type	Min Depth (ft)	Max Depth (ft)	Volume (CY)	Color
CUT	-0.7	0.0	0	Red
FILL	0.0	1.0	8151	Orange
FILL	1.0	2.0	8069	Yellow
FILL	2.0	3.0	7857	Light Green
FILL	3.0	4.0	7369	Green
FILL	4.0	5.0	6590	Light Blue
FILL	5.0	6.0	5349	Blue
FILL	6.0	9.0	3981	Purple

LEGEND

- 952 --- EXISTING CONTOUR MINOR
- 950 — EXISTING CONTOUR MAJOR
- 952 --- PROPOSED CONTOUR MINOR
- 950 — PROPOSED CONTOUR MAJOR
- ➔ DRAINAGE PATH



DATE OF ISSUANCE	June 25, 2020
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NO	REVISION	DATE

SURVEY	CORNER POINT
DRAWN	
DESIGNED	
CHECKED	JW
APPROVED	MAB
PROJ. NO.	193805824

TABLE

Table 1
 Analysis of Brownfields Cleanup Alternatives
 1110 Buffalo Street
 Manitowoc, Wisconsin

Remedial Action Area Description:		The target remedial area consists of a vacant 5.1-acre property. Residual heavy metal and/or petroleum 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 soil to groundwater residual contaminant levels (RCLs). In addition, residual petroleum impacts to groundwater remain at concentrations that exceed ch. NR 140 WAC groundwater enforcement standards (ES) and/or preventive action limits (PAL).										
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	No	Lead Paint	No	Asbestos
Media	Remedial Alternative	Remedial Action Options Evaluation										
		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 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 (41,000 cubic yards @ \$70 per yard = \$2.9MM). Purchase and import clean fill is anticipated concurrent with redevelopment (47,400 cubic yards @ \$20 per yard = \$950K). Establishing the institutional control to control groundwater consumption will occur with final closure (\$13,000).	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 - Construct a soil engineered barrier through placement of clean fill to raise the current grade to proposed final grade; establish institutional controls to manage the engineered barrier and prevent groundwater consumption.	Construction of a soil engineered barrier through placement of clean fill to raise the current grade to proposed final grade 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.	Capital costs would be minimized as the work will take place concurrent with placement of fill to raise the grade of the Site to final grade. Fill is currently available at no cost to the City, and pending approval from the VPLE committee, the fill could be used to construct a portion of the engineered barrier (\$47,400 cubic yards @ \$3.25 per yard = \$154,050). An incremental cost could be incurred, if fill needed to be purchased (47,400 cubic yards @ \$20 per yard = \$950K). Establishing the institutional control to control groundwater consumption will occur with final closure (\$13,000).	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.					