

Notice: Use this form to request a **written response (on agency letterhead)** from the Department of Natural Resources (DNR) regarding technical assistance, a post-closure change to a site, a specialized agreement or liability clarification for Property with known or suspected environmental contamination. A fee will be required as is authorized by s. 292.55, Wis. Stats., and NR 749, Wis. Adm. Code., unless noted in the instructions below. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Public Records law [ss. 19.31 - 19.39, Wis. Stats.].

Definitions

"Property" refers to the subject Property that is perceived to have been or has been impacted by the discharge of hazardous substances.

"Liability Clarification" refers to a written determination by the Department provided in response to a request made on this form. The response clarifies whether a person is or may become liable for the environmental contamination of a Property, as provided in s. 292.55, Wis. Stats.

"Technical Assistance" refers to the Department's assistance or comments on the planning and implementation of an environmental investigation or environmental cleanup on a Property in response to a request made on this form as provided in s. 292.55, Wis. Stats.

"Post-closure modification" refers to changes to Property boundaries and/or continuing obligations for Properties or sites that received closure letters for which continuing obligations have been applied or where contamination remains. Many, but not all, of these sites are included on the GIS Registry layer of RR Sites Map to provide public notice of residual contamination and continuing obligations.

Select the Correct Form

This form should be used to request the following from the DNR:

- Technical Assistance
- Liability Clarification
- Post-Closure Modifications
- Specialized Agreements (tax cancellation, negotiated agreements, etc.)

Do not use this form if one of the following applies:

- Request for an **off-site liability exemption or clarification** for Property that has been or is perceived to be contaminated by one or more hazardous substances that originated on another Property containing the source of the contamination. Use DNR's Off-Site Liability Exemption and Liability Clarification Application Form 4400-201.
- Submittal of an Environmental Assessment for the **Lender Liability Exemption**, s 292.21, Wis. Stats., **if no response or review by DNR is requested**. Use the Lender Liability Exemption Environmental Assessment Tracking Form 4400-196.
- Request for an **exemption to develop on a historic fill site** or licensed landfill. Use DNR's Form 4400-226 or 4400-226A.
- **Request for closure** for Property where the investigation and cleanup actions are completed. Use DNR's Case Closure - GIS Registry Form 4400-202.

All forms, publications and additional information are available on the internet at: dnr.wi.gov/topic/Brownfields/Pubs.html.

Instructions

1. Complete sections 1, 2, 6 and 7 for all requests. Be sure to provide adequate and complete information.
2. Select the type of assistance requested: Section 3 for technical assistance or post-closure modifications, Section 4 for a written determination or clarification of environmental liabilities; or Section 5 for a specialized agreement.
3. Include the fee payment that is listed in Section 3, 4, or 5, unless you are a "Voluntary Party" enrolled in the Voluntary Party Liability Exemption Program **and** the questions in Section 2 direct otherwise. Information on to whom and where to send the fee is found in Section 8 of this form.
4. Send the completed request, supporting materials and the fee to the appropriate DNR regional office where the Property is located. See the map on the last page of this form. A paper copy of the signed form and all reports and supporting materials shall be sent with an electronic copy of the form and supporting materials on a compact disk. For electronic document submittal requirements see: <http://dnr.wi.gov/files/PDF/pubs/rr/RR690.pdf>

The time required for DNR's determination varies depending on the complexity of the site, and the clarity and completeness of the request and supporting documentation.

Technical Assistance, Environmental Liability Clarification or Post-Closure Modification Request

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Section 1. Contact and Recipient Information

Requester Information

This is the person requesting technical assistance or a post-closure modification review, that his or her liability be clarified or a specialized agreement and is identified as the requester in Section 7. DNR will address its response letter to this person.

Last Name Cater	First Brian	MI	Organization/ Business Name City of Kenosha
Mailing Address 625 52nd Street			City Kenosha
			State WI
			ZIP Code 53140
Phone # (include area code) (414) 653-4156	Fax # (include area code) (414) 653-4056	Email bcater@kenosha.org	

The requester listed above: (select all that apply)

- Is currently the owner
- Is currently considering selling the Property
- Is renting or leasing the Property
- Is currently considering acquiring the Property
- Is a lender with a mortgagee interest in the Property
- Other. Explain the status of the Property with respect to the applicant:

Contact Information (to be contacted with questions about this request) Select if same as requester

Contact Last Name Cater	First Brian	MI	Organization/ Business Name City of Kenosha
Mailing Address 625 52nd Street			City Kenosha
			State WI
			ZIP Code 53140
Phone # (include area code) (262) 653-4156	Fax # (include area code) (262) 653-4056	Email bcater@kenosha.org	

Environmental Consultant (if applicable)

Contact Last Name Altenbach	First Lanette	MI	Organization/ Business Name AECOM
Mailing Address 1555 N RiverCenter Drive, Suite 214			City Milwaukee
			State WI
			ZIP Code 53212
Phone # (include area code) (414) 944-6186	Fax # (include area code)	Email lanette.altenbach@aecom.com	

Section 2. Property Information

Property Name Kenosha Engine Plant (former)	FID No. (if known) 230004500
BRRTS No. (if known) 02-30-000327	Parcel Identification Number Multiple parcels
Street Address 5555 30th Avenue	City Kenosha
	State WI
	ZIP Code 53144
County Kenosha	Municipality where the Property is located <input checked="" type="radio"/> City <input type="radio"/> Town <input type="radio"/> Village of
	Property is composed of: <input type="radio"/> Single tax parcel <input checked="" type="radio"/> Multiple tax parcels
	Property Size Acres 100

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1. Is a response needed by a specific date? (e.g., Property closing date) Note: Most requests are completed within 60 days. Please plan accordingly.

- No Yes

Date requested by: 10/01/2022

Reason: The City of Kenosha has a Federal EDA grant which has a second phase of approvals that will require reaffirmation that the project can proceed. & The Kenosha Unified School District (KUSD) will not proceed to design until they have a letter from the WDNR with an approval.

2. Is the "Requester" enrolled as a Voluntary Party in the Voluntary Party Liability Exemption (VPLE) program?

- No. **Include the fee that is required for your request in Section 3, 4 or 5.**
 Yes. **Do not include a separate fee.** This request will be billed separately through the VPLE Program.

Fill out the information in Section 3, 4 or 5 which corresponds with the type of request:

Section 3. Technical Assistance or Post-Closure Modifications;

Section 4. Liability Clarification; or Section 5. Specialized Agreement.

Section 3. Request for Technical Assistance or Post-Closure Modification

Select the type of technical assistance requested: [Numbers in brackets are for WI DNR Use]

- No Further Action Letter (NFA) (Immediate Actions) - NR 708.09, [183] - Include a fee of \$350. Use for a written response to an immediate action after a discharge of a hazardous substance occurs. Generally, these are for a one-time spill event.
- Review of Site Investigation Work Plan - NR 716.09, [135] - **Include a fee of \$700.**
- Review of Site Investigation Report - NR 716.15, [137] - **Include a fee of \$1050.**
- Approval of a Site-Specific Soil Cleanup Standard - NR 720.10 or 12, [67] - **Include a fee of \$1050.**
- Review of a Remedial Action Options Report - NR 722.13, [143] - **Include a fee of \$1050.**
- Review of a Remedial Action Design Report - NR 724.09, [148] - **Include a fee of \$1050.**
- Review of a Remedial Action Documentation Report - NR 724.15, [152] - **Include a fee of \$350**
- Review of a Long-term Monitoring Plan - NR 724.17, [25] - **Include a fee of \$425.**
- Review of an Operation and Maintenance Plan - NR 724.13, [192] - **Include a fee of \$425.**

Other Technical Assistance - s. 292.55, Wis. Stats. [97] (For request to build on an abandoned landfill use Form 4400-226)

- Schedule a Technical Assistance Meeting - **Include a fee of \$700.**
- Hazardous Waste Determination - **Include a fee of \$700.**
- Other Technical Assistance - **Include a fee of \$700.** Explain your request in an attachment.

Post-Closure Modifications - NR 727, [181]

- Post-Closure Modifications: Modification to Property boundaries and/or continuing obligations of a closed site or Property; sites may be on the GIS Registry. This also includes removal of a site or Property from the GIS Registry. **Include a fee of \$1050, and:**
 - Include a fee of \$300 for sites with residual soil contamination; and
 - Include a fee of \$350 for sites with residual groundwater contamination, monitoring wells or for vapor intrusion continuing obligations.

Attach a description of the changes you are proposing, and documentation as to why the changes are needed (if the change to a Property, site or continuing obligation will result in revised maps, maintenance plans or photographs, those documents may be submitted later in the approval process, on a case-by-case basis).

Section 4. Request for Liability Clarification

Select the type of liability clarification requested. Use the available space given or attach information, explanations, or specific questions that you need answered in DNR's reply. Complete Sections 6 and 7 of this form. [Numbers in brackets are for DNR Use]

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- "Lender" liability exemption clarification - s. 292.21, Wis. Stats. [686]

❖ **Include a fee of \$700.**

Provide the following documentation:

- (1) ownership status of the real Property, and/or the personal Property and fixtures;
- (2) an environmental assessment, in accordance with s. 292.21, Wis. Stats.;
- (3) the date the environmental assessment was conducted by the lender;
- (4) the date of the Property acquisition; for foreclosure actions, include a copy of the signed and dated court order confirming the sheriff's sale.
- (5) documentation showing how the Property was acquired and the steps followed under the appropriate state statutes.
- (6) a copy of the Property deed with the correct legal description; and,
- (7) the Lender Liability Exemption Environmental Assessment Tracking Form (Form 4400-196).
- (8) If no sampling was done, please provide reasoning as to why it was **not** conducted. Include this either in the accompanying environmental assessment or as an attachment to this form, and cite language in s. 292.21(1)(c)2., h.-i., Wis. Stats.:
 - h. The collection and analysis of representative samples of soil or other materials in the ground that are suspected of being contaminated based on observations made during a visual inspection of the real Property or based on aerial photographs, or other information available to the lender, including stained or discolored soil or other materials in the ground and including soil or materials in the ground in areas with dead or distressed vegetation. The collection and analysis shall identify contaminants in the soil or other materials in the ground and shall quantify concentrations.
 - i. The collection and analysis of representative samples of unknown wastes or potentially hazardous substances found on the real Property and the determination of concentrations of hazardous waste and hazardous substances found in tanks, drums or other containers or in piles or lagoons on the real Property.

- "Representative" liability exemption clarification (e.g. trustees, receivers, etc.) - s. 292.21, Wis. Stats. [686]

❖ **Include a fee of \$700.**

Provide the following documentation:

- (1) ownership status of the Property;
- (2) the date of Property acquisition by the representative;
- (3) the means by which the Property was acquired;
- (4) documentation that the representative has no beneficial interest in any entity that owns, possesses, or controls the Property;
- (5) documentation that the representative has not caused any discharge of a hazardous substance on the Property; and
- (6) a copy of the Property deed with the correct legal description.

- Clarification of local governmental unit (LGU) liability exemption at sites with: (select all that apply)

- hazardous substances spills - s. 292.11(9)(e), Wis. Stats. [649];
- Perceived environmental contamination - [649];
- hazardous waste - s. 292.24 (2), Wis. Stats. [649]; and/or
- solid waste - s. 292.23 (2), Wis. Stats. [649].

❖ **Include a fee of \$700, a summary of the environmental liability clarification being requested, and the following:**

- (1) clear supporting documentation showing the acquisition method used, and the steps followed under the appropriate state statute(s).
- (2) current and proposed ownership status of the Property;
- (3) date and means by which the Property was acquired by the LGU, where applicable;
- (4) a map and the ¼, ¼ section location of the Property;
- (5) summary of current uses of the Property;
- (6) intended or potential use(s) of the Property;
- (7) descriptions of other investigations that have taken place on the Property; and
- (8) (for solid waste clarifications) a summary of the license history of the facility.

Section 4. Request for Liability Clarification (cont.)

Lease liability clarification - s. 292.55, Wis. Stats. [646]

❖ **Include a fee of \$700 for a single Property, or \$1400 for multiple Properties and the information listed below:**

- (1) a copy of the proposed lease;
- (2) the name of the current owner of the Property and the person who will lease the Property;
- (3) a description of the lease holder's association with any persons who have possession, control, or caused a discharge of a hazardous substance on the Property;
- (4) map(s) showing the Property location and any suspected or known sources of contamination detected on the Property;
- (5) a description of the intended use of the Property by the lease holder, with reference to the maps to indicate which areas will be used. Explain how the use will not interfere with any future investigation or cleanup at the Property; and
- (6) all reports or investigations (e.g. Phase I and Phase II Environmental Assessments and/or Site Investigation Reports conducted under s. NR 716, Wis. Adm. Code) that identify areas of the Property where a discharge has occurred.

General or other environmental liability clarification - s. 292.55, Wis. Stats. [682] - Explain your request below.

❖ **Include a fee of \$700 and an adequate summary of relevant environmental work to date.**

No Action Required (NAR) - NR 716.05, [682]

❖ **Include a fee of \$700.**

Use where an environmental discharge has or has not occurred, and applicant wants a DNR determination that no further assessment or clean-up work is required. Usually this is requested after a Phase I and Phase II environmental assessment has been conducted; the assessment reports should be submitted with this form. This is not a closure letter.

Clarify the liability associated with a "closed" Property - s. 292.55, Wis. Stats. [682]

❖ **Include a fee of \$700.**

- Include a copy of any closure documents if a state agency other than DNR approved the closure.

Use this space or attach additional sheets to provide necessary information, explanations or specific questions to be answered by the DNR.

Section 5. Request for a Specialized Agreement

Select the type of agreement needed. Include the appropriate draft agreements and supporting materials. Complete Sections 6 and 7 of this form. More information and model draft agreements are available at: dnr.wi.gov/topic/Brownfields/igu.html#tabx4.

Tax cancellation agreement - s. 75.105(2)(d), Wis. Stats. [654]

❖ **Include a fee of \$700, and the information listed below:**

- (1) Phase I and II Environmental Site Assessment Reports,
- (2) a copy of the Property deed with the correct legal description.

Agreement for assignment of tax foreclosure judgement - s.75.106, Wis. Stats. [666]

❖ **Include a fee of \$700, and the information listed below:**

- (1) Phase I and II Environmental Site Assessment Reports,
- (2) a copy of the Property deed with the correct legal description.

Negotiated agreement - Enforceable contract for non-emergency remediation - s. 292.11(7)(d) and (e), Wis. Stats. [630]

❖ **Include a fee of \$1400, and the information listed below:**

- (1) a draft schedule for remediation; and,
- (2) the name, mailing address, phone and email for each party to the agreement.

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Section 6. Other Information Submitted

Identify all materials that are included with this request.

Send both a paper copy of the signed form and all reports and supporting materials, and an electronic copy of the form and all reports, including Environmental Site Assessment Reports, and supporting materials on a compact disk.

Include one copy of any document from any state agency files that you want the Department to review as part of this request. The person submitting this request is responsible for contacting other state agencies to obtain appropriate reports or information.

- Phase I Environmental Site Assessment Report - Date: _____
- Phase II Environmental Site Assessment Report - Date: _____
- Legal Description of Property (required for all liability requests and specialized agreements)
- Map of the Property (required for all liability requests and specialized agreements)

Analytical results of the following sampled media: Select all that apply and include date of collection.

- Groundwater
- Soil
- Sediment
- Other medium - Describe: _____

Date of Collection: _____

- A copy of the closure letter and submittal materials
- Draft tax cancellation agreement
- Draft agreement for assignment of tax foreclosure judgment
- Other report(s) or information - Describe: Site Redevelopment Plan - 2022 infrastructure; roads, utilities, two buildings

For Property with newly identified discharges of hazardous substances only: Has a notification of a discharge of a hazardous substance been sent to the DNR as required by s. NR 706.05(1)(b), Wis. Adm. Code?


- Yes - Date (if known): 08/17/1989
- No

Note: The Notification for Hazardous Substance Discharge Form - Non-Emergency Only (Form 4400-225) is accessible through the RR Program Submittal Portal application. Directions for using the form and the Submittal Portal application are available on the [Submittal Portal web page](#).

Section 7. Certification by the Person who completed this form

- I am the person submitting this request (requester)
- I prepared this request for: _____
Requester Name

I certify that I am familiar with the information submitted on this request, and that the information on and included with this request is true, accurate and complete to the best of my knowledge. I also certify I have the legal authority and the applicant's permission to make this request.



Signature

9/30/22

Date Signed

City Engineer

Title

262.653.4156

Telephone Number (include area code)

Technical Assistance, Environmental Liability Clarification or Post-Closure Modification Request

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Section 8. DNR Contacts and Addresses for Request Submittals

Send or deliver one paper copy and one electronic copy on a compact disk of the completed request, supporting materials, and fee to the region where the property is located to the address below. Contact a DNR regional brownfields specialist with any questions about this form or a specific situation involving a contaminated property. For electronic document submittal requirements see: <http://dnr.wi.gov/files/PDF/pubs/rr/RR690.pdf>.

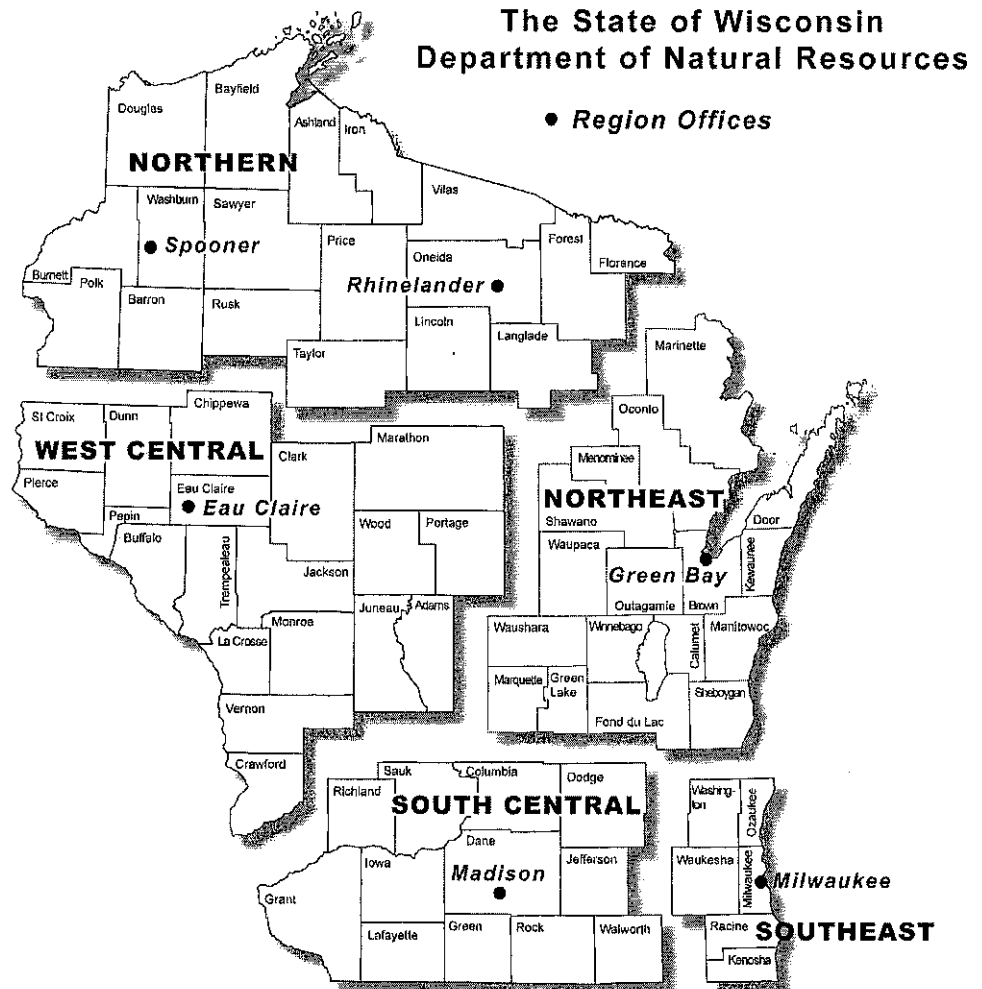
DNR NORTHERN REGION
 Attn: RR Program Assistant
 Department of Natural Resources
 223 E Steinfest Rd Antigo, WI 54409

DNR NORTHEAST REGION
 Attn: RR Program Assistant
 Department of Natural Resources
 2984 Shawano Avenue
 Green Bay WI 54313

DNR SOUTH CENTRAL REGION
 Attn: RR Program Assistant
 Department of Natural Resources
 3911 Fish Hatchery Road
 Fitchburg WI 53711

DNR SOUTHEAST REGION
 Attn: RR Program Assistant
 Milwaukee DNR Office
 1027 West St. Paul Ave
 Milwaukee WI 53233

DNR WEST CENTRAL REGION
 Attn: RR Program Assistant
 Department of Natural Resources
 1300 Clairemont Ave.
 Eau Claire WI 54702



Note: These are the Remediation and Redevelopment Program's designated regions. Other DNR program regional boundaries may be different.

DNR Use Only			
Date Received	Date Assigned	BRRTS Activity Code	BRRTS No. (if used)
DNR Reviewer		Comments	
Fee Enclosed? <input type="radio"/> Yes <input type="radio"/> No	Fee Amount \$	Date Additional Information Requested	Date Requested for DNR Response Letter
Date Approved	Final Determination		

Former Chrysler Kenosha Engine Plant Redevelopment Plan - Phase I Infrastructure Construction

Kenosha Innovation Neighborhood (KIN)
5555- 30th Avenue, Kenosha, Wisconsin

City of Kenosha

Project reference: WDNR FID 230004500, BRRTS #02-30-000327
Project number: 60677460

September 29, 2022

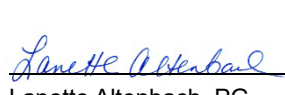
Quality information

Prepared by



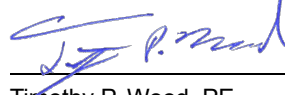
Courtney Kulinski, E.I.T.
Project Engineer

Checked by



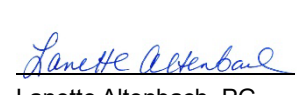
Lanette Altenbach, PG
(WI)

Verified by



Timothy P. Wood, PE

Approved by



Lanette Altenbach, PG
(WI)

Prepared for:

City of Kenosha
625 52nd Street, Room 305
Kenosha, WI 53140

Prepared by: Courtney Kulinski, E.I.T.

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Former Chrysler Kenosha Engine Plant Redevelopment Plan- Phase I Infrastructure Construction Kenosha Innovation Neighborhood (KIN) 5555 30th Avenue, Kenosha, Wisconsin


In conformance with NR 712.09 submittal certification requirements:

"I, Lanette Altenbach, 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](#), Wis. Adm. Code."


Reviewed By: Lanette Altenbach, P.G.
Senior Hydrogeologist



"I, Timothy P. Wood, hereby certify that I am a registered professional engineer in the State of Wisconsin, registered in accordance with the requirements of ch. [A-E4](#), Wis. Adm. Code; that this document has been prepared in accordance with the Rules of Professional Conduct in ch. A-E8, 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](#), Wis. Adm. Code."


Reviewed By: Timothy P. Wood, P.E.
Project Engineer

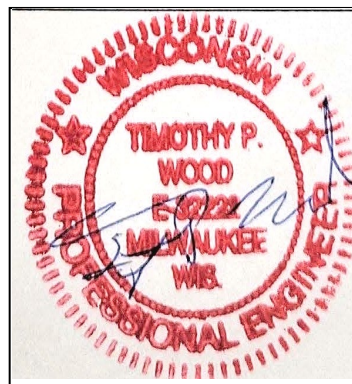


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Figure 9	Proposed Revised Stormwater Pond
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Appendix

Appendix A Silva Cells Brochure

Executive Summary

AECOM Technical Services, Inc. (AECOM), on behalf of the City of Kenosha, has prepared this *Former Chrysler Kenosha Engine Plant Redevelopment Plan- Phase I Infrastructure Construction* in support of the redevelopment known as the Kenosha Innovation Neighborhood (KIN) located at the former Kenosha Engine Plant (subject property). The City of Kenosha is informing the Wisconsin Department of Natural Resources (DNR) of the planned redevelopment that includes constructing two through-streets and utilities including stormwater, sanitary sewer, potable water and electricity adjacent to/under the roadways and along several spurs as basic infrastructure prior to construction of two planned buildings on the site.

The purpose of this report is to provide the information regarding the redevelopment on the former KEP, an open BRRTs site in the process of groundwater remediation completion. The requested outcome is a letter from the Wisconsin Department of Natural Resources to the City of Kenosha stating the DNR's concurrence with the planned Phase I Infrastructure and school construction on the site. The DNR letter is necessary to support the federal EDA grant approval and to inform the Kenosha Unified School District that the school construction in the planned location has limited environmental risk and will comply with future environmental restrictions.

The City of Kenosha will redevelop the former Kenosha Chrysler Engine Plant as a mixed-use innovation neighborhood by completing two through-roads, utility infrastructure and two buildings. The KIN will create a well-connected street grid that promotes multi-modal access and a range of development opportunities that include over 1 million square feet of innovative office, medical institution, and commercial space along with incorporating 20 acres of public green space. The master plan will act as a framework to guide the development of the site.¹ Redevelopment efforts will include the following:

- Connect the KIN to the street and avenue grid consistent through Kenosha with 28th Avenue and 56th Street forming the primary north-south and east-west connections.
- Potable water, sanitary sewer, storm sewer and electric infrastructure which will follow the proposed road alignments within the KIN site.
- Improved stormwater management which will include a change to the shape of the existing storm water detention basin along 56th Street to maximize redevelopment.
- Provide public green space areas and greenway to provide a pedestrian connectivity link which incorporates the existing 100-foot-wide utility easement for ATC transmission lines.
- Development uses will be a mix of institutional (educational/healthcare), commercial (office space and retail), residential, light industrial (business incubators), and public use buildings.

The redevelopment of the site is scheduled to begin in Spring 2023. The project can be divided into the following two phases:

- Phase 1 (2023-2024): Installation of basic infrastructure including the main roadways and supporting utility (e.g., electric, storm, sanitary and potable water) prior to redevelopment of the site. Phase 1 will begin construction of common green spaces and two institutional buildings (school and public use building). The proposed Phase 1 redevelopment plans are depicted on Figure 4.
- Phase 2 (2023- open): Development of additional buildings and public spaces. The master plan layout at full redevelopment is depicted on Figure 5.

The described redevelopment activities will not impact the existing environmental conditions. The construction considerations for activities requiring soil and groundwater management, installation of a final cover and/or vapor migration mitigation are described in this KIN 2022 Redevelopment Plan.

¹ Smith Group. (April 5, 2022), *Kenosha Innovation Neighborhood Master Plan*, City of Kenosha, Wisconsin

1. Introduction

AECOM Technical Services, Inc. (AECOM), on behalf of the City of Kenosha, has prepared this *Former Chrysler Kenosha Engine Plant Redevelopment Plan- Phase I Infrastructure Construction* in support of the redevelopment known as the Kenosha Innovation Neighborhood (KIN) located at the former Kenosha Engine Plant (KEP or subject property). The City of Kenosha is informing the Wisconsin Department of Natural Resources (DNR) of the planned redevelopment that includes constructing two through-streets, a third internal street, and utilities including stormwater, sanitary sewer, potable water and electricity adjacent to/under the roadways and along several spurs as basic infrastructure prior to construction of two buildings on the site.

1.1 Contact Information

Owner

City of Kenosha
625 52nd Street, Room 305
Kenosha, WI 53140
Contact: Brian Cater 414-653-4156

Consultant

AECOM
1555 River Center Drive, Suite 214
Milwaukee, WI 53212
Contact: Lanette Altenbach 414-944-6186

Oversight Agency

Wisconsin Department of Natural Resources
Southeast Region
141 NW Barstow St, Room 180
Waukesha, WI 53188
Contact: Paul Grittner 262-574-2166

1.2 Site Location

The subject property is located in southeast ¼ of the southeast ¼ of Section 36, Township 2 North, Range 22 East (Figure 1). The subject property includes approximately 100 acres of land and is located at 5555 - 30th Avenue in the city of Kenosha, Kenosha County, Wisconsin. The site is generally level and is capped with a temporary vegetated soil cap (Figure 2).

1.3 Purpose and Scope

The purpose of this report is to provide the information regarding the redevelopment on the former KEP, an open BRRTs site in the process of groundwater remediation completion. The requested outcome is a letter from the Wisconsin Department of Natural Resources to the City of Kenosha stating the DNR's concurrence with the planned Phase I Infrastructure and school construction on the site. The DNR letter is necessary to support the federal EDA grant approval and to inform the Kenosha Unified School District that the school construction in the planned location has limited environmental risk and will comply with future environmental restrictions.

The scope of this report includes the proposed infrastructure and building layouts with the current groundwater remediation areas and monitoring well/piezometer locations. A description of the proposed improvements is provided as well as a discussion regarding the redevelopment on the existing environmental cleanup.

1.4 Report Organization

This report describes the proposed basic infrastructure plans and the corresponding environmental construction consideration to ensure the activities will not impact the existing environmental conditions. The remainder of the request is organized, as shown below.

- Section 2.0: Background
- Section 3.0: Redevelopment Overview

- Section 4.0: Construction Considerations
- Section 5.0: Documentation

2. Background

The subject property was formerly occupied by the Chrysler Engine Plant. Historic operations at the site included complete automobile manufacturing and assembly, while more recent operations were focused on the manufacture of automotive engines. In 2009 Chrysler declared bankruptcy and in 2010 manufacturing operations were permanently discontinued. Buildings at the site were razed in 2013 and currently the site is temporarily capped with vegetated soils.

2.1 Prior Remedial and Interim Actions

The former Chrysler Kenosha Engine Plan is a site under the Wisconsin Department of Natural Resource (WDNR) environmental repair program for environmental contamination resulting from normal operations at an automotive manufacturing facility. Chrysler declared bankruptcy in 2009 and ceased operations at the site in 2010. Site investigation and remedial efforts were conducted by the WDNR and the City of Kenosha including underground storage tank (UST) removal, interim investigations and focused soil removal and disposal. The bankruptcy court appointed a liquidation trust to decommission the site and recover as much money as they could for the lien holders (various banks in the United States and Canada). Once the buildings were decommissioned, the buildings were razed, leaving the concrete floor slabs in place as a temporary cap. Following the razing of the buildings, the property was abandoned and the City of Kenosha took ownership of the property. Site investigation followed by soil remediation was conducted by the City of Kenosha. Currently, the City of Kenosha is in the post-treatment monitoring phase of groundwater remediation.

Environmental investigations began with a Phase I Environmental site assessment completed in 2011 followed by focused area Phase II ESAs (2012), a Wisconsin Administrative Code §NR716 site investigation (2015) and a Wis. Adm. Code § NR722 Remedial Action Options Report (2015). Focused interim actions were conducted (2012-2018) following by site-wide soil remediation (2016-2017 and 2018-2020) to remove the highest impacted soil. Groundwater treatment pilot studies (2017-2018) were conducted followed by site-wide in-situ groundwater treatment (2021-2022).

2.2 Current Site Environmental Condition

Low concentrations of volatile, semi-volatile and metal compounds remain within the soil matrix, at the surface of the soil and deeper within the soil column. The concentrations may exceed the groundwater pathway, or the non-industrial direct contact (DC) residual contaminant level (RCL) established by the Wisconsin Department of Natural Resources (WDNR) under the Wisconsin Administrative Code §NR 720. The site is currently capped with a temporary cap of vegetated soil, and site access is restricted by a perimeter fence.

Groundwater is currently monitored by a groundwater monitoring system of 20 perimeter groundwater monitoring wells/piezometers monitored semi-annually and 51 new and existing monitoring wells and piezometers to monitor the groundwater remediation areas quarterly as depicted in Figure 3.

Groundwater treatment is occurring in four target areas (Figure 3) for the contamination of volatile organic compounds (VOCs) by means of a combination of in-situ technologies by REGENESIS Bioremediation Products, Inc. (Regenesis). Post-treatment monitoring to demonstrate the treatment of the plume will continue at least through January 2024. The need for continued monitoring will be evaluated on an annual basis after the initial eight monitoring periods are completed.

2.3 Anticipated Post-Remedial Site Conditions

The site is currently zoned M-1 Light Manufacturing and M-2 Heavy Manufacturing. Zoning changes will be made as redevelopment occurs. The following assumptions are incorporated into the redevelopment plan:

- The City of Kenosha will require the use of a vapor barrier system with an active recovery system for new construction in general conformance with current WDNR guidelines.
- As redevelopment occurs, the buildings, pavement and landscape will provide the final cap, where necessary.
- Until a final cap is in place (through redevelopment) the site is capped temporarily by vegetated soil.
- Impacted soil encountered during site redevelopment activities will be managed on-site or disposed off-site.
- Institutional controls will be used to address capped areas and residual groundwater impact (if any) that remain after completion of the redevelopment.

3. Redevelopment Overview

The City of Kenosha has engaged with the stakeholders of the community surrounding the former KEP including residents, business owners, institutions, and community leaders. The results of that engagement have resulted in a master plan for redevelopment. Phase I of the redevelopment is to connect the KEP property by extending roadways through the property with infrastructure (sewer, water, electricity, etc.) under and adjacent to those roadways. The KEP would be known as the Kenosha Innovation Neighborhood (KIN).

3.1 Redevelopment Master Plan

The City of Kenosha will redevelop the subject property as a mixed-use innovation neighborhood. Redevelopment efforts will include the following:

- Connect the street and avenue grid consistent through Kenosha with 28th Avenue and 56th Street forming the primary north-south and east-west connections.
- Install potable water, sanitary sewer, storm sewer and electric infrastructure which will follow the proposed road alignments within the KIN site.
- Update stormwater management with modifications to the existing storm water detention basin to maximize redevelopment.
- Provide public green space areas and greenway to provide a pedestrian connectivity link with bike lanes, future bike paths and public sidewalks.
- Development uses will be a mix of institutional (educational/healthcare), commercial (office space and retail), residential, light industrial (business incubators) and public use buildings.

3.2 Redevelopment Schedule

The redevelopment of the site is scheduled to begin in Spring 2023.

The project can be divided into the following two phases:

- Phase 1 (2023-2024): Installation of basic infrastructure including 28th Avenue and 56th Streets as through-streets and 26th Avenue to connect 56th and 55th Streets, with utility infrastructure (e.g., electric, storm, sanitary and potable water) located under and adjacent to the roadways. Phase 1 will include construction of common green spaces and two institutional buildings (school and public use building). The proposed Phase 1 redevelopment plans are depicted on Figure 4.

- Future Phases (2023- open): Development of additional buildings and public spaces. The conceptual site layout from the publicly reviewed Master Plan at full redevelopment is depicted on Figure 5.

Redevelopment activities of the site will not impact the existing environmental conditions. Impacted materials generated during Phase 1 will be managed on-site or disposed as described later in this Plan.

4. Construction Considerations

During Phase 1 of redevelopment, the following activities potentially require soil and groundwater management, installation of a final cover and/or vapor migration mitigation.:

- Roadway development
- Infrastructure installation
- Modifications to the existing detention basin (dry pond)
- Green space construction and landscaping
- School and Innovation Center (public building) construction

4.1 Soil Management and Covers

Soil that may be excavated will be either managed onsite or stockpiled, characterized and re-used or disposed as appropriate. Shallow soils that are excavated and managed on-site are anticipated to have the same characteristics as the existing surficial materials. Some PAH impacts occur across the site due to the historical industrial activities, but predominantly the surface soils are not expected to exceed industrial RCLs. Non-industrial RCL and groundwater pathway exceedances may exist but will be managed in-place or by placement under an area to be capped. Soils that are stained, odorous or otherwise appears visually to be contaminated will be stockpiled, characterized and disposed at a sanitary landfill. The soils are not expected to be hazardous based on historical experience at the site.

It is anticipated that there is a net import of clean fill soil needed to make planned final grades for the redevelopment. Some fill material may be obtained from on-site sources (where excavated for shallow foundations) to the extent available as identified by the proposed redevelopment. Use of on-site fill soil or imported fill soil will be used in general conformance with NR 504.04(3)(c), NR 504.04 and NR 718.12(1)(c).

In general conformance with NR 504.04(3)(c) and NR 504.04 the backfill, from either on-site or off-site sources, will not:

- Be located within a floodplain – the KEP is not located in a flood plain;
- Will not have a “significant adverse impact on wetlands” – the KEP is located in an urban area with no nearby wetlands;
- Will not cause a “take of an endangered or threatened species”;
- Will not cause a “detrimental effect on any surface water”;
- Will not cause a “detrimental effect on groundwater quality or will cause or exacerbate an attainment or exceedance of any preventive action limit or enforcement standard”;
- Will not cause a “migration and concentration of explosive gases”; and
- Will not cause “the emission of any hazardous air contaminant exceeding the limitations for those substances contained in NR 445.04 or 445.05.

In addition, in general conformance with NR 718.12(1)(c), in no instance will impacted soil be placed in the following locations:

- Within a floodplain.
- Within 100 feet of any wetland or critical habitat.
- Within 300 feet of any navigable river, stream, lake, pond, or flowage.

- Within 100 feet of any on-site water supply well or 300 feet of any off-site water supply well;
- Within 3 feet of the high groundwater level.
- At a depth greater than the depth of the original excavation from which the contaminated soil was removed.
- Where the contaminated soil poses a threat to public health, safety, or welfare or the environment.

Redevelopment activities will incorporate final covers as needed over impacted soils, if present. Metals are not expected to leach to groundwater based on historic groundwater sampling. The type of final cover will depend on the redevelopment use, either clean fill soil surface cap or structural (pavements including roads, parking lots and/or buildings). The cover design will consider erosion, cracking and deterioration risks, the prevention of incompatible human activities and settlement issues. A cap maintenance plan will be necessary for areas where a cap is required and will be prepared in general conformance with NR.726.11 (2) and (3).

4.1.1 Roadway Development

The KIN will be connected to the street and avenue grid consistent through Kenosha with 28th Avenue and 56th Street forming the primary north-south and east-west connections as seen on Figure 6. Soil will be graded as needed, using soil removed from below building foundations as backfill around the building to bring the area to grade. Additional imported fill may be required.

The roadway will act as the final cap in applicable areas as described above. Proposed construction specification of the main roadways will have an approximate nine-inch layer of concrete or ten-inch layer of asphalt above a minimum of six-inches of crushed aggregate. Permeable (porous) pavement will be installed in the parking lane along 56th Street and 28th Avenue. Permeable concrete pavers will be placed on top of an aggregate base and geotextile fabric.

4.1.2 Infrastructure Utility Trenches

The main utility infrastructure will connect into the existing public infrastructure outside of the subject property limits while following the proposed roadway alignments within the KIN site as seen on Figure 7. Soil will be excavated to various depths dependent on the utility line and will be managed as described above. Soils that do not appear to be visually or olfactory contaminated will be used as backfill in the originally trench.

Based on preliminary site plans, utility lines installed along the main roadways will vary in depth but will be relatively shallow with the deepest utilities buried to approximately 10 feet, as described:

- Potable water lines- Lines vary between six to eight feet below ground surface (bgs). Minimum 6-foot cover over private water lines are required by City code.
- Sanitary sewer lines- Lines vary between three and seven feet bgs.
- Storm sewer lines- Lines vary between three to ten feet bgs.
- Electrical Conduit- Lines vary between 1 and 2 feet bgs. Light poles will extend to 5 feet bgs.

Roadways installed over the utility trench will act as the final cap in applicable areas as described above.

4.1.3 Dry Pond Modifications

To support the redevelopment stormwater management plans, the existing dry pond will be modified as shown on Figure 9. The pond will be reshaped to increase developable area along 56th Street. The majority of the soil used to create the berm shown will be from removal of soil in the areas where the pond will be extended. There is expected to be a net balance of soil for the stormwater pond reconfiguration.

4.1.4 Landscaping

The KIN will have designated green spaces throughout the site with special attention to the Central Plaza, Greenway, setbacks on the north and south sides, incorporation of the existing 100-foot-wide utility easement for ATC transmission lines, and around the detention basin (Figure 5). The soil removed during landscaping for trees and shrubs will be managed as described above.

Final landscaping will act as the final earthen cap in applicable areas as described above. Areas to be landscaped will have a minimum of 6-inches of clean topsoil over the site's existing soil. If the landscaping is gravel over contaminated soil, a geotextile or filter fabric should be placed between the existing soil and the gravel to prevent contaminating soil from migrating into the gravel.

Trees with root structures placed deeper into the soil will be planted in new soil inside a tree grate and surrounded by an underground system of Silva cells (Appendix A- Silva Cells Brochure). Silva cells make up a modular suspended pavement system that help to support large tree growth in an urban setting with root management. The system will help to restrict the roots from migrating up through the cap (topsoil and surrounding pavement) and instead grow within or below the Silva cells. The Silva cells will sit on an 8-inch minimum layer of aggregate underlain by geotextile fabric which will extend beneath the planted tree.

4.1.5 Building Construction

Two buildings are proposed to be installed during Phase 1 of the redevelopment, an Innovation Center and a technical high school as depicted in Figure 10. Building foundations within the KIN will generally be slab on-grade or may have one lower level for parking that will not be deeper than the water table. The depth of the foundations will generally be eight feet or less so that they remain above the water table. Soil removed for foundations will be managed on site or disposed if the soil is observed to have obvious impacts (staining and odor).

Buildings and associated paved parking areas will act as the cap in applicable areas as described above. Additional vapor intrusion control measures will be discussed later in this report.

4.2 Water Management and Vapor Migration Prevention

During Phase 1, groundwater management and vapor migration mitigation considerations will be made during redevelopment activities.

Excavation activities may extend to varying depths through the unsaturated soils. Based on prior excavations, the soil down to the water table interface will be removable without dewatering. In the event that groundwater would enter the excavation to the degree where dewatering would be necessary, groundwater captured by dewatering will be contained and sampled before discharge to the sanitary sewer. If discharge to the storm sewer is required, a Wisconsin Pollution Discharge Elimination System (WPDES) permit will be obtained prior to dewater and discharge. Groundwater dewatering is not planned for the Phase I redevelopment, but could be possible in future construction.

When necessary, the construction contractors will take measures to mitigate the drainage of storm water runoff from entering excavations caused by their work. If a substantial amount of storm water enters the excavation from a significant rainfall event, the construction contractor will remove any accumulated water from the excavation. Stormwater will be discharged to the on-site storm water pond.

Vapor migration into buildings or through granular backfill of utility trenches could occur from residual contamination. Although the residual contaminant concentrations are not expected to cause vapor intrusion (VI) issues, design for control of vapor migration will be incorporated into the specifications for utility trenches and building design as described below.

4.2.1 Roadway Development

The main north-south and east-west through-streets, 28th Avenue and 56th Street, will be constructed to a maximum depth of approximately 16-inches and is above the water table. Therefore, dewatering is not a concern.

4.2.2 Commercial Utility Trenches

Main utility lines to be installed within the KIN will be buried at various depths as described in Section 4.1.2. If groundwater is encountered, management methods as described above will be followed.

Buried utilities within the KIN facility will be constructed with vapor migration protection to limit the movement of contaminated water and vapor through the granular backfill of the utility trenches. The proposed vapor migration barrier will be a clay plug that is installed to the full depth of the utility trenches and is at least four feet long. The plug will be installed at any point where the new utility (e.g., storm and sanitary sewers and water main) enters the area of groundwater remediation and at the point the trench exits the groundwater remediation area as seen in Figure 7. See example design configuration on Figure 8.

4.2.3 Dry Pond Modifications

The existing dry pond will be modified as shown on Figure 9. The current plan is to reconfigure the areal extent to contain the estimated future stormwater volume. At this time, the pond will remain a dry pond.

4.2.4 Landscaping

A majority of landscaping within the KIN is relatively shallow and groundwater should not be encountered. As described previously, trees planted within the silva cell system will require excavations to a maximum depth of five feet. If groundwater is encountered, management methods as described above will be followed.

The silva cell system in addition to maintain the root system of the trees will also serve as an ongoing surface and groundwater management system. Perforated piping will collect accumulated water and distribute it to the underlying soil within the silva cells which includes providing water for the nearby trees. Underdrain piping beneath the cell will collect the remaining water which has filtered through soil and aggregate and discharge to a stormwater catch basin.

4.2.5 Building Construction

Buildings within the KIN will be constructed such that groundwater management is not required. However, if conditions change and groundwater is encountered, management methods as described above will be followed.

Buildings within the KIN facility will be constructed with vapor migration protection to limit the movement of vapor into the building. The two buildings to be erected during Phase 1 are in areas outside of the groundwater remediation areas and known areas of soil exceeding industrial groundwater pathway standards as shown in Figure 10.

To limit the risk of VI into buildings, buildings will be designed to have installed VI mitigation that meets the established requirements as outlined by The Interstate Technology and Regulatory Council (ITRC) and WDNR. A passive venting system made of sands or pea gravel below the floor slab will allow soil gas to move laterally beyond the building footprint under natural diffusion gradients. Collection pipes at the edge of the system will collect gas and move it to the outside of the building. The design of the system will incorporate the ability to be converted into an active venting system if required based on post construction subslab testing. Any incoming utilities will be capped within the soil and at the connection into the building.

4.3 Well Protection

Monitoring wells in the project area or adjacent to the project area will be protected with fencing and remain undisturbed until groundwater remediation is complete, and the wells are no longer needed.

In areas that where wells overlap with planned developments, such as the area of the proposed school redevelopment, wells will be abandoned in accordance with NR141 requirements. In the areas where monitoring wells are in the roadway, the wells may be relocated out of the roadway but within the same area for continued monitoring.

5. Documentation

Utilities and locations of clay plugs will be documented on as-built drawings and incorporated into the City's GIS Stormwater system.

Redevelopments that form the permanent cap in those areas as depicted in Alternative 4 (if any still remain) from the Remedial Action Options Report, will require a cap maintenance plan. The plan will be prepared in general conformance with NR.726.11 (2) and (3). If additional activities during redevelopment change the need for a cap, the changes can be enumerated in a future closure request if the work is sufficient to remove the need for a cap.

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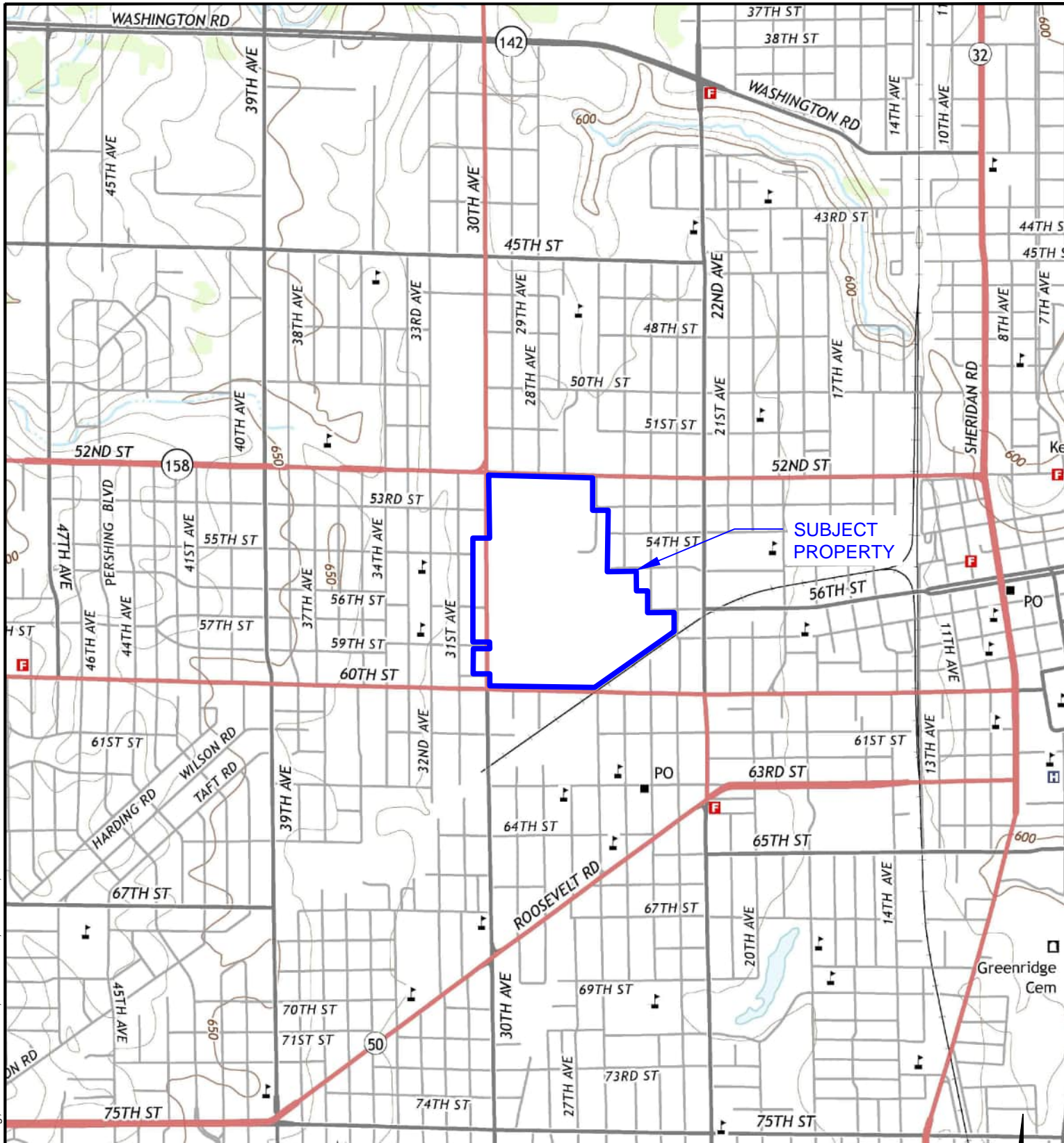
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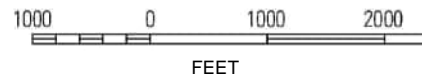
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Figure 10	Proposed Building Locations With Environmental Conditions



NOTES

1. TOPOGRAPHIC MAP FROM USGS:
http://store.usgs.gov/b2c_usgs/usgs/maplocator/
 DATED 2013



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 Milwaukee, WI 53212
 414.944.6080
 www.aecom.com
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SITE LOCATION
 KENOSHA INNOVATION NEIGHBORHOOD
 CITY OF KENOSHA
 KENOSHA, WISCONSIN

Drawn : AS 4/7/2015
 Checked: LLA 4/7/2015
 Approved: KWB 4/7/2015

PROJECT NUMBER 60677460

FIGURE NUMBER 1



Key:

- Site Location
- Approximate location of the Current Dry Stormwater Pond

Source: Google Earth, 2021

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CURRENT SITE LAYOUT

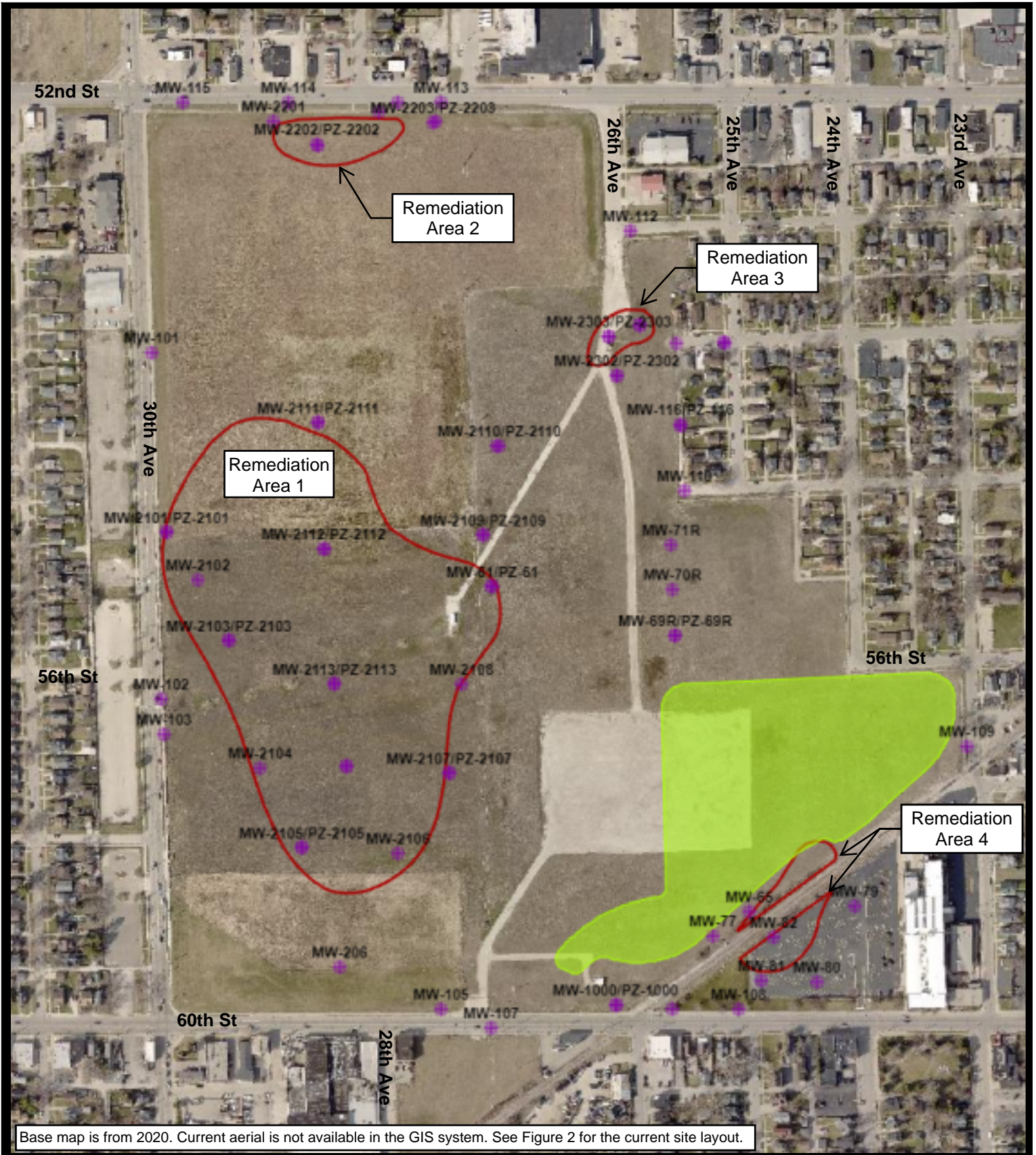


Project Number:
60482705

Drawn By:
CAK

Date:
6/9/2022

Figure 2



Base map is from 2020. Current aerial is not available in the GIS system. See Figure 2 for the current site layout.

- Key:**
- Monitoring Wells/ Piezometers
 - Groundwater Remediation Areas
 - Current Dry Stormwater Pond

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 KENOSHA, WISCONSIN

SITE ENVIRONMENTAL CONDITIONS

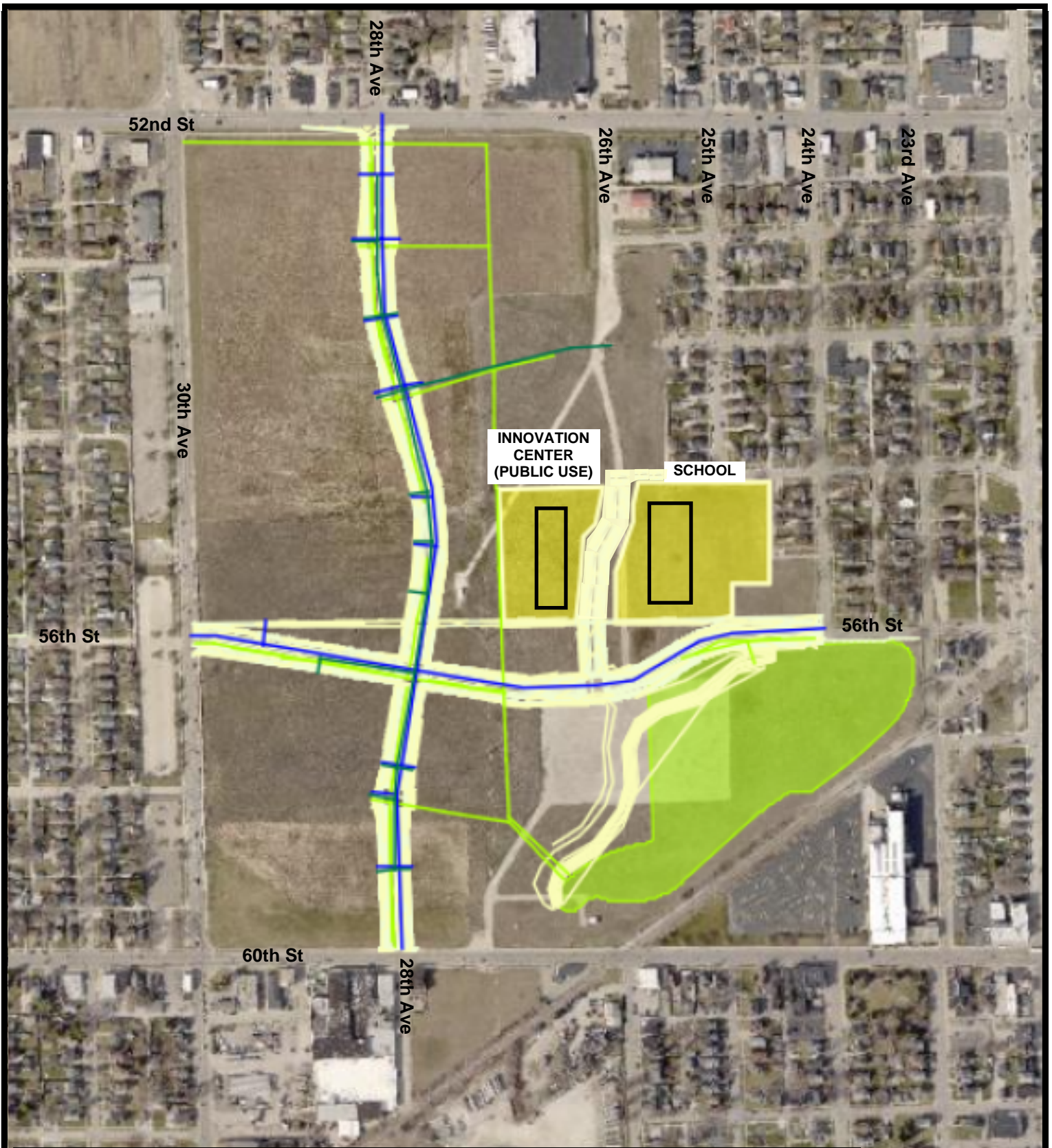


Project Number:
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Drawn By:
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Date:
6/9/2022

Figure 3









Base map is from 2020. Current aerial is not available in the GIS system. See Figure 2 for the current site layout.

Key: Proposed Storm Sewer Proposed Sanitary Sewer Proposed Water Line Current Dry Stormwater Pond	Proposed Roadway Proposed Building Parcel Berm for Proposed Stormwater Pond	AECOM Milwaukee Office 1555 RiverCenter Dr Milwaukee, WI 414.944.6080	KENOSHA INNOVATION NEIGHBORHOOD CITY OF KENOSHA KENOSHA, WISCONSIN
		PHASE I PROPOSED REDEVELOPMENTS	
		Project Number: 60482705	Drawn By: CAK
			Date: 6/9/2022



LEGEND

-  Incubator / Office
-  Medical
-  Institution / Tech
-  Residential
-  Commercial
-  Green Space

Please note that uses shown are illustrative in nature and only the school and Innovation Center are proposed at this time.

Source: Smith Group, (April 5, 2022), *Kenosha Innovation Neighborhood Master Plan*, City of Kenosha, WI

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KENOSHA INNOVATION NEIGHBORHOOD
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ILLUSTRATED LAYOUT OF FINAL
DEVELOPMENT AS PROPOSED
IN MASTER PLAN

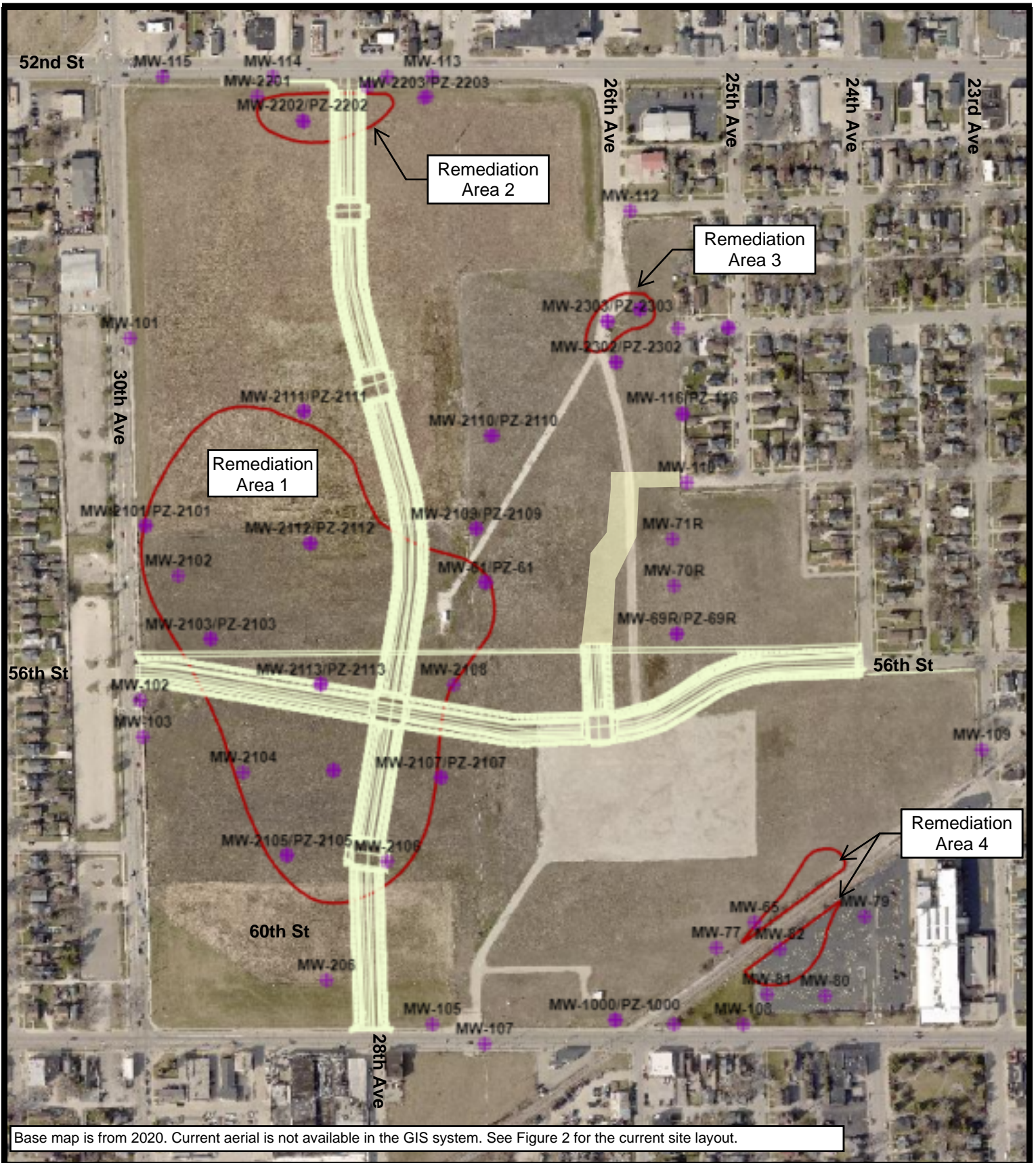


Project Number:
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Figure 5



- Key:**
- Proposed Roadway
 - Monitoring Wells/ Piezometers
 - Groundwater Remediation Areas

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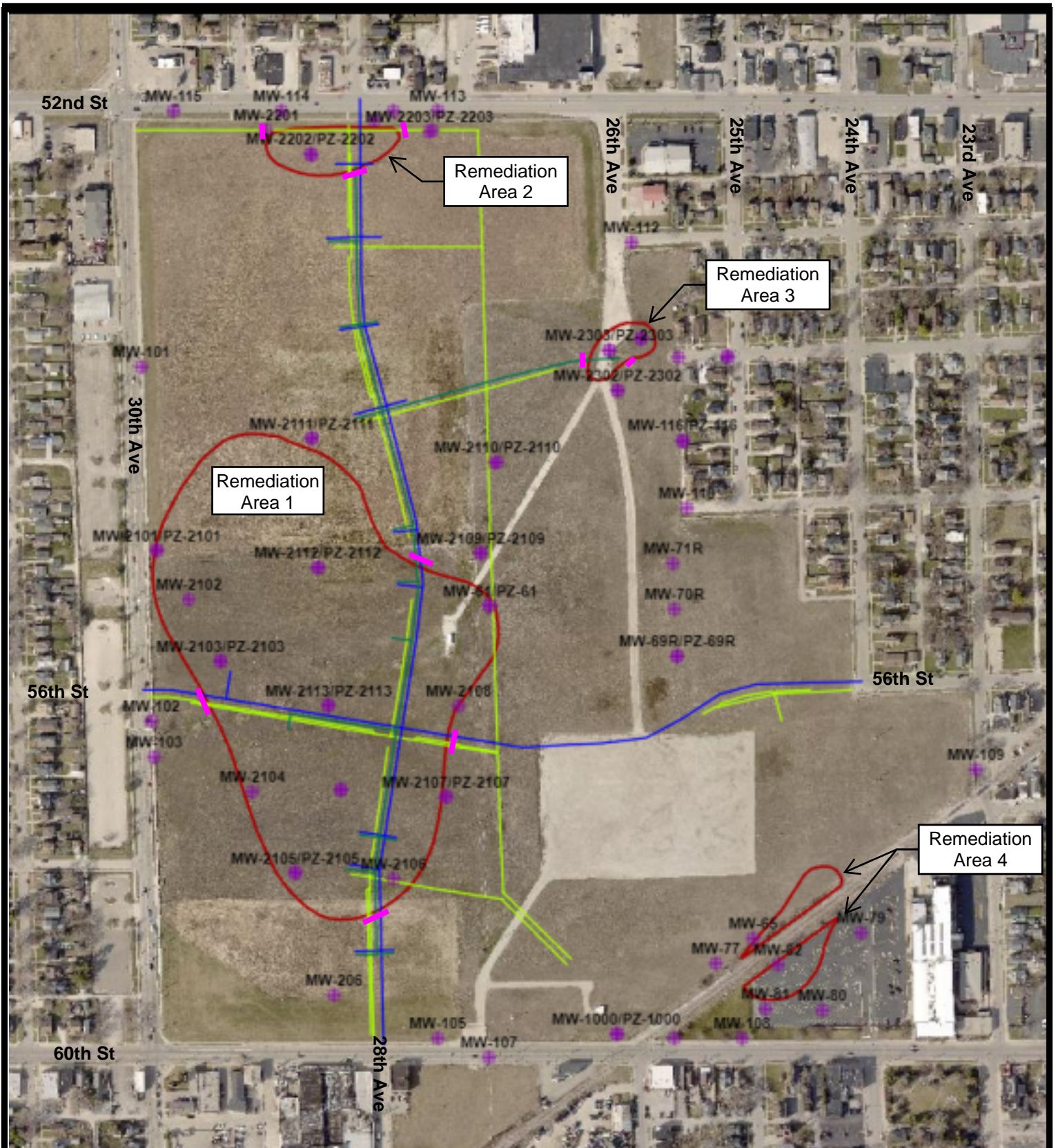
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PROPOSED ROAD LAYOUT WITH
 ENVIRONMENTAL CONDITIONS



Project Number: 60482705 Drawn By: CAK Date: 6/9/2022

Figure 6



Base map is from 2020. Current aerial is not available in the GIS system. See Figure 2 for the current site layout.

Key:	Proposed Storm Sewer	Clay Plug Location
Proposed Sanitary Sewer	Monitoring Wells/ Piezometers	Groundwater Remediation Areas
Proposed Water Line		

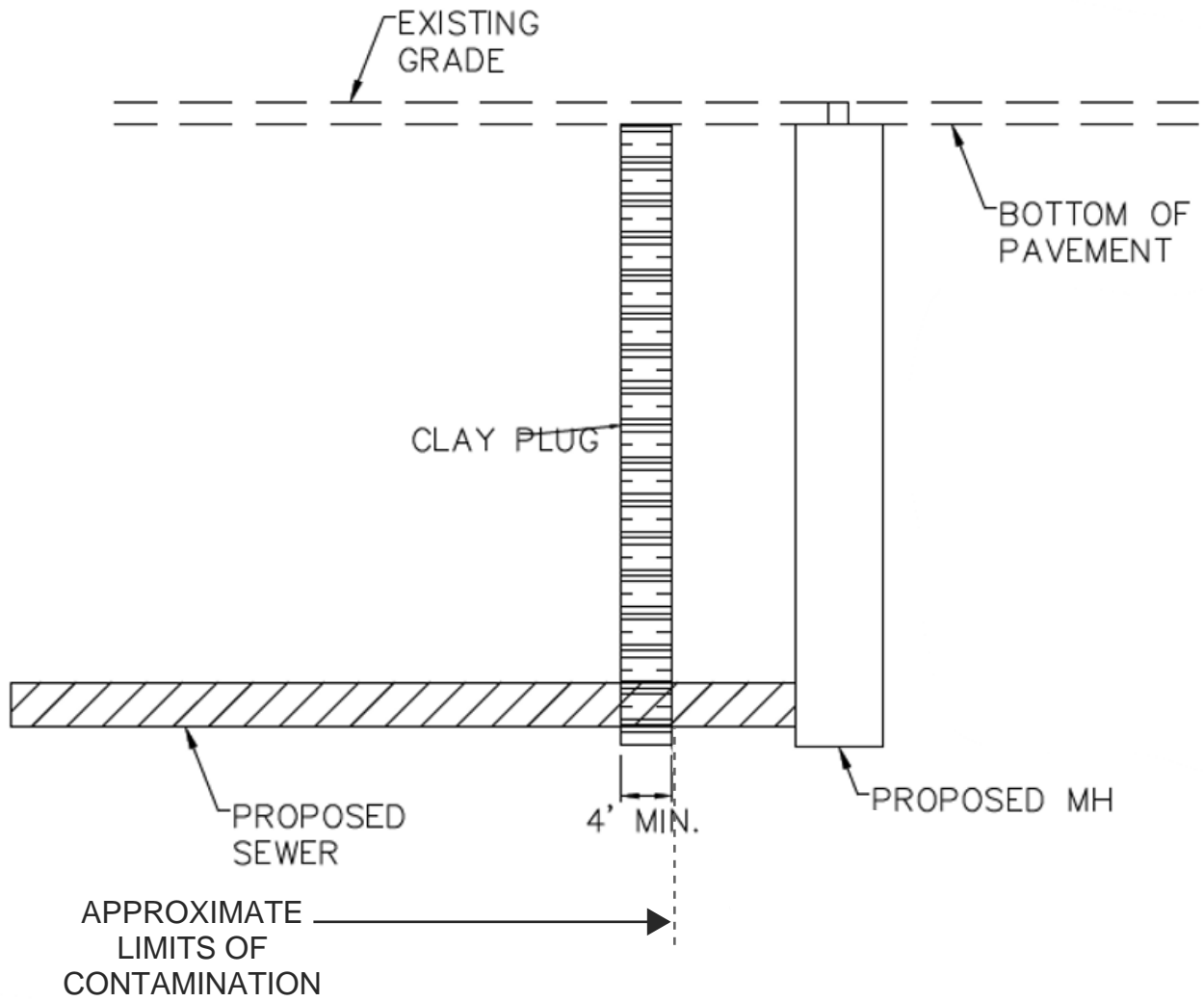
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PROPOSED UTILITY LAYOUT WITH
ENVIRONMENTAL CONDITIONS

Project Number: 60482705	Drawn By: CAK	Date: 6/9/2022	Figure 7
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NOTES:

1. CLAY PLUG TO FILL THE WIDTH OF THE TRENCH FROM THE BOTTOM OF THE PAVEMENT TO THE BOTTOM OF THE TRENCH A MINIMUM LENGTH OF FOUR FEET,
2. CLAY MATERIAL CAN BE A CLEAN NATIVE CLAY WITH PERMEABILITY OF AT LEAST 10⁻⁸ CN/SEC OR LOWER. NATIVE CLAY SOIL SHOULD BE AT A WATER CONTENT SUFFICIENT FOR COMPACTION IN 1-2 FOOT LIFTS TO PROVIDE A TIGHT VAPOR SEAL TO THE UTILITY TRENCH.

Note: Drawing not to scale

Key:



Clay Plug

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PROPOSED VAPOR INTRUSION
BARRIER IN UTILITY TRENCH






Project Number:
60482705

Drawn By:
CAK

Date:
6/9/2022

Figure 8



- Key:**
-  Proposed Roadway
 -  Berm for Proposed Stormwater Pond
 -  Current Dry Stormwater Pond

AECOM
 Milwaukee Office
 1555 RiverCenter Dr
 Milwaukee, WI
 414.944.6080

KENOSHA INNOVATION NEIGHBORHOOD
 CITY OF KENOSHA
 KENOSHA, WISCONSIN

PROPOSED REVISED STORMWATER
 POND

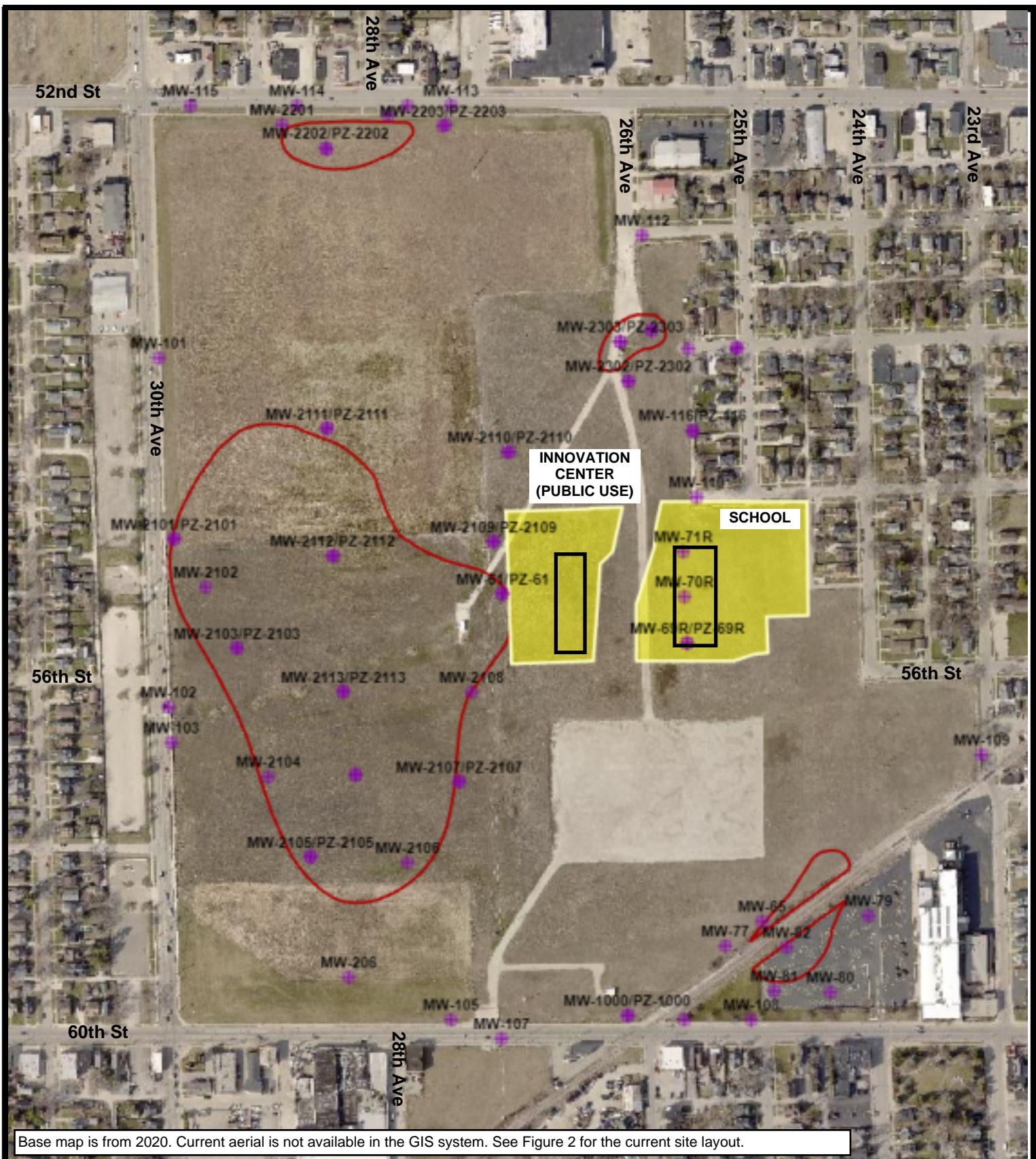


Project Number:
60482705

Drawn By:
CAK

Date:
6/9/2022

Figure 9



Key:

-  Monitoring Wells/
Piezometers
-  Proposed Building Parcel
-  Groundwater Remediation Areas

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 Milwaukee, WI
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AECOM

KENOSHA INNOVATION NEIGHBORHOOD
 CITY OF KENOSHA
 KENOSHA, WISCONSIN

PROPOSED BUILDING LOCATIONS WITH
 ENVIRONMENTAL CONDITIONS

Project Number: 60482705 Drawn By: CAK Date: 6/9/2022

Figure 10

Appendix A Silva Cells Brochure



SILVA CELL[®]

THE DIFFERENCE IS DESIGN

The Integrated Tree, Soil and Stormwater System

INTEGRATED TREE, SOIL, AND STORMWATER SYSTEM

The Silva Cell is a modular suspended pavement system that uses soil volumes to support large tree growth and provide powerful on-site stormwater management through absorption, evapotranspiration, and interception.



The first trees planted in Silva Cells were planted over 10 years ago. Now more than 20,000 trees are growing in Silva Cells, in over 1,500 projects in 20 countries around the world, and we're adding more every day.

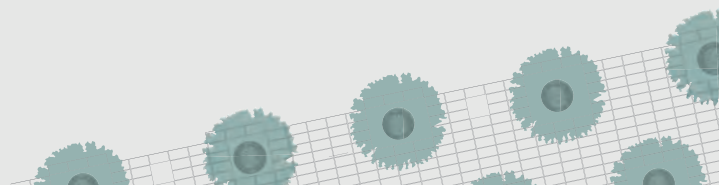
Our invention of the Silva Cell has created a revolution in how trees are planted in our urban environment. Cities are creating street tree soil volume standards and using Silva Cells to achieve them to mitigate the effects of climate change, while increasing shade and beauty.

Developers use the Silva Cell to provide stormwater management and beautiful, shade producing street trees. Plazas and parking lots are reducing the effects of ever-increasing

paving by storing stormwater on-site to reduce water pollution while growing large, healthy trees. The Silva Cell is a tool at the forefront of a green infrastructure revolution, changing how urban infrastructure functions.

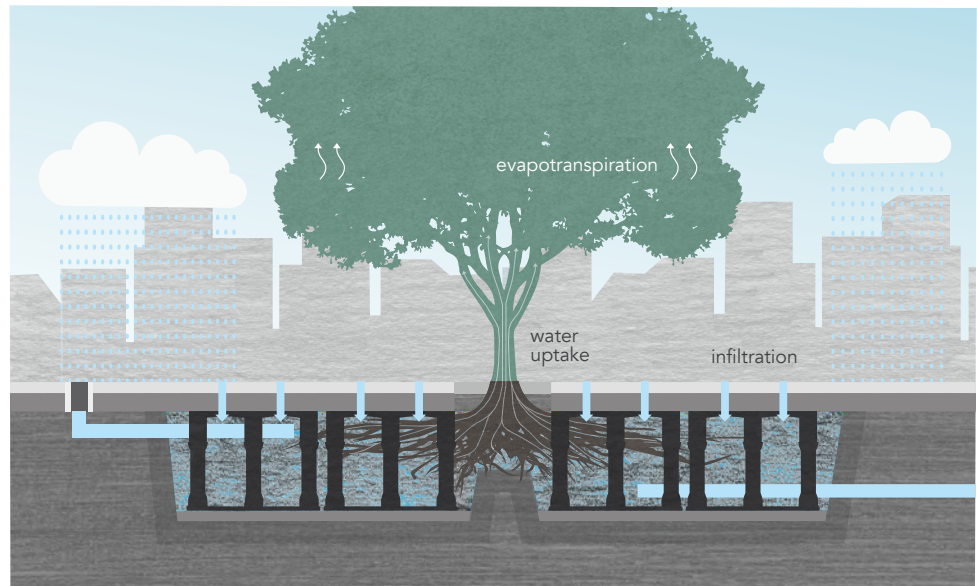
The Difference is Design

- Independent system – no lateral connections
- Flexibility in layout to accommodate utilities
- Modular system means easily scalable
- Minimum cover to achieve vehicular loading
- Walk-through compaction for optimal rooting environment



CREATING HIGH-PERFORMANCE GREEN INFRASTRUCTURE

The integration of green utilities like soil, trees, and water into urban areas can help alleviate some of our most pressing ecological challenges - including air and water quality, rising temperatures, flooding, and erosion from daily rainfall events.



The Silva Cell is a patented modular suspended pavement system that holds unlimited amounts of lightly compacted soil while supporting traffic loads beneath paving. That soil serves two important functions: growing large trees and treating stormwater on-site.

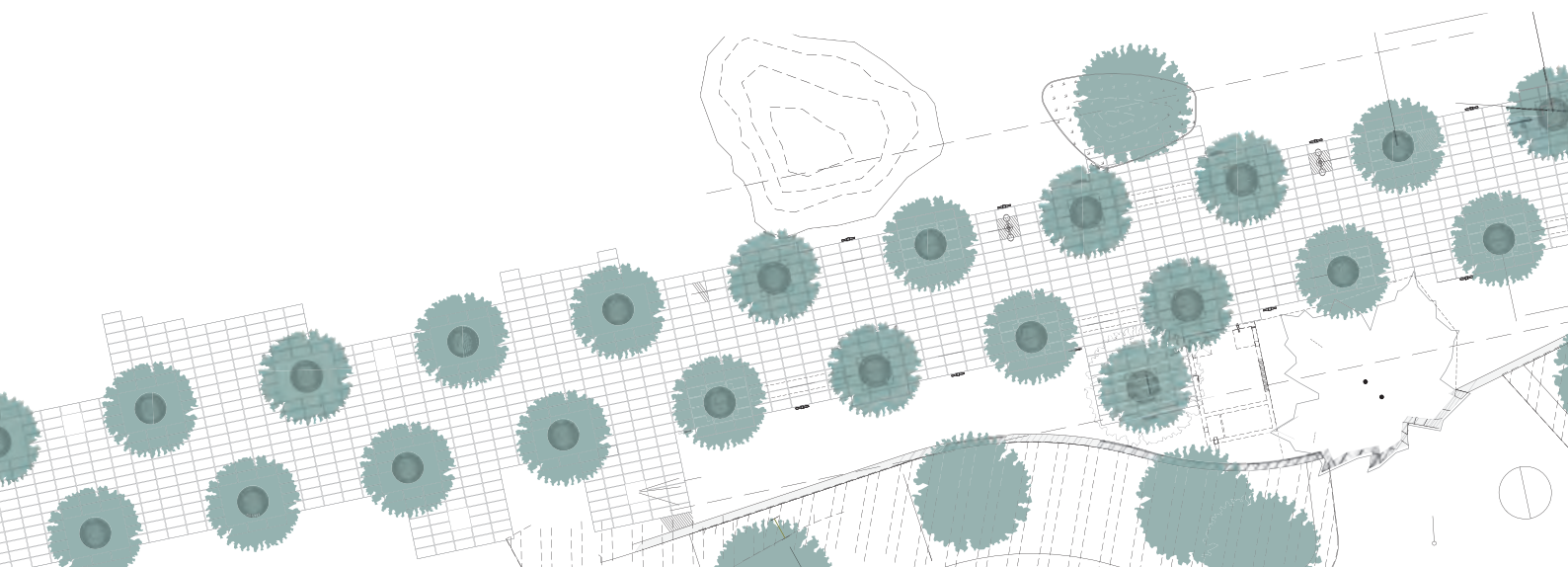
Water Quality Benefits

Trees are crucial to many water quality benefits, including removal or sequestration of dissolved nutrients, hydrocarbons, and Total Suspended Solids (TSS).

Trees also provide evapotranspiration and slow water flow, allowing more time for sedimentation to occur.

Silva Cells can be used on almost any type of site, including:

- Streets
- Plazas
- Parking areas
- Promenades
- Green roofs/on-structure
- "Break-out" zones



UNDERGROUND BIORETENTION WITH THE SILVA CELL

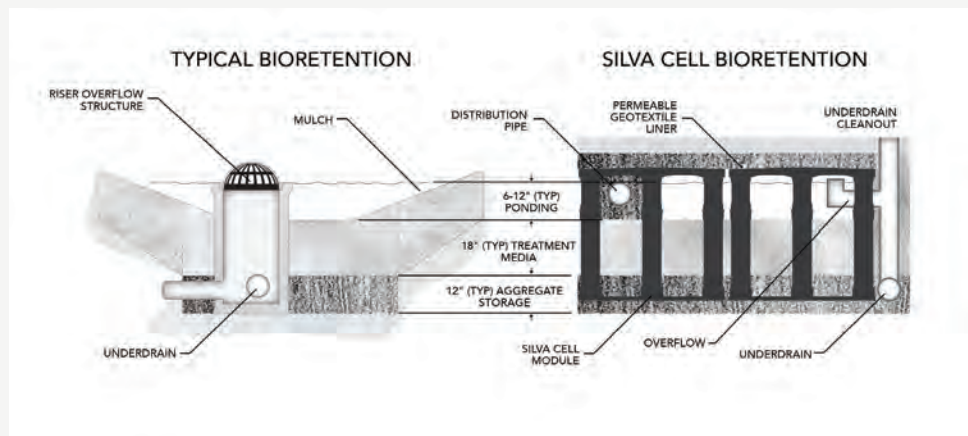
Bioretention is an incredible tool for low-impact development, keeping water where it falls so that it can be cleaned, cooled, and recharged. Open bioretention presents challenges in dense urban areas, where land values and maintenance requirements are high. This is where underground bioretention with the Silva Cell is ideal.

How do the stormwater benefits of the Silva Cell system compare to those of traditional bioretention systems? Research shows they are essentially the same.

Final results from a performance monitoring study in Wilmington, North Carolina (USA) show that Silva Cells can provide stormwater benefits equal to, or better than, traditional bioretention. Similar data has been found at Queensway (CAN) and at Howard Street (UK). Read more about these projects on our website: www.deeproot.com.

The Silva Cell system is equal to typical bioretention systems:

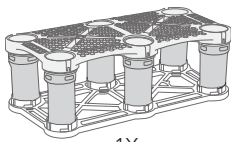
Water quality benefits: For all of the pollutants monitored, the Silva Cell systems performed better or about the same as the mean for bioretention systems in peer reviewed literature (Page et al 2015).



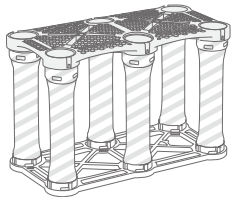
"The aim of the Howard Street project is to demonstrate and quantify how, in an urban context, Green Infrastructure such as street trees can provide a natural solution to managing surface water runoff and addressing diffuse pollution. It is hoped that the findings from this project can be used to encourage a wider uptake of this natural alternative to engineered drainage systems for new infrastructure projects." - Pete Stringer of City of Trees Manchester

PRODUCT DETAILS

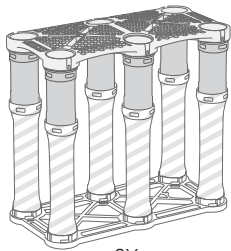
The Silva Cell is composed of a base, posts, and a deck. Each unit is 48" long x 24" wide. The assembled cells transfer paving loads vertically downward to a compacted sub-base through the posts.



1X



2X



3X



UTILITIES: 14" apertures easily accommodate new or existing utilities.

STORMWATER IN/OUT: Totally open interior allows for easy movement of water into and out of the system.

FLEXIBILITY: Independent units allow maximum flexibility around existing or planned site considerations.

Up to 6" spacing delivers soil as efficiently as possible.

	SOIL CAPACITY	HEIGHT
1x	~15.27 ft ³	16.7 in
2x	~28.21 ft ³	30.9 in
3x	~39.28 ft ³	43 in

The Silva Cell is covered by one or more of the following patents:

US PATENTS	CANADIAN PATENTS	EUROPEAN PATENTS
USA 7,080,480	Canada 2,552,348	EP 2059114
USA 8,065,831	Canada 2,662,129	
USA 9,085,886	Canada 2,829,599	
USA 9,085,887		
USA 9,775,303		

Other patents pending.

LOADING & ENGINEERING

AASHTO H-20

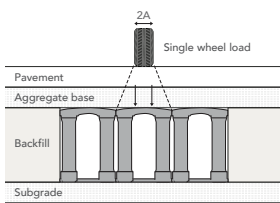


- 32,000 lbs maximum per axle
- 16,000 lbs maximum per wheel
- Tire contact area is 14.25" radius

AASHTO HS-20



- 32,000 lbs maximum per axle
- 16,000 lbs maximum per wheel
- Tire contact area is 10"x 20" rectangle



The Silva Cell has been meticulously engineered to handle multiple competing needs, including paving and related vehicle loads, providing maximum space for unimpeded soil volume, and ease of construction – including placement within areas of high services and utility infrastructure. We have years of in-ground projects in multiple applications, providing examples of daily use in high demand environments. For more details please contact us to discuss applications for your project.

Independent lab testing and engineering analysis shows that Silva Cell, when installed per manufacturer’s specifications, meets or exceeds most loading requirements and safety factor, including AASHTO H/HS-20 (US), BS EN 1991-1-1:2002 (UK) and standards for tire contact surface area equal to 250 mm x 600 mm (Canada).

ULTIMATE WHEEL LOAD BY STANDARD PAVEMENT TYPE

The table below provides the maximum load that can be on any single wheel (tire), or per axle, for a given pavement section, assuming tires have a contact area equal to either the AASHTO H-20 standard of a 14.25" radius or the AASHTO HS-20 standard of a 10"x 20" rectangle.

STANDARD PAVING PROFILES

Silva Cell System Type	Traffic Loading Standard	Pavers		Asphalt		Concrete		Pavers with Concrete	
		3.15" pavers 1" sand base 12" of aggregate		4" of asphalt 12" of aggregate		4" of concrete 4" of aggregate		2.36" pavers 5" concrete	
		Wheel	Axis	Wheel	Axis	Wheel	Axis	Wheel	Axis
1X	H-20	30,200 lbs	60,400 lbs	40,600 lbs	93,200 lbs	34,900 lbs	69,800 lbs	38,600 lbs	77,200 lbs
	HS-20	31,800 lbs	63,600 lbs	48,700 lbs	97,400 lbs	35,900 lbs	71,800 lbs	41,100 lbs	82,200 lbs
2X	H-20	33,200 lbs	66,400 lbs	51,200 lbs	102,400 lbs	38,300 lbs	76,600 lbs	42,200 lbs	84,800 lbs
	HS-20	34,900 lbs	69,800 lbs	53,500 lbs	107,000 lbs	39,500 lbs	79,000 lbs	45,200 lbs	90,400 lbs
3X	H-20	28,200 lbs	56,400 lbs	43,500 lbs	87,000 lbs	32,600 lbs	65,200 lbs	36,000 lbs	72,000 lbs
	HS-20	29,700 lbs	59,400 lbs	45,500 lbs	91,000 lbs	33,600 lbs	67,200 lbs	38,400 lbs	76,800 lbs

UTILITIES



The Silva Cell provides the utmost in project flexibility, able to integrate utilities throughout the system.

PROJECTS AND APPLICATIONS

Using Silva Cells in plazas creates a powerful visual landscape, providing shade, harmony and beauty.



University of North Carolina,
Chapel Hill, NC



Native Bald Cypress Trees shown 5 years
after planting.

The iconic museum houses a powerful underground storm-water capture and reuse system provided by the Silva Cell, while simultaneously providing the soil volume needed to grow beautiful trees.



Metropolitan Museum of Art,
New York, NY



Trees shown 5 years after planting.

Waterfront promenades in formerly industrial areas are a perfect match for Silva Cell, as in this example from the former Olympic village site for the 2010 Olympic games.



Southeast False Creek Promenade,
Vancouver, BC Canada



Trees shown 8 years after planting.

"North Carolina State University chose to use the Silva Cells and DeepRoot.... For right-of-way applications and from a design and implementation perspective, the Silva Cell is the most flexible and integrated suspended pavement system available." - Jonathon Page, Extension Associate at NCSU

"We used Silva Cells as a stormwater quality BMP (best management practice) in order to comply with the Regional Water Quality Control Board storm drain requirements and to provide pollutant-control and flow-control functions... Silva Cells made the most sense because they provide all the stormwater benefit that we need, don't take up surface area, and are great for the proposed trees."

- David Wiener, Michael Baker International

THE DIFFERENCE IS DESIGN

The Silva Cell is a modular suspended pavement system that uses soil volumes to support large tree growth and provide powerful on-site stormwater management through absorption, evapotranspiration, and interception. Meet regional soil volume and stormwater requirements, and utilize the Silva Cell as a stormwater BMP that leverages soil and trees to provide:

- Water quality/pollutant control
- Peak overflow reduction/flow control
- Low/no maintenance
- Any type of soil
- Grow big trees

Our clients say it best:
"Silva Cells were used for their ability to achieve water quality treatment goals as well as to grow large and mature trees. Nature-based systems are, by far, the best ones available to us," - Russell Barth, Senior Water Resources Engineer, ISL Engineering

Uptown Normal Redevelopment, Normal, IL
Trees shown 8 years after planting.



Howard Street, Manchester, UK
Trees shown 3 years after planting.



The award-winning projects shown here harness the power of the Silva Cell to integrate trees, soil and stormwater, creating a powerful Green Infrastructure tool.

The Difference is Design. As the creator and innovator of suspended paving systems, the depth of our experience, product knowledge and system integration is what makes the Silva Cell the most widely used suspended paving system.



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