

## Analysis of Brownfields Cleanup Alternatives for the Former Industrial Property located at 615 Marquette Street Racine, Wisconsin CDA – USEPA Cleanup Grant

This Analysis of Brownfields Cleanup Alternatives (ABCA) has been prepared for the Community Development Authority of the City of Racine (CDA) to outline options identified and evaluated to complete the cleanup planning process for the former industrial property located at 615 Marquette Street in Racine, Wisconsin (the “site”). Alternative cleanup and environmental management activities considered for the site consisted of the following:

- Alternative 1: No Action
- Alternative 2: Limited Source Area Soil Excavation/Off-Site Disposal of Chlorinated Volatile Organic Compounds (CVOC)-impacted Soil with Natural Attenuation of Groundwater and Installation of Direct Contact Site Cap
- Alternative 3: In-Situ Chemical Oxidation via Hydraulic Injections for Treatment of Soil Impacts with Natural Attenuation of Groundwater and Installation of Direct Contact Site Cap

### SITE BACKGROUND

The Site consists of an approximately 2.18-acre parcel located at 615 Marquette Street in Racine, Wisconsin (Figure 1). The layout of the Site is shown on Figure 2. It is bordered to the north by Water Street and to the south by Sixth Street. A City-owned access road borders the property along its eastern edge, and Marquette Street borders the property along its western edge. The property was historically used for industrial operations and owned/occupied by owners including J.I. Case and Western Publishing. It was most recently operated as an indoor fish farm. The Site was developed with an approximately 60,000-square-foot warehouse building, which was constructed in sections with various building materials. The building was demolished in Fall 2018/Winter 2019 in anticipation of future redevelopment of the Site.

Five aboveground storage tanks (ASTs) were historically located on the Site, and these tanks reportedly included: one 8,000-gallon tank with unknown contents, one 6,700-gallon tank containing “naphtha”, one 7,000-gallon gasoline tank, one 8,000-gallon fuel oil tank, and one 8,000-gallon tank containing “other” (Symbiont, 2014). These tanks were historically located at the southeastern portion of the Site. Petroleum and chlorinated volatile organic compound (VOCs) impacts to soil and groundwater were discovered in this area of the Site in 2005 and the WDNR was notified of a release. An open case file for the Site is listed on the Wisconsin Department of Natural Resources (WDNR) Bureau of Remediation and Redevelopment Tracking System (BRRTS) as BRRTS # 02-52-543869.

A Phase II Environmental Site Assessment (ESA) was conducted in August 2005 by K. Singh and Associates, Inc. The Phase II ESA consisted of the completion of four soil borings focused on the former AST area. Diesel range organics (DRO) were detected at a concentration exceeding the Wisconsin Administrative Code (WAC) NR 720 criteria of 100 milligrams per kilogram (mg/kg) DRO at that time. An interim remedial action involving the excavation and off-site disposal of approximately 242 tons of petroleum-impacted soil was completed in August and September 2005, according to the K. Singh & Associates, Inc.’s October 12, 2005 *Interim Remedial Action Report*. Additional soil excavation was completed again on September 21, 2005, in the eastern portion of the former tank bed area based on concentrations of DRO in sidewall confirmation samples exceeding the NR 720 criteria at that time; however, the quantity of additional soil removed was not specified. Additional assessment was conducted in 2018 by Ramboll, on behalf of the CDA, which identified low levels of metals, polycyclic aromatic hydrocarbons (PAHs), and chlorinated volatile organic compounds (CVOCs), predominantly trichloroethene (TCE) and its break-down products, near the eastern site

boundary and in the southeastern portion of the site near the location of the former ASTs. Two areas of site have also been identified as having concentrations of trichloroethene (TCE) exceeding its Wisconsin Administrative Code (WAC) NR 720 Residual Contaminant Level (RCL) for the non-industrial direct contact pathway and the groundwater migration pathway. The locations where exceedances of the WAC NR 720 RCLs were detected for TCE are shown on Figure 3.

Groundwater sampling at the site has also revealed chlorinated VOC (CVOC) impacts to groundwater. TCE has been detected at concentrations exceeding its WAC NR 140 groundwater quality Enforcement Standard (ES) and Preventive Action Limit (PAL). Tetrachloroethene (PCE) and vinyl chloride were also detected at concentrations exceeding their respective WAC NR 140 PALs. Cis-1,2-dichloroethene (DCE) was also detected in groundwater but did not exceed its NR 140 standards. Both DCE and vinyl chloride are break-down products of TCE and PCE and their presence in the site groundwater indicates that some degradation of these contaminants is occurring naturally at the Site, which indicates conditions are suitable for continued natural degradation of residual CVOCs. The exceedances of the WAC NR 140 groundwater quality standards are shown on Figure 4.

Since 2018, additional groundwater monitoring activities were completed to assess groundwater impacts at the Site and evaluate for natural attenuation. In addition, pre-remedial design soil sampling was completed in 2020 in order to gather the data needed for designing a final site remedy. Fourteen shallow soil probes were advanced in June 2020 to define the extent of CVOC soil impacts in the northeast and southeast areas of the site.

## **SITE REDEVELOPMENT PLAN**

The Site is anticipated to be redeveloped for primarily residential development with some mixed-use commercial. Development plans are being prepared, but no specific development has been identified at this time. Areas of the site with low concentration soil impacts will primarily be covered by concrete building slabs or such soils will be removed from the site during site redevelopment. Because the areas with CVOC-impacted soils would present a vapor intrusion risk to the anticipated development if allowed to remain in place, it is anticipated that the future redevelopment plans will include site capping and possible sub-slab vapor mitigation for buildings constructed in the areas with identified CVOC impacts. It is anticipated that some of the site capping will be conducted in conjunction with the proposed redevelopment.

All solid wastes generated at the Site, including contaminated soil and other solid wastes generated during response actions associated with this USEPA Cleanup Grant, will be disposed of properly at either a Wisconsin Chapter 289, Stats., licensed landfill or in a manner consistent with the applicable provisions of WAC NR 718..

## **ANALYSIS OF ALTERNATIVES**

Three alternatives for remedial action at the Site were considered with the goal of maximizing the potential for redevelopment, which is currently impaired by the contamination present. The alternatives discussed below were evaluated based on effectiveness, implementability, and cost.

### **Alternative 1: No Action**

The “No Action” alternative was considered but disregarded. While implementable and cost-effective, it does not meet regulatory requirements for soil and groundwater remediation and would potentially create a risk for direct contact with contaminated soil and for vapors that may be present until CVOCs were naturally degraded. It would also significantly hinder the proposed redevelopment of the Site.

## **Alternative 2: Limited Soil Excavation/Off-Site Disposal of Chlorinated Volatile Organic Compounds (CVOC)-impacted Soil with Natural Attenuation of Groundwater and Installation of Direct Contact Site Cap**

This alternative consists of excavation of CVOC-impacted soil with off-site disposal and the construction of a direct contact site cap in areas with low-level residual direct contact impacts. Residual groundwater impacts will be addressed through monitored natural attenuation (MNA).

The excavations will focus on the areas of the site that have been determined to be impacted with CVOCs above a site-specific remedial threshold goal of 1 mg/kg along the eastern site boundary and in the southeastern portion of the site near the location of the former ASTs. Near the northeastern property corner, shallow soil impacts were observed at boring B-3, and an excavation area of approximately 380 square feet, to a depth of 3 feet bgs, is proposed (approximately 45 cy) to be removed and disposed. At the southeastern property corner, TCE impacts were encountered to a depth of 3 to 5 feet bgs, and a proposed soil excavation area of 1285 square feet is proposed, resulting in approximately 200 cy to be removed and disposed. The excavations will be backfilled to grade with imported clean soil.

Following excavation of CVOCs as provided above, the low-level soil impacts remaining on the site will be addressed through the construction of a direct contact site cap in the areas that have remaining contamination in excess of direct contact RCLs. A temporary site cap has already been placed at the site as part of the site demolition activities, with crushed concrete from former building slabs placed across the site to minimize the risk of direct contact with contaminated soil.

The final site capping plan for the site will likely consist of building slabs, paved parking and drive areas as part of the site redevelopment. The building slab portion of the final cap is anticipated to be constructed as part of site redevelopment, while the final site cap in the paved parking and drive areas is anticipated to be constructed as part of this remedial action alternative. A concrete or asphalt pavement cover or a one to two-foot soil cover in greenspace areas would be constructed over an estimated 15% of the site, for the purpose of this alternatives evaluation. The site cap is considered an institutional control that will be listed on the WDNR's Bureau for Remediation and Redevelopment Tracking System (BRRTS) database with a long-term requirement for inspection and maintenance.

MNA was determined to be the most cost effective and technically feasible alternative to address the low-level residual groundwater impacts at the site. There are currently exceedances of WAC NR 140 ESs and PALs at the site, and four quarters of MNA groundwater sampling are proposed to document a stable or decreasing plume, prior to receiving final case closure on the site.

Based on the estimated extent of soil contamination at the subject site, the estimated cost to implement the soil excavation/off-site disposal including four rounds of MNA groundwater sampling, construction of the site cap, and associated reporting is \$113,600. Under this remedial alternative, active remediation could be completed within 1 month and regulatory case closure could likely be secured within a 2-year timeframe, after completion of MNA groundwater monitoring.

## **Alternative 3: In-Situ Chemical Oxidation via Hydraulic Injections for Treatment of Soil Impacts with Natural Attenuation of Groundwater and Installation of Direct Contact Site Cap**

This alternative consists of *in-situ* chemical oxidation involving the application of the chemical oxidant, sodium persulfate directly into the subsurface for the treatment of impacted soil. When the sodium persulfate is applied to the subsurface, it aerobically breaks down the contaminants into non-toxic products such as carbon dioxide and water. Various oxidant delivery methods can be considered for the treatment of shallow soil impacts, such as direct injection or *in-situ* soil mixing. A challenge with injection methods is the potential for the surfacing of oxidants due to the shallow treatment zones, extending to a maximum of 6 feet bgs. In addition, soil mixing inherently affects the structural stability of the soils, which can potentially impact redevelopment in the impacted area.

The soil treatment area for *in-situ* chemical oxidation will focus on the two areas of the site that have been determined to be impacted with CVOCs above WAC NR 720 RCLs, including the area along the eastern site boundary and the area in the southeastern portion of the site near the location of the former ASTs. The direct injection delivery method is considered in order to maximize redevelopment potential.

The low-level soil impacts remaining on other portions of the site will be addressed through the construction of a direct contact site cap. A temporary site cap has already been constructed at the site as part of the site demolition activities, with crushed concrete from former building slabs placed across the site to minimize the risk of direct contact with contaminated soil.

The final site capping plan for the Site will likely consist of building slabs, paved parking and drive areas as part of the site redevelopment. The building slab portion of the final cap is anticipated to be constructed as part of site redevelopment, while the final site cap in the paved parking and drive areas is anticipated to be constructed as part of this remedial action alternative. A concrete or asphalt pavement cover or a one to two-foot soil cover in greenspace areas would be constructed over an estimated 15% of the site, for the purpose of this alternatives evaluation. The site cap is considered an institutional control that will be listed on the WDNR's Bureau for Remediation and Redevelopment Tracking System (BRRTS) database with a long-term requirement for inspection and maintenance.

Based on the estimated extent of soil contamination at the subject site, the estimated cost to implement *in-situ* chemical oxidation for soil remediation, including four rounds of MNA groundwater sampling, construction of the site cap, and associated reporting is \$149,000. Under this remedial alternative, active remediation could be completed within 1 month and regulatory case closure could likely be secured within a 2-year timeframe, after completion of MNA groundwater monitoring.

## RECOMMENDATION

Based on this remedial alternative analysis and in consideration of the remedial activities conducted to date, it is concluded that the most cost-effective and technically feasible alternative to complete the remedial action is Alternative 2: Limited Source Area Soil Excavation/Off-Site Disposal of CVOC-impacted Soil with Natural Attenuation of Groundwater and Installation of Direct Contact Site Cap. Under this alternative, regulatory case closure could likely be secured within a 2-year timeframe, and redevelopment potential would be maximized for the Site.

## DECISION DOCUMENT

A decision document will be issued at the close of the 30-day public comment period with additional details on the selected alternative.

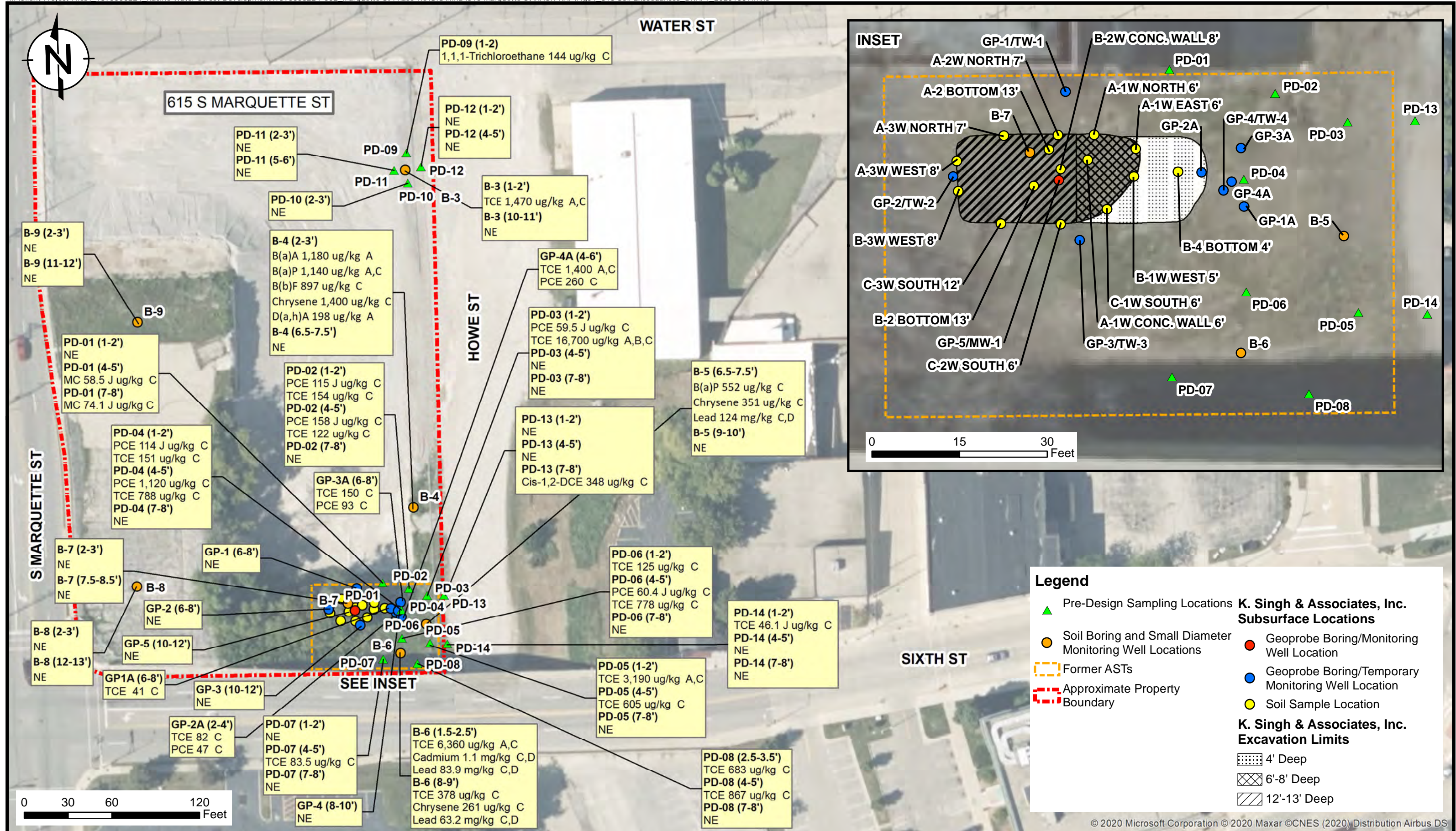




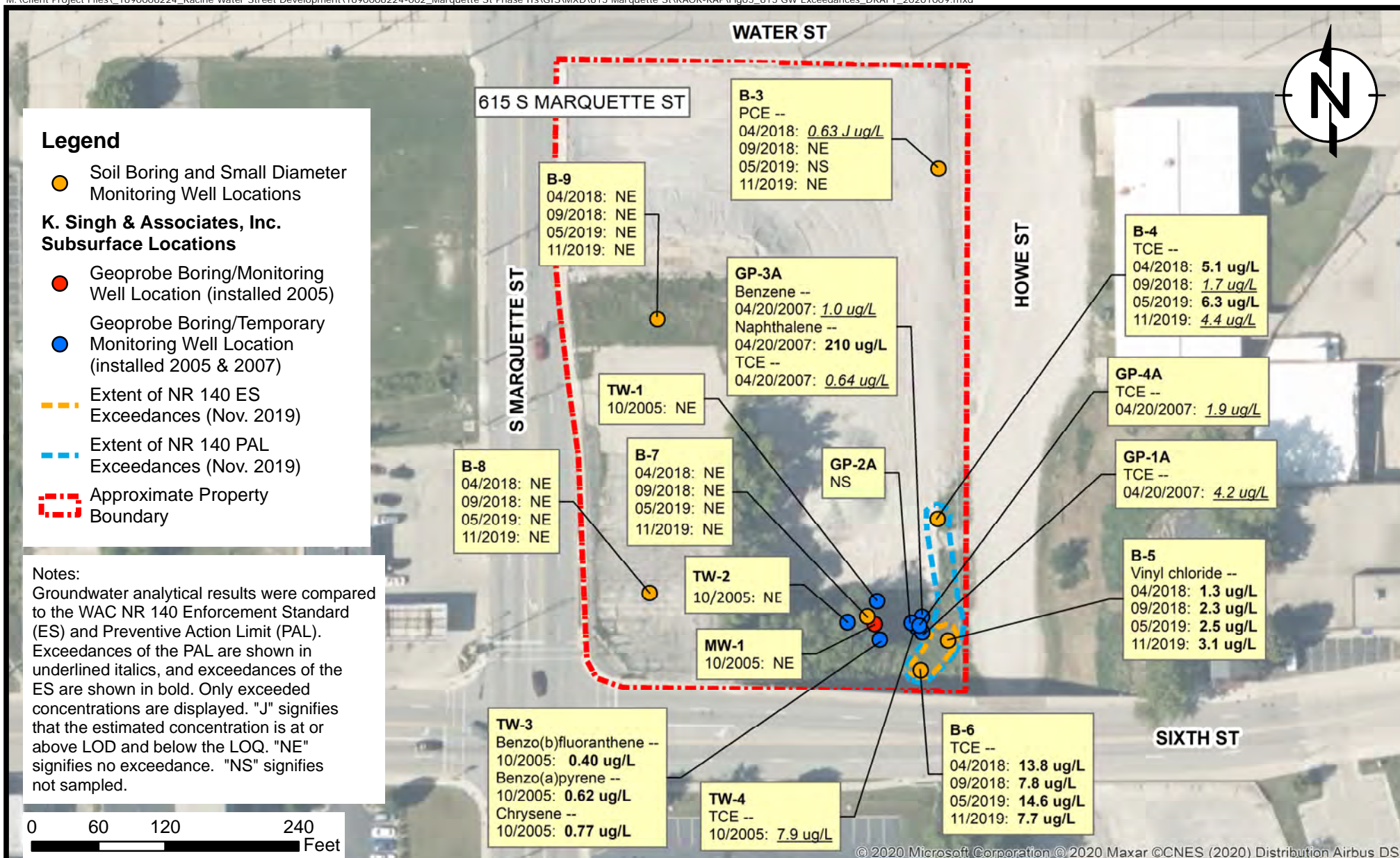












EXCEEDANCES OF NR140 GROUNDWATER STANDARDS  
WATER STREET REDEVELOPMENT  
MARQUETTE STREET PROPERTY  
RACINE, WISCONSIN

FIGURE  
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