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April 10, 2018

Mr. Riley Neumann
Wisconsin Department of Natural Resources
2300 North Dr. Martin Luther King, Jr. Drive
Milwaukee, Wisconsin 53212-3128

Re: ***Remedial Action Options Report/Design Report***
BRRTS #: 02-41-576336 & 02-41-579429
FID #: 241828620
Sunrise Shopping Center
2410-2424 10th Avenue & 1009 Marquette Avenue
South Milwaukee, Wisconsin 53172

Mr. Neumann:

Please find enclosed the *Remedial Actions Options Report/Design Report* (RAOR/Design Report) for the Sunrise Shopping Center facility located at the above-referenced address. This RAOR/Design Report is submitted to propose to the Wisconsin Department of Natural Resources (WDNR) remedial methods to address observed soil, groundwater, and vapor contamination at the Site in order to meet regulatory compliance and obtain a Case Close Out Letter for the Site. The RAOR/Design Report proposes a combination of active remediation and implementation of institutional controls to address the observed contamination on-site.

If you have any questions or require additional information in regards to this submission, please contact me at 847-573-8900 extension 580. Thank you for your time.

Sincerely,
DAI Environmental, Inc.

Christopher Cailles

Christopher Cailles, P.E.
Project Engineer

Enclosure

cc: Steven Dukatt – Carol Investment Corporation (w/enclosure)

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REMEDIAL ACTION OPTIONS REPORT/ DESIGN REPORT SUNRISE SHOPPING CENTER 2410-2424 10TH AVENUE & 1009 MARQUETTE AVENUE SOUTH MILWAUKEE, WISCONSIN 53172 WDNR BRRTS ACTIVITY #02-41-576336 & 02-41-579429 WDNR FID #241828620

April 2, 2018

DAI Project Number: 6255

Prepared For:
Carol Investment Corporation
1410 South Clinton Street
Chicago, IL 60607

Prepared By:
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1.0 EXECUTIVE SUMMARY

1.1 INTRODUCTION

DAI Environmental, Inc., (DAI) has been engaged by the Carol Investment Corporation to obtain a Case Closure letter from the Wisconsin Department of Natural Resources (WDNR) for the Sunrise Shopping Center Property located at 2410-2424 10th Avenue and 1009 Marquette Avenue in South Milwaukee, Wisconsin (Site). Figure B.1.a in Appendix B provides a topographic site location map. The Site name, current property owner, and current Responsible Party are provided below.

Site: Sunrise Shopping Center
2410-2424 10th Avenue and 1009 Marquette Avenue
South Milwaukee, Wisconsin 53172
Parcel Identification No. 7769994001
WDNR BRRTS Activity #02-41-576336 & 02-41-579429
WDNR FID #241828620

Property Owner/ Responsible Party: Carol Investment Corporation
1410 South Clinton Street
Chicago, Illinois 60607

Consultant: DAI Environmental, Inc.
27834 North Irma Lee Circle
Lake Forest, Illinois 60045
(847) 573-8900

1.2 SITE DESCRIPTION

The Site is comprised of a single parcel of approximately 3.22-acres land, classified as "Commercial" in the Milwaukee County Land Information Office. The Site remains improved with the two (2) above-described buildings. The remainder of the Site is asphalt paved parking lot, with the exception of landscape islands. The utility corridor generally runs below the western property boundary behind the buildings. The buildings are adjacent, but not physically connected. An approximately 5-ft gap between the two (2) buildings exists, though the space is enclosed by walls on the east and west ends of the "alley" between the buildings to form a facade. The 1009 Marquette Avenue building includes a basement area below approximately half

of the building footprint. The multi-tenant space building is concrete slab-on-grade construction. The Site is currently used as a strip mall. The current tenant information is provided below.

Address	Current Tenant	Most Recent Tenant	Comments
1009 Marquette Avenue	Ace Hardware	--	
2410 10th Avenue	Vacant	American Family Insurance	Historical location of Sunbrite Cleaners
2412 10th Avenue	Vacant	Sunrise Salon	
2414 10th Avenue	Aurora Pharmacy	--	
2414B 10th Avenue (previously 2416)	Vacant	Lakeshore Medical Clinic (never took occupancy of the space)	Historical location of Wolf's Dry Cleaners & Launderers
2418 10th Avenue	Sunrise Restaurant	--	
2422/2424 10th Avenue	Vacant	Family Tree Child Care	

The Site is located in a mixed use area, with surrounding properties including commercial, light industrial, municipal, and residential. PyraMax Bank (within Sunrise Plaza) or Marquette Avenue are located to the adjacent north, then commercial and light industrial facilities. To the east is BMO Harris Bank (within Sunrise Plaza) or 10th Avenue, followed by Marquette Manor, a retirement facility. To the south of the Site (within Sunrise Plaza) is Servpro of Southeast Milwaukee County, a building damage restoration company, followed by Sunrise Village, a retirement facility. To the west of the Site is the Chicago & Northwestern Railroad (Union Pacific), followed by other residential and commercial properties. Figure B.1.b.1 includes an aerial view of the Site and surrounding property.

1.3 REGULATORY REPORTING

A *Notification For Hazardous Substance Discharge (Non-Emergency Only)* form 4400-225 was submitted to the WDNR on October 22, 2015. The notification was submitted based upon the results of subsurface investigations performed between November 2014 and April 2015. The notification form was submitted concurrent to a *Site Investigation Report/Remedial Action Options Report/Case Close Out Report* (SIR/RAOR/CCOR) dated May 2015. In a response letter dated December 21, 2015, WDNR requested additional subsurface investigations to be performed before Case Close Out could be approved.

As additional Site Investigations were completed and data submitted between February 2016 and June 2017, WDNR requested that a second notification be submitted in order to separate the

Volatile Organic Compound (VOC) contamination observed in the northwestern portion of the Site from the Polynuclear Aromatic Hydrocarbon (PAH) contamination observed in the center-east to southern area of the Site. The second notification form was submitted to the WDNR on May 16, 2017. The VOC contamination remains associated with the original BRRTS number (02-41-576336); the PAH contamination was assigned BRRTS number 02-41-579429.

Following the 2016-2017 additions Site Investigations, a *Site Investigation Report Amendment* (SIR Amendment) dated September 18, 2017, and a *Supplemental Information to Site Investigation Report Amendment* (Supplemental Information) dated November 16, 2017, were submitted by DAI on behalf of the Carol Investment Corporation. The SIR Amendment provided all information previously submitted in the May 2015 SIR/RAOR/CCOR, as well as a complete summary of all additional sampling activities and investigation results from February 2016 to June 2017 additional Site Investigations activities. The Supplemental Information report provided further evaluation of the submitted data for use by WDNR in determining the completeness of Site Investigation in relation to NR 716 requirements. In a letter dated December 5, 2017, WDNR issued a response letter indicating that clarification of or additional information be submitted, including results of additional vapor and groundwater sampling. WDNR also provided comment that off-site notification of contamination was to be completed.

The additional vapor and groundwater sampling was conducted in January 2018. A *Site Investigation Report Amendment Addendum* (SIR Addendum) dated February 28, 2018, was submitted documenting the results of the additional sampling investigations conducted to complete Site Investigations per NR 716 requirements. Figure B.1.b.2 provides all soil, groundwater, and air sample locations since beginning Site Investigation activities in November 2014. The SIR Addendum demonstrates soil, groundwater, and soil gas contaminant delineation across the Site.

This *Remedial Actions Options Report/Design Report* (RAOR/Design Report) is submitted to propose to WDNR how Carol Investment Corporation will address the contamination at the Site so as to meet regulatory compliance and obtain a Case Close Out Letter for the Site. The

RAOR/Design Report proposes a combination of active remediation and implementation of institutional controls to address the observed contamination on-site.

2.0 SUMMARY OF SITE INVESTIGATIONS

2.1 SITE STRATIGRAPHY AND HYDROGEOLOGY

During Site Investigation activities, the stratigraphy of the Site was generally well defined to a depth of 15-ft below ground surface (bgs). With the exception of landscape islands within the parking lot, the entire Site is covered with concrete building pad asphalt pavement. Below the pavement, the subsurface stratigraphy generally consists of mixed soil fill (sand and gravel mixed with silty clay/clay) of varying thickness followed primarily by clay and silty clay. In soil boring GP-306, the deepest (25-ft) soil boring, the clay continued to 17-ft (bgs), followed by inter-bedded seams of clay and sand to 20-ft, then clayey sand to 23-ft, and then clay to the terminus of the boring.

Visible soil saturation was encountered at varying depths and locations, generally coinciding with locations of silty sand and sandy clay seams. The measured depth to water is approximately 6-ft to 8-ft bgs, though certain areas of Site are observed with an artificially elevated groundwater level.

Static water level elevations were measured on several occasions. A northwesterly groundwater flow direction from the southern half of the Site and a north-northeasterly groundwater flow direction on the northern half of the Site is observed. Due to the assumed influence on the static measurements from non-native subsurface, observed groundwater flow direction is likely indicative of a localized and site-specific direction. Based upon review of the area topographic map and the direction to Oak Creek (nearest body of surface water), the north-northeasterly groundwater flow direction is anticipated to be more consistent with the natural flow direction. The hydraulic conductivity for the uppermost water-bearing unit at the Site has been calculated in a range of 4.859×10^{-6}-cm/s and 7.102×10^{-6}-cm/s.

2.2 OBSERVED CONTAMINATION

The results of the Site Investigations conducted between November 2014 and January 2018 identified VOC and PAH contamination. The VOC contaminants of concern (COCs) include: Benzene, Tetrachloroethene (Perc), Trichloroethene (TCE), and 1,1,1-Trichloroethene (1,1,1-

TCA). PAH COCs include: Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Chrysene, Dibenzo(a,h)anthracene, Indeno(1,2,3-cd)pyrene, and Naphthalene. Contamination exceeding applicable standards has been observed in the soil, groundwater, and sub-slab vapor (but not indoor air or soil gas).

The observed contamination, summarized in the following sections, is identified within five (5) independent source areas:

- the south-central portion of the Site,
- the central/east-central portion of the Site,
- the area immediately behind the 2414B tenant space,
- the area along the west-central property boundary to the rear of the 2414-2414B tenant spaces, and
- the area below and behind the 2410-2412 tenant spaces.

2.2.1 South-Central Portion of Site

Benzene and PAH soil contamination were observed within the south-central portion of the Site. The source of contamination in the south-central portion of the Site is likely associated with historical petroleum and/or coal storage during operation of the Site (and neighboring property to the south) by Caveney Oil Company. As observed in Figures B.2.a.1.a (Benzene) and B.2.a.2.a1-B.2.a.2.a6 (various PAH constituents), included in the February 2018 SIR Addendum, Site Investigations were effective in delineating the horizontal extents of Benzene and PAH contamination in soil. The soil contamination was observed in soil samples collected from a sample depth range of 2-ft to 4-ft bgs, with vertical delineation observed in soil samples collected at 8-ft to 10-ft bgs. Contaminant concentrations were observed at levels exceeding the WDNR Residual Contaminant Levels (RCLs) for Non-Industrial Direct Contact (DC) protection of groundwater (GW). Concentrations of Benzo(a)pyrene were also observed above the Industrial DC RCL.

In addition to PAH contamination in the soil, PAH groundwater contamination was also observed monitoring well MW-3 (see Figure B.3.b.2 of the February 2018 SIR Addendum). The most recent results for MW-3 indicate Benzo(b)fluoranthene and Chrysene concentrations above

the Preventative Action Limits (PALs). The groundwater concentrations in MW-3 have fluctuated between sampling events.

2.2.2 Central/East-Central Portion of Site

Exceedances of five (5) PAH constituents were observed within the central/east-central area in soil samples collected at 2-ft to 4-ft bgs (see Figures B.2.a.2.b1-B.2.a.2.b5 of the February 2018 SIR Addendum). Concentrations above the GW RCLs and Non-Industrial DC RCLs were observed. The PAH contamination in the central/east-central portion of the Site is associated with the known leaking aboveground storage tanks for which a Case Closure was previously issued in May 1998 (historical Caveney Oil Company operations may also have been a contaminant source). PAH soil contamination is generally delineated horizontally. Vertical delineation was observed in the soil samples collected at 14-ft to 15-ft bgs, though delineation is anticipated to occur at shallower depths of approximately 11.75-ft, similar to the south-central portion of the Site. The anticipated depth to delineation is consistent with the approximate depth to native soils. No groundwater contamination was identified within the central/east-central portion of the Site.

2.2.3 Former Heating Oil UST

Soil and groundwater contamination for the PAH constituents were observed within the area of the former heating oil underground storage tank (UST) that was located behind the 2416 (now 2414B) tenant space. As observed in Figure B.2.a.2 of the February 2018 SIR Addendum, Naphthalene was observed above the GW RCL in a soil sample collected at 4-ft to 6-ft bgs, with vertical delineation noted in the soil sample collected at 8-ft to 10-ft bgs. The most recent groundwater results from MW-4 indicate Benzo(b)fluoranthene and Chrysene concentrations above the Enforcement Standards and a Naphthalene concentration above the PAL (see Figure B.3.b.2 of the February 2018 SIR Addendum).

2.2.4 West-Central Property Boundary

A single exceedance of 1,1,1-TCA was observed at a concentration above the GW RCL in a soil boring installed near the west-central property boundary (see Figure B.2.a.a of the February 2018 SIR Addendum), located to the rear of the 2414-2414B tenant spaces. The exceedance was

observed in a soil sample collected from 8-ft to 10-ft bgs, but not the shallower sample at 2-ft to 4-ft bgs. The isolated source contamination is generally delineated horizontally.

2.2.5 Former Sunbrite Dry Cleaner

2.2.5.1 Soil Contamination: Figures B.2.a.1.b and B.2a.1.c of the February 2018 SIR Addendum show Perc and TCE contamination in the subsurface soils both inside and behind (west of) the 2410-2412 tenant spaces. The contamination is associated with the historical use of the 2410 tenant space as a dry cleaner. Concentrations within the tenant spaces were observed above each of the three (3) RCLs; concentrations to the rear of the building were only observed above the GW RCLs. Contamination in the soil has been generally delineated both horizontally and vertically.

2.2.5.2 Groundwater Contamination: Perc has been consistently observed in monitoring well MW-5 (see Figure B.3.b.1 of the February 2018 SIR Addendum), which is installed to the rear of the 2410 tenant space. The three (3) most recent concentrations exceed the Enforcement Standard, and the concentrations currently indicate an increasing trend, even though there are no known remaining active sources.

In addition to the observed Perc groundwater contamination in MW-5, water samples collected from the sump pit located in the basement of the Ace Hardware building (adjacent north of MW-5 and observed soil contamination) contain Perc at concentrations above the Enforcement Standard. Based upon the proximity of the Ace Hardware building to the observed groundwater contamination in MW-5, it is anticipated that the observed Perc concentrations in the Ace Hardware sump water sample are indicative of the collection of shallow contaminated groundwater from the permeable soils around the building footing and near MW-5.

2.2.5.3 Vapor Contamination: Several types of air monitoring samples have been collected. Perc was observed in a sub-slab vapor sample in the 2410 tenant space at a concentration exceeding the Vapor Risk Screening Level (VRSL). Naphthalene was originally observed at concentration above the VRSL in sub-slab vapor sample in the 2412 tenant space, but the Naphthalene concentration in the replicate sample was below the VRSL. There is no know

source of Naphthalene in the 2412 tenant space, so the initial Naphthalene detection is believed to be an anomaly. Figures B.4.a.1 and B.4.a.2 of the February 2018 SIR Addendum summarize vapor results for Perc and Naphthalene, respectively.

3.0 REMEDIAL ACTIONS OPTIONS REPORT

During subsurface investigations, soil, groundwater, and vapor contamination were observed at concentrations above the most stringent applicable standards. The extent of contamination in the soil and groundwater has been sufficiently defined to determine appropriate Remedial Actions that are protective of human exposure and limit further environmental impact. Indoor vapor contamination is well defined and only isolated to two (2) of the tenant spaces.

The most common and proven remedial actions available to the Responsible Party were considered for each of the contaminants and contaminated areas. Following evaluation of each remedial option, the most feasible solution was then selected based upon performance and cost-effectiveness. The final remedial options are proposed in this RAOR/Design Report for WDNR's approval. The selected remedial options include a combination of active in-situ remedial actions and implementation of institutional controls.

3.1 SELECTED REMEDIAL OPTIONS FOR BENZENE AND PAH CONTAMINATION

PAH soil contamination was observed in two (2) separate source areas, i.e., the south-central and center/east-central portions of the Site. Benzene soil contamination was observed in the south-central portion of the Site. NR 722.09(2)(a) requires that the soil contamination be restored to the RCLs established per NR 720. Limited groundwater contamination for PAHs was observed in the south-central portion of the Site. NR 722.09(2)(b) requires that groundwater concentrations be reduced below the PALs to the extent technologically and economically possible.

The remedial options evaluation for these two (2) source areas were:

- Excavation and Removal
- Soil Mixing and Replacement
- Chemical Injection
- Bioremediation
- Soil Vapor Extraction
- Engineered Barriers

The remedial options of chemical injection, bioremediation, and soil vapor extraction (SVE) were ruled out based upon not always being fully effective when addressing PAH contamination, and these options are generally more expensive and require more time for remediation than other options. The other active remedial options (excavation and disposal, and soil mixing and replacement) are typically fully effective and reasonably fast; however, these options are disruptive to ongoing operations, and are slower and more expensive than using an engineered barrier. After considering both time for remediation and cost-effectiveness, the continued property use, the observed soil concentrations, and the general lack of groundwater contamination within the two (2) contaminant areas, the selection of an engineered barrier is proposed.

3.1.1 Permanent Engineering Control for Eliminating Contact with Soil

No removal or in-situ remediation is proposed. Therefore, to meet the requirement of NR 722.09(2)(a), soil performance standards for groundwater protection and the direct contact exposure route are to be established through the placement of a permanent engineering control consistent with NR 720.08(2)(a) and NR 720.08(3)(a), respectively.

All soil contamination is already covered by existing asphalt pavement (parking lot). Appropriate repairs or re-paving will be completed to improve any areas of the existing pavement not in condition suitable to be considered an engineering control. Because limited (if any) modification to the asphalt pavement is required, the expenses associated with this chosen remedial action option are low, as are the long-term costs associated with maintaining the integrity of the barrier. See Section 4.1 for details of the proposed engineered barriers.

3.1.2 Protection of Groundwater

No active remediation is presently proposed for PAH groundwater contamination. An exemption from the requirements of NR 722.09(2)(b) is requested since the observed PAH concentrations in groundwater in the south-central portion of the Site were only marginally above the PALs based upon the most recent (January 2018) sampling results. (No groundwater contamination is observed in the center/east-central portion of the Site.) Further, the groundwater ingestion pathway is incomplete since groundwater is not utilized as a source of potable water in the City

of South Milwaukee, and all properties serviced by the public water supply must have abandoned any existing wells per 10.27(4) of the City of South Milwaukee Municipal Code. Therefore, any residual groundwater contamination does not pose a threat to the public welfare. The only time or expenses associated with this selected option are for the abandonment of on-site monitoring wells in compliance with City of South Milwaukee and WDRN requirements.

Quarterly sampling will continue to be conducted throughout 2018, as proposed in the December 28, 2017, *Site Investigation Work Plan* (SIWP), to verify that PAH groundwater concentrations remain below the Enforcement Standards and are not increasing such that an exemption from the requirements of NR 722.09(2)(b) no longer applies (i.e., increased impact to the environment or threat to human health may be of concern). If concentrations are observed to be increasing such that Enforcement Standards will be exceeded, then a remedial method for addressing PAHs in groundwater will be proposed.

3.2 SELECTED REMEDIAL OPTIONS FOR FORMER DRY CLEANER AREA

3.2.1 Soil Remediation Evaluation

Perc and TCE contamination were observed in the subsurface soils under the former Sunbrite Cleaners and behind the 2410 and 2412 tenant spaces. The total area of soil contamination exceeding the RCLs is approximately 6,295-ft^2. Soil contamination exceeding the RCLs at a depth in excess of 4-ft (i.e., below the direct contact zone) is delineated to an approximate area of 4,235-ft^2. The highest Perc and TCE concentrations were observed below the front of the former Sunbrite Cleaners (2410) unit, where the dry-cleaning machines were reported to have been located. The Perc and TCE soil plume extends under the front portion of the neighboring tenant space (2412). In addition to the observed soil concentrations, the VRSL for Perc was observed to have been exceeded in a sub-slab vapor sample installed in the front of the 2410 tenant space. NR 722.09(2)(a) requires that the soil contamination be restored to the RCLs established per NR 720. NR 722.09(3)(d)(1) and NR 726.05(8)(b)(1) require that a remedial action be undertaken to reduce the mass and concentration of volatile soil contamination when a VRSL is exceeded. The installation of a vapor mitigation system alone is not considered a remedial action.

Therefore, various remedial options were evaluated, including chemical injection and SVE, as suggested by WDNR in the response letter dated March 27, 2017. The remedial actions evaluated were:

- Excavation and Removal
- Soil Mixing and Replacement
- Chemical Injection
- Bioremediation
- Soil Vapor Extraction
- Engineered Barriers

Because of access and space limitations limiting the ability to bring in suitable excavation equipment, soil excavation and disposal or soil mixing and replacement options were excluded from consideration. The 2410 and 2412 tenant spaces can only be accessed by single man doors, and the front portions of the tenant spaces are only 12.5-ft at the widest point for the 2410 tenant space and 14-ft at the widest point for the 2412 tenant space. The width of the spaces is actually smaller when accounting for the build-outs inside the spaces. Additionally, the drop-in ceiling height of the spaces is only 8-ft.

An SVE system was considered but ruled out based upon the limited effectiveness in relatively impermeable silty clay soil. Based upon DAI's experience with SVE in less permeable soils, high vacuum blowers are required to create adequate airflow. This type of equipment has higher cost and noise levels, and the air distribution within the subsurface is still limited, which results in future modifications and longer a remediation period. The longer period of remediation, higher cost, high noise levels, and other disruptions to future operations within the tenant space are also disadvantages with this approach. Additionally, soil vapor extraction systems are not designed to operate below the groundwater table, which is approximately 6-ft bgs in MW-5 (behind the building) and 8-ft bgs in MW-2 (in front of the building). An air sparging component could be added to the remediation system to address the saturated zone, but air sparging requires additional equipment installation and has similar limitations in air flow distribution in low permeable soils.

Chemical and biological injection have similar difficulties with the distribution of fluids in the subsurface and do not provide an ideal solution either. But presented with the greater limitations associated with the other approaches, either chemical or biological injection are the more practical alternatives for this Site. In DAI's experience biological applications tend to be less expensive than chemical applications, although biological treatment requires a longer period of remediation. Also, the available VOC soil data do not indicate much biodegradation of Perc into TCE occurring (and no degradation to cis-1,2-Dichloroethene and Vinyl chloride), suggesting the conditions are not highly conducive to bioremediation. Considering the shorter period of remediation (oxidation generally tends to have "immediate" impact) and the desire to limit additional injections once the tenant space is re-occupied, chemical injection is preferred over biological injection.

3.2.2 Groundwater Remediation Evaluation

In addition to the soil and vapor exceedances that were observed in association with the former Sunbrite Cleaners, Perc groundwater contamination exceeding the Enforcement Standard was observed in monitoring well MW-5. The estimated groundwater plume exceeding the PAL for Perc encompasses an area of approximately 19,541-ft^2 with 6,361-ft^2 of the groundwater plume exceeding the Enforcement Standard. NR 722.09(2)(b) requires that groundwater concentrations be reduced below the PALs to the extent technologically and economically possible. Unlike the groundwater contamination for PAHs, where an exemption from the requirements of NR 722.09(2)(b) are being requested based upon marginal exceedances of the PAL, the groundwater concentrations for Perc in monitoring well MW-5 were above the Enforcement Standard and have shown an increasing trend.

Therefore, remedial options were evaluated for treatment of groundwater. The remedial actions evaluated were:

- Groundwater pump and treat
- Chemical injection
- Bioremediation
- Monitored natural attenuation and protection of groundwater use

Groundwater pump and treat is used less often than in the past due primarily to the long period of remediation required and the often-ineffective results obtained in silty clay soil such as are present at this Site. Groundwater pump and treat is also expensive by comparison to the other options and will not address the contaminant mass observed above the groundwater table. Monitored natural attenuation was excluded from consideration due to the increasing observed concentrations above Enforcement Standards. Both chemical and biological injection were considered feasible, although chemical injection was preferred at this Site based primarily on the shorter period of remediation.

3.2.3 Chemical Treatment Selection

In-situ chemical injection can be effectively used to treat both the vadose and saturated zones and was selected as the most cost-effective remedial approach to address the contaminated soils and groundwater around the former Sunbrite Cleaners tenant space. Details of the proposed chemical treatment are provided in Section 4.2, and supporting documentation is included in Appendix C.6.

3.2.4 Sub-slab depressurization System

The above-discussed chemical injection remediation is expected to reduce the mass of chlorinated solvents from beneath the former dry cleaners unit and thereby also reduce the Perc vapor concentrations in the 2410 and 2412 tenant spaces. However, the level of cleanup that can be achieved by chemical injection is not certain and may not necessarily eliminate the potential for vapor intrusion. To address vapor intrusion in the 2410 and 2412 tenant spaces (both currently vacant but expected to be re-occupied sometime in the future), the following controls were evaluated:

- Installation of a vapor barrier
- Building pressurization
- Sub-slab depressurization and venting.

The first two (2) alternatives (installation of a vapor barrier and building pressurization) were ruled out based upon significantly higher costs and the impractical aspects for installation in an active facility with slab-on-grade construction. Any vapor barrier installation would need to

incorporate a much larger area of impact to ensure prevention of contaminated vapors into any of the neighboring tenant spaces. Further, future build out of tenant spaces would likely involve concrete cuts and subsurface utility installations that would limit the effectiveness of the vapor barrier and increase replacement costs.

The most practical selection for a Vapor Mitigation System (VMS) at this Site is the installation of a sub-slab depressurization (SSD) system. Not only are the costs significantly less than the other options, but the installation can coincide with the soil remediation helping reduce the time for Site Closure. As noted in WDNR guidance document RR-800, "The most common way to interrupt the vapor pathway in existing structures is to install a sub-slab depressurization system…" Section 4.3 provides details of the proposed SSD system.

3.3 SELECTED REMEDIAL OPTIONS FOR FORMER UST AREA

PAH soil and groundwater contamination were observed within the area of the former heating oil UST previously located behind the 2416 (now 2414B) tenant space. Naphthalene soil contamination was observed at a concentration above the GW RCL. Although the contamination is covered by an existing barrier of asphalt pavement, the most recent groundwater results indicate exceedances of the Enforcement Standards for Benzo(b)fluoranthene and Chrysene, as well as a Naphthalene concentration above the PAL. Past groundwater sampling had only indicated contaminant concentrations marginally above the PALs.

Direct groundwater recovery and treatment was considered but is not warranted at this Site based upon the high costs associated with groundwater recovery and the source of the PAH contamination likely the result of soil contaminants in and around the former UST leaching from the soil into the groundwater. To be effective in the long term, any remedial action selected should consider treatment of residual PAH contaminated soils as well. Although SVE or a combination of SVE and air sparging is a viable option, the more obvious choice is chemical injection. This approach not only addresses both media (i.e., soil and groundwater), but is particularly cost-effective considering that chemical injection will also be employed on-site for treatment of contamination from the former Sunbrite dry cleaners. Also, the non-native soils used to backfill the UST excavation will be more permeable and amenable to the distribution of

injectate in the subsurface soils. By reducing the source of PAH contamination, any contaminated groundwater that is not directly treated will attenuate to concentrations below the PALs before migrating off-site.

Section 4.2 provides details of the proposed chemical treatment; supporting documentation is included in Appendix C.6. In addition to the proposed chemical treatment, quarterly sampling of MW-4 for PAHs will continue through 2018, as proposed in the December 2017 SIWP.

3.4 SELECTED REMEDIAL OPTIONS FOR ISOLATED TCA CONTAMIATION

The 1,1,1-TCA soil contamination observed along the west-central property boundary was identified in only one (1) of the 91 soil samples collected for VOC analysis. The single exceedance was observed at a concentration above the GW RCL in GP-511 in the soil sample collected from 8-ft to 10-ft bgs, but not the shallower sample collected at 2-ft to 4-ft bgs. The 1,1,1-TCA exceeded the GW RCL based upon a dilution attenuation factor (DAF) of 2. Note that the USEPA utilizes a DAF of 20 for the migration to groundwater pathway when a DAF of 1 is not applicable. At a DAF of 20 (or as low as 5), no 1,1,1-TCA contamination would be identified above the GW RCL. No concentrations of 1,1,1-TCA have been reported above the Limit of Detection (LOD) in any groundwater sample. Additionally, the are no known active sources of 1,1,1-TCA contamination remaining on-site.

Because the existing contamination does not pose a threat to human health or the environment, no removal or in-situ remediation is proposed. In compliance with NR 720.08(2)(a), soil performance standards will be established through an already existing permanent engineering control (asphalt driveway). Limited (if any) modification to the asphalt pavement is required, the expenses associated with this chosen remedial action option are low, as are the long-term costs associated with maintaining the integrity of the barrier. See Section 4.1 for details of the proposed engineered barrier.

4.0 DESIGN REPORT

4.1 ENGINEERED BARRIERS

Use of the existing asphalt pavement as a permanent engineering control is the proposed remedial action for addressing soil contamination at several separate locations at the Site. The south-central and center/east-central portions of the Site will be addressed together under a combined asphalt pavement barrier (a small portion of the barrier includes imported clean soil within landscape islands). A separate barrier will be implemented near the west-central property boundary.

Figures D.2.a-D.2.b in Appendix D show the existing paving to be used as a permanent engineering control, as well as the soil boring locations with residual soil exceedances. Figure D.2.a depicts coverage of an approximately 30,446-ft^2 area addressing Benzene and PAH soil contamination exceeding the GW RCLs and/or Non-industrial DC RCLs within the south-central and center/east-central portions of the Site. Figure D.2.b depicts coverage of an approximately 1,745-ft^2 area which addresses the isolated 1,1,1-TCA soil contamination that exceeds the GW RCL along with west-central property boundary.

A Barrier Maintenance Plan will be completed and submitted along with the Case Close Out Report. Table A.3 includes a summary of the residual soil concentrations that will remain in-place below the above-describe barriers.

4.2 CHEMICAL TREATMENT

In-situ chemical oxidation is proposed to address soil and groundwater contamination within the area of the former Sunbrite Cleaners, as well as behind the 2414B tenant space (former heating oil UST location). The chemical treatment will be accomplished using a commercially available product manufactured by Carus Corporation under the trade name RemOx®. RemOx® is a strong oxidant consisting of >98.8% Potassium permanganate, specifically formulated for use in soil and groundwater remediation. RemOx® is particularly useful in the oxidation of chlorinated ethenes (e.g., Perc and TCE), but is also effective for treating PAHs.

The RemOx® solution will be injected into the subsurface using high pressure pumps. A combination of direct-push rods and 1-in injection wells (i.e., Class V underground injection control wells) will be used to direct the injectate to the most contaminated soils. It is not feasible for the treatment zone to include the entirety of the area indicating contamination above the RCLs and PALs; rather the chemical oxidation treatment will be targeted at the source areas. Figure C.6.a shows the two (2) identified foci (source areas) that make up the greater soil contaminant plume, as well as the chemical injectate points. The proposed injection will be conducted within the front of the 2410-2412 tenant spaces to address the location of highest observed contaminant concentrations and reduce the potential for vapor intrusion and contaminant leaching into groundwater. Chemical treatment will also focus on the rear of the spaces within the vicinity of MW-5 to reduce soil and groundwater contaminant concentrations. A third injection area includes that former UST excavation behind the 2414B tenant space where PAH Enforcement Standard exceedances were observed. Figures C.6.a-C.6.b in Appendix C.6.1 show the proposed injection locations. An *Inventory of Injection Wells* Form (3300-253) is provided in Appendix C.6.2.

Based upon the levels of chlorinated VOCs identified and the low permeability of the subsurface soils, several rounds of injection are anticipated. Since there is no way of predicting how successful each injection event will be, the remedial progress (i.e., the reduction in chlorinated VOC soil concentrations) will be determined by post-injection soil sampling. The post injection soil sampling results will then be used to plan the next round of injection. When the remedial progress is no longer cost-effective, the remediation will be considered complete to the extent practicable, and the Site Closure will proceed under NR 720.08(2)(a) and (3)(a) by establishing applicable performance standards. An exemption from the requirements of NR 722.09(2)(b) may be requested based upon the lack of a complete groundwater ingestion pathway. A formal request for soil performance standards and/or an exemption from the requirements of NR 722.09(2)(b) will be included in the Case Close Out Report.

4.3 SSD SYSTEM

In the October 10, 2016, dated *Design Report (Vapor Intrusion),* information was provided to WDNR regarding the proposed installation of an SSD system within the 2410-2412 tenant

spaces. The results of pilot testing performed within the two (2) tenant spaces was also provided. The below sections include the previously provided information, as this RAOR/Design Report again proposes installation of an SSD system, in conjunction with chemical injection remedial activities discussed above in Section 4.2.

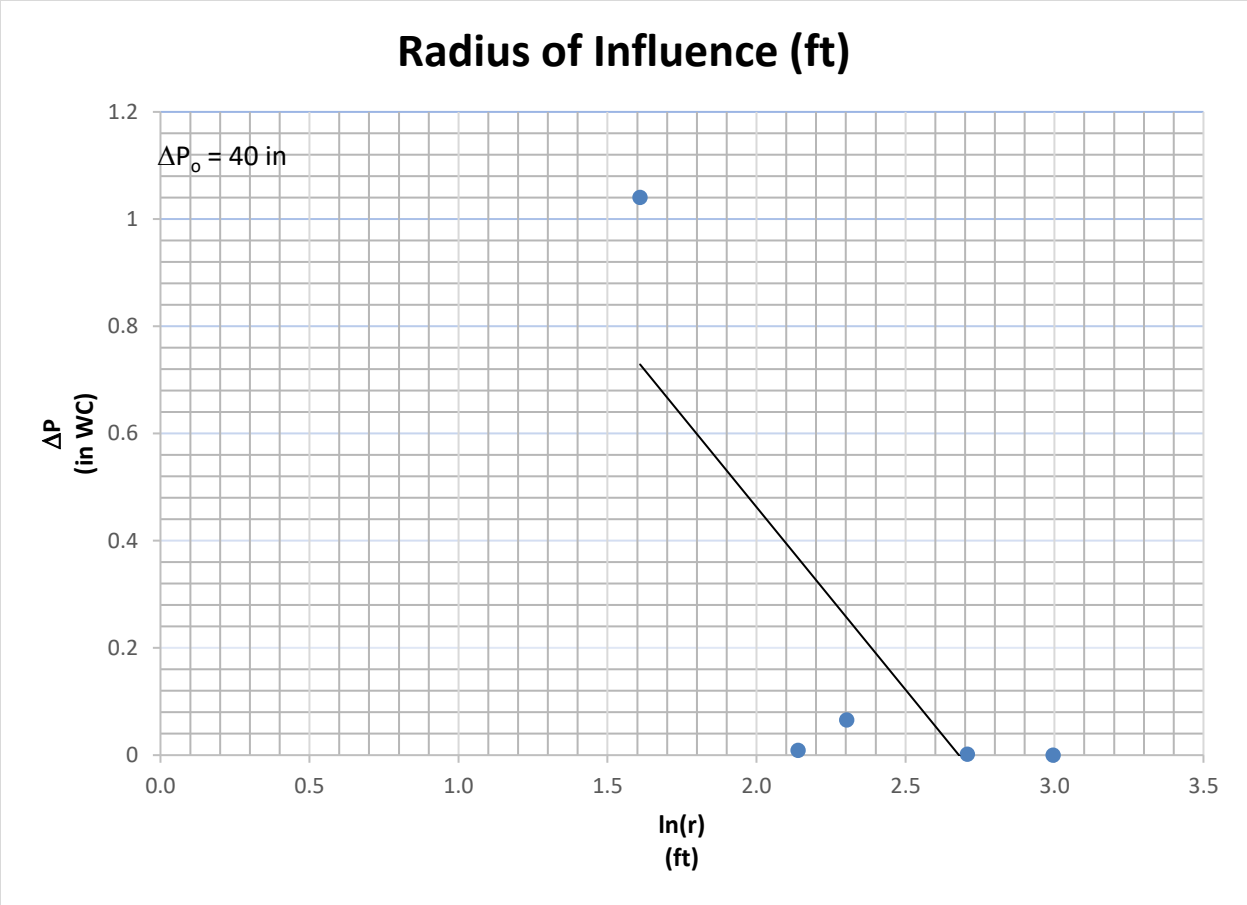
4.3.1 Pilot Testing

4.3.1.1 Pilot Test Procedures: To estimate the site-specific design parameters needed to design a full-scale SSD system, a pilot scale test was conducted on September 23, 2016. The pilot testing consisted of extracting air from beneath the concrete building slab (depressurizing) under a series of operating conditions and then monitoring the sub-slab pressure at variable distances from the point of air extraction.

One (1) 4-in hole was cored through the concrete inside the 2410 tenant space within the area of the building requiring an SSD system. A 4-in PVC tube was then installed through the core to a depth of approximately 3-in below grade (the bottom of the concrete slab). The tube/concrete interface was then sealed to make the junction airtight, and the tube was connected to the intake side of an air suction pump. Airtight vapor monitoring points were installed at 5-ft intervals through the concrete slab distances between 5-ft and 40-ft from the extraction point. Two (2) different air pumps, including a duct fan and a Shop-Vac® style vacuum, were used to vary the air flow and static pressure at the air intake point. Fan speeds and flow resistance were further altered to provide measurements of total air flow, static pressure at the point of air intake, and static pressure at each of the monitoring points across the range of anticipated operating conditions.

In addition to measuring the vacuum at multiple locations from the extraction point, the stratigraphy below the slab was evaluated during the pilot testing. The 4-in concrete slab is underlain by a layer of plastic sheeting, followed by approximately 1.5-ft of clayey sand (building pad sub-base). A black clay and slag (non-native fill) followed by native clay are observed below the clayey sand (as determined from September 2016 soil borings).

4.3.1.2 Pilot Test Data Evaluation: Following the suggestion of Johnson and Kemblowski's design for in-situ soil venting systems, the subsurface gauge pressure (i.e., the vacuum measurement) is plotted against the natural log of the distance from the extraction point, as shown below.



As can be observed, the pilot scale testing results indicated that a radius of influence (defined as the distance at which a vacuum of 0.003-in water column (WC) is generated) of 14.5-ft can be achieved under a static pressure of 40-in WC at the extraction point. This radius of influence was obtained at a flowrate of 9-ft^3/min. Analysis of the duct fan test run indicated a smaller radius of influence and multiple sump pits, such that a duct fan would not be cost effective. The sand underlying the concrete slab, rather than more highly permeable gravel, is the likely reason for a relatively small radius of influence.

4.3.2 SSD Layout

A conceptual plan and layout for the SSD system is depicted in Figure C.4.1. The design utilizes a radius of influence of 10-ft as a conservative measure, slightly lower than the calculated 14.5-ft. Five (5) extraction points are proposed to be installed, three (3) within the 2410 tenant space and two (2) within the 2412 tenant space. The suction pits will have dimensions of approximately 1.5-ft by 1.5-ft (length by width) and will extend to a depth of 0.5-ft to 1-ft below the bottom of the floor slab. The area of influence will encompass the entire impacted area. However, based upon DAI's experience with soil vapor extraction, exactly circular areas of influence, particularly for multiple extraction points, is highly idealized. The individual areas of influence for each extraction point will likely differ from that shown in the conceptual plan, although the total area covered by the final layout of the SSD system is expected to be similar to the conceptual plan.

As noted in WDNR guidance document RR-800, verification testing of an SSD system is required. With the proposed extraction vaults installed, pressure gradient measurements will be collected to verify that the entire area requiring depressurization is under vacuum. If these initial measurements do not indicate sufficient vacuum across the entire area of vapor exceedances, multiple vacuum blowers or a larger vacuum blower will be installed and/or additional recovery vaults will be added. A sufficient number of suctions pits will be installed to generate a vacuum of at least 0.003-in WC beneath the floor slab over the entire area of vapor exceedances.

Alternatively, the sub-slab pressure gradient may be measured after the installation of each air extraction sump pit (i.e., field measurement verification during construction). With this information, the proposed vault configuration can be altered (if necessary), and the location of the next suction pit can be finalized.

Once all the suction pits are installed, the suction pits will be connected to a manifold equipped with individual valves to regulate the air flow rate from each of the installed extraction points. PVC piping will run from each suction pit to the manifold, which in turn will connect to the intake (suction) side of an in-line vacuum blower. A vacuum gauge or manometer will be placed on the manifold or at the SSD blower so that the generation of an adequate vacuum can be

confirmed by direct inspection of the gauge/manometer. The proper vacuum range of the system (at the suction blower) will be listed next to the gauge/manometer so that anyone inspecting the system operations can assess whether the proper vacuum is being generated.

The recovered air will be directed from the manifold and exhausted to the roof. The exhaust piping from the vacuum blower will terminate a minimum of 10-ft above the ground and at least 10-ft from any door or window. Figure C.4.1 in Appendix C.4 shows the likely location for the piping manifold and vacuum blower.

To ensure that appropriate vacuum is maintained and to prevent short circuiting, the floor slab in the two (2) tenant spaces will be inspected. All visible cracks and joints in the floor slab and foundation walls will be sealed, as necessary. Any sumps exposed to the subsurface will be sealed. Any existing floor drains will remain in place, but the interface of the perimeter of the floor drains and the floor slab will be sealed to ensure no possible leakage of sub-slab gas into the indoor air space.

4.3.3 Response to WDNR Comments

In WDNR's March 27, 2017, review of the October 10, 2016, dated *Design Report (Vapor Intrusion)*, the WDNR reviewer had several comments. In response to those comments, DAI will:

- The proposed VMS, together with proposed chemical treatment, will be used to address the vapor intrusion pathway.
- The VMS design includes the installation of manometers on each leg of the vapor recovery system, prior to entry to the common manifold, as well as at the vacuum blower.
- The addition of multiple fans to address the extraction points has been added into the contingency plan as directed by the WDRN.
- Following the completion of additional vapor sampling conducted subsequent to the March 2017 letter, the extent of vapor contamination within the tenant spaces has been well defined. The original extraction point location and layout has been modified, but no additional extraction points are proposed at this time. The preliminary design still includes the installation of five (5) total extraction points.

4.3.4 Additional Obligations

Final design and construction details for the SSD system will be included in the construction/as-built report required to be submitted per NR 724.15. An Operation, Monitoring, and Maintenance (OM&M) Plan meeting the requirements of NR 724.13 will be included with the construction/as-built report. The OM&M Plan will include information such as a schedule for system operation verification inspections, details of system maintenance requirements, and reporting requirements. It is understood that the on-going operation of a VMS is considered a continuing obligation when seeking a Case Close Out Letter. If the VMS is to continue operation beyond the receipt of a Case Close Out Letter, a Maintenance Plan will be completed in conformance with WDNR guidance document RR-981 (or the OM&M Plan written to also ensure compliance with NR 726.11(2) will be utilized).

As required under NR 716.25, appropriate notifications will be made to the occupants of the tenant spaces where the VMS has been installed and will include of all pertinent information. It is understood that failure to maintain the VMS in accordance with the continuing obligations requirements may results in the WDNR reopening the Site as allowed by NR 727.13.

4.4 SUMP WATER TREATMENT SYSTEM

Due to close proximity to the contaminant Perc plume to the Ace Hardware building, the Perc impacted groundwater from behind the 2410 tenant space is being captured by the stormwater drainage system which surrounds the Ace Hardware basement. The collected groundwater drains to a sump in the basement sump prior to discharge to the municipal stormwater sewer system, which ultimately discharges into Lake Michigan.

To ensure that water collected in the sump will meet applicable discharge standards, a small carbon cannister type pre-discharge treatment system will be installed. Since sub-slab vapor and indoor air samples collected from within the Ace Hardware basement do not indicate any indoor air exceedances, the treatment system does not need to be designed to address vapor intrusion. The proposed treatment system is designed to remove VOCs from groundwater collected by the Ace Hardware stormwater drainage system and meet all City of South Milwaukee and WPDES discharge limitations. While the Ace Hardware stormwater drainage system was not designed for

groundwater remediation purposes, the collection system is effectively functioning as a "pump and treat" remediation system to assist in the remediation of Perc contaminated groundwater from behind the 2410 tenant space.

Groundwater from the sump is currently discharged directly into the stormwater sewer system. The current discharge configuration will be modified to re-route the collected groundwater through an activated carbon filter process prior to discharge of the effluent into the stormwater sewer system. A permit application requesting approval to discharge treated sump water under WPDES Permit WI-0046566-6 (remedial action groundwater treatment permit) is to be submitted following submission of this RAOR/Design Report.

Figure C.4.2 provides a sump water remediation system conceptual schematic. In general, the carbon treatment will include 2-stages, the first being the primary treatment and the second stage primarily intended as a backup should the first stage experience "breakthrough." The filter units will consist of 55-gallon drums (or similar containers) filled with activated carbon. A sample port will be installed between the filters and on the final filter outlet to allow for collection of water samples. Samples will be collected to monitor for breakthrough and to confirm that discharge into the stormwater sewer system does not exceed the applicable (0.050-mg/L) discharge limitation listed in WPDES Permit WI-0046566-6. A construction/as-built report (NR 724.15) with OM&M Plan (NR 724.13) will be submitted following completion of construction. All required information will be included in the OM&M Plan, or the OM&M Plan will provide citation to the appropriate section of WPDES Permit WI-0046566-6 that includes the required information.

5.0 NR 712 CERTIFICATIONS

"I, Christopher Cailles, P.E., hereby certify that I am a registered professional engineer in the State of Wisconsin, registered in accordance with the requirements of ch. A-E 4, Wis. Adm. Code; that this document has been prepared in accordance with the Rules of Professional Conduct in ch. A-E 8, Wis. Adm. Code; 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. NR 700 to 726, Wis. Adm. Code."

Christopher Cailles, Senior Project Engineer
E-39121

Signature, title and P.E. number

P.E. stamp

"I, Kurt Thomsen, 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."

Signature and title

Kurt O. Thomsen, Ph.D., PG

Date 04/08/18

APPENDIX A
TABLES

Table A.3. Residual Soil Contamination Table

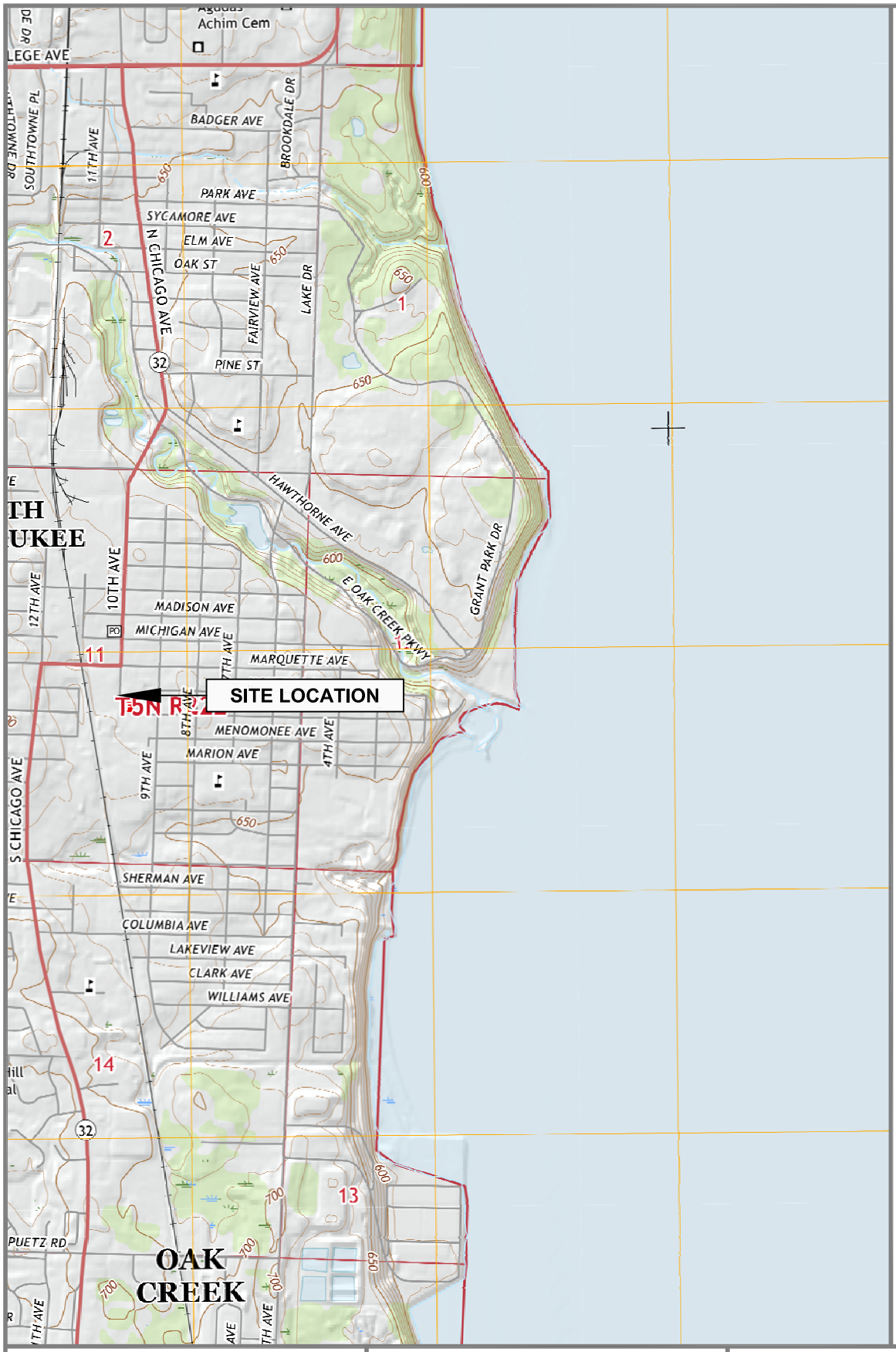
Contaminant	Sample Location	Sample Interval (feet bgs)	Date Collected	Concentration (mg/kg)	Exposure Route Exceeded	Applicable Criteria (mg/kg)
South-central portion of Site						
Benzene	GP-11	2-4	11/13/14	0.114	GW	0.0051[1]
	GP-106	2-4	01/06/15	0.0998	GW	
	GP-108	2-4	01/06/15	0.154	GW	
Benzo(a)anthracene	GP-11	2-4	11/13/14	3.5	DC	1.14[2]
	GP-107	2-4	01/06/15	4.36	DC	
	GP-108	2-4	01/06/15	4.6	DC	
Benzo(a)pyrene	GP-11	2-4	11/13/14	3.07*	GW, DC	0.47[1]/0.21[2]
	GP-105	2-4	01/06/15	1.72	GW, DC	
	GP-106	2-4	01/06/15	0.53	GW, DC	
	GP-107	2-4	01/06/15	6.93*	GW, DC	
	GP-108	2-4	01/06/15	3.27*	GW, DC	
	GP-302	2-4	02/19/16	0.894	GW, DC	
Benzo(b)fluoranthene	GP-11	2-4	11/13/14	1.87	GW, DC	0.478[1], 1.15[2]
	GP-105	2-4	01/06/15	1.73	GW, DC	
	GP-106	2-4	01/06/15	0.61	GW	
	GP-107	2-4	01/06/15	7.79	GW, DC	
	GP-108	2-4	01/06/15	2.43	GW, DC	
	GP-302	2-4	02/19/16	0.503	GW	
Chrysene	GP-11	2-4	11/13/14	5.66	GW	0.144[1]
	GP-105	2-4	01/06/15	1.51	GW	
	GP-106	2-4	01/06/15	0.586	GW	
	GP-107	2-4	01/06/15	5.21	GW	
	GP-108	2-4	01/06/15	5.1	GW	
	GP-302	2-4	02/19/16	1.78	GW	
Dibenzo(a,h)anthracene	GP-11	2-4	11/13/14	0.714	DC	0.115[2]
	GP-105	2-4	01/06/15	0.33	DC	
	GP-107	2-4	01/06/15	1.42	DC	
	GP-108	2-4	01/06/15	0.569	DC	
	GP-302	2-4	02/19/16	0.173	DC	
Indeno(1,2,3-cd)pyrene	GP-107	2-4	01/06/15	1.16	DC	1.15[2]
	GP-108	2-4	01/06/15	4.18	DC	

Table A.3 (Continued). Residual Soil Contamination Table

Contaminant	Sample Location	Sample Interval (feet bgs)	Date Collected	Concentration (mg/kg)	Exposure Route Exceeded	Applicable Criteria (mg/kg)
Center/east-central portion of Site						
Benzo(a)anthracene	GP-8	2-4	11/13/14	1.18	DC	1.14[2]
Benzo(a)pyrene	GP-8	2-4	11/13/14	1.59	GW, DC	0.47[1]/0.21[2]
	GP-101	2-4	01/06/15	1.67	GW, DC	
	GP-102	2-4	01/06/15	0.296	DC	
	GP-506	2-4	05/26/17	0.581	GW, DC	
Benzo(b)fluoranthene	GP-8	2-4	11/13/14	1.49	GW, DC	0.478[1], 1.15[2]
	GP-101	2-4	01/06/15	1.77	GW, DC	
	GP-506	2-4	05/26/17	0.938	GW	
Chrysene	GP-8	2-4	11/13/14	1.95	GW	0.144[1]
	GP-101	2-4	01/06/15	1.42	GW	
	GP-102	2-4	01/06/15	0.702	GW	
	GP-506	2-4	05/26/17	0.58	GW	
Dibenzo(a)anthracene	GP-8	2-4	11/13/14	0.392	DC	0.115[2]
	GP-101	2-4	01/06/15	0.311	DC	
West-central property boundary						
1,1,1-Trichloroethane	GP-511	8-10	05/26/17	0.332	GW	0.1402[1]

[1] –Soil Residual Contaminant Levels (RCLs) based on protection of groundwater (GW) and a dilution factor of 2 taken from the WDNR Soil RCL spreadsheet (December 2017 update)
[2] – Soil RCL for Non-Industrial Direct Contact (DC) taken from the WDNR Soil RCL spreadsheet (December 2017 update)
* – Observed concentration also above the Industrial Direct Contact RCL, but Non-Industrial DC RCLs applicable to the Site

APPENDIX B
FIGURES



LEGEND

SOUTH MILWAUKEE QUADRANGLE
WISCONSIN-MILWAUKEE CO.
7.5-MINUTE SERIES
(2016 TOPOGRAPHIC)

N

0' 2,000'
S C A L E

CAD FILE: 6255-25A
REVISED: 05/01/17

ENVIRONMENTAL

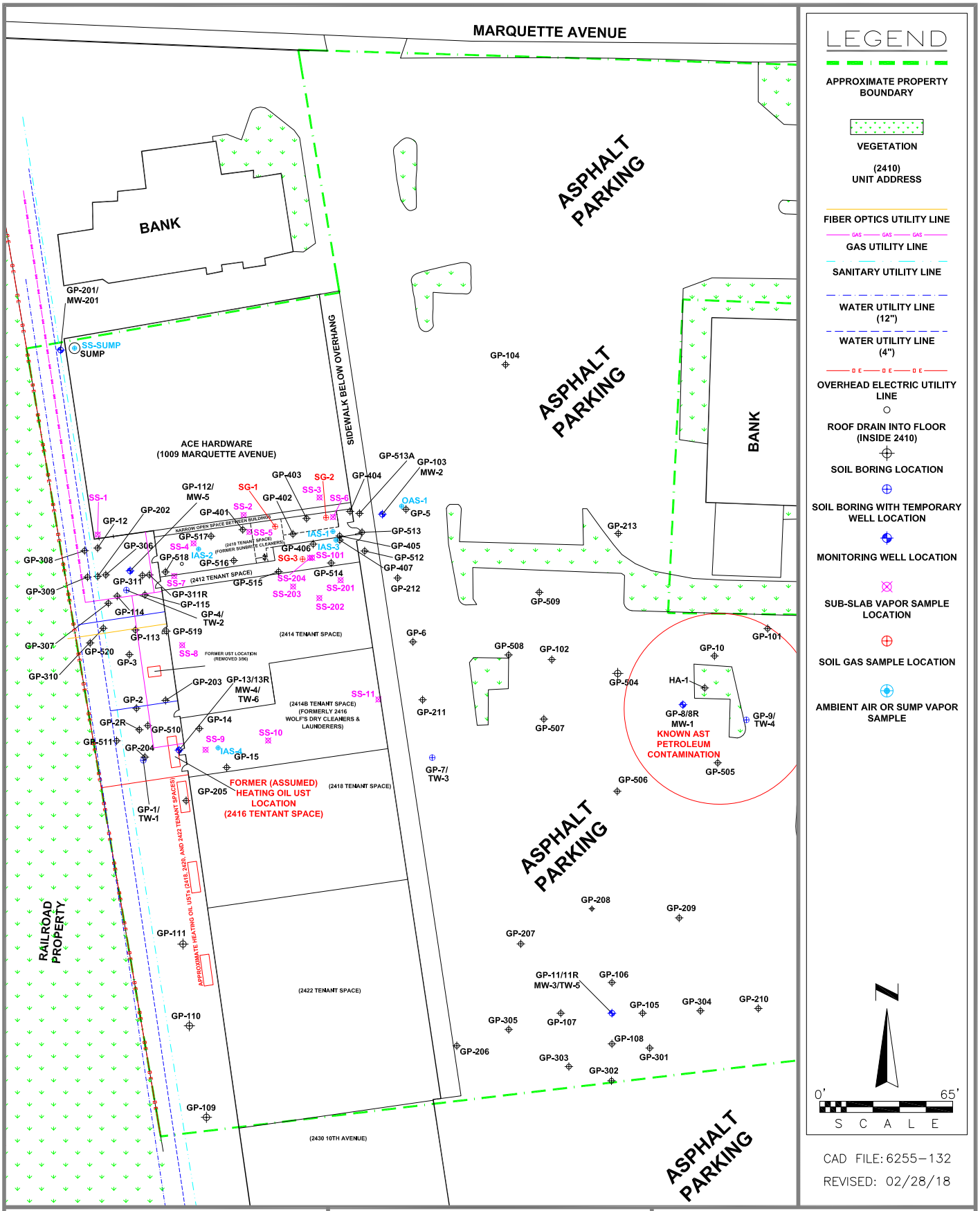
SUNRISE SHOPPING CENTER
2410-2424 10TH AVENUE
1009 MARQUETTE AVENUE
SOUTH MILWAUKEE, WISCONSIN

FIGURE B.1.a.
LOCATION MAP

ENVIRONMENTAL DAI

SUNRISE SHOPPING CENTER
2410-2424 10TH AVENUE
1009 MARQUETTE AVENUE
SOUTH MILWAUKEE, WISCONSIN

FIGURE B.1.b.1
DETAILED SITE MAP WITH AERIAL VIEW
OF SITE AND SURROUNDING PROPERTY
(2015 AERIAL TAKEN FROM GOOGLE EARTH)



LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- VEGETATION
- (2410) UNIT ADDRESS
- FIBER OPTICS UTILITY LINE
- GAS UTILITY LINE
- SANITARY UTILITY LINE
- WATER UTILITY LINE (12")
- WATER UTILITY LINE (4")
- OVERHEAD ELECTRIC UTILITY LINE
- ROOF DRAIN INTO FLOOR (INSIDE 2410)
- SOIL BORING LOCATION
- SOIL BORING WITH TEMPORARY WELL LOCATION
- MONITORING WELL LOCATION
- SUB-SLAB VAPOR SAMPLE LOCATION
- SOIL GAS SAMPLE LOCATION
- AMBIENT AIR OR SUMP VAPOR SAMPLE

N

0' 65'

S C A L E

CAD FILE: 6255-132

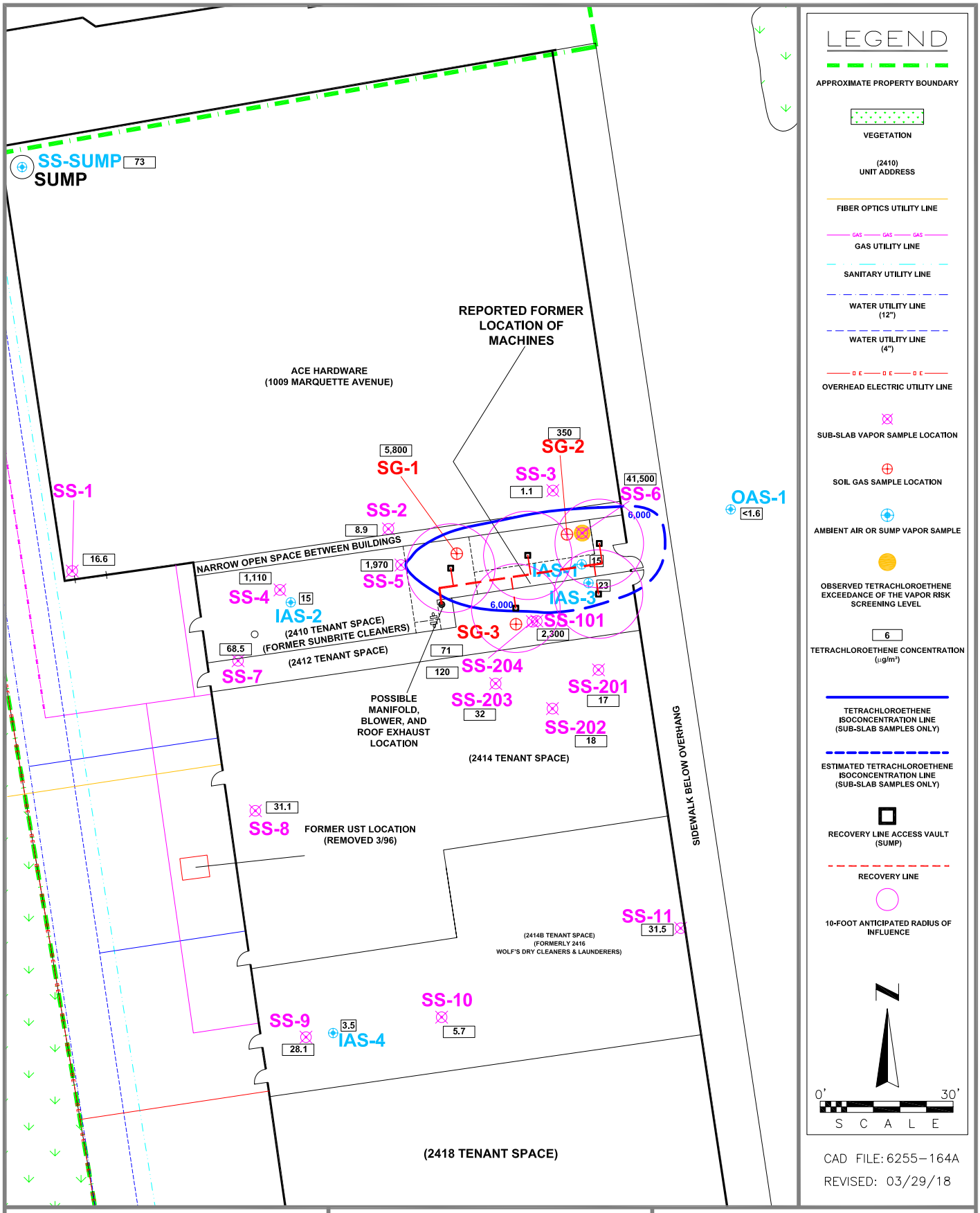
REVISED: 02/28/18

ENVIRONMENTAL

SUNRISE SHOPPING CENTER
2410-2424 10TH AVENUE
1009 MARQUETTE AVENUE
SOUTH MILWAUKEE, WISCONSIN

FIGURE B.1.b.2
DETAILED SITE MAP SHOWING SOIL, GROUNDWATER, AND VAPOR SAMPLING LOCATIONS

APPENDIX C.4
CONSTRUCTION DOCUMENTATION



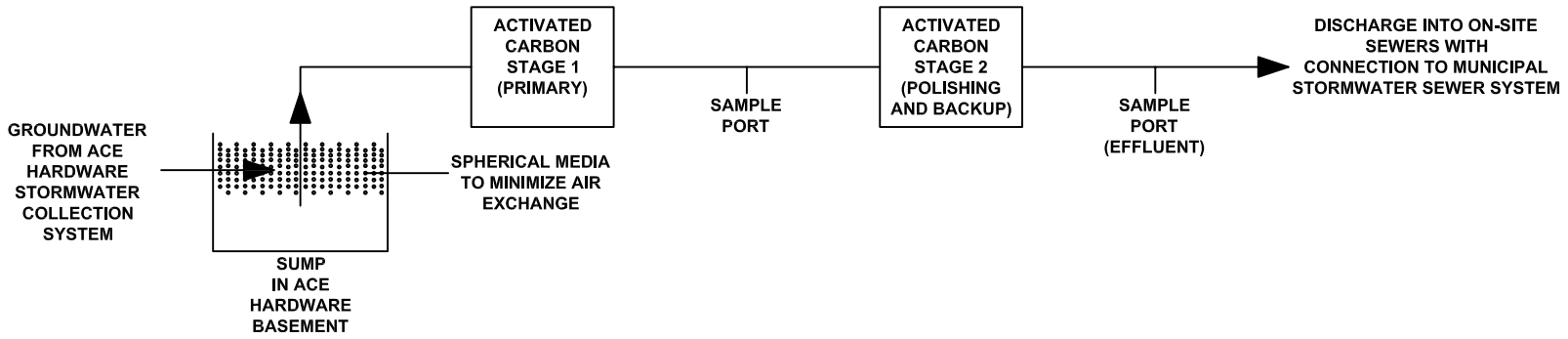
CAD FILE: 6255-164A

REVISED: 03/29/18

DAI ENVIRONMENTAL

SUNRISE SHOPPING CENTER
2410-2424 10TH AVENUE
1009 MARQUETTE AVENUE
SOUTH MILWAUKEE, WISCONSIN

FIGURE C.4.1
PRELIMINARY SSD SYSTEM DESIGN
SHOWING APPROXIMATE RADIUS
OF INFLUENCE



LEGEND

WATER FLOW

CAD FILE: 6255–165

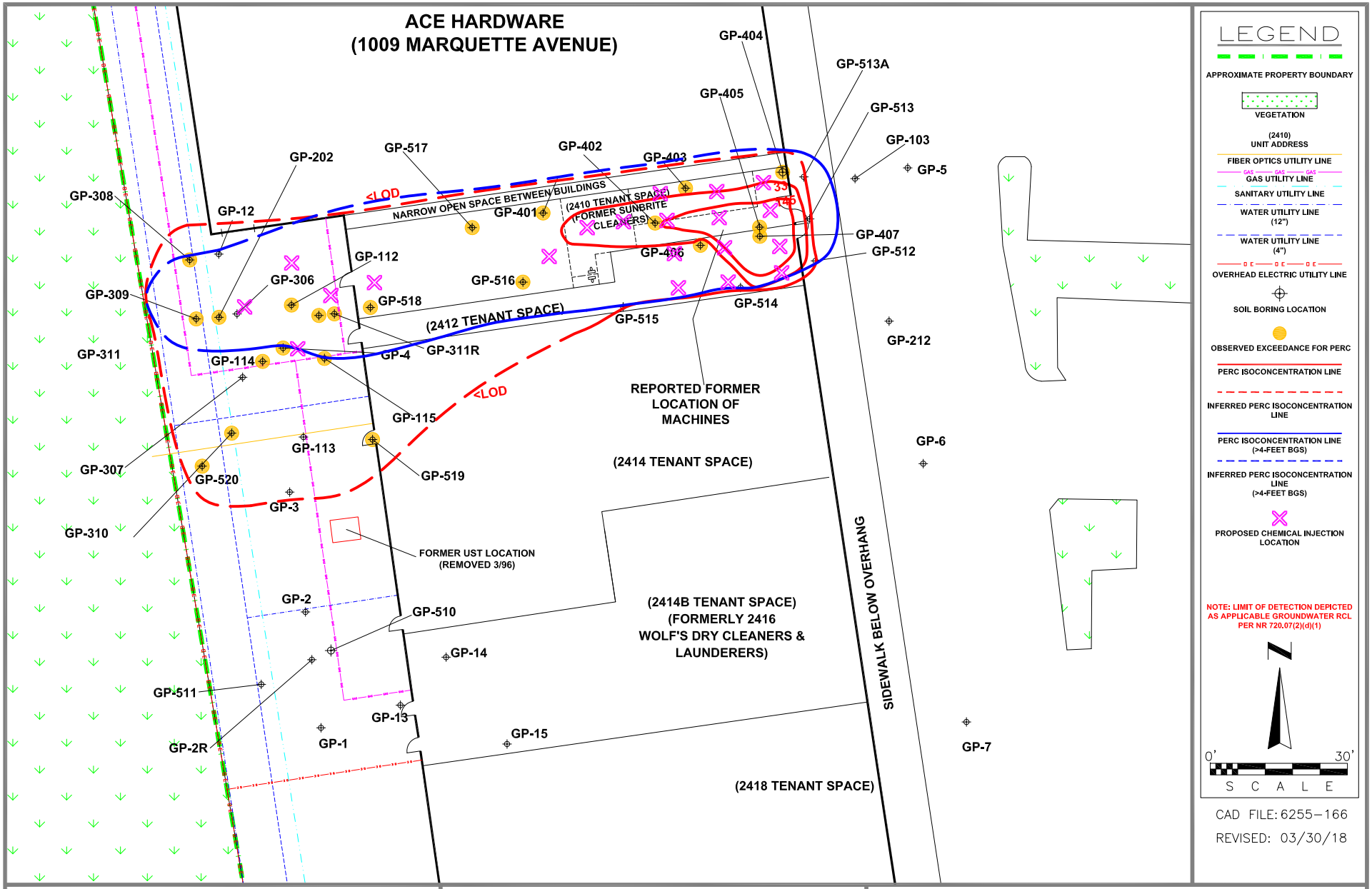
REVISED: 03/30/18

ENVIRONMENTAL DAI

SUNRISE SHOPPING CENTER
2410-2424 10TH AVENUE
1009 MARQUETTE AVENUE
SOUTH MILWAUKEE, WISCONSIN

FIGURE C.4.2
SUMP WATER TREATMENT DESIGN
AND PROCESS FLOW DIAGRAM

APPENDIX C.6.1
CHEMICAL INJECTION TREATMENT FIGURES



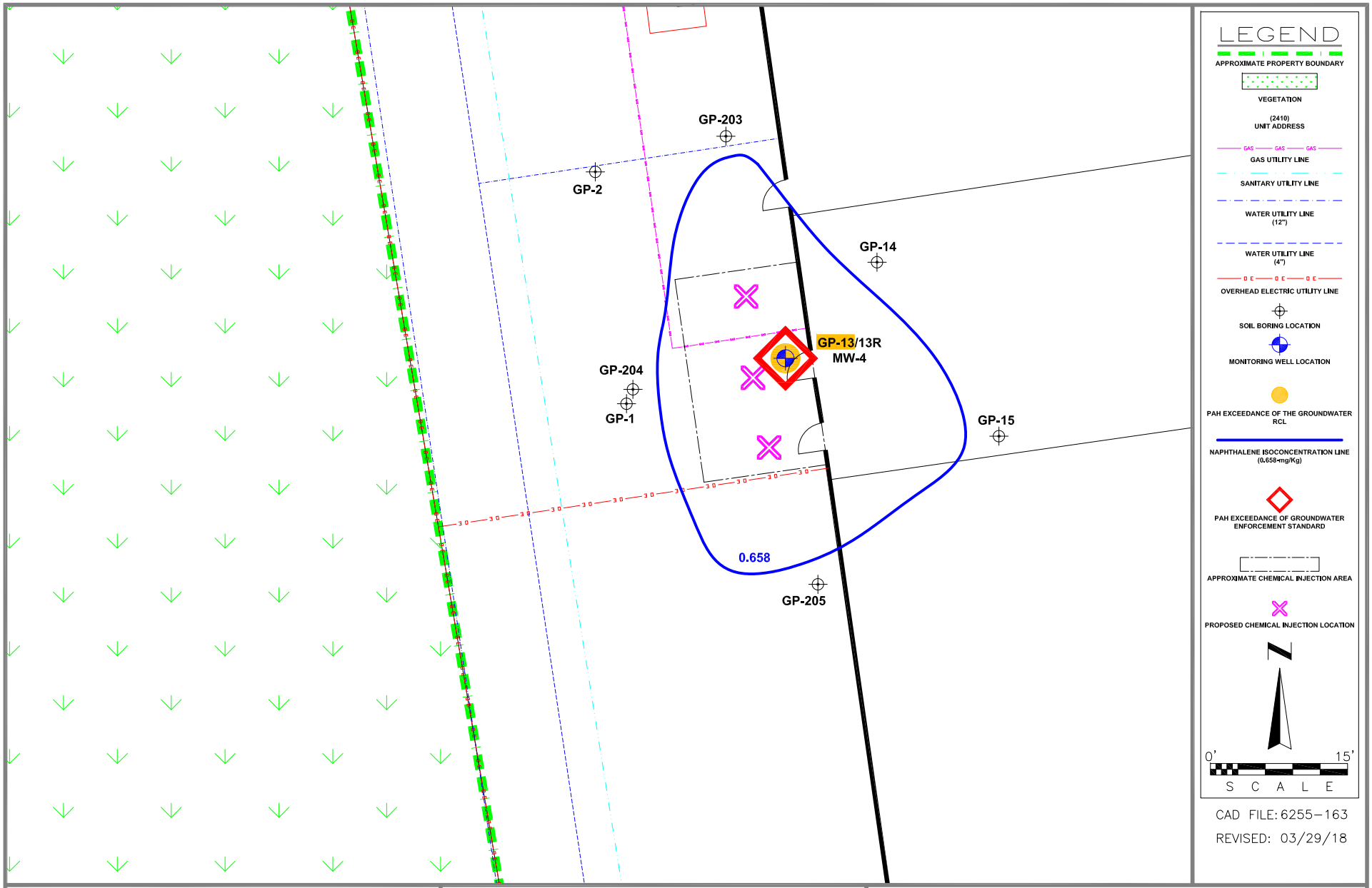
CAD FILE: 6255-166

REVISED: 03/30/18

ENVIRONMENTAL

SUNRISE SHOPPING CENTER
2410-2424 10TH AVENUE
1009 MARQUETTE AVENUE
SOUTH MILWAUKEE, WISCONSIN

FIGURE C.6.a
PROPOSED CHEMICAL INJECTION
(FORMER DRY CLEANER)



CAD FILE: 6255-163

REVISED: 03/29/18

DAI ENVIRONMENTAL

SUNRISE SHOPPING CENTER
2410-2424 10TH AVENUE
1009 MARQUETTE AVENUE
SOUTH MILWAUKEE, WISCONSIN

FIGURE C.6.b
PROPOSED CHEMICAL INJECTION
(FORMER HEATING OIL UST)

APPENDIX C.6.2
INVENTORY OF INJECTION WELLS

State of Wisconsin
Department of Natural Resources
PO Box 7921, Madison WI 53707-7921

Inventory of Injection Wells

Form 3300-253 (5/01)

This information is collected under the authority of the Safe Drinking Water Act.

Notice: Code of Federal Regulations (40 CFR 144.26 Inventory Requirements): owners or operators of all injection wells authorized by rule shall submit inventory information to an approved State Underground Injection Control Program. Personal information collected on this form will be used for inventory purposes. Information will be made accessible to requesters under Wisconsin's Open Records laws (s. 19.32 to 19.39, Wis. Stats.) and requirements.

Date Prepared (Year, Month, Day)	Facility ID Number	Transaction Type (Please check one of the following)
2018/03/30	241828620	☐ Deletion ☐ Entry Change ☒ First Time Entry ☐ Replacement

Facility Name and Location

Last Name	First	MI	Latitude: DEG MIN SEC	Longitude: DEG MIN SEC
Sunrise Shopping Center			N	W

Street Address / Route Number	Township	Range	Section	¼ Section
2410-2424 10th Avenue & 1009 Marquette Avenue	5 N	22 E	11	SE & SW

City / Town	State	ZIP Code	County	Tribal Land
South Milwaukee	WI	53172	Milwaukee	☐ Yes ☒ No

Legal Contact

Type	Last Name	First	MI	Telephone Number (incl. area code)
☒ Owner ☐ Operator	Dukatt	Steven		

Organization: Carol Investment Corporation

Street / P.O. Box: 1410 South Clinton Street

City / Town	State	ZIP Code
Chicago	IL	60607

Ownership

☒ Private ☐ County / Local Government
☐ State ☐ Federal
☐ Specify Other _____

Well Information

WELL CLASS	WELL TYPE	TOTAL NUMBER OF WELLS	WELL OPERATION STATUS				
			UC	AC	TA	PA	AN
V	see below	23	X				

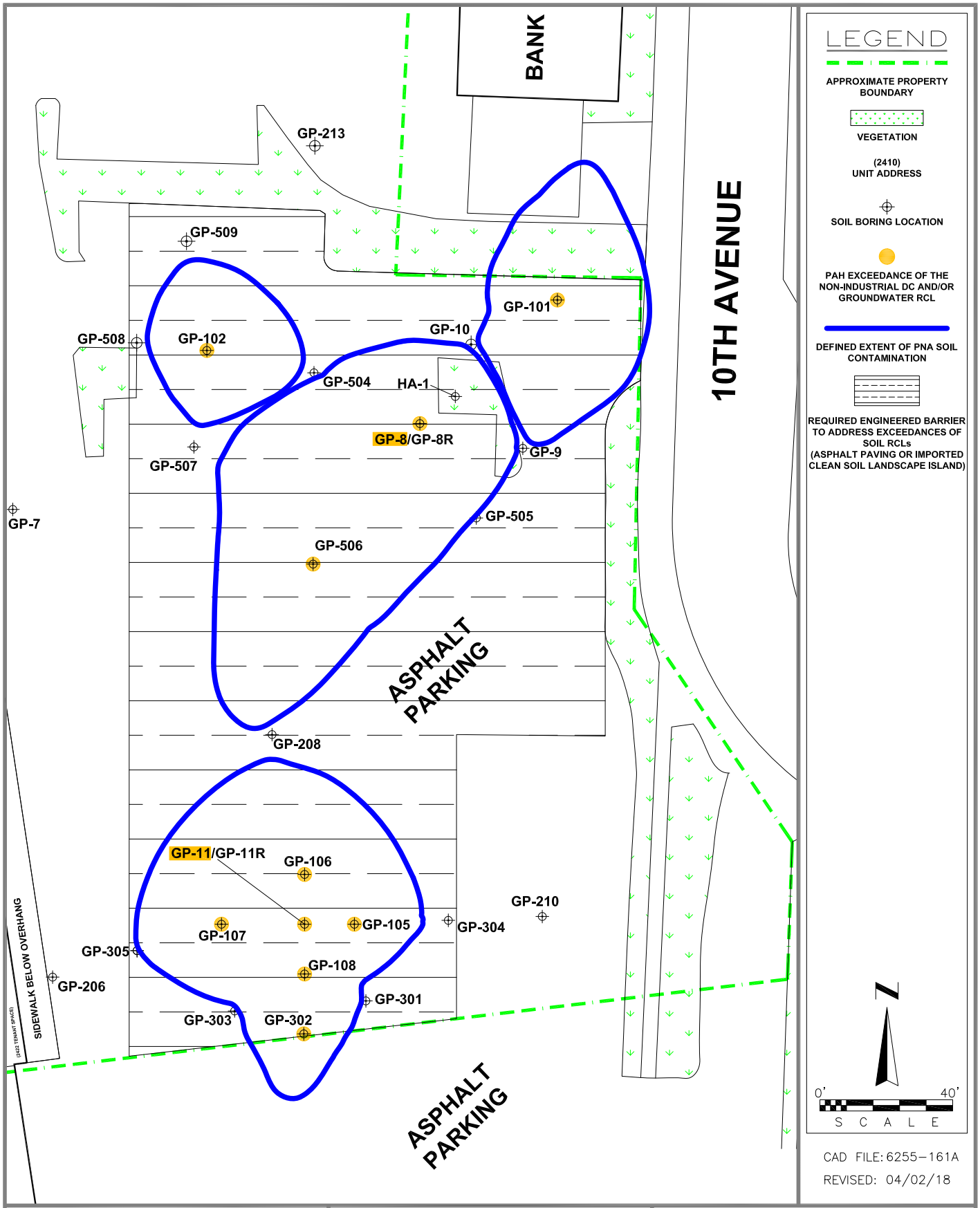
KEY:

DEG = Degree
MIN = Minute
SEC = Seconds
SECT = Section
¼ SECT = Quarter Section
AC = Active
UC = Under Construction
PA = Permanently Abandoned and Aproved by State
AN = Permanently Abandoned and Not Approved by State
TA = Temporarily Abandoned and Not Approved by State

Comments *(Optional)*:

The above injection wells are proposed to be utilized for injection of a chemical oxidant during soil and groundwater remediation activities. The wells will consist of injection through direct-push drilling rods or 1-in PVC wells. The exact number of injection points may be modified based upon the ability to deliver the appropriate volume of chemical into the subsurface.

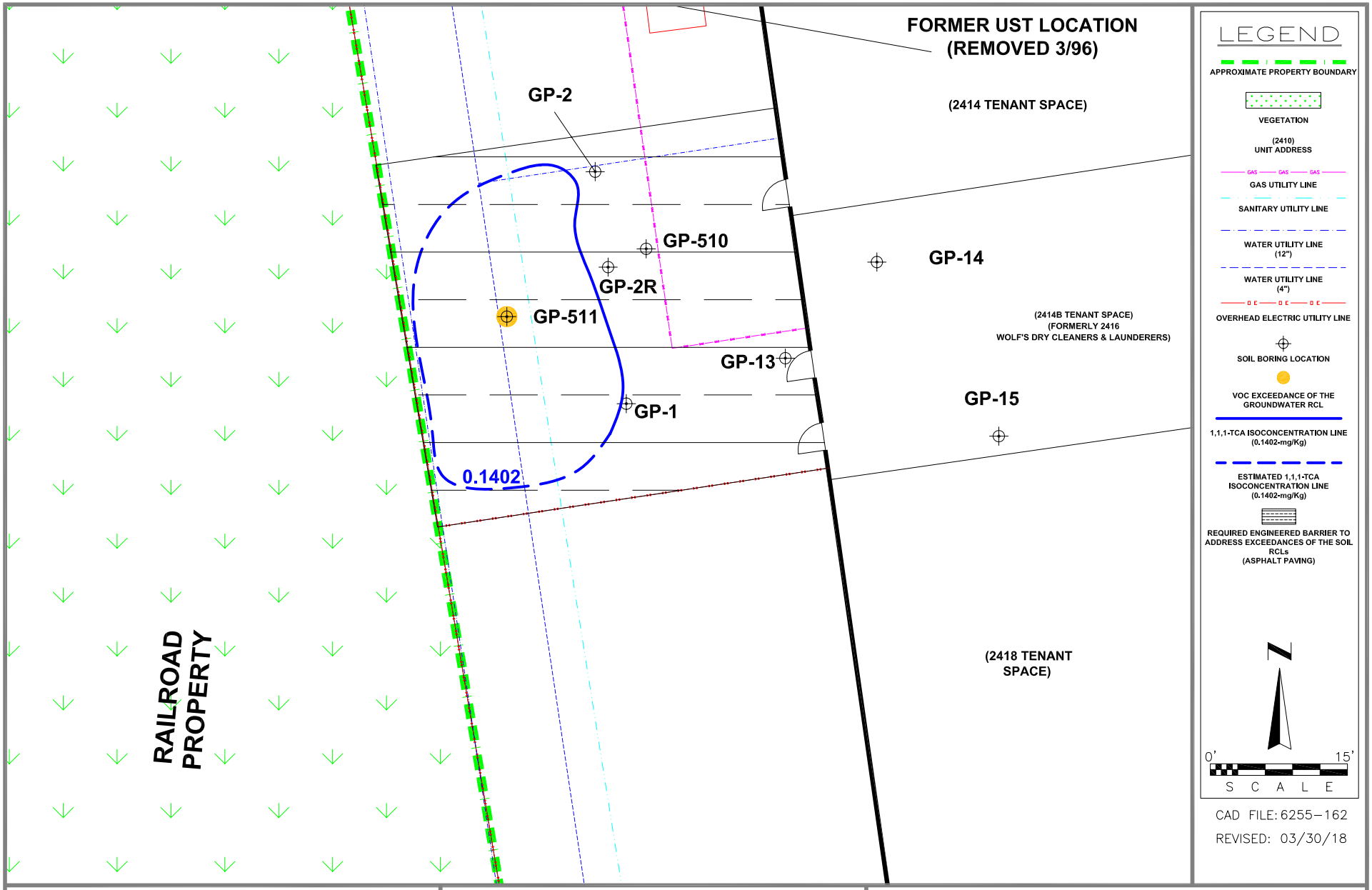
APPENDIX D
MAINTENANCE PLAN FIGURES



ENVIRONMENTAL DAI

SUNRISE SHOPPING CENTER
2410-2424 10TH AVENUE
1009 MARQUETTE AVENUE
SOUTH MILWAUKEE, WISCONSIN

FIGURE D.2.a
BARRIER LOCATION MAP
(SOUTH-CENTRAL AND CENTER/EAST-CENTRAL)



DAI ENVIRONMENTAL

SUNRISE SHOPPING CENTER
2410-2424 10TH AVENUE
1009 MARQUETTE AVENUE
SOUTH MILWAUKEE, WISCONSIN

FIGURE D.2.b
BARRIER LOCATION MAP
(WEST-CENTRAL PROPERTY BOUNDARY)