CORRECTIVE MEASURES WORK PLAN

NAPL REMEDIATION OPERATIONAL UNIT II – L4 NAPL AREA
HARMON RAILROAD YARD
WESTCHESTER COUNTY, NEW YORK
NYSDEC SITE NO. 3-60-010

Prepared For: Metro-North Railroad
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Project No.: 21-3590M

Date: August 2021

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APPENDICES

1.0 INTRODUCTION

This Corrective Measures Work Plan (CMWP), prepared by Day Engineering, P.C. (DAY) on behalf of Metro-North Railroad (MNR), describes methods proposed to augment the remedial actions that have been completed at Operational Unit (OU) II of the New York State Department of Environmental Conservation (NYSDEC) State Superfund Site No. 3-60-010 (i.e., designed Harmon Railroad Yard Waste Water Area), located at the MNR Harmon Railroad Yard facility in the Village of Croton-on-Hudson, Westchester County, New York (hereinafter referred to as "OUII"). A project locus map is presented as Figure 1.

OUII contains four Non-Aqueous Phase Liquid (NAPL) areas (designated L1 through L4) surrounding a former wastewater treatment equalization lagoon. The lagoon is the OUI component of NYSDEC Site No. 3-60-010. The combined OUI and OUII area comprises 5.087 acres. The OUI and OUII areas are located on the western-most portion of the MNR Harmon Railroad Yard and they are bound to the south by Croton Point Park (formerly the Croton Point Sanitary Landfill, a closed and capped solid waste landfill), to the west by an access road to the Half Moon Bay residential development followed by the Hudson River, to the north by Half Moon Bay residential development and to the east by the remainder of the Harmon Railroad Yard. The L4 NAPL Area is approximately 0.6 acres in size and located in the southeast quadrant of OUII.

Remedial actions have been completed at OUI and OUII, and a Site Management Plan (SMP) has been prepared and approved by the NYSDEC. As required by the SMP, monitoring and removal of NAPL from select locations within OUII is on-going. SMP status reports are submitted to the NYSDEC quarterly and Periodic Review Reports (PRR) are submitted to the NYSDEC every three years. These reports document the work completed, problems encountered and the status of the remediation. As documented in the SMP Status reports and PRR, NAPL is present in off-site wells (designated OUII-A, OUII-B, OUII-D and OUII-F) installed in proximity of the L4 NAPL Area. A Site Plan presenting the location of monitoring wells within the L4 NAPL Area and the off-site monitoring wells is included as Figure 2.

1.1 Purpose

The objective of the work described herein is to identify corrective measures pursuant to their implementation to address the off-site NAPL identified in the vicinity of OUII L4 NAPL Area.

1.2 Health and Safety Plan

A copy of the site-specific Health and Safety Plan (HASP), which includes the requirements for a Community Air Monitoring Program (CAMP), is included in Appendix A. These plans will be implemented during completion of CMWP activities, which have the potential to encounter/ release contaminants of concern.

1.3 Applicable Project Standards, Criteria and Guidance

Based on the contaminants identified at the Site and the NYSDEC requirements, the applicable Standards, Criteria and Guidance (SCG) values that will be used for this project are outlined below:

- Guidelines referenced in NYSDEC document titled “DER-10 Technical Guidance for Site Investigation and Remediation”, dated May 2010 (DER-10).

- NYSDEC Technical and Operational Series (TOGS) 1.1.1 document tilted “Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations”, updated 1998, 1999, 2000 and 2004.

- Soil Cleanup Objectives (SCO) and other guidance as set forth in 6 NYCRR Part 375-4 Environmental Restoration Program dated December 14, 2006.

- Solid waste characterization as set forth in 6 NYCRR Part 371.4(e) - Wastes Containing Polychlorinated Biphenyls (PCBs).

If applicable and required based on the remedial efforts required:

- Permit requirements for State Pollutant Elimination System (SPDES) permit NY0006866

- Industrial Wastewater discharge permit with Westchester County

2.0 BACKGROUND

This section describes previous studies and work completed at the Site relative to the proposed remedial activities described herein. In addition, a conceptual site model is presented based upon available information to assist in the determination of appropriate remedial actions.

2.1 Previous Studies

Various studies were undertaken to characterize the nature and extent of contamination at Site No. 3-60-010. The results of these studies are described in detail in the following reports:

- Remedial Investigation Report, Harmon Lagoon – Fred C. Hart Associates, Inc., November 27, 1989

- Remedial Investigation/Feasibility Study (RI/FS) Report, Harmon Railroad Yard Wastewater Treatment Area, Operable Unit II, NYSDEC Site No.: 3-60-010 – ERM-Northeast, January 24, 1997

The 1997 RI/FS report prepared by ERM-Northeast included the installation of temporary off-site monitoring wells downgradient of the L4 NAPL area. Five of the eight wells installed nearest OUII (i.e., designated OS-B through OS-F, located on the north side of the access road way between OUII and Croton Point Park) contained NAPL. However, the two temporary off-site wells located further to the west on the north side of the road way (i.e., designated OS-G and OS-H) and six temporary off-site wells located on the south side of the road way (i.e., designated OS-I through OS-M and OS-FS, located nearest to Croton Point Park) did not contain NAPL. A Site Plan that includes the location of the temporary monitoring wells installed as part of the studies completed for the RI/FS is included as Figure 3.

During monitoring completed in 2002, approximately 4 feet of NAPL was encountered in a monitoring well installed in the L4 NAPL area (i.e., PGW-2). In response, nine temporary wells (designated TW-1 through TW-9) were installed in proximity of PGW-2. NAPL was identified in temporary wells TW-5 and TW-6 (located in proximity of the fence that surrounds OUII) and in TW-7 (located to the east of PGW-2). However, NAPL was not detected in temporary wells TW-1, TW-2 or TW-3, located on the western side of the road way between OUII and the Croton Point Park. A memorandum prepared by ERM Northeast, dated March 14, 2002, which summarized the work completed concluded, *"The NAPL delineation activities indicate that the NAPL in the vicinity of PGW-2 is localized and does not appear to be contiguous with the L4 NAPL Area."* A Site Plan showing the location of PGW-2 and the temporary monitoring wells installed in proximity of PGW-2 is included as Figure 4.

2.2 Off-Site Monitoring Wells Installed in 2016

Based on the consistent presence of NAPL in several monitoring wells located in proximity of the southern boundary of OUII observed during periodic SMP monitoring events, and the presence of NAPL in the temporary off-site monitoring wells described above, the need for off-site monitoring wells was identified. The purpose of these off-site monitoring wells was to evaluate if NAPL was present away from the Site, and assess the need for additional remediation to preclude possible

migration. To this end, MNR met, and reached a consensus with, the adjacent property owner (i.e., Westchester County) on an access agreement to install off-site monitoring wells. Off-site monitoring wells (designated OUII-A through OUII-F) were installed between September 20, 2016 and September 22, 2016 (refer to Figure 2). These off-site monitoring wells are constructed of 1-inch inside diameter (ID) PVC well screens that extend from around elevation 10 ft. to -5 ft. above mean sea level (AMSL) (i.e., OUII-A through OUII-E), or around elevation 7 ft. to -8 ft. AMSL (i.e., OUII-F), connected to 1-inch ID solid PVC risers that extend to the ground surface.

During the weekly monitoring, conducted starting on October 1, 2016, free product has been observed in monitoring wells OUII-A, OUII-B, OUII-D, and OUII-F. [Note: NAPL was detected/measured in monitoring well OUII-C during only two of the 227 monitoring events conducted in the well since October 1, 2016. Further, the thickness of NAPL measured during both detections equaled 0.01 ft., which is the minimum measurement that the oil-water interface meter is capable of making. Thus, it is concluded that, if present, the trace amount of NAPL present in this well is not significant with respect to the corrective measures described here-in.] The thickness of NAPL observed in the off-site wells varied with changes in the static water level (i.e., increased amounts of NAPL were evident when the static water level decreased). The frequency at which NAPL was detected, as well as the thickness of the of NAPL observed, was greater in monitoring wells OUII-D and OUII-B than in monitoring wells OUII-A and OUII-F over this approximate 5-year period. To date, NAPL has not been observed in monitoring well OUII-E. Hydrographs prepared for data collected between October 1, 2016 and June 8, 2021 are included in Appendix B.

2.3 Croton Point Sanitary Landfill

Based on information contained in the March 1993 Record of Decision (ROD) prepared by the NYSDEC for State Superfund Site No. 3-60-001, an approximate 142-acre area located to the west and south of OUII, which is currently utilized as Croton Point Park, was formerly the Croton Point Sanitary Landfill (CPSL). This closed landfill, operated for nearly 60 years beginning in 1927, was the primary municipal waste landfill for Westchester County. The landfill is described as comprised of three units, of which the contiguous 96-acre "Original Fill Area" unit and the 18.5-acre "Ballfield Cell" unit make up NYSDEC Site No. 3-60-001.

NYSDEC Site No. 3-60-001 is located approximately 1,300 feet south/southwest of OUII NAPL Area L4, and monitoring wells and surface water sample locations associated with the landfill are located on the south side of the access road that separates the landfill and OUII (i.e., the nearest monitoring point is located about 1,400 feet southeast of the OUII property line). A Site Plan showing the approximate extent of the former CPSL and depicting the locations of NYSDEC Site No. 3-60-001 monitoring wells and surface water samples is included as Figure 5.

Test results (i.e., consisting of concentrations of metals, VOC and general chemistry parameters typical of landfill monitoring) from groundwater and surface water monitoring completed between April 1996 and September 2013 at the locations depicted on Figure 5 were obtained from the NYSDEC and reviewed for evidence of compounds/analytes that may indicate the presence of NAPL. The test results reviewed did not provide evidence of NAPL. Further, the monitoring locations were deemed to be generally hydrologically upgradient/cross gradient from the OUII area (refer to Section 2.4) and of sufficient distance from OUII that groundwater communication between the areas appears unlikely.

The third landfill unit, designated the "Railroad I" Unit is described in a summary of the operational history of the CPSL, (i.e., included in Section 1 of the Operation and Maintenance Plan for NYSDEC Site No. 3-60-001 prepared by Savin Engineers, P.C., dated July 10, 1996) as *"an 18-acre lined landfill with a combination synthetic top and clay-side liner and a leachate collection system…(which) operated from 1976 until 1982…(and) received only municipal solid waste"*. The Operation and Maintenance Plan states that the "Railroad I" Unit was constructed to provide interim solid waste management capacity. The ROD states that the Railroad I" Unit, "has already complied with closure requirements in place at the time it closed in the early 1980's." The "Railroad I" Unit is located adjacent to the south and west of OUII. To date, monitoring wells associated with the "Railroad I" Unit have not been identified.

2.4 Conceptual Site Model

The following description of the geology of the OUII area is a summary of information presented in Section 1.2.3.1 of the 1997 RI/FS report prepared by ERM-Northeast: *Croton Point is approximately two miles long and it extends south into the Hudson River. Harmon Yard and OUI/OUII are located on the northwestern edge of the Croton Point peninsula (refer to Figure 1 and Figure 5). The geologic origin of Croton Point dates back 10,000 years to a river delta comprised of sediments of sand, silt and clay that were deposited in a post-glacial lake. The stratigraphy of the peninsula consists of bedrock overlain by lacustrine silts and clays, deltaic silts and clays and deltaic sands. These soils are typical of those developed by glacial outwash. Historic sand hills up to 60 feet high once occupied the peninsula and these hills were removed over time by mining operations and to prepare the Site and Harmon Yard for railroad operations. The soils encountered during RI/FS drilling activities were uniform across the Site. The soils consist primarily of brown very fine to coarse sands and gravels. Bedrock was not encountered RI/FS drilling activities, which extended to a maximum of approximately 16 feet below grade. Based on test boring data reported by others, the depth to bedrock is thought to exceed 200 feet in the vicinity of OUII.*

A sheeting wall was installed around the perimeter of the OUI Area as part of the remedial actions completed in 1995 to address subsurface impacts. The sheeting consists of approximately 1,400 linear feet of continuous Z-type interlocking sheet pile installed starting just below the asphalt pavement to a depth of approximately 16 ft. below the asphalt pavement (i.e., around elevation 3 ft. AMSL). Two continuous layers of 40 mil HDPE geomembrane (i.e., located around elevation 9 ft AMSL and around 17 ft AMSL) are installed in the backfill (i.e., between soil layers) within the perimeter of the sheeting wall. The OUI area is capped by asphalt pavement, creating a horizontal and vertical barrier to migration of fluids (e.g., NAPL, stormwater infiltration, groundwater migration, etc.) through the OUI area.

The 1994 Stipulation of Discontinuance for NYSDEC Site No. Site No.: 3-60-010 defines the NAPL component of OUII (i.e., NAPL Areas L1 through L4) as the separate hydrocarbon layer resulting from past releases from the former wastewater equalization lagoon, which is present on the water table surface and extends hydrologically downgradient of the lagoon (i.e., OUI). Although these four areas are located around the former lagoon, they were all considered to be downgradient of the lagoon, due to the radial ground water flow patterns that existed during the operation of the lagoon (i.e., prior to the installation of the sheeting wall and the cap construction completed to

address OUI impacts). However, following the closure of OUI measurement of groundwater elevations made for the 1997 RI/FS indicated that the direction of groundwater flow across the OUII area was generally toward the northwest, and that the direction of groundwater flow across the L4 NAPL Area was toward the former lagoon. The 1997 RI/FS report concluded, "*NAPL (in the L4 NAPL Area) probably moved (southeast) in response to hydraulic influences when the former lagoon was open. Now that the former lagoon is closed, to the extent NAPL can migrate, the direction would be toward the northwest.*"

Measurements of groundwater elevations made at approximate 3-month intervals in select monitoring/recovery wells located within the OUII boundary since August 2012 (and in the off-site wells since May 2017) are used to develop potentiometric groundwater contour maps for the quarterly SMP Status Reports. The potentiometric groundwater contours indicate that a groundwater flow divide is generally present, trending northwest to southeast between the L2 NAPL Area and the northwest portion of the L4 NAPL Area, with the direction of groundwater flow perpendicular to the divide (i.e., northeast toward the L3 NAPL Area and southwest toward OUI). Groundwater flow on the western portion of OUII is generally to the north-northwest (i.e., from the western portion of the L4 NAPL Area toward the L1 NAPL Area). Groundwater flow across the central portion of the L4 NAPL Area (i.e., in the vicinity of off-site wells OUII-A through OUII-D) is generally toward the northwest (i.e., toward OUI). Copies of the potentiometric groundwater contour maps prepared for the Quarterly SMP Status Reports are presented as Appendix C.

Based on the information provided above, it is concluded that the NAPL which is present in the off-site area located to the southeast of the L4 NAPL Area (i.e., as identified in off-site monitoring wells OUII-A, OUII-B and OUII-D) is unlikely to migrate further to the southeast against the groundwater gradient. Further, the NAPL present in this off-site area, and extending northwest toward the OUI sheeting wall, appears to be impeded from migrating in the direction of groundwater flow (i.e., northwest) by the OUI sheeting wall. Additionally, NAPL has not been identified in off-site monitoring wells located to the west-southwest of the L4 NAPL Area between OUII-D and OUII-F (i.e., the current off-site monitoring well OUII-E and temporary monitoring wells OS-G and OS-H installed for the 1997 RI/FS), indicating that NAPL is not migrating off-site in this direction the from L4 NAPL Area. [Note: As outlined in Section 2.1. the NAPL identified in the PGW-2/OUII-F area was determined to be localized. Monitoring data from the delineation monitoring wells proposed in Section 3.2 will be used to confirm that NAPL is not migrating off-site toward the west-southwest from the L4 NAPL Area.]

3.0 PROPOSED CORRECTIVE MEASURES

This section describes the currently anticipated corrective measures proposed to address the NAPL identified in off-site well locations (i.e., OUII-A, OUII-B, OUII D and OUII-F). This work will be completed in general accordance with provisions and guidance outlined in NYSDEC DER-10, and will include regular communication with the NYSDEC and submittal of status reports.

3.1 Access Agreement

Permission to conduct the corrective measures described below on property that is adjacent to west of OUII will be requested from the property owner (i.e., Westchester County). Completion of the proposed corrective measures will be contingent on an access agreement between MNR and the property owner.

3.2 NAPL Delineation – OUII-F and PGW-2 Area

As summarized in Section 2.1, NAPL was identified in monitoring well PGW-2 and in temporary monitoring wells TW-5 and TW-6 (i.e., installed approximately 20 ft. to the northwest and 20 ft. to southwest of monitoring well PGW-2) during a study completed in 2002. Further, NAPL has generally been present in monitoring well PGW-2 since 2014 (i.e., based on weekly measurements made in the monitoring well starting in July 2014) and in off-site monitoring well OUII-F (i.e., installed in the vicinity of temporary well TW-6) since weekly NAPL measurement commenced at this location in October 2016. The vicinity of PGW-2/OUII-F was not historically identified as a NAPL area and further work is necessary to delineate the current extent of NAPL in this area. [Note: A relatively small amount of NAPL has been occasionally detected during quarterly measurements made in the monitoring wells located in the vicinity of monitoring well PGW-2 (i.e., monitoring well DAY-1, located around 50 ft. to the northeast of monitoring well PGW-2 and monitoring well VE4-1, located around 100 ft. to the east of monitoring well PGW-2.)]

It is anticipated that four monitoring wells will be installed in the vicinity of PGW-2 and OUII-F for the purpose of delineating the extent of NAPL in this area. These monitoring wells will be installed in the approximate locations shown on Figure 6. If possible, these monitoring wells will be installed using a two-inch (ID), schedule 40 PVC casing and screen materials within test borings advanced approximately 20 ft. below the ground surface (i.e., around elevation -10 ft. AMSL). The screened section of the LNAPL monitoring wells will consist of a 15-foot-long section of No. 10 slot screen placed to intercept the top of the groundwater table. The annulus around the well screen will be filled with a washed and graded silica sand pack that will be placed at least one foot above the top of the screen interval. A minimum one-foot thick bentonite seal will be placed above the sand pack and hydrated with potable water. Following hydration of the bentonite, the remaining annulus will be filled with cement/bentonite grout to approximately one foot below grade. A curb box with locking cap will be placed over each well. In the event a drill rig of sufficient size to install 2-inch monitoring wells cannot access the drilling locations, 1-inch diameter monitoring wells will be installed.

Each monitoring well will be developed and subsequently evaluated for the presence of NAPL. It is anticipated the NAPL evaluations will be conducted on a weekly basis (i.e., completed in conjunction with the monitoring currently completed in the existing off-site wells). Following an initial evaluation period of 12 weeks, the data collected will be reviewed to determine if additional monitoring wells are needed to delineate the extent of NAPL in the vicinity of PGW-2 and OUII-F, or (if after this evaluation period it is determined that these wells have adequately delineated the extent of NAPL in the vicinity of PGW-2 and OUII-F), the data will be used to select location(s) for the installation of one or more NAPL recovery wells (refer to Section 3.3). The NYSDEC will be consulted prior to the installation of additional (delineation) monitoring wells, or NAPL recovery well(s) in this area.

3.3 Installation of NAPL Recovery Wells

It is proposed that recovery wells be installed for the purpose of removing NAPL from the off-site areas in the vicinity of off-site monitoring wells OUII-A/OUII-B, OUII-D and OUII-F. The locations proposed to install recovery wells in the vicinity of monitoring wells OUII-A/OUII-B and OUII-D are depicted on Figure 7. As outlined in Section 3.2, the location(s) for installation of recovery well(s) in the PGW-2/OUII-F will be determined following further delineation of NAPL in this area. Each recovery well will be installed using a four-inch or six-inch ID, schedule 40 PVC casing and screen materials (i.e., depending on the capability of the drilling equipment that can access these locations) within test borings advanced approximately 20 ft. below the ground surface (i.e., around elevations -5 to -10 ft. AMSL). The screened section of the LNAPL monitoring wells will consist of a 15-foot-long section of No. 10 slot screen placed to intercept the top of the groundwater table. The annulus around the well screen will be filled with a washed and graded silica sand pack that will be placed at least one foot above the top of the screen interval. A minimum one-foot thick bentonite seal will be placed above the sand pack and hydrated with potable water. Following hydration of the bentonite, the remaining annulus will be filled with cement/bentonite grout to approximately one foot below grade. A curb box with locking cap will be placed over each well.

Each recovery well will be developed and subsequently evaluated for the presence of NAPL.

3.4 NAPL Recovery

Following installation and development of the recovery wells described in Section 3.3, NAPL removal procedures will be implemented. This will likely include a combination of recovery techniques that would include the placement of a Magnum Spill Buster^{TM}, and the use of bailers, and/or a Spill Buddy^{TM} in the newly installed recovery wells. The Spill Buddy^{TM} and Magnum Spill Buster^{TM} are automated devices designed to systematically pump only petroleum that accumulates on the groundwater surface. Specifications for the Spill Buddy^{TM} and Magnum Spill Buster^{TM} recovery systems are included as Appendix D. During each monitoring event, the recovery procedures will be adjusted as necessary (e.g., varying the pumping rates, altering the frequency of free product collection, etc.) to maximize the amount of free product that can be collected.

Weekly site visits using an electronic oil/water interface meter to measure the depth to groundwater and NAPL thickness (if any) in the off-site monitoring wells (i.e., OUII-A through OUII-F and the NAPL delineation monitoring wells proposed in Section 3.2) will be completed

to assess the effectiveness of the NAPL removal efforts. In addition, the amount of free product removed from the newly installed recovery wells using the Spill Buddy™, Spill Buster™, and/or bailers will also be recorded during each site visit. The monitoring schedule may be adjusted on an as-needed basis (i.e., conducted more frequently or less frequently) depending on the data collected during the routine monitoring. The recovered NAPL will be containerized in NYSDOT-approved 55-gallon drums that are labeled and staged on-site for future disposal.

3.5 Contingency Measures

It is anticipated that the corrective measures proposed above will be effective to address the NAPL that has been identified in the OUII off-site monitoring wells. However, should future monitoring results indicate that a sufficient quantity of NAPL cannot be removed in the OUII off-site monitoring wells, additional corrective measures may be warranted. These measures may include:

- installation of additional recovery wells in off-site locations;
- dewatering in one or more recovery wells using an auxiliary water depression control module in conjunction with the Magnum Spill Buster™ to create a localized cone of depression in the groundwater table (refer to Appendix D); and/or;
- installation of a NAPL collection trench along portions of the perimeter of the OUII L4 NAPL area/fence line.

The NYSDEC would be consulted and additional work plan(s) would be prepared prior to implementation of any contingency measures.

4.0 SCHEDULE AND DELIVERABLES

The proposed corrective measure schedule and deliverables for the activities described in this CMWP are as follows:

4.1 Schedule

Task	Anticipated Duration	Anticipated or Actual Completion/Submission Date
3.1 - Access agreement for off-site corrective measures	**6 months**	
3.2 - NAPL Delineation – OUII-F and PGW-2 Area		
Installation and development of monitoring wells	2 weeks	Within 6 weeks of Access Agreement
Initial NAPL monitoring in newly installed wells (weekly)	12 weeks	To commence 4 weeks following well development
Evaluation of data, recommendation for additional delineation	4 weeks	Within 24 weeks of Access Agreement
3.3 - Installation of NAPL Recovery Wells		
Installation and development of recovery wells in the vicinity of off-site monitoring well OUII-A/B and OUII-D	1 week	Within 6 weeks of Access Agreement
Installation and development of recovery well(s) in the OUII-F and PGW-2 Area	1 week	TBD
3.4 - NAPL Recovery		
Initiate NAPL monitoring and recovery efforts in newly installed recovery wells in the vicinity of off-site monitoring well OUII-A/B and OUII-D	TBD	Within 10 weeks of Access Agreement
Initiate NAPL monitoring and recovery efforts in newly installed recovery well(s) in the OUII-F and PGW-2 Area	TBD	TBD
3.5 – Contingency Measures	NA	As necessary

4.2 Status Reports

The status of the access agreement and subsequently the status of the corrective measures proposed in Section 3.2 through Section 3.4 will be summarized in the quarterly Site Management Plan Status Reports which are prepared for Site No. 3-60-010. The next Site Management Plan Status Report will be submitted for the reporting period July 1, 2021 through September 30, 2021 on, or about, October 31, 2021.

FIGURES

Last Date Saved: 08 Feb 2016 Document Path: D:\GIS\Aerial Locus Maps\MNR\Harmon Yard - Monitoring Report Locus Map.mxd

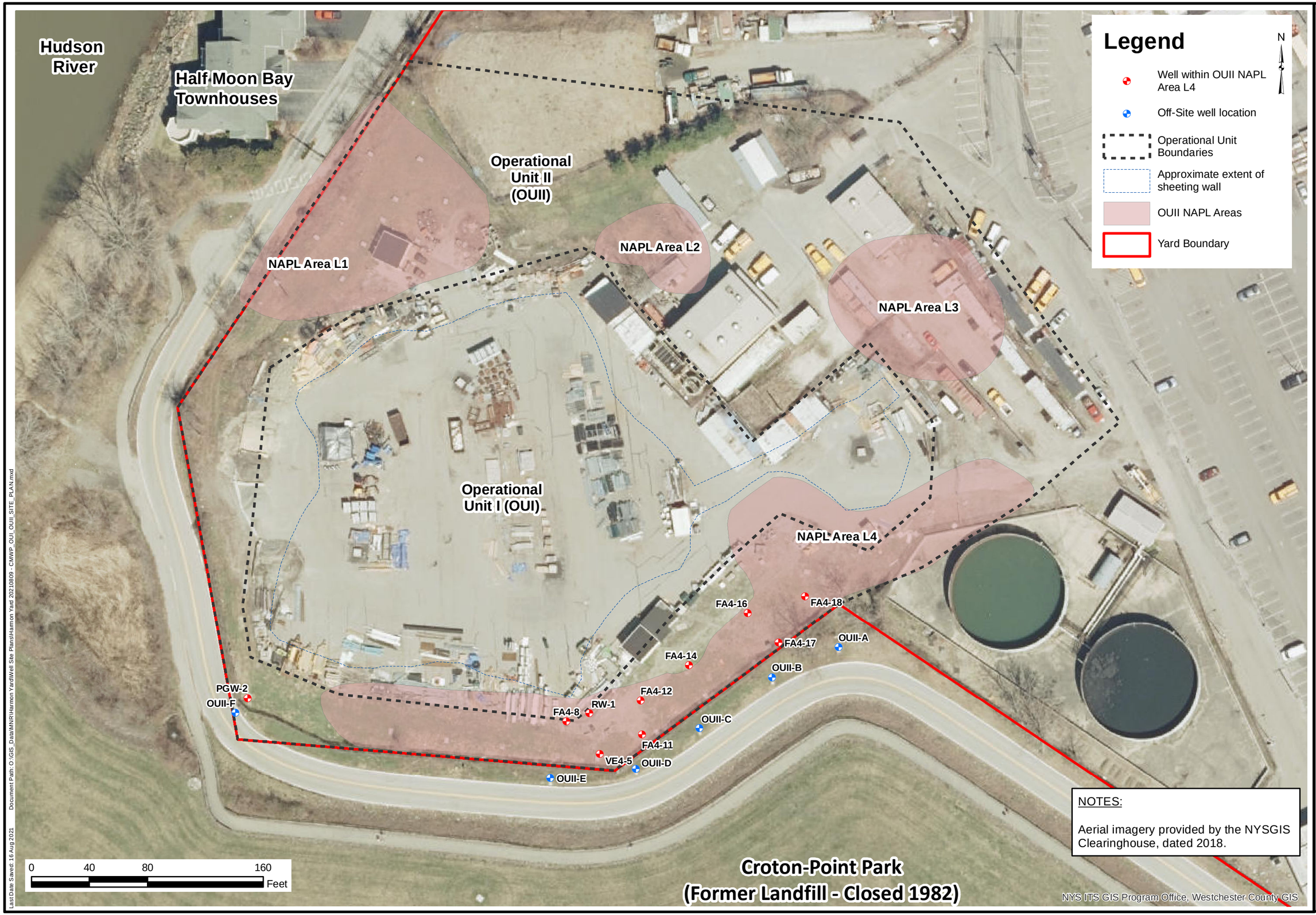
NOTE:

Topo imagery provided by ESRI Online Services and USGS 7.5 Minute Quad of Haverstraw, NY, dated 2010.

Site Coordinates are in Decimal Degrees:

73° 53' 9.72" W 41° 11' 28.64" N

Date: 08-18-2021 Drawn By: CAH Scale: AS NOTED	day **DAY ENVIRONMENTAL, INC.** **Environmental Consultants** **Rochester, New York 14614-1008** **New York, New York 10016-0710**	Project Title: METRO-NORTH RAILROAD HARMON YARD CROTON-ON-HUDSON, NEW YORK NYSDEC SITE #360010 Drawing Title: Project Locus Map	Project No. 21-3590M (007) FIGURE 1



NOTES:

Aerial imagery provided by the NYSGIS Clearinghouse, dated 2018.

Last Date Saved: 16 Aug 2021 Document Path: O:\GIS_Data\MNR\Harmon Yard\Well Site Plans\Hamon Yard 20210809 - CMWP_OU_OUII_SITE_PLAN.mxd

PROJECT MANAGER	RLK
DATE	08-2021
DRAWN BY	CAH
DATE DRAWN	08-2021
SCALE	As Noted
DATE ISSUED	08-10-2021

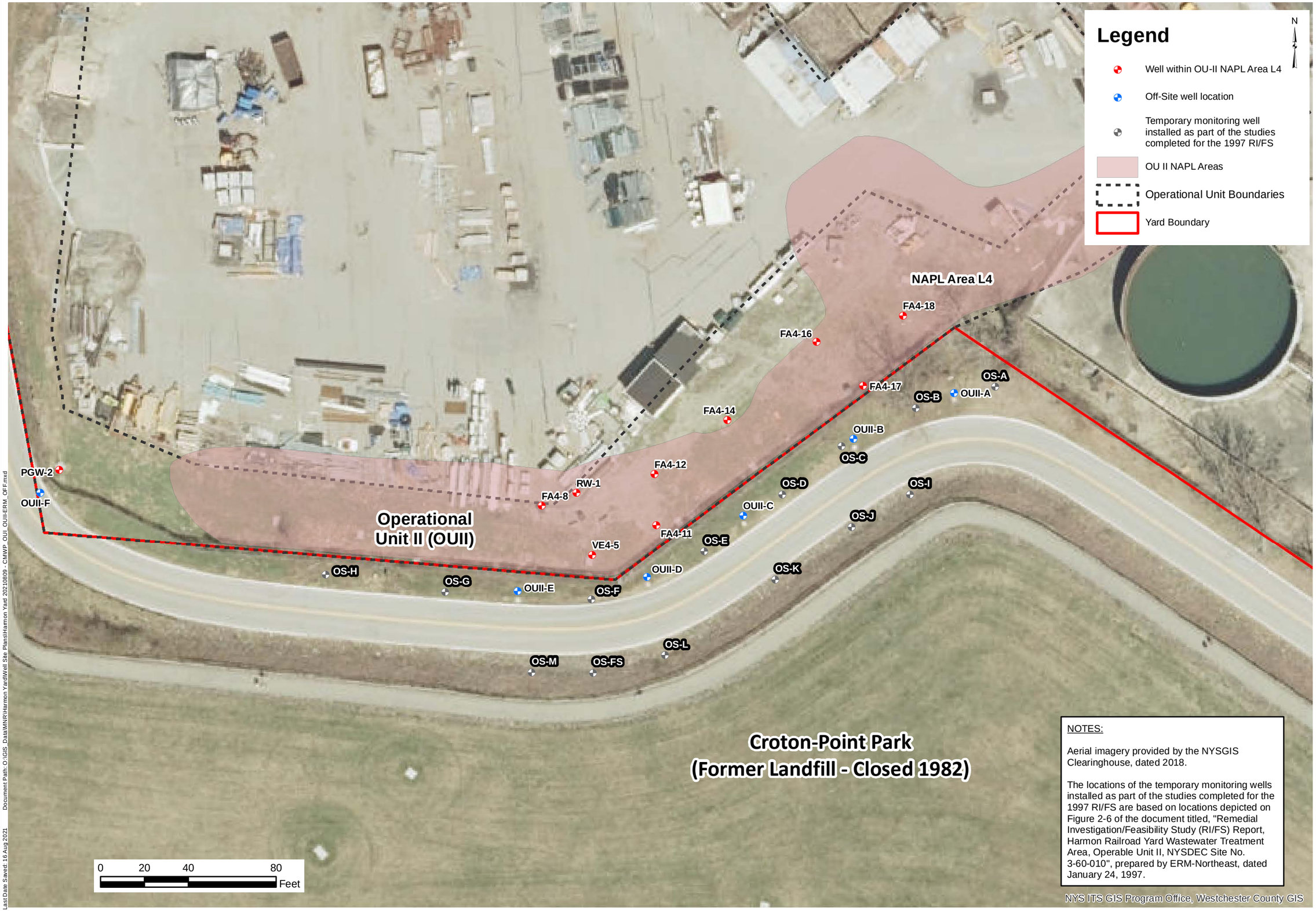
day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OUI AND OUII
CROTON-ON-HUDSON, NEW YORK
NYSDEC SITE NO 360010

Drawing Title
OUI & OUII Site Plan

Project No.
21-3590M (007)

FIGURE 2



NOTES:

Aerial imagery provided by the NYSGIS Clearinghouse, dated 2018.

The locations of the temporary monitoring wells installed as part of the studies completed for the 1997 RI/FS are based on locations depicted on Figure 2-6 of the document titled, "Remedial Investigation/Feasibility Study (RI/FS) Report, Harmon Railroad Yard Wastewater Treatment Area, Operable Unit II, NYSDEC Site No. 3-60-010", prepared by ERM-Northeast, dated January 24, 1997.

PROJECT MANAGER	DRAWN BY	SCALE	DATE
RLK	CAH	As Noted	08-2021

DATE	DATE DRAWN	DATE ISSUED
08-2021	08-2021	08-10-2021

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OUI AND OUII
CROTON-ON-HUDSON, NEW YORK
NYSDEC SITE NO 360010

Drawing Title
Site Plan Depicting Former Locations of Temporary Monitoring Wells, Installed for RI/FS Studies

Project No.
21-3590M (007)

FIGURE 3

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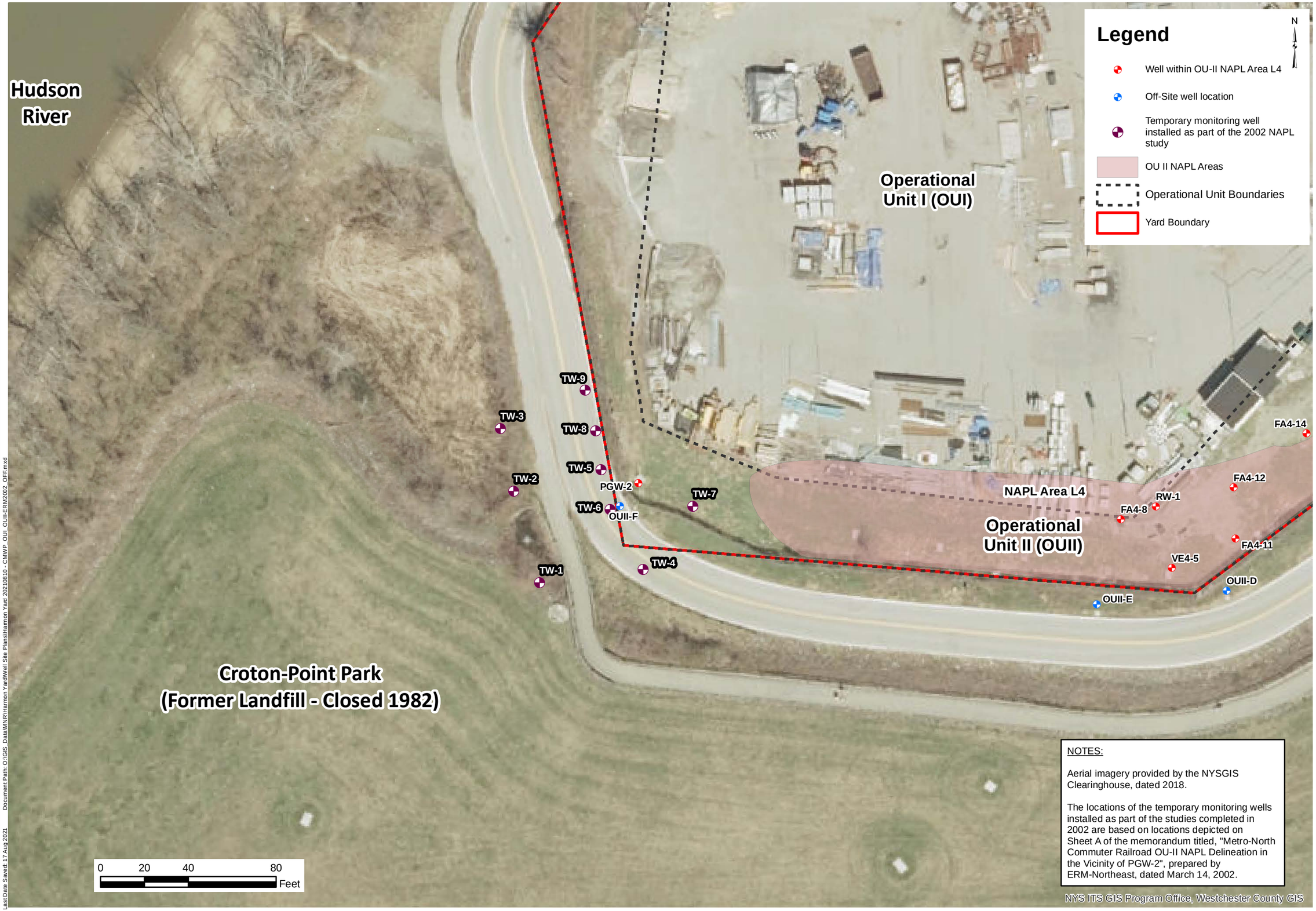


Legend

- Well within OU-II NAPL Area L4
- Off-Site well location
- Temporary monitoring well installed as part of the 2002 NAPL study
- OU II NAPL Areas
- Operational Unit Boundaries
- Yard Boundary

NOTES:

Aerial imagery provided by the NYSGIS Clearinghouse, dated 2018.

The locations of the temporary monitoring wells installed as part of the studies completed in 2002 are based on locations depicted on Sheet A of the memorandum titled, "Metro-North Commuter Railroad OU-II NAPL Delineation in the Vicinity of PGW-2", prepared by ERM-Northeast, dated March 14, 2002.

NYS ITS GIS Program Office, Westchester County GIS

PROJECT MANAGER	RLK	DRAWN BY	CAH	SCALE	As Noted
DATE	08-2021	DATE DRAWN	08-2021	DATE ISSUED	08-10-2021

DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OUI AND OUII
CROTON-ON-HUDSON, NEW YORK
NYSDEC SITE NO 360010

Drawing Title
Site Plan Depicting Former Locations of Temporary Monitoring Wells, Installed for 2002 NAPL Study

Project No.
21-3590M (007)

FIGURE 4

Last Date Saved: 17 Aug 2021 Document Path: O:\GIS_Data\MNR\Harmon Yard\Well Site Plans\Harmon Yard 20210810 - CMMP_OU_OUII\ERM2002_QPF.mxd

Last Date Saved: 19 Aug 2021 Document Path: O:\GIS_Data\MNR\Harmon Yard\Well Site Plans\Harmon Yard 20210804 - Off-Site_OUII.mxd

PROJECT MANAGER	RLK
DRAWN BY	CAH
SCALE	As Noted
DATE	08-2021
DATE DRAWN	03-2018
DATE ISSUED	08-10-2021

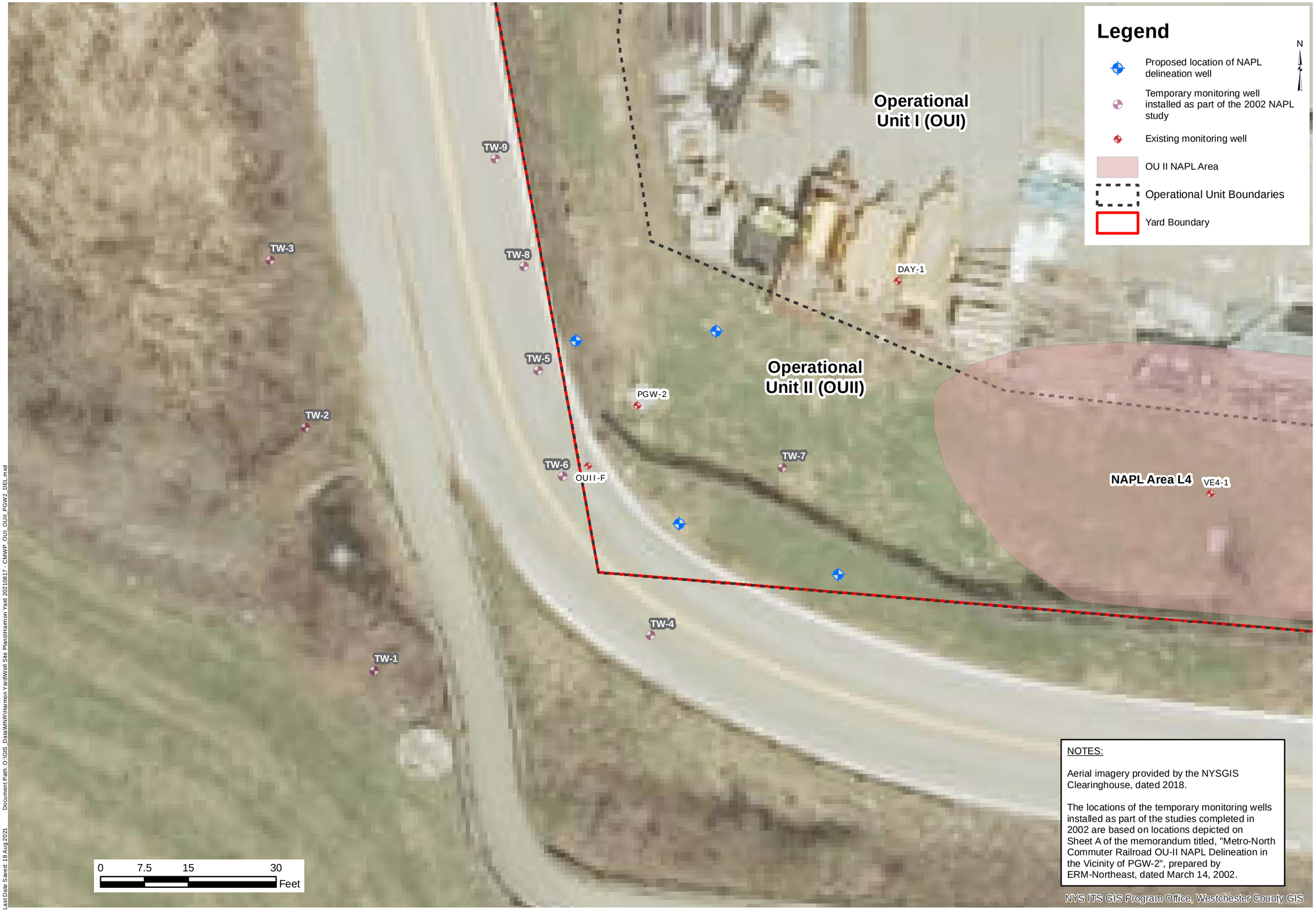
day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OUI AND OUII
CROTON-ON-HUDSON, NEW YORK
NYSDEC SITE NO 360010

Drawing Title
Former Croton Point Sanitary Landfill (CPSL)
Extent and Monitoring Locations

Project No.
21-3590M (007)

FIGURE 5



Last Date Saved: 18 Aug 2021 Document Path: O:\GIS_Data\MNR\Harmon Yard\Well Site Plans\Harmon Yard 20210817 - CMWP_OUI_OUII_PGW2_DEL.mxd

PROJECT MANAGER	DRAWN BY	SCALE	DATE	DATE DRAWN	DATE ISSUED
RLK	CAH	As Noted	08-2021	08-2021	08-17-2021

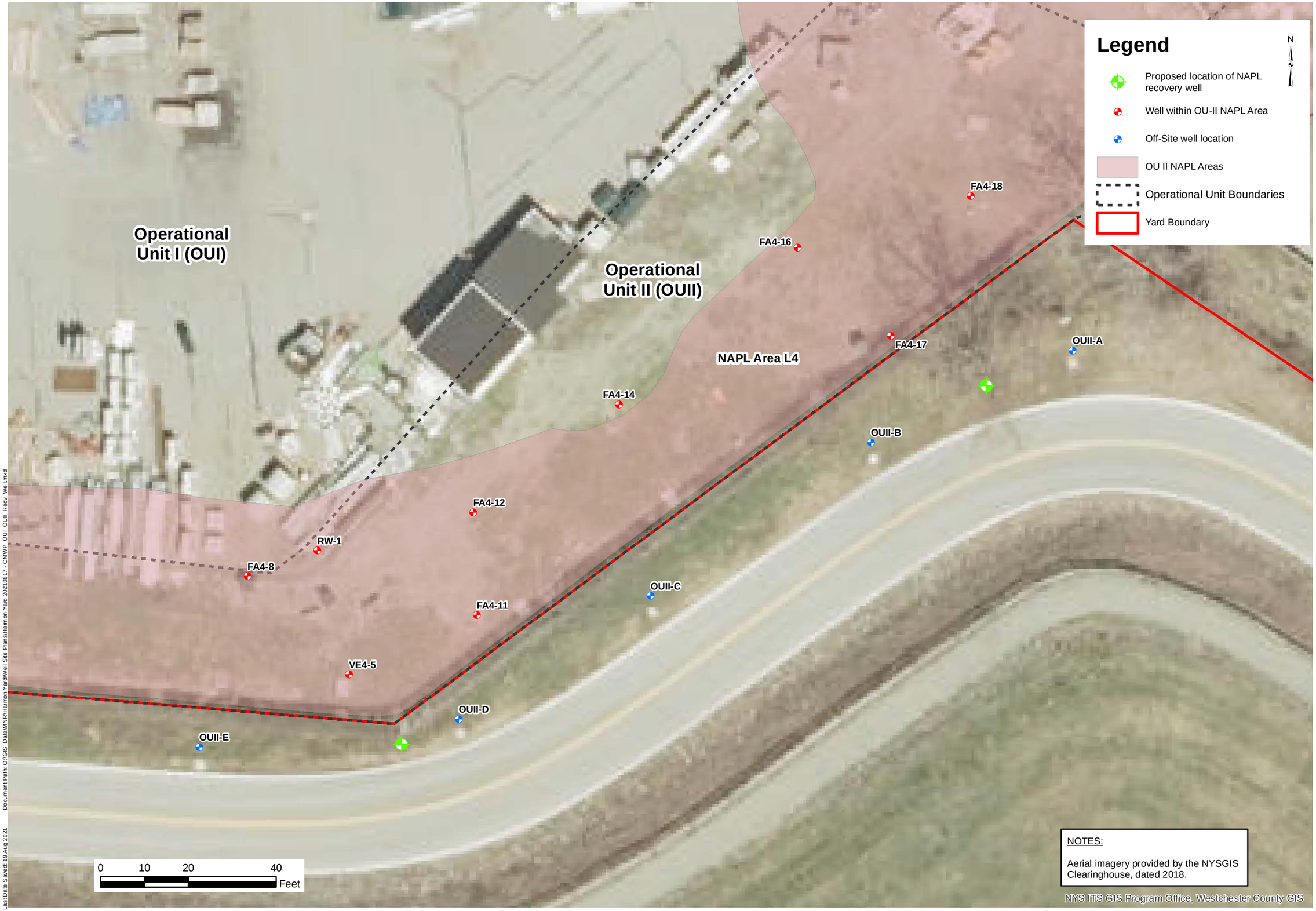
day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OUI AND OUII
CROTON-ON-HUDSON, NEW YORK
NYSDEC SITE NO 360010

Drawing Title
Proposed NAPL Delineation Monitoring Wells PGW-2/OUII-F Area

Project No.
21-3590M (007)

FIGURE 6



Last Date Saved: 19 Aug 2021 Document Path: O:\GIS_Data\MNR\Harmon Yard\Well Site Plans\Harmon Yard 20210817 - CMWP_OU_OUII_OUI_Recv_Well.mxd

PROJECT MANAGER	RLK
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SCALE	As Noted
DATE ISSUED	08-18-2021

day
DAY ENGINEERING, P.C.
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ROCHESTER, NEW YORK 14606

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OUI AND OUII
CROTON-ON-HUDSON, NEW YORK
NYSDEC SITE NO 360010

Drawing Title
Proposed NAPL Recovery Wells

Project No.
21-3590M (007)

FIGURE 7

APPENDIX A

HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN

HARMON YARD
OPERABLE UNIT II
VACUUM ENHANCED NAPL RECOVERY
METRO-NORTH RAILROAD

Prepared for: Metro-North Railroad
347 Madison Avenue, 12th floor
New York, New York 10017

Prepared by: Day Engineering, P.C.
40 Commercial Street
Rochester, New York 14614

Project No.: PC.2648I-01 (90)

Date: July 2003

Revisions: December 2003
February 2004
January 2011

I have read the Health and Safety Plan (HASP), "Harmon Yard, Operable Unit II, Vacuum Enhanced NAPL Recover, Metro-North Railroad."

I agree to conduct all on-site work in accordance with the requirements set forth in this HASP and understand that failure to comply with this HASP could lead to my removal from this site.

Print Name: _____ Company: _____

Signed: _____ Date: _____

Print Name: _____ Company: _____

Signed: _____ Date: _____

Print Name: _____ Company: _____

Signed: _____ Date: _____

Print Name: _____ Company: _____

Signed: _____ Date: _____

Print Name: _____ Company: _____

Signed: _____ Date: _____

Print Name: _____ Company: _____

Signed: _____ Date: _____

Print Name: _____ Company: _____

Signed: _____ Date: _____

Print Name: _____ Company: _____

Signed: _____ Date: _____

TABLE OF CONTENTS

ATTACHMENTS

1.0 INTRODUCTION

This Health and Safety Plan (HASP) outlines the policies and procedures to protect workers and the public from potential environmental hazards posed during vacuum enhanced NAPL recovery operation and maintenance (O & M) activities at the Metro-North Railroad (MNR) Harmon Yard Operable Unit II (OU-II) remediation area (Site). In addition to the requirements outlined in the HASP, activities shall be conducted in a manner to reduce the probability of injury, accident, or incident occurrence.

1.1 Planned Activities Covered by HASP

This HASP is to be implemented during O & M of the vacuum enhanced NAPL recovery systems at the Site. This plan addresses specific health and safety issues related to the presence of combustible gases (methane), volatile organic compounds, PCB wastes, petroleum hydrocarbons, semi-volatile organics, various potential physical hazards and other hazardous constituents, which may be encountered during O & M activities.

Site-specific activities include: operation and maintenance of vacuum enhanced NAPL recovery systems in four OU-II NAPL areas (e.g., NAPL recovery wells and air injection/inlet wells in all four NAPL areas), NAPL recovery and transfer to on-site storage.

1.2 Site Background

Harmon Yard, the largest facility operated by MNR, has functioned as a primary diesel and electrical maintenance and marshaling yard for over 100 years and previously included a coal burning power plant and steam generation facility. The present maintenance shop, constructed at the turn of the century, replaced several round houses and service facilities. Harmon Yard also includes fuel storage tanks, locomotive fuel pads, car wash tracks (no longer in use), storage yards for equipment, wastewater treatment facilities, and material distribution facilities.

The Site, as defined in this HASP, refers to the area surrounding the former wastewater treatment plant lagoon. This area of Harmon Yard, which has been designated as Operable Unit II (OU-II), is a New York State Inactive Hazardous Waste Disposal Site.

2.0 HEALTH AND SAFETY RESPONSIBITIES

MNR, contractor, and subcontractor employees involved with O & M operations will be responsible for their own safety. Site personnel will be required to understand the information contained in this HASP, and must follow the recommendations that are made in this document.

2.1 Project Manager

The project manager (PM) is responsible for coordinating with the site safety officer (SO) and ensuring the O & M operations are conducted in a manner consistent with the HASP requirements outlined herein. The PM shall be responsible for maintenance of this HASP and communicating all related measures to the MNR personnel involved in O&M operations. The designated PM for this project is Ms. Joanne Reilly, Manager, Department of Environmental Compliance and Services (DECS) for MNR (212-340-3342).

2.2 Safety Officer

The SO or designated representative will supervise emergency response activities, implement safety procedures and document field briefings. The SO will provide HASP addenda information to the PM if safety issues arise during O & M operations that are not discussed in this HASP. The designated SO for this project is Mr. Bruce Washburn, Special Duty Mechanical Foreman (914-271-1945).

2.3 Personnel Responsibilities

All personnel performing O & M operations will be directed to read and follow this HASP and be responsible for informing the SO of any changes in conditions and/or levels of protection required in the work areas. All project personnel are responsible for the following:

- Taking all reasonable precautions to prevent injury to themselves and others.
- Implementing the requirements of this HASP and reporting any deviations from the anticipated conditions described herein to the SO.
- Performing only those tasks that they believe they can do safely, and immediately report any accidents and/or unsafe conditions to the SO.
- Filling out a MNR accident report form for all injuries, regardless of severity. The injured worker should complete the form and review it with the SO. A copy of the form shall be provided to the worker, the SO, and the worker's foreman.

3.0 SITE ACTIVITIES HAZARD ANALYSIS

Site activities during O & M operations will include: well gauging and sampling; system equipment monitoring, system component replacement, inspection of recovery equipment and transfer of recovered NAPL to storage containers. The following sections identify the sequence of steps, potential hazards and recommended actions or procedures to prevent hazards.

3.1 Well Gauging and Sampling

Sequence of Basic Steps	Potential Hazards	Recommended Action or Procedure
1. Site Setup	• Slips, trips, and falls • Back strain • Traffic	• Watch footing and surroundings • Utilize proper lifting techniques • Wear reflective vest when conducting work
2. Open Well Vaults and Entering	• Back strain • Hazardous environments • Slips, trips, and falls	• Utilize proper lifting techniques • Know site conditions by having data on vault % oxygen, % LEL and VOCs. • Watch footing and surroundings
3. Well Monitoring	• Contact with contaminants • Slips, trips, and falls	• Wear proper PPE • Watch footing and surroundings
4. Sample collection	• Contact with contaminants	• Wear proper PPE
5. Demobilization	• Slips, trips, and falls • Back strain	• Watch footing and surroundings • Utilize proper lifting techniques

3.2 System Monitoring

Sequence of Basic Steps	Potential Hazards	Recommended Action or Procedure
1. Site Setup	• Slips, trips, and falls • Back strain • Traffic	• Watch footing and surroundings • Utilize proper lifting techniques • Wear reflective vest when conducting work
2. Open Well Vaults and Entering	• Back strain • Hazardous environments • Slips, trips, and falls	• Utilize proper lifting techniques • Know site conditions by having data on vault % oxygen, % LEL and VOCs. • Watch footing and surroundings
3. Entering Bldg L1/L2 and L4	• Hazardous environments	• Know site conditions by having data on vault % oxygen, % LEL and VOCs
4. Inspection of System	• Noise • Pinch points • Electric shock • Contact with contaminants • Back strain	• Wear proper PPE for noise level present • Awareness and proper work gloves, secure loose clothing • Check electrical cords and equipment for damage • Wear proper PPE • Utilize proper lifting techniques

Sequence of Basic Steps	Potential Hazards	Recommended Action or Procedure
5. Equipment Change Out	• Release of stored energy in equipment • Noise • Pinch points and nip points • Contact with contaminants • Back strain	• Utilize lockout/tagout procedures • Wear proper PPE for noise level present • Awareness, proper work gloves, and secure loose clothing • Wear proper PPE • Utilize proper lifting techniques
6. Demobilization	• Slips, trips, and falls • Back strain	• Watch footing and surroundings • Utilize proper lifting techniques

3.3 NAPL Management and Recovery

Sequence of Basic Steps	Potential Hazards	Recommended Action or Procedure
1. Site Setup	• Slips, trips, and falls • Back strain • Traffic	• Watch footing and surroundings • Utilize proper lifting techniques • Wear reflective vest when conducting work
2. Open Well Vaults and Entering	• Back strain • Hazardous environments • Slips, trips, and falls	• Utilize proper lifting techniques • Know site conditions by having data on vault % oxygen, % LEL and VOCs. • Watch footing and surroundings
3. Well Monitoring	• Contact with contaminants • Slips, trips, and falls	• Wear proper PPE • Watch footing and surroundings
4. NAPL Recovery	• Contact with contaminants • Electric shock • Hazardous environments • Flammable environments	• Wear proper PPE • Check electrical cords and equipment for damage • Know site conditions by having data on VOCs, % oxygen, and % LEL • Ventilate work area and utilize non-sparking tools
5. NAPL Transfer into Container at Site	• Contact with contaminants • Splash hazards • Flammable environments	• Wear proper PPE • Use proper equipment for liquid transfer • Ventilate work area utilize non-sparking tools
6. Entering Bldg L1/L2 and L4	• Hazardous environments	• Know site conditions by having data on vault % oxygen, % LEL and VOCs
7. NAPL Transfer into Primary Container	• Contact with contaminants • Splash hazards • Flammable environments	• Wear proper PPE • Use proper equipment for liquid transfer • Ventilate work area and utilize non-sparking tools
8. Demobilization	• Slips, trips, and falls • Back strain	• Watch footing and surroundings • Utilize proper lifting techniques

3.4 Carbon System Change Out

Sequence of Basic Steps	Potential Hazards	Recommended Action or Procedure
1. Site Setup	• Slips, trips, and falls • Back strain	• Watch footing and surroundings • Utilize proper lifting techniques
2. Entering Bldg L1/L2 and L4	• Hazardous environments	• Know site conditions by having data on vault % oxygen, % LEL and VOCs.
3. Open Carbon Canisters	• Back strain • Pinch points	• Use proper equipment to open drums • Awareness and proper work gloves
4. Carbon Recovery	• Contact with contaminated carbon • Inhalation of carbon dust • Electric shock	• Wear proper PPE. • Know site conditions by having data on % oxygen, % LEL, VOCs, and particulate concentrations. • Check electrical cords and equipment for damage
5. Carbon Replacement	• Inhalation of carbon dust	• Know site conditions by having data on % oxygen, % LEL, VOCs, and particulate concentrations.
6. Demobilization	• Slips, trips, and falls • Back strain	• Watch footing and surroundings • Utilize proper lifting techniques

3.5 General Work Rules

To protect against the occurrence of accidents and dangerous situations, as well as to reduce the potential for emergency events, all on-site personnel shall follow these general rules:

1. Obtain annual safety training required by MNR and read this HASP. The HASP is to be reviewed periodically by all on-site personnel conducting O & M field operations.
2. As required by MNR policy, attend daily job safety briefings, and discuss job-specific hazards that may be encountered during planned work activities.
3. Fieldwork must only be conducted during daylight hours unless adequate artificial light is provided.
4. Wear a hardhat, gloves, appropriate eye/face protection, hearing protection and durable work boots when working around heavy equipment.
5. No eating, drinking or smoking will be permitted within the buildings, near product storage areas or during any O & M operations.
6. All personnel shall be knowledgeable in the use of the first-aid equipment available onsite.
7. Personnel will be advised of the precautions to be taken against sunburn, heat stroke, frostbite, and hypothermia.
8. Only authorized personnel will be allowed on site.
9. Fire extinguishers shall be available at the work site for immediate use in the event of an emergency.

To minimize the possibility of injuries, the following general precautions will be taken:

1. All hand and power tools must be maintained in safe operating condition.
2. Safety guards will be kept in place during equipment operation.
3. Power tools will be double insulated and/or properly grounded.
4. Walkways must be kept clear of equipment, vegetation, excavated material, or other obstructions.
5. Employees exposed to vehicular traffic during O & M operations must wear reflective warning vests.
6. Employees will observe proper lifting techniques and obey sensible lifting limits.
7. Heavy equipment will be used in accordance with the manufacturer's specifications and guidelines.

To guard against injury caused by exposure to cold temperatures, the following measures should be taken in cold weather:

1. Workers should wear adequate winter clothing.
2. Clothing should be changed if they become wet.
3. Warm shelter and regular rest periods will be available for workers.
4. Training sessions should be held as appropriate to emphasize warning symptoms of hypothermia or frostbit such as reducing coordination, drowsiness, impaired judgment, fatigue, and numbing of toes and fingers.

To guard against injury caused by heat stress, the following control measures should be employed in hot weather:

1. Provision for adequate liquids to replace lost body fluids. Employees must replace water and salt lost through perspiration.
2. Employees will be encouraged to drink more than the amount required to satisfy thirst, since thirst satisfaction is not an accurate indicator of adequate salt and fluid replacement. Replacement fluids can be a 0.1 percent salt solution; commercial mixes such as Gatorade or Quick Kick, or a combination of these with fresh water.
3. Establishment of a work schedule that will provide adequate rest periods for cooling down. Rest breaks are to be taken in a cool, shaded area during hot weather.
4. Employees shall not be assigned other tasks during rest periods.
5. All employees shall be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress.

4.0 GENERAL JOB HAZARDS

The general job hazard characteristics associated with O & M operations are identified in greater detail in the following sections.

4.1 Chemical Hazards

Chemical substances can enter the unprotected body by inhalation, skin absorption, ingestion, or through a puncture wound (injection). A contaminant can cause damage to the point of contact or can act systemically, causing a toxic effect at a part of the body distant from the point of initial contact.

The potential routes of exposure for these contaminants include inhalation, ingestion, and absorption through skin/eye contact. The potential for exposure through any one of these routes will depend on the activity conducted. The most likely routes of exposure for the activities that are performed during O & M operations include inhalation and absorption through skin contact.

During initial O & M operations in which inhalation of vapors and absorption are potential routes of entry, the worker's breathing zone shall be monitored for volatile organic compounds (VOCs) using a photoionization detector (PID). This real-time field instrument reading can be used to determine the level of personal protective equipment (PPE) required (see Section 6.0 and Attachment 3 for Log Sheets).

The primary constituent of concern at the Site is polychlorinated biphenyl (PCBs) present in the NAPL. The OSHA permissible exposure limit (PEL) for PCBs is 1 mg/m^3 and the level that is considered immediately dangerous to life and health (IDLH) is 5 mg/m^3. Primary routes of entry are absorption through skin and eye contact; however if PCBs are burned the respirable soot contains PCBs, polychlorinated dibenzofurans and chlorinated dibenzo-p-dioxins. PCB mists may occur from leaks or fugitive emissions from equipment carrying PCB contaminated fluids. Although PCBs evaporate slowly at room temperature, small increases in temperature can increase the volatility of PCBs significantly. Overheated PCB equipment can vaporize PCB compounds and create an inhalation hazard. Proper ventilation is needed in PCB system/transformer servicing and maintenance operations.

During other initial O & M operations in which inhalation of particulates is a potential route of entry; the worker's breathing zone shall be monitored for total particulate concentrations using a particulate monitor. If total particulate concentrations equal or exceed 5 mg/m^3 time weighted average (TWA), then respirable particulate concentrations using analytical air sampling will be required. Over a period of time as particulate results are documented and concentrations remain constant for the task, reduced monitoring can be conducted (e.g., quarterly).

4.2 Physical Hazards

There are physical hazards associated with the O & M operations, which might compound the chemical hazards. Hazard identification, training, adherence to the O & M plans and careful housekeeping can prevent many problems or accidents arising from physical hazards. Potential physical hazards associated with O & M operations and suggested preventative measures include:

- Slip/Trip/Fall Hazards - Some areas may have wet surfaces that will greatly increase the possibility of inadvertent slips. Caution must be exercised when walking in grassed areas out to the well sites due to slippery surfaces in conjunction with the hazard. Also good housekeeping practices are essential to reduce the trip hazards at the work sites.

- Oxygen Deficient and Explosive Atmosphere Hazards – Some areas may have the potential for oxygen deficient and/or explosive atmosphere conditions. Monitoring of the atmosphere prior to entry and as conditions change shall be conducted, as necessary, using an oxygen and combustible gas monitor.

- Small Quantity Flammable Liquids - If small quantities of flammable liquids are brought on-site, they must be stored in "safety" cans and labeled according to contents.

- Electrical Hazards - Electrical devices and equipment shall be de-energized prior to working near them. All extension cords will be kept out of water, protected from crushing, and inspected regularly to ensure structural integrity. Temporary electrical circuits will be protected with ground fault circuit interrupters. Only qualified electricians are authorized to work on electrical circuits.

- Noise - Work around large equipment often creates excessive noise. The effects of noise can include:

    - Workers being startled, annoyed, or distracted.
    - Physical damage to the ear resulting in pain, or temporary and/or permanent hearing loss.
    - Communication interference that may increase potential hazards due to the inability to warn of danger and proper safety precautions to be taken.

  If employees are subjected to noise exceeding an 8-hour time weighted average (TWA) sound level of 90 dBA (decibels on the A-weighted scale), feasible administrative or engineering controls shall be utilized to reduce average sound levels below 90 dBA. In addition, whenever employee noise exposures equal or exceed an 8-hour, time weighted average sound level of 85 dBA, employers shall administer a continuing, effective hearing conservation program as described in OSHA Regulation 29 CFR Part 1910.95.

- Heavy Equipment - Each morning before start-up, heavy equipment will be inspected to ensure safety equipment and devices are operational and ready for immediate use.

- Subsurface and Overhead Hazards - Before any excavation activity, efforts must be made to determine whether underground utilities and potential overhead hazards will be encountered. Underground utility clearance must be obtained prior to subsurface work.

4.3 Environmental Hazards

Environmental factors such as weather, wild animals, insects, and irritant plants always pose a hazard when performing outdoor tasks. Every reasonable effort should be made to alleviate these hazards should they arise.

4.3.1 Heat Stress

The combination of warm ambient temperature and protective clothing increases the potential for heat stress. In particular:

- Heat rash is an itchy rash caused by sweating and inadequate hygiene practices.
- Heat cramps are painful muscle spasms as a result of exposure to excess heat.
- Heat exhaustion is a condition usually caused by loss of body water because of exposure to excess heat. Symptoms include headache, tiredness, nausea, and sometimes fainting.
- Heatstroke is a serious disorder resulting from exposure to excess heat. It results from sweat suppression and increased storage of body heat. Symptoms include hot dry skin, high temperature, mental confusion, convulsions, and coma. Heatstroke is fatal if not treated promptly.

Site workers will be encouraged to increase consumption of water and electrolyte-containing beverages such as Gatorade when the potential for heat stress exists. In addition, workers are encouraged to take rests whenever they feel any adverse effects that may be heat-related. The frequency of breaks may need to be increased upon worker recommendations.

4.3.2 Exposure to Cold

With outdoor work in winter months, the potential for hypothermia and/or frostbite exists.

Proper protective clothing greatly reduces the possibility of hypothermia and/or to workers. However, personnel will be instructed to wear warm clothing in layers. Employees will also be advised to change into dry clothes if their clothing becomes wet from perspiration or from exposure to precipitation.

5.0 SITE CONTROLS

Appropriate site control procedures, listed below, shall be implemented to control employee exposure to hazardous substances during O & M operations. In addition, site control procedures are also used to prevent migration of potential contamination caused through tracking by personnel or equipment outside of the designated work area. The Site is an inactive hazardous waste site and site controls must be conducted in accordance with 29 CFR 1910.120.

5.1 Site Zones

In areas where NAPL presents a potential for worker exposure, an "exclusion zone" shall be established when O&M operations are underway. Personnel entering the "exclusion zone" must have received appropriate HAZWOPER training in accordance with 29 CFR 1910.120 and must wear the mandated level of protection for the area. The NAPL recovery well locations present the greatest potential for exposure to other workers in the area. NAPL Areas L1, L2, and L4 have the potential for lawn maintenance crews to be in the vicinity. NAPL Area L3 has the potential for pedestrian and vehicular traffic in the area. To prevent exposure to other workers, traffic cones and barrier tape should be used to delineate the work area at a minimum 5-foot "exclusion zone" radius during O & M operations. This "exclusion zone" is temporary and can be removed once O & M operations are completed and the recovery well vault closed. Figure 1 in Attachment 2 provides the locations of the four NAPL recovery areas.

A "transition zone", designated as a line identified by the perimeter of the "exclusion zone", shall be established where personnel can begin personal and equipment decontamination procedures when O&M operations are underway. If NAPL is encountered and equipment or clothing becomes contaminated, they will not be allowed on clean portions of the Site to preclude the spread of contamination. If contaminated equipment is to be transferred to another well site, then equipment may be wrapped in polyethylene or other suitable materials to prevent release of contaminates outside of the work areas. Operational support facilities, if needed, will be located outside the transition zone (i.e., in a "support zone"), and normal work clothing and support equipment are appropriate in this area. Personnel assisting O & M operations from the support zone should be located upwind of project activities, whenever possible.

5.2 General

The following items will be implemented to protect the health and safety of workers during O & M activities.

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand to mouth transfer and ingestion of contamination shall not occur in the work zone and/or transition zone during O & M operations.
- Personnel admitted in the work zone shall be properly trained in health and safety techniques and equipment usage.
- No personnel shall be admitted in the work zone without the proper safety equipment.

- Proper decontamination procedures (See Section 7.0, DECONTAMINATION PROCEDURES) shall be followed before leaving the Site.

6.0 PROTECTIVE EQUIPMENT

This section addresses the various levels of personal protective equipment (PPE) that are or may be required during O & M operations. Personnel entering the work zone and transition zone shall be trained in the use of the anticipated PPE to be utilized.

6.1 Anticipated Protection Levels

The following table summarizes the protection levels (refer to Section 6.2) anticipated for various tasks to be implemented during the O & M activities.

TASK	PROTECTION LEVEL	COMMENTS/MODIFICATIONS
Site mobilization	Level D	
O & M preparation	Level D	
Well gauging	Modified Level D	Based on air monitoring and safety officer or designated representative discretion
Well sampling	Modified Level D	Based on air monitoring and safety officer or designated representative discretion
NAPL recovery	Modified Level D	Based on air monitoring and safety officer or designated representative discretion
System equipment monitoring	Modified Level D	Based on air monitoring and safety officer or designated representative discretion
System component replacement	Level D	Modified Level D if NAPL is encountered
Carbon unit change out	Modified Level D	Based on air monitoring and safety officer or designated representative discretion
Support zone	Level D	
Site demobilization	Level D	

During O & M task operations, periodic monitoring of parameters identified in Section 3.0 shall be conducted. The results will be used to establish anticipated monitoring results at each work location. Once a history on results has been established, PID, percent oxygen,

and percent LEL monitoring can be adjusted to a monthly basis. Particulate monitoring shall be conducted whenever a carbon change-out occurs.

During carbon change-out, monitoring shall be conducted in the worker's breathing zone to determine if VOCs and total particulate concentrations exceed the action levels. Total particulate and VOC concentrations will be initially evaluated. If particulate concentrations exceed established action levels, then respirable particulate sampling shall be done. Once a history on VOC and particulate concentrations less than the action levels has been established, monitoring may be adjusted accordingly. The determination of adjusted monitoring or other actions taken shall be documented and included in this HASP.

The air-monitoring program will be used to assist in determining the level of PPE required (see Section 8.0 and Attachment 3 Log Sheets).

It is anticipated that work conducted, as part of the O & M operations will be performed in Level D or modified Level D PPE. If air-monitoring results exceed the action levels for the PPE being worn (see Section 8.0) the work will immediately be stopped and site workers should leave the work area. The PPE level being worn should be evaluated and modified as site conditions warrant. The proper health and safety measures will be implemented (e.g., develop and implement engineering controls, upgrade in PPE, etc.).

6.2 Protection Level Descriptions

This section lists the minimum requirements for each protection level anticipated for O & M operations. Modifications to these requirements can be made upon approval of the safety officer.

6.2.1 Level D

Level D consists of the following:

- Safety glasses with side shields
- Hard hat
- Hard-toed work boots
- Work gloves*
- Hearing protection, if needed
- Work clothing as prescribed by weather

6.2.2 Modified Level D

Modified Level D consists of the following:

- Safety glasses with side shields
- Hard hat
- Steel-toed work boots
- Work gloves*

- Hearing protection, if needed
- Outer protective wear, such as Tyvek coverall [Tyveks (Sarans) and polyvinyl chloride (PVC) will be required when workers have a potential to be exposed to NAPL or activated carbon particulates].

* Nitrile gloves are often appropriate when handing oil potentially containing elevated concentrations of PCBs. However, depending on the material encountered, another glove type may be more appropriate. Based upon the work activities and the anticipated materials that will be encountered, site workers should check with the MNR Safety Department to determine the most-appropriate protective work glove for the task to be completed.

6.3 Hearing Protection

Hearing protectors (ear plugs and/or ear muffs) shall be worn in locations where powered or motorized equipment or any other noise source could reasonably be expected to exceed 85 dBA. A hearing conservation program shall be implemented in accordance with OSHA 29 CFR 1910.95 when 8-hour time-weighted average exposure levels exceed 85 dBA.

Noise monitoring was conducted within the OU-II maintenance buildings. Noise levels of $\geq$ 85 dBA were observed in the L1/L2 building and in the L4 building. Employee exposures are expected to be less than 1 hour of an 8-hour workday. Hearing protectors (ear plugs and/or ear muffs) shall be worn in these identified locations and any other locations where powered or motorized equipment or any other noise source could reasonably be expected to exceed 85 dBA.

7.0 DECONTAMINATION PROCEDURES

This section describes the procedures necessary to ensure that both personnel and equipment are free from potential contamination when they leave the work Site.

7.1 Personnel Decontamination

Personnel involved with O & M activities in which PPE becomes contaminated will follow the decontamination procedures described herein to ensure that material which workers may have contacted in the work zone and/or transition zone does not result in personal exposure and is not spread to clean areas of the Site. This sequence describes the general decontamination procedure. The specific stages can vary depending on the task, protection level, etc.

1. Leave work zone and go to transition zone
2. Remove soil/debris from boots and gloves, if applicable
3. Remove and discard disposable boot covers, if worn (remove boots and decontaminate otherwise)
4. Remove and discard Tyvek suit, if applicable
5. Remove and discard gloves
6. Wash hands and/or other areas of exposed skin that may have come in contact with petroleum using a waterless soap (e.g., GoJo Heavy Duty Hand Cleaner or similar)
7. Go to support zone

7.2 Equipment Decontamination

If equipment becomes contaminated, it shall be decontaminated before leaving the Site. Decontamination procedures can vary depending upon the contaminant involved, but may include sweeping, wiping, scraping, hosing, or steam cleaning the exterior of the equipment. Personnel performing this task will wear the proper PPE.

7.3 Disposal

Disposable clothing will be placed into appropriately labeled containers for future disposal in accordance with applicable regulations. Current sampling and analysis information obtained on PCB levels indicate that PCBs are less than 50 ppm in the oil on site. Therefore, disposable clothing may be collected in trash containers in each area, bagged, and disposed as industrial waste (i.e., not managed as hazardous waste or PCB waste). If regularly conducted analysis of the oil identifies PCB levels of greater than 50 ppm, all debris/material in contact with the oils must be managed as hazardous and PCB waste in accordance with applicable regulations.

8.0 AIR MONITORING

During activities that have the potential to expose O & M workers to inhalation hazards, air monitoring for VOCs and particulates will be conducted in order to determine potential contamination levels. VOC monitoring is recommended during the recovery and handling of free product. Particulate monitoring is recommended during the carbon change-out that may occasionally occur from the system. This ensures that respiratory protection is adequate to protect personnel against the contaminants that may be encountered and that potential contaminants are not migrating off-site. In addition, oxygen levels and combustible gas levels will be taken prior to VOC and particulate monitoring. If site conditions change, additional air monitoring may be conducted to further characterize the breathing zone.

The following chart describes the direct reading instrumentation that will be utilized and the currently anticipated action levels.

Monitoring Device	Action level	Action/Level of PPE
Oxygen Monitor	> 21 % oxygen	Do not enter, oxygen rich environment increase fire potential. Ventilate area to reduce oxygen to below 21 %
	21 - 19.5 % oxygen	Level D or Modified Level D
	< 19.5 % oxygen	Stop work, evaluate the use of engineering controls
Combustible Gas Monitor	< 10 % LEL	PPE level depending upon oxygen and VOC concentration.
	> 10 % LEL	Do not enter. Ventilate area to reduce LEL
PID Volatile Organic Compound Meter	< 1 ppm in breathing zone, sustained 5 minutes	Level D or Modified Level D
	1-5 ppm in breathing zone, sustained 5 minutes	Level D or Modified Level D
	> 5 ppm in breathing zone, sustained 5 minutes	Stop work, evaluate the use of engineering controls.
Particulate Monitor	<5 mg/m^3 TWA	Level D or Modified Level D
	≥ 5 mg/m^3 TWA	Stop work, collect sample to evaluate concentration of respirable particulates via approved analytical method.

MNR personnel will be responsible for conducting all air monitoring, except Particulate Monitoring. An appropriate representative from the MNR Safety Department shall conduct particulate monitoring using a total particulate monitor to determine overall particulate loads. If particulate loads exceed 5 mg/m^3 TWA, then specific industrial hygiene respirable dust monitoring

of personnel should be performed. 24-hour HAZWOPER and 8-hour HAZWOPER Refresher training should include training on appropriate use of monitoring equipment.

8.1 Oxygen Monitoring

Oxygen monitoring shall be conducted using an AIM 600 series confined space gas monitor or equivalent to monitor percent oxygen content of the ambient air. The oxygen monitor will prove information to determine if an area is oxygen deficient (i.e., < 19.5 % oxygen). The action level for percent oxygen is greater than 21 or less than 19.5.

8.2 Combustible Gas Monitoring

An AIM 600 series confined space gas monitor or equivalent will be used to monitor the explosive (flammable) limits. The low end of this range is the lower explosive limit (LEL), and the high end is called the upper explosive limit (UEL). The explosive (flammability) range and the lower and upper explosive limits are expressed as volume percents. The action level for combustibility is 10% of the LEL. Care must be taken to assess the calibration gas to the anticipated gas being monitored. A correction factor must be taken into account when the calibration gas and atmosphere gas are different.

8.3 Volatile Organic Compound Monitoring

A MiniRae 2000 PID equipped with a minimum 10.6 eV lamp or equivalent will be used to monitor total volatile organic content of the ambient air. The PID will prove useful as a direct reading instrument to aid in determining if current respiratory protection is adequate or needs to be upgraded. The safety officer or designated representative will take measurements before operations begin in an area to determine the amount of VOCs naturally occurring in the air. This is referred to as a background level. Levels of VOCs will periodically be measured in the air at active work sites, and at the transition zone when levels are detected above background in the work zone. The action level for VOCs is > 5 ppm above background levels.

8.4 Particulate Monitoring

A MIE personal data ram Model 1000 particulate monitor or equivalent will be used to measure total airborne particulate concentrations. These devices are generally aerosol monitors in which the aerosol is a solid (dust), liquid (mist), or condensed vapor form a high-temperature process such as combustion or welding (fume). Activated carbon change out is the primary operation in which significant particulate concentrations can be generated. The action level for particulates is greater than or equal to 5 mg/m^3 TWA.

In the event the action level is exceeded, a sample must be collected for analytical laboratory testing to assess respirable particulate concentrations. This sample should be collected using a SKC Aluminum Cyclone and sampling pump or equivalent with a pre-weighted filter. Upon collection the filter should be submitted to an approved analytical

laboratory for testing using National Institute for Occupational Safety and Health (NIOSH) Method 0600.

8.5 Community Air Monitoring Plan

During excavation and loading of potentially impacted material, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. A Community Air Monitoring Plan (CAMP) will be implemented in accordance with Appendix 1A of the DER-10 guidance document.

9.0 EMERGENCY RESPONSE

To provide first-line assistance to field personnel in case of illness or injury, the following items must be made available on the Site. These items will be immediately accessible if placed in the equipment buildings on the OU-II site.

- First-Aid Kit
- Portable emergency eyewash

Specific, emergency response items required are to be implemented as further discussed in this section.

9.1 First Aid

The following 'First Aid' is to occur after contact with free product that has the potential to contain PCBs or airborne mists containing PCBs.

- Skin Contact: Wash with warm water and soap; apply cold cream to reduce irritation
- Eye Contact: Flush with lukewarm water for at least 15 minutes; seek medical attention
- Ingestion: Do not induce vomiting; consult a physician
- Inhalation: Get victim to fresh air; take victim to physician

9.2 Emergency Telephone Numbers

The following telephone numbers are listed in case there is an emergency at the Site:

Fire/Police Department	911
Poison Control Center	(800) 336-6997
MNR DECS	(914) 686-8681 or (212) 340-3322
MNR Safety Department	(212) 340-2358
Assistant Chief Rail Traffic Controller	(212) 340-2050
Bruce Washburn- Site Safety Officer (SO)	(914) 271-1945
Nearest Hospital to Harmon Yard Hospital Phone Number: Directions to Hospital:	Phelps Memorial Hospital (914) 336-3000 See Hospital Map in Attachment 1

9.3 Evacuation

Although unlikely, it is possible that a site emergency could require evacuating all personnel from the Site. The following actions should take place during site evacuation:

- Immediately notify all on-site personnel of the emergency requiring evacuation.
- Leave the dangerous area and report to designate rally point.
- Notify emergency services, as appropriate.
- Account for all personnel
- Contact the SO and MNR Safety Department (see contact list in Section 9.1).
- Maintain site security and control measures for worker and community safety until emergency services take over.

9.4 Medical Emergency

In the event of a medical emergency involving illness or injury to one of the on-site personnel, the Site should be shutdown and immediately secured. The SO should notify the appropriate regulatory authorities immediately. The area in which the injury or illness occurred should not be entered until the cause of the illness or injury is known and a determination is made that re-entry is safe. The nature of injury or illness should be assessed. If the victim appears to be critically injured, administer first aid and/or CPR as needed. Instantaneous real-time air monitoring should be done in accordance with air monitoring outlined in Section 8.0 of this HASP.

9.5 Contamination Emergency

It is unlikely that a contamination emergency will occur; however, if such an emergency does occur, the Site should be shutdown and immediately secured. Real-time air monitoring should be implemented as outlined in Section 8.0 of this HASP. If the material is unknown, samples of the material should be acquired to facilitate identification of the material. The area in which the spill or release occurred should not be entered until the cause can be determined and Site safety can be evaluated. All non-essential on-site personnel should be evacuated from the Site to a safe, secure area. If an emergency rescue is needed, notify, Police, Fire Department and EMS Units immediately. Advise them of the situation and request an immediate response. The MNR DECS should notify the appropriate regulatory authorities as soon as possible. The area in which the contamination occurred should not be entered until the arrival of trained personnel who are properly equipped with the appropriate PPE and monitoring instrumentation (See also Section 8.0 of this HASP).

9.6 Fire Emergency

In the event of a fire on-site, the Site should be shutdown and immediately secured. The area in which the fire occurred should not be entered until the cause is known and a determination is made that re-entry is safe. All non-essential site personnel should be evacuated from the Site to a safe, secure area. The SO should immediately advise the Fire

Department of the situation and identify of any hazardous material involved. The appropriate regulatory authorities should be notified as soon as possible.

The four classes of fire along with their constituents are as follows:

Class A:	Wood, cloth, paper, rubber, many plastics and ordinary combustible materials.
Class B:	Flammable liquids, gases and greases.
Class C:	Energized electrical equipment.
Class D:	Combustible metals such as magnesium, titanium, sodium and potassium.

Small fires may be actively extinguished; however, extreme care should be taken while in this operation. All approaches to the fire should be done from the upwind side if possible. Distance from on-site personnel to the fire should be close enough to ensure proper application of the extinguishing material, but far enough away to ensure that the personnel are safe. The proper extinguisher should be utilized for the Class(s) of fire present on the site. If possible, the fuel source should be cut off or separated from the fire. Care must be taken when performing operations involving the shut-off values and manifolds, if present.

Examples of proper extinguishing agent as follows:

Class A:	Water Water with 1% AFFF Foam (Wet Water) Water with 6% AFFF or Fluorprotein Foam ABC Dry Chemical
Class B:	ABC Dry Chemical Purple K Carbon Dioxide Water with 6% AFFF Foam
Class C:	ABC Dry Chemical Carbon Dioxide
Class D:	Metal-X Dry Powder

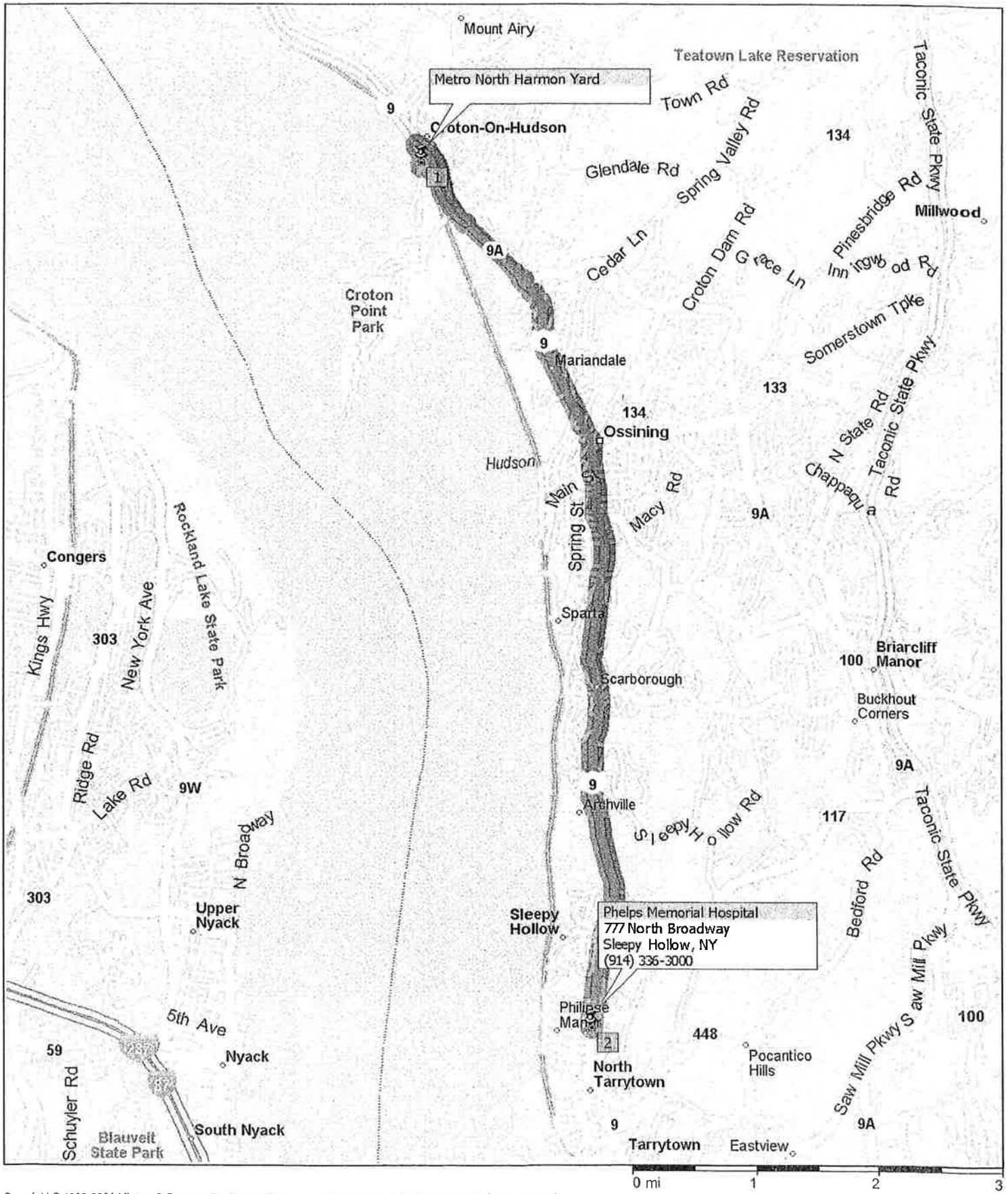
No attempt should be made against large fires. These should be handled by the Fire Department.

ATTACHMENT 1

Map to Hospital

Metro North Harmon Yard Hospital Route

8.3 miles; 13 minutes



9:00 AM	0.0 mi	Depart Metro North Harmon Yard on Local road(s) (South-West) for 54 yds
9:00 AM	0.1 mi	Turn LEFT (South) onto Half Moon Bay Dr for 54 yds
9:01 AM	0.1 mi	Turn LEFT (East) onto Local road(s) for 0.3 mi
9:02 AM	0.4 mi	Turn RIGHT (South-East) onto Ramp for 174 yds towards US-9 / RT-9A S
9:02 AM	0.5 mi	Bear RIGHT (South-East) onto US-9 for 7.7 mi
9:13 AM	8.3 mi	Arrive N Broadway, Tarrytown, NY 10591

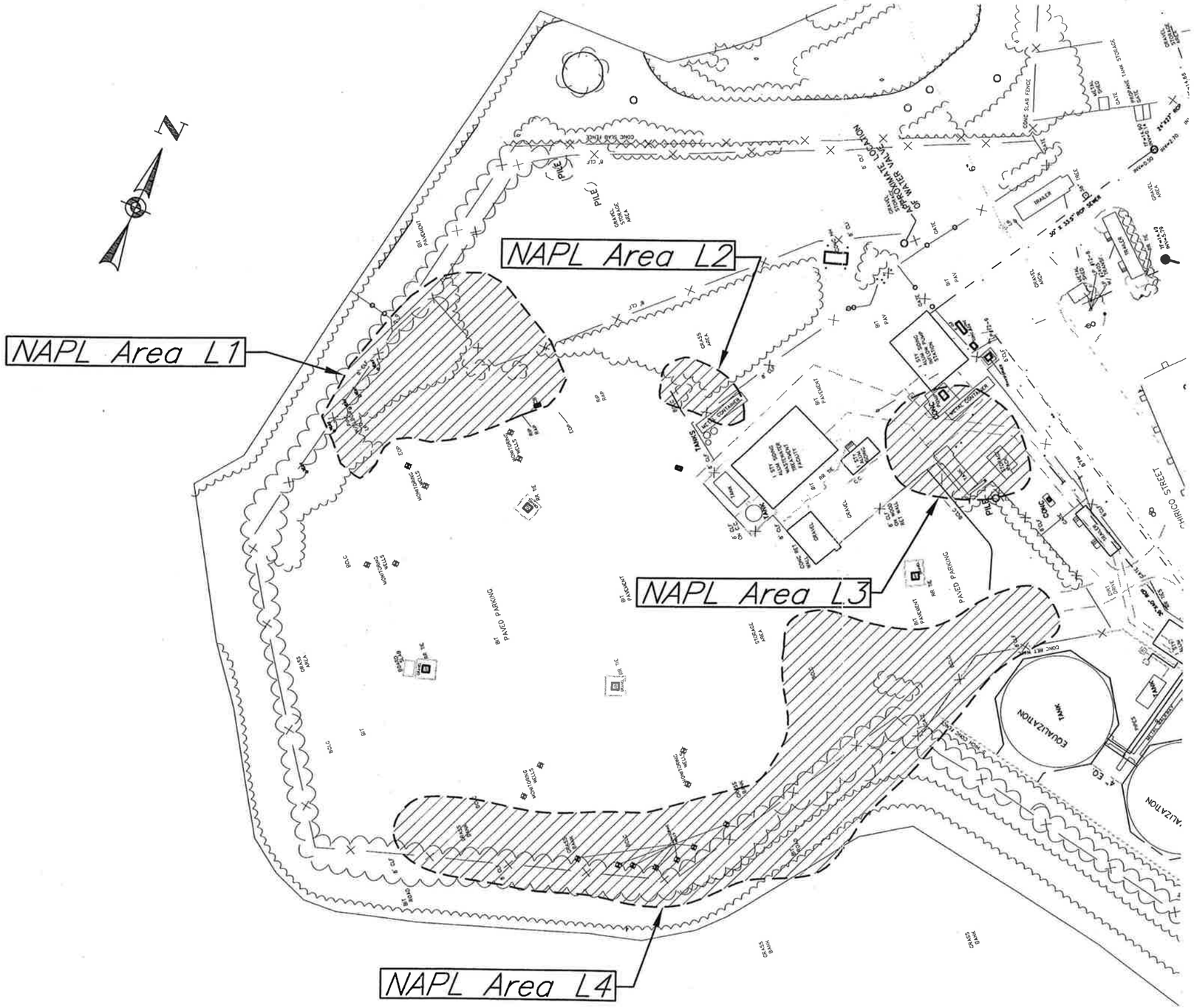
ATTACHMENT 2

Figure 1 – NAPL Recovery Areas

Ref1: NAPLLOCPLAN-1.dwg
Ref2: x-topo-full3.dwg
Ref3:
Ref4:
Ref5:
Ref6:

Xerox230AnsiB-2; 11 x 17

Time Plotted: Wed Apr 30 13:27 2003
File Name: Metro\Harmon\NAPL\Figure-1.dwg



NAPL RECOVERY AREAS
1"= 80'

NOTES:

1. This drawing was prepared by a CAD base file provided by others and from a drawing by ERM entitled "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet no. C-1, dated 7/31/00.
2. This Figure shows four (4) areas were non-aqueous phase liquids (NAPL) product has been detected. The four (4) NAPL areas are identified as L1, L2, L3, and L4.

LEGEND:

- ◆ Existing monitoring well
- — — Approximate NAPL area

FIELD VERIFIED BY	WEW
DATE	04-30-2003
DRAWN BY	LRP
DATE DRAWN	04-30-2003
SCALE	As Noted
DATE ISSUED	04-30-2003

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14614-1008

PROJECT TITLE
METRO NORTH RAILROAD
HARMON YARD
CROTON-ON-HUDSON, NY
HEALTH AND SAFETY PLAN

DRAWING TITLE
NAPL Recovery Areas

PROJECT NO.
3013I (90)

FIGURE 1

ATTACHMENT 3

LOG SHEETS
NAPL AREA L1/L2
NAPL AREA L3
NAPL AREA L4

NAPL AREA L1/L2 - NAPL AND WATER REMOVAL VOLUMES
NAPL AREA L3- NAPL AND WATER REMOVAL VOLUMES
NAPL AREA L4- NAPL AND WATER REMOVAL VOLUMES

MONTHLY LOG SHEET - NAPL AREA L1/L2

Date: _____

Vacuum Extraction Wells	Velocity (ft/min)	Pressure (" WC)	Well Header Gas Quality from Ground			
			PID (ppm)	H2S (ppm)	Lower Explosive Limit (%)	Oxygen (%)
1.5						
1.6						
1.1						
1.2						
1.3						
1.4						
1.9						
1.11						
2.1						
1.10						
1.8						
1.7						

Air Injection Well	Velocity (ft/min)	Pressure (" WC)
1.1		
1.2		
1.3		
1.4		
1.5		
1.6		
1.7		
1.8		
1.9		
1.10		
1.11		
1.12		
1.13		
1.14		
1.15		
1.16		
1.17		
2.1		
2.2		
2.3		

CARBON BED	PID READINGS	O2 Readings	LEL Readings	Particulates (during carbon change-out)
Safe Limits to Atmosphere	< 1 ppm	< 10 % LEL	19.5 % – 21 %	<5 mg/m^3 TWA
Change filter	>5 ppm			
BEFORE				
BETWEEN				
AFTER				
BACKGROUND DATA				

Comments: _____

_____

MONTHLY LOG SHEET - NAPL AREA L3

Date: _____

Vacuum Extraction Wells	Velocity (ft/min)	Pressure (" WC)	Well Header Gas Quality from Ground			
			PID (ppm)	H2S (ppm)	Lower Explosive Limit (%)	Oxygen (%)
3.1						
3.2						
3.3						

Air Injection Well	Velocity (ft/min)	Pressure (" WC)
3.1		
3.2		
3.3		
3.4		
3.5		
3.6		

CARBON BED	PID READINGS	O2 Readings	LEL Readings	Particulates (during carbon change-out)
Safe Limits to Atmosphere	< 1 ppm	< 10 % LEL	19.5 % – 21 %	<5 mg/m^3 TWA
Change filter	>5 ppm			
BEFORE				
BETWEEN				
AFTER				
BACKGROUND DATA				

Comments: _____

_____

MONTHLY LOG SHEET - NAPL AREA L4

Date: _____

Vacuum Extraction Wells	Velocity (ft/min)	Pressure (" WC)	Well Header Gas Quality from Ground			
			PID (ppm)	H2S (ppm)	Lower Explosive Limit (%)	Oxygen (%)
4.1						
4.2						
4.3						
4.4						
4.5						
4.6						
4.7						
4.8						
4.9						
4.10						
4.11						
4.12						
4.13						

CARBON BED	PID READINGS	O2 Readings	LEL Readings	Particulates (during carbon change-out)
Safe Limits to Atmosphere	< 1 ppm	< 10 % LEL	19.5 % – 21 %	<5 mg/m^3 TWA
Change filter	>5 ppm			
BEFORE				
BETWEEN				
AFTER				
BACKGROUND DATA				

Comments: _____

_____

Air Injection Well	Velocity (ft/min)	Pressure (" WC)
4.1		
4.2		
4.3		
4.4		
4.5		
4.6		
4.7		
4.8		
4.9		
4.10		
4.11		
4.12		
4.13		
4.14		
4.15		
4.16		
4.17		
4.18		
4.19		
4.20		
4.21		
4.22		
4.23		
4.24		
4.25		

NAPL AREA L1/L2
NAPL AND WATER REMOVAL VOLUMES - MONTHLY LOG SHEET

DATE: _____

Vacuum Extraction Wells	VOLUME (GALLONS)	REMOVAL METHOD	Vault Exposure Levels			Exposure Levels while pumping from wells			OBSERVATIONS	RECOVERED PRODUCT TO: 500-GAL TANK OR 55-GAL DRUM IN BUILDING (L1/L2 OR L4?)
			PID (ppm)	Lower Explosive Limit (%)	Oxygen (%)	PID (ppm)	Lower Explosive Limit (%)	Oxygen (%)		
Safe Limits	NA	NA	< 1 ppm	< 10 % LEL	19.5 % – 21 %	< 1 ppm	< 10 % LEL	19.5 % – 21 %	NA	NA
1.1										
1.2										
1.3										
1.4										
1.5										
1.6										
1.7										
1.8										
1.9										
1.10										
1.11										
2.1										

Comments: _____

_____

_____

NAPL AREA L3

NAPL AND WATER REMOVAL VOLUMES - MONTHLY LOG SHEET

DATE: _____

Vacuum Extraction Wells	VOLUME (GALLONS)	REMOVAL METHOD	Vault Exposure Levels			Exposure Levels while pumping from wells			OBSERVATIONS	RECOVERED PRODUCT TO: 500-GAL TANK OR 55-GAL DRUM IN BUILDING (L1/L2 OR L4?)
			PID (ppm)	Lower Explosive Limit (%)	Oxygen (%)	PID (ppm)	Lower Explosive Limit (%)	Oxygen (%)		
Safe Limits	NA	NA	< 1 ppm	< 10 % LEL	19.5 % – 21 %	< 1 ppm	< 10 % LEL	19.5 % – 21 %	NA	NA
3.1										
3.2										
3.3										

Comments: _____

_____

_____

NAPL AREA L4

NAPL AND WATER REMOVAL VOLUMES - MONTHLY LOG SHEET

DATE: _____

Vacuum Extraction Wells	VOLUME (GALLONS)	REMOVAL METHOD	Vault Exposure Levels			Exposure Levels while pumping from wells			OBSERVATIONS	RECOVERED PRODUCT TO: 500-GAL TANK OR 55-GAL DRUM IN BUILDING (L1/L2 OR L4?)
			PID (ppm)	Lower Explosive Limit (%)	Oxygen (%)	PID (ppm)	Lower Explosive Limit (%)	Oxygen (%)		
Safe Limits	NA	NA	< 1 ppm	< 10 % LEL	19.5 % – 21 %	< 1 ppm	< 10 % LEL	19.5 % – 21 %	NA	NA
4.1										
4.2										
4.3										
4.4										
4.5										
4.6										
4.7										
4.8										
4.9										
4.10										
4.11										
4.12										
4.13										

Comments: _____

_____

_____

ATTACHMENT 4

HASP CHECKLIST

HASP EXCLUSION ZONE Checklist

Complete?

OU-II Site Work - Checklist

Steps to be taken …

☐ Identify the systems to be worked on/repaired.. The following areas/systems/activities require the development of an exclusion zone and meeting all requirements of the OU-II HASP prior to entry:

- Well gauging and sampling
- System Monitoring
- NAPL Management and Recovery
- Carbon System Change-Out

If the work area/system/activity is NOT listed above, the following requirements will not apply.

☐ Set up an Exclusion Zone around the work area

- Create a minimum of 5-foot radius around the work area, mark the area off with cones and caution tape (or equivalent).

☐ Prepare for work / Site Set-up

- Provide emergency response equipment
  - Fire extinguisher outside the Exclusion Zone, but within arms reach (should meet Class A, B, and C).
  - First-Aid kit, in closest equipment buildings on the OU-II site
  - Portable emergency eyewash, in closest equipment buildings on the OU-II site
- Provide clean containers (drums, buckets or bags, as appropriate), in good condition, for collection and disposal of contaminated PPE, debris, and NAPL fluid within the edge of the Exclusion Zone. Keep debris and contaminated PPE separate from fluids (that is, have two or more containers available).
- Make sure to place appropriate safety and hazardous waste (if required) labels on containers to meet Hazard Communication/Right-To-Know requirements.
- Provide appropriate PPE for working with NAPL and contaminated materials, and make sure employees wear the PPE.
  - Level D:
    - Safety glasses with side shields
    - Hard hat
    - Hard-toed work boots
    - Work gloves*
    - Hearing protection, if needed (entering the OU-II buildings)
    - Work clothing as prescribed by weather
    - Reflective vest, if potential traffic in area (L3 Area)
  - Modified Level D (if NAPL/liquid may be contacted)
    - Safety glasses with side shields
    - Hard hat
    - Steel-toed work boots
    - Work gloves*
    - Hearing protection, if needed (entering the OU-II buildings)
    - Reflective vest, if potential traffic in area (L3 Area)
    - Outer protective wear, such as Tyvek coverall [Tyveks (Sarans) and polyvinyl chloride (PVC) will be required when workers have a potential to be exposed to NAPL or activated carbon particulates].

HASP EXCLUSION ZONE Checklist

Complete?

OU-II Site Work - Checklist

Steps to be taken …

* Nitrile gloves are often appropriate when handing oil potentially containing elevated concentrations of PCBs. However, depending on the material encountered, another glove type may be more appropriate. Based upon the work activities and the anticipated materials that will be encountered, site workers should check with the MNR Safety Department to determine the most-appropriate protective work glove for the task to be completed.

- Provide waterless soap (e.g., GoJo Heavy Duty Hand Cleaner or similar) for cleaning exposed skin prior to exiting the Exclusion Zone.
- Provide appropriate air monitoring equipment
  - Well gauging and sampling, System Monitoring, and NAPL Management and Recovery
    - AIM 600 series confined space gas monitor (or equivalent)- % oxygen and % LEL
    - MiniRae 2000 PID (10.6 eV lamp minimum) (or equivalent) - VOCs
  - Carbon System Change-Out
    - AIM 600 series confined space gas monitor (or equivalent)- % oxygen and % LEL
    - MiniRae 2000 PID (10.6 eV lamp minimum) (or equivalent) - VOCs
    - MIE personal data ram Model 1000 particulate monitor (or equivalent) – particulates

☐ Conduct Monitoring prior to entering well vaults and buildings / Opening Well Vaults

- Conduct appropriate air monitoring – RECORD information on NAPL AND WATER REMOVAL VOLUMES Log Sheet(see Attachment 3 of the OU-II HASP). **DO NOT** enter the well vault or building if safe limits are exceeded (or in the case of oxygen, lower limits are not met). Safe limits are identified on the NAPL Area Log Sheets.
  - If low oxygen levels are observed in a well vault, provide continuous mechanical ventilation of the well vault and re-take the readings. If the oxygen levels pass, continue to monitor oxygen levels while in the vault.

☐ Conduct Well Monitoring, NAPL recovery, NAPL transfer, and/or Carbon System Change-out

- Wear proper PPE
- Use proper equipment for liquid transfer
- Ventilate work area and utilize non-sparking tools
- Watch footing and surroundings

☐ Equipment and Area Decontamination

- Equipment – sweep, wipe, scrape, hose or steam the exterior of contaminated equipment. Wear the appropriate PPE while conducting this task. Collect contaminated material removed from the equipment and discard with other debris from the exclusion zone.
- Area – any amount of spilled material must be cleaned up immediately and be collected with debris and other waste materials on the site.

HASP EXCLUSION ZONE Checklist

Complete?

OU-II Site Work - Checklist

Steps to be taken ...

☐ Personnel Decontamination - Prior to any person leaving the Exclusion Zone, the following measures must be taken:

- Go to the edge of the Exclusion Zone. Arrange for a PCB debris collection drum to be located at the edge of the zone. Do not exit the Exclusion Zone.
- Remove soil/debris from disposable boot covers and gloves, to the extent possible. Remove and clean non-disposable boots until visually clean (scraping and wiping).
- Remove and discard disposable boot covers
- Remove Tyvek suit and discard, if applicable
- Remove and discard gloves
- Wash hands and/or other areas of exposed skin that may have come in contact with petroleum using a waterless soap (e.g., GoJo Heavy Duty Hand Cleaner or similar)
- Exit the Exclusion Zone
- If work requires re-entering the Exclusion Zone, appropriate PPE shall be worn and decontamination practices shall be followed when exiting.

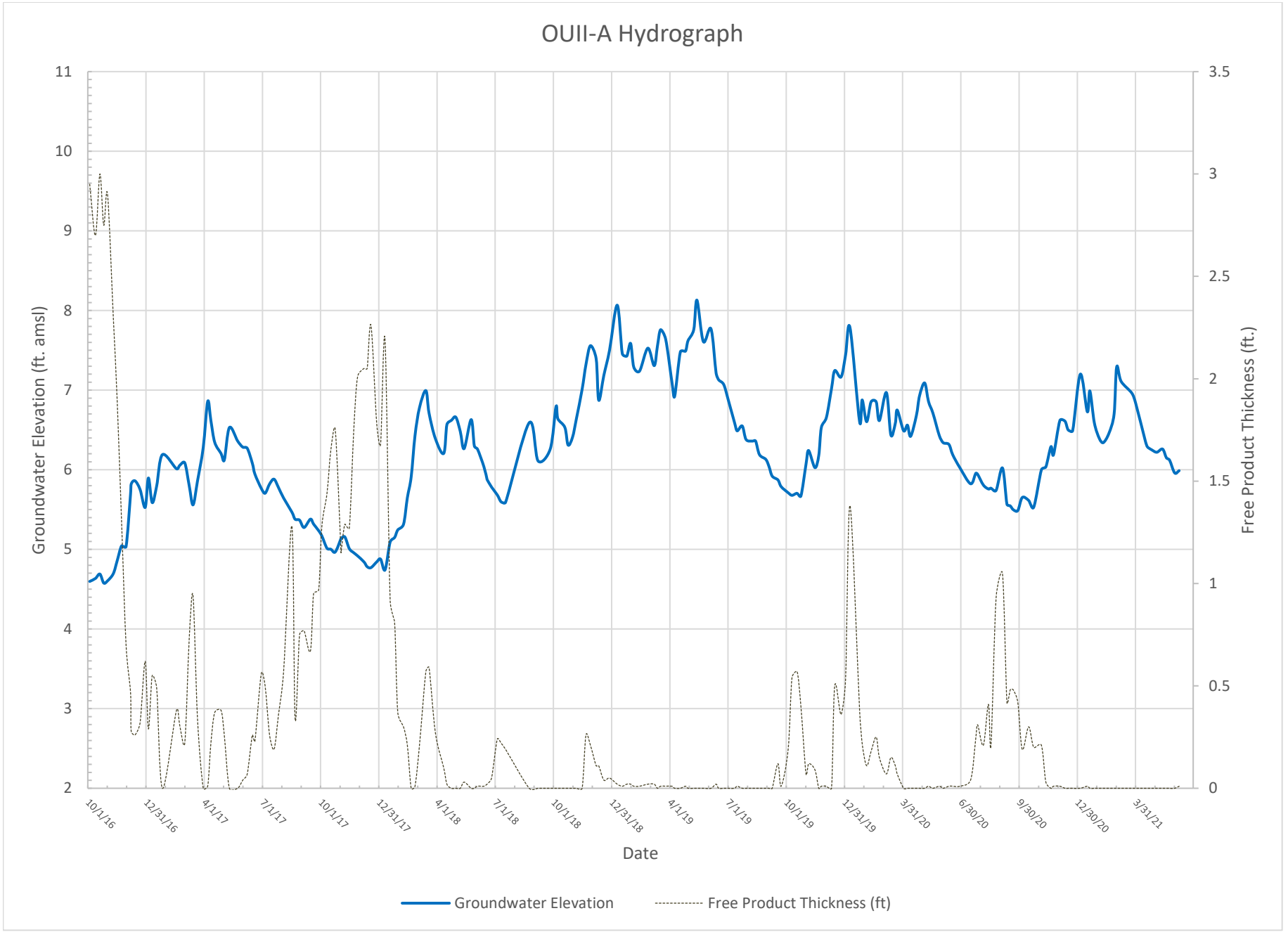
☐ Arrange for containers to be moved to the Hazardous Waste Storage Building

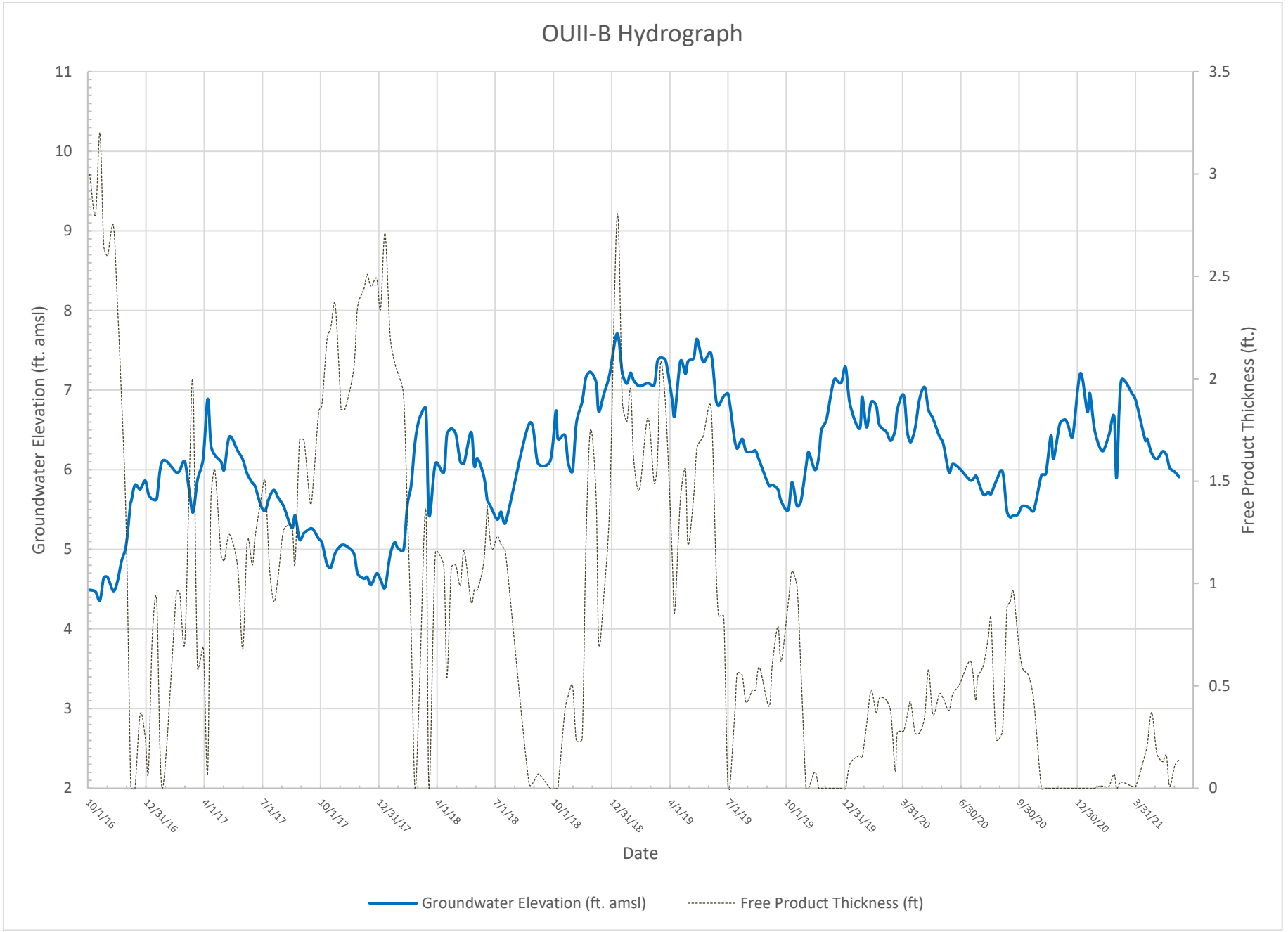
- Ensure the containers/equipment (e.g., pump and tools) are wrapped to prevent the spread of contaminants while in movement
- Ensure that the personnel decontamination procedures noted earlier have been followed, if personnel were in the Exclusion Zone.
- Move the drums and equipment to the Hazardous Waste Storage Building
- Have employees follow Personnel Decontamination requirements prior to exiting the Hazardous Waste Storage Building. Place all PPE used to handle the drums and equipment within one of the debris drums prior to exiting the Hazardous Waste Storage Building.

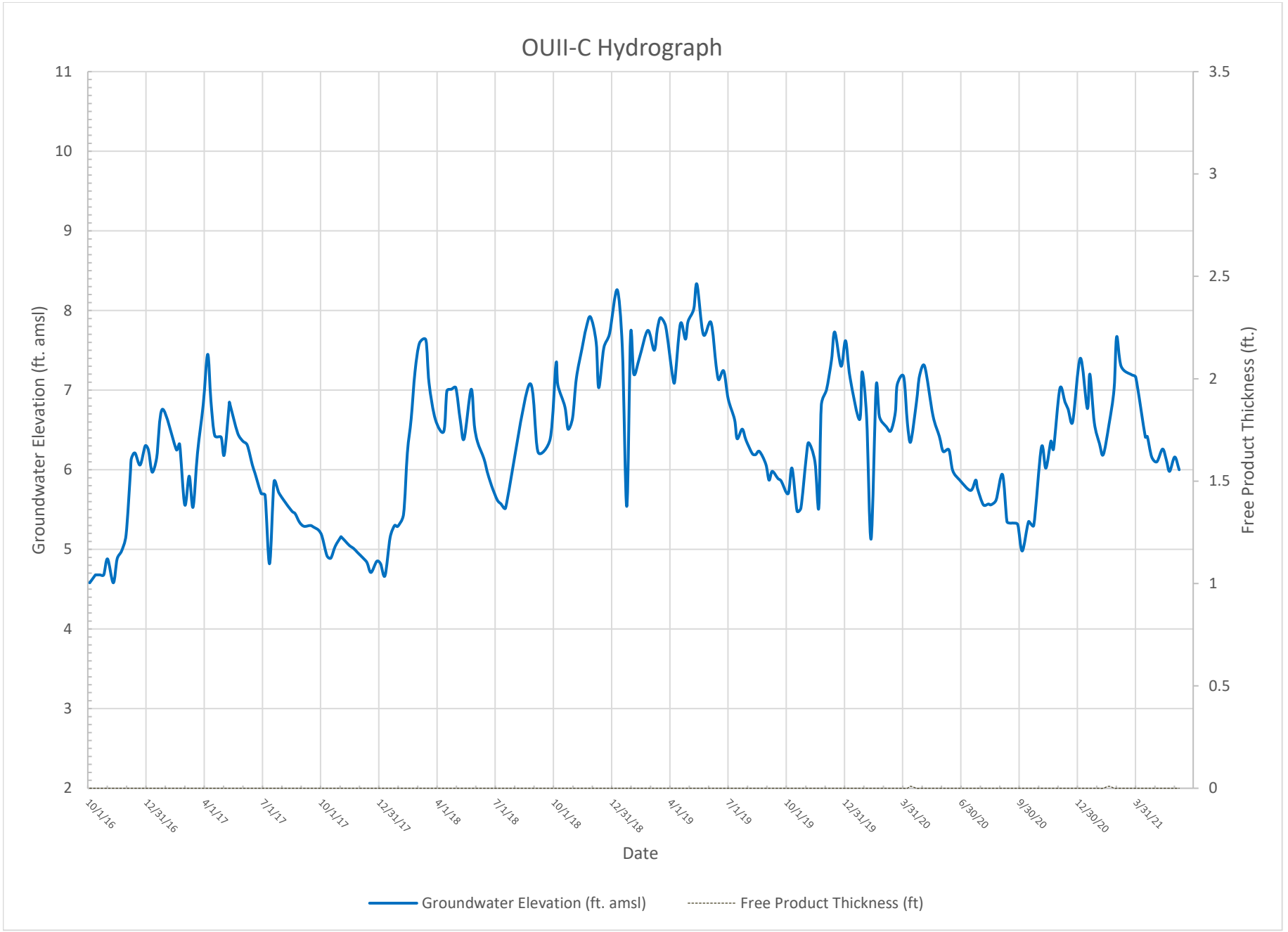
APPENDIX B

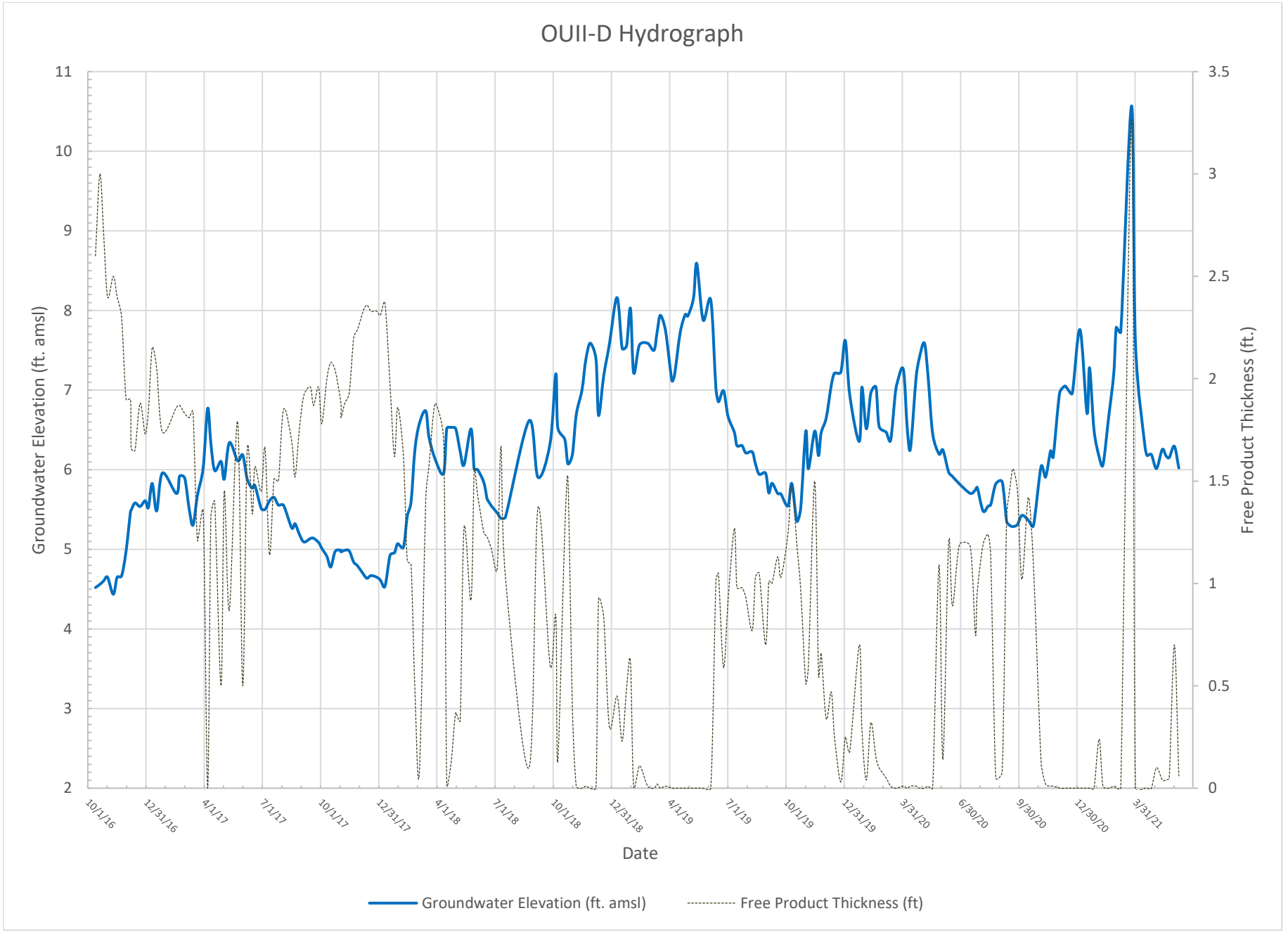
OUII OFF-SITE WELL HYDROGRAPHS

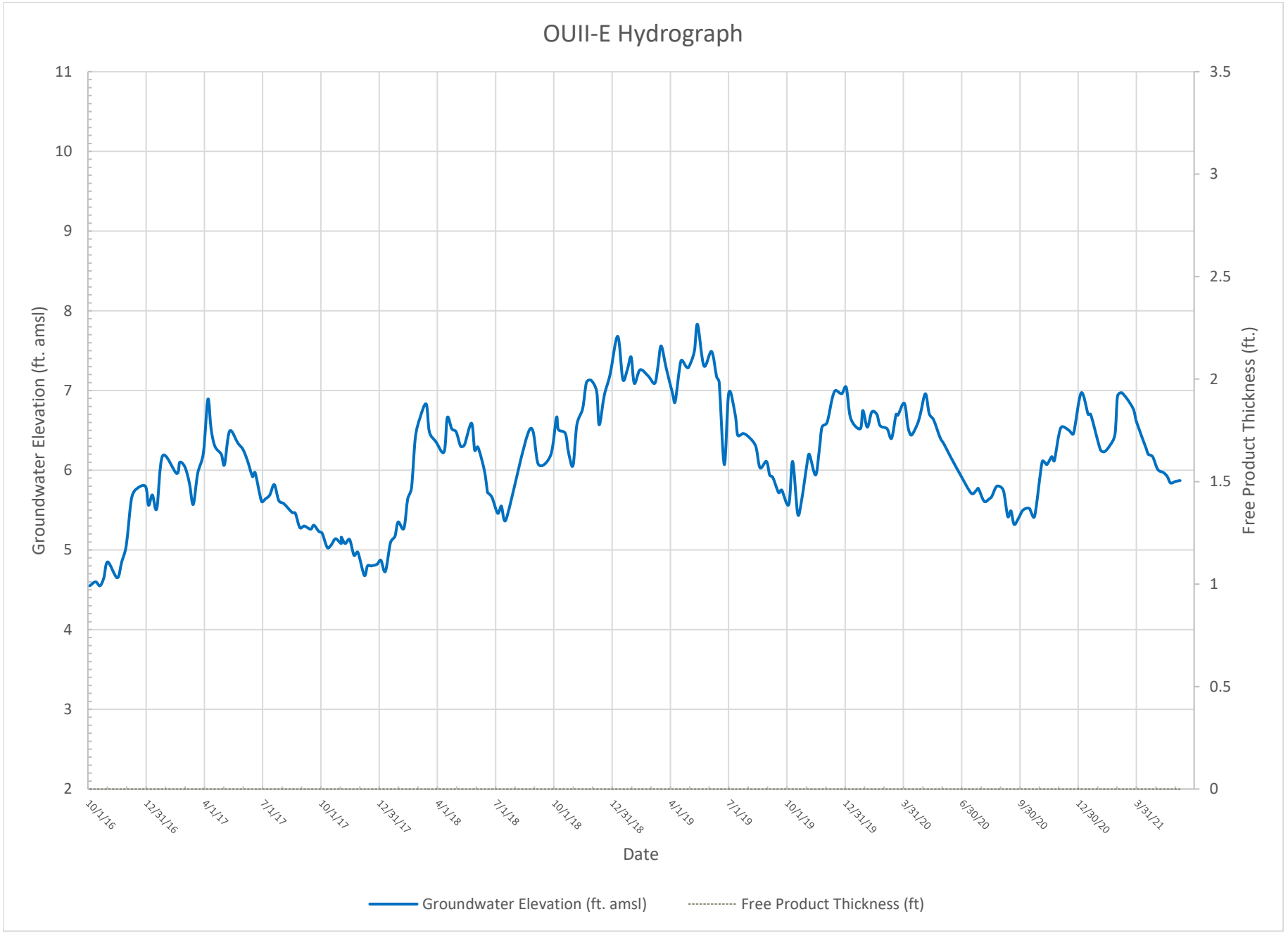
OCTOBER 1, 2016 THROUGH JUNE 8, 2021

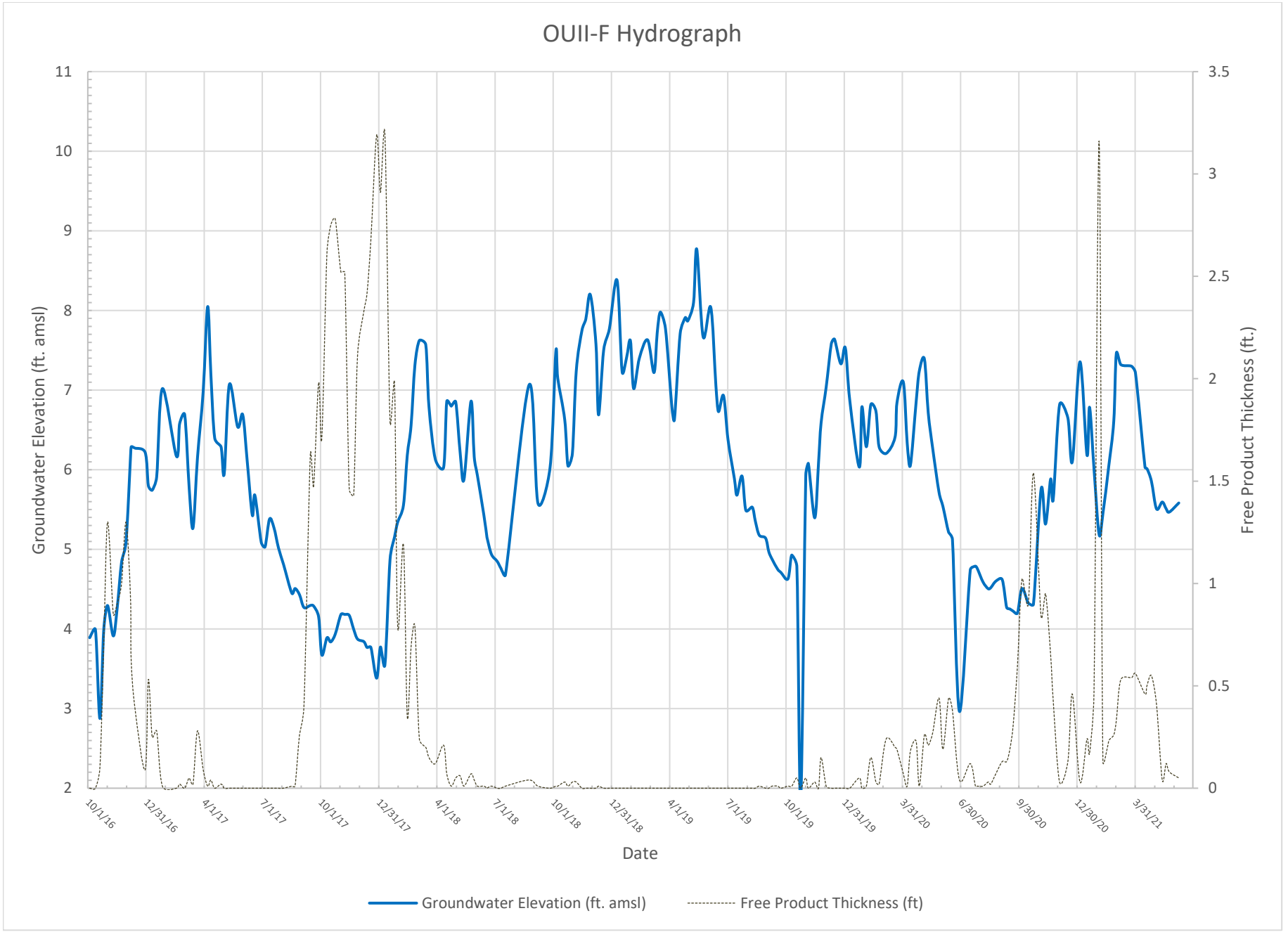

OUII-A Hydrograph
Groundwater Elevation (ft. amsl)
Free Product Thickness (ft.)
Date
11
10
9
8
7
6
5
4
3
2
3.5
3
2.5
2
1.5
1
0.5
0
10/1/16
12/31/16
4/1/17
7/1/17
10/1/17
12/31/17
4/1/18
7/1/18
10/1/18
12/31/18
4/1/19
7/1/19
10/1/19
12/31/19
3/31/20
6/30/20
9/30/20
12/30/20
3/31/21
Groundwater Elevation
Free Product Thickness (ft)


OUII-B Hydrograph
Groundwater Elevation (ft. amsl)
Free Product Thickness (ft.)
Date
11
10
9
8
7
6
5
4
3
2
3.5
3
2.5
2
1.5
1
0.5
0
10/1/16
12/31/16
4/1/17
7/1/17
10/1/17
12/31/17
4/1/18
7/1/18
10/1/18
12/31/18
4/1/19
7/1/19
10/1/19
12/31/19
3/31/20
6/30/20
9/30/20
12/30/20
3/31/21
Groundwater Elevation (ft. amsl)
Free Product Thickness (ft)


OUII-C Hydrograph
Groundwater Elevation (ft. amsl)
Free Product Thickness (ft.)
Date
11
10
9
8
7
6
5
4
3
2
3.5
3
2.5
2
1.5
1
0.5
0
10/1/16
12/31/16
4/1/17
7/1/17
10/1/17
12/31/17
4/1/18
7/1/18
10/1/18
12/31/18
4/1/19
7/1/19
10/1/19
12/31/19
3/31/20
6/30/20
9/30/20
12/30/20
3/31/21
Groundwater Elevation (ft. amsl)
Free Product Thickness (ft)


OUII-D Hydrograph
Groundwater Elevation (ft. amsl)
Free Product Thickness (ft.)
Date
11
10
9
8
7
6
5
4
3
2
3.5
3
2.5
2
1.5
1
0.5
0
10/1/16
12/31/16
4/1/17
7/1/17
10/1/17
12/31/17
4/1/18
7/1/18
10/1/18
12/31/18
4/1/19
7/1/19
10/1/19
12/31/19
3/31/20
6/30/20
9/30/20
12/30/20
3/31/21
Groundwater Elevation (ft. amsl)
Free Product Thickness (ft)

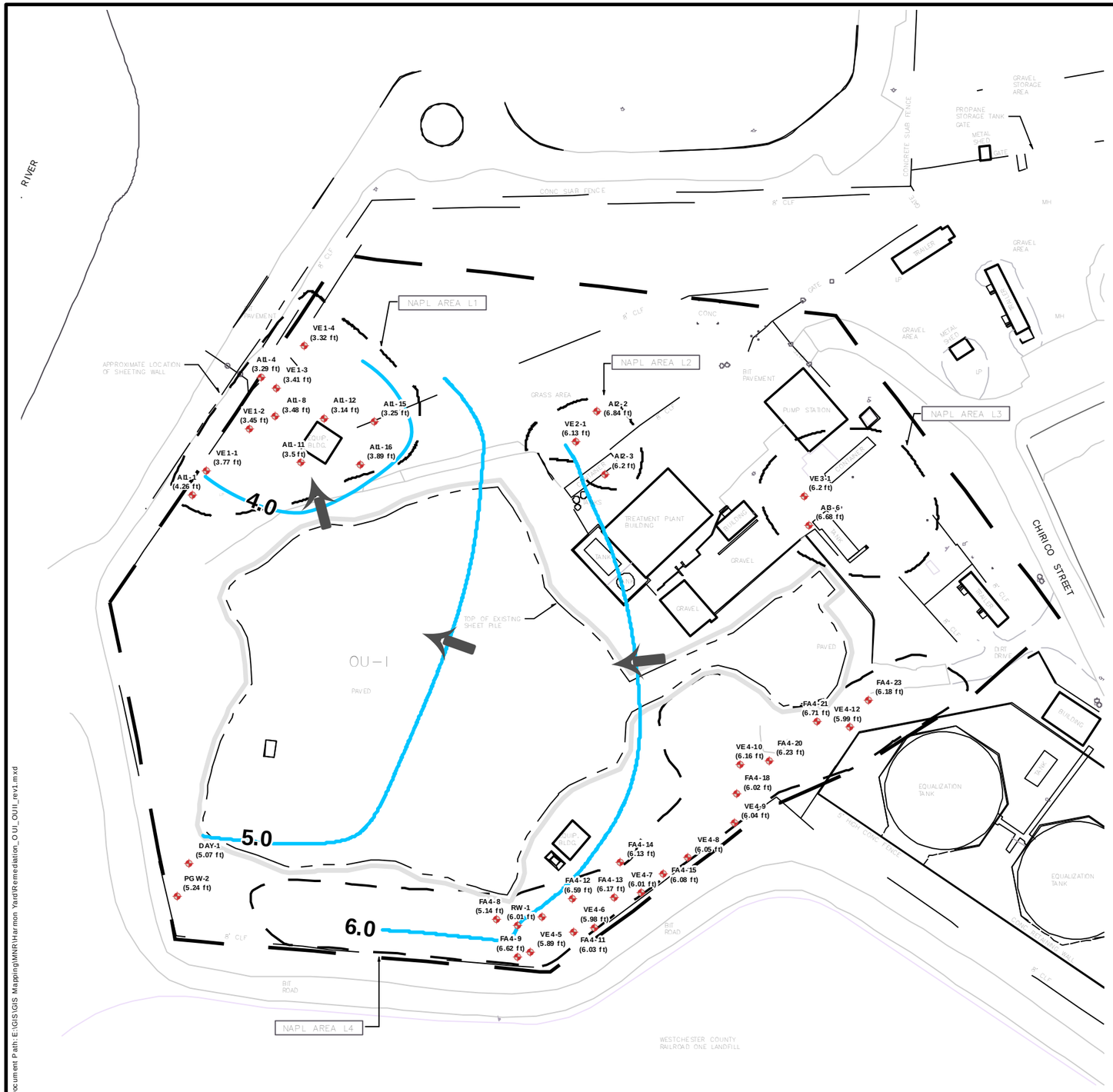

OUII-E Hydrograph
Groundwater Elevation (ft. amsl)
Free Product Thickness (ft.)
11
10
9
8
7
6
5
4
3
2
3.5
3
2.5
2
1.5
1
0.5
0
10/1/16
12/31/16
4/1/17
7/1/17
10/1/17
12/31/17
4/1/18
7/1/18
10/1/18
12/31/18
4/1/19
7/1/19
10/1/19
12/31/19
3/31/20
6/30/20
9/30/20
12/30/20
3/31/21
Date
Groundwater Elevation (ft. amsl)
Free Product Thickness (ft)


OUII-F Hydrograph
Groundwater Elevation (ft. amsl)
Free Product Thickness (ft.)
Date
11
10
9
8
7
6
5
4
3
2
3.5
3
2.5
2
1.5
1
0.5
0
10/1/16
12/31/16
4/1/17
7/1/17
10/1/17
12/31/17
4/1/18
7/1/18
10/1/18
12/31/18
4/1/19
7/1/19
10/1/19
12/31/19
3/31/20
6/30/20
9/30/20
12/30/20
3/31/21
Groundwater Elevation (ft. amsl)
Free Product Thickness (ft)

APPENDIX C

OUII GROUNDWATER CONTOUR MAPS

AUGUST 2012 THROUGH MAY 2021



NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

N

LEGEND:

- VE3-1 (6.2 ft) — Former Vapor Extraxtion (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- 6.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Extent of OU-I final cover system
- Extent of OU-I final cover system

0 40 80 160 Feet

DATE	DRAWN BY	DATE DRAWN	SCALE	DATE ISSUED
09-2012	CPS	09-2012	As Noted	09-26-2012

PROJECT MANAGER: RLK

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title: METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

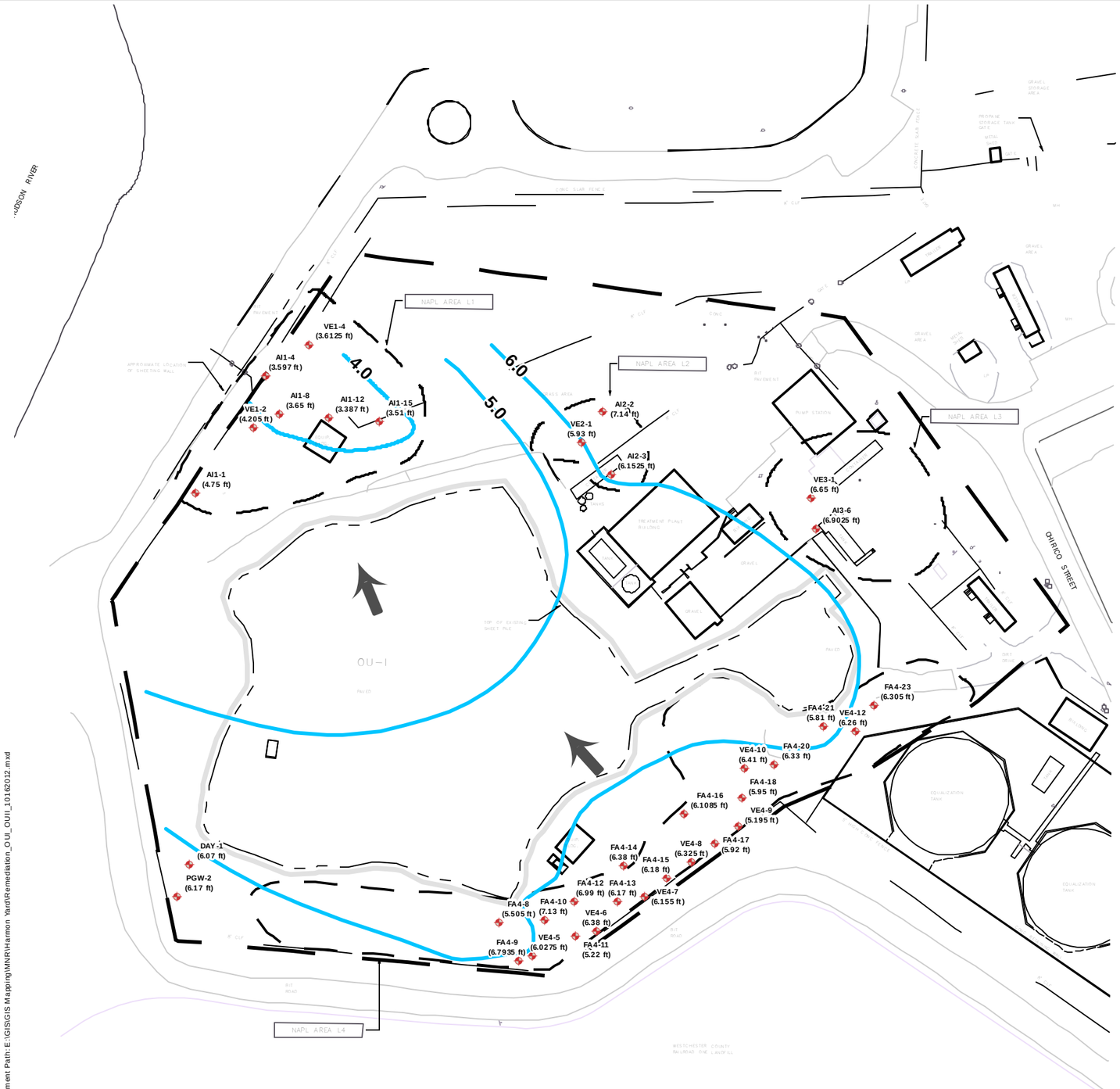
Drawing Title: SITE MANAGEMENT PLAN

Groundwater Conour Map: August 14, 2012

Project No.
10-3231M (46)

FIGURE 1

Last Date Saved: 26 Sep 2012 Document Path: E:\GIS\GIS Mapping\MNR\Harmon Yard\Remediation_OU\OUII_rev1.mxd



NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

N

LEGEND:

- VE3-1 (6.65 ft) — Former Vapor Extraxtion (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- 6.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Extent of OU-I final cover system
- Extent of OU-I final cover system

0 40 80 160 Feet

PROJECT MANAGER	RLK
DATE	12-2012
DRAWN BY	CPS
DATE DRAWN	12-2012
SCALE	As Noted
DATE ISSUED	12-21-2012

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

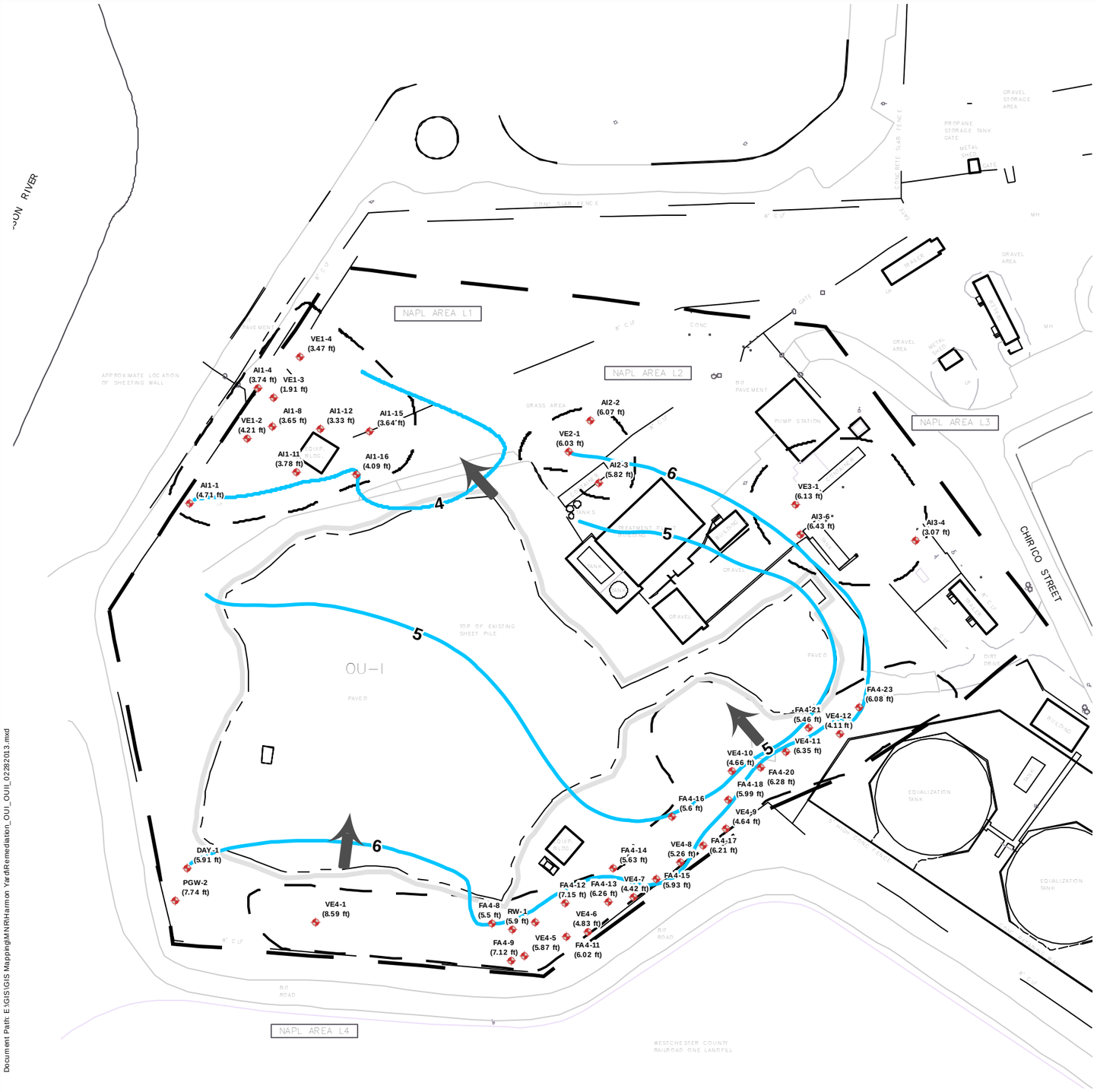
Drawing Title
SITE MANAGEMENT PLAN

Groundwater Conour Map: October 16, 2012

Project No.
10-3231M (46)

FIGURE 1

Last Date Saved: 31 Dec 2012 Document Path: E:\GIS\GIS Mapping\MNR\Harmon Yard\Remediation_OUI_OUII_10162012.mxd



NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

N

LEGEND:

- VE3-1 (6.13 ft) — Former Vapor Extraxtion (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- 6.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Extent of OU-I final cover system
- Extent of OU-I final cover system

0 40 80 160 Feet

PROJECT MANAGER	RLK
DATE	03-2013
DRAWN BY	CPS
DATE DRAWN	03-2013
SCALE	As Noted
DATE ISSUED	03-08-2013

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

Drawing Title
SITE MANAGEMENT PLAN

Groundwater Conour Map: February 26-28, 2013

Project No.
10-3231M (46)

FIGURE 1

Last Date Saved: 11 Mar 2013 Document Path: E:\GIS\GIS Mapping\MNR\Harmon Yard\Remediation_OUI_OUII_02282013.mxd

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

N

LEGEND:

- VE3-1 (5.95 ft) — Former Vapor Extraxtion (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- 6.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Extent of OU-I final cover system
- Extent of OU-I final cover system

0 40 80 160 Feet

DATE	PROJECT MANAGER	DRAWN BY	DATE DRAWN	SCALE	DATE ISSUED
05-2013	RLK	CPS	05-2013	As Noted	06-07-2013

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

SITE MANAGEMENT PLAN

Drawing Title
Groundwater Conour Map: May 9, 2013

Project No.
10-3231M (46)

FIGURE 1

Last Date Saved: 07 Jun 2013 Document Path: E:\GIS\GIS Mapping\MNR\Harmon Yard\OU1_OU2\Remediation_OUI_OUII_05092013.mxd

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

N

LEGEND:

- VE3-1 (6.2 ft) — Former Vapor Extraxtion (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- 6.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Extent of OU-I final cover system
- Extent of OU-I final cover system

0 40 80 160 Feet

PROJECT MANAGER	RLK
DATE	09-2013
DRAWN BY	CPS
DATE DRAWN	09-2013
SCALE	As Noted
DATE ISSUED	09-23-2013

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

Drawing Title
SITE MANAGEMENT PLAN

Groundwater Conour Map: August 21, 2013

Project No.
10-3231M (46)

FIGURE 1

Last Date Saved: 24 Sep 2013 Document Path: \\Mrrgis\MRMNR_Documents\GIS_Data\MNR\Harmon Yard\OU1_OU2\Remediation_OU\OUII_082113.mxd

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

N

LEGEND:

- VE3-1 (6.2 ft) — Former Vapor Extraxtion (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- 3.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Extent of OU-I final cover system
- Extent of OU-I final cover system

0 40 80 160 Feet

PROJECT MANAGER	RLK
DATE	12-2013
DRAWN BY	CPS
DATE DRAWN	12-2013
SCALE	As Noted
DATE ISSUED	12-16-2013

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

Drawing Title
SITE MANAGEMENT PLAN

Groundwater Conour Map: November 20, 2013

Project No.
10-3231M (46)

FIGURE 1

Last Date Saved: 31 Dec 2013 Document Path: O:\GIS_Data\MNR\Harmon Yard\OU1_OU2\Remediation_OU_OUII_121613.mxd

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

N

LEGEND:

- VE3-1 (5.59 ft) — Former Vapor Extraxtion (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- 3.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Extent of OU-I final cover system
- Extent of OU-I final cover system

0 40 80 160 Feet

PROJECT MANAGER	RLK
DATE	03-2014
DRAWN BY	CPS
DATE DRAWN	03-2014
SCALE	As Noted
DATE ISSUED	03-20-2014

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title:
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

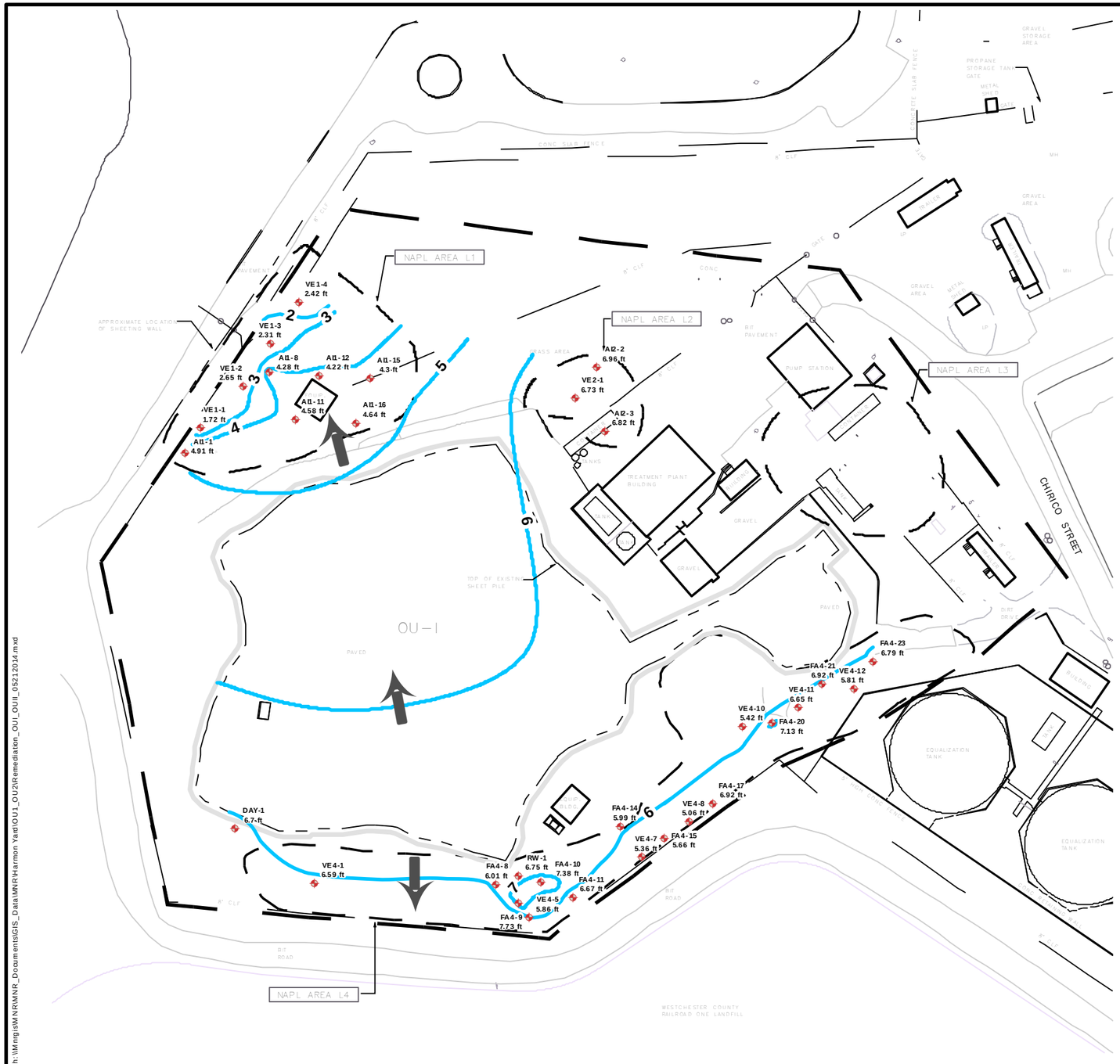
SITE MANAGEMENT PLAN

Drawing Title:
Groundwater Conour Map: February 22, 2014

Project No.
10-3231M (46)

FIGURE 1

Last Date Saved: 20 Mar 2014 Document Path: O:\MNR_Documents\GIS_Data\MNR\Harmon Yard\OU1_OU2\Remediation_OU1_OUII_02222014.mxd



NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

N

LEGEND:

- VE3-1 (5.59 ft) — Former Vapor Extraxtion (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- 3.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Extent of OU-I final cover system
- Extent of OU-I final cover system

0 40 80 160 Feet

PROJECT MANAGER	RLK
DATE	07-2014
DRAWN BY	AT/CPS
DATE DRAWN	07-2014
SCALE	As Noted
DATE ISSUED	07-09-2014

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

Drawing Title
SITE MANAGEMENT PLAN

Groundwater Conour Map: May 21. 2014

Project No.
10-3231M (46)

FIGURE 1

Last Date Saved: 09 Jul 2014 Document Path: \\Mngis\NYR\MNR_Documents\GIS_Data\MNR\Harmon Yard\OU1_OU2\Remediation_OU_I_OUII_05212014.mxd

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

N

LEGEND:

- VE 3-1 (6.59 ft) — Former Vapor Extraxtion (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- 3.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Extent of OU-I final cover system
- Extent of OU-I final cover system

0 40 80 160 Feet

PROJECT MANAGER	RLK
DRAWN BY	AT/CPS
SCALE	As Noted
DATE	09-2014
DATE DRAWN	09-2014
DATE ISSUED	09-17-2014

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

SITE MANAGEMENT PLAN

Drawing Title
Groundwater Conour Map: July 8, 2014

Project No.
10-3231M (46)

FIGURE 1

Last Date Saved: 17 Sep 2014 Document Path: \\Mrngis\mnr\MNR_Documents\GIS_Data\MNR\Harmon Yard\OU1_OU2\Remediation_OUI_OUII_07082014.mxd

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

N

LEGEND:

- VE 3-4 (2.48 ft) — Former Vapor Extraxtion (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- 3.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Extent of OU-I final cover system
- Extent of OU-I final cover system

0 40 80 160 Feet

PROJECT MANAGER	RLK
DRAWN BY	CPS
SCALE	As Noted
DATE	12-2014
DATE DRAWN	12-2014
DATE ISSUED	12-18-2014

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

SITE MANAGEMENT PLAN

Drawing Title
Groundwater Conour Map: November 20, 2014

Project No.
10-3231M (46)

FIGURE 1

Last Date Saved: 18 Dec 2014 Document Path: \\Mngis\MNR\MNR_Documents\GIS_Data\MNR\Harmon Yard\OU1_OU2\Remediation_OU1_OU II_11202014.mxd

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

N

LEGEND:

- VE 3-4 (2.48 ft) — Former Vapor Extraxtion (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- 3.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Extent of OU-I final cover system
- Extent of OU-I final cover system

0 40 80 160 Feet

PROJECT MANAGER	RLK
DRAWN BY	CPS
SCALE	As Noted
DATE	02-2015
DATE DRAWN	02-2015
DATE ISSUED	03-16-2015

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK
SITE MANAGEMENT PLAN

Drawing Title
Groundwater Conour Map: February 19, 2015

Project No.
10-3231M (46)

FIGURE 1

Last Date Saved: 16 Mar 2015 Document Path: \\Mmgis\MNR\MNR_Documents\GIS_Data\MNR\Harmon Yard\OU1_OU2\Remediation_OU1_OU2\2019\2015.mxd

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

N

LEGEND:

- VE 4-5 (3.82 ft) — Former Vapor Extraxtion (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- 3 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Extent of OU-I final cover system
- Extent of OU-I final cover system

0 40 80 160 Feet

PROJECT MANAGER	RLK
DRAWN BY	CPS
SCALE	As Noted
DATE	06-2015
DATE DRAWN	06-2015
DATE ISSUED	06-16-2015

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

SITE MANAGEMENT PLAN

Drawing Title
Groundwater Conour Map: May 20, 2015

Project No.
10-3231M (46)

FIGURE 1

Last Date Saved: 16 Jun 2015
Document Path: \\Mngis\MNR\MNR_Documents\GIS_Data\MNR\Harmon Yard\OU1_OU2\Remediation_OU1_OU2_05202015.mxd

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

N

LEGEND:

- VE 4-5 (5.49 ft) — Former Vapor Extraxtion (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- 4.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Extent of OU-I final cover system
- Extent of OU-I final cover system

0 40 80 160 Feet

PROJECT MANAGER	RLK
DRAWN BY	CPS
SCALE	As Noted
DATE	09-2015
DATE DRAWN	09-2015
DATE ISSUED	09-15-2015

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

Drawing Title
SITE MANAGEMENT PLAN

Groundwater Conour Map: August 14, 2015

Project No.
15-3356M (46)

FIGURE 1

Last Date Saved: 15 Sep 2015 Document Path: E:\GIS Mapping\MNR\Harmon\OU1_OU2\Remediation_OU_OUII_08142015.mxd

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

N

LEGEND:

- VE 4-5 (5.27 ft) — Former Vapor Extraxtion (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- 4.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Extent of OU-I final cover system
- Extent of OU-I final cover system

0 40 80 160 Feet

PROJECT MANAGER	RLK
DATE	12-2015
DRAWN BY	CPS
DATE DRAWN	12-2015
SCALE	As Noted
DATE ISSUED	12-18-2015

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

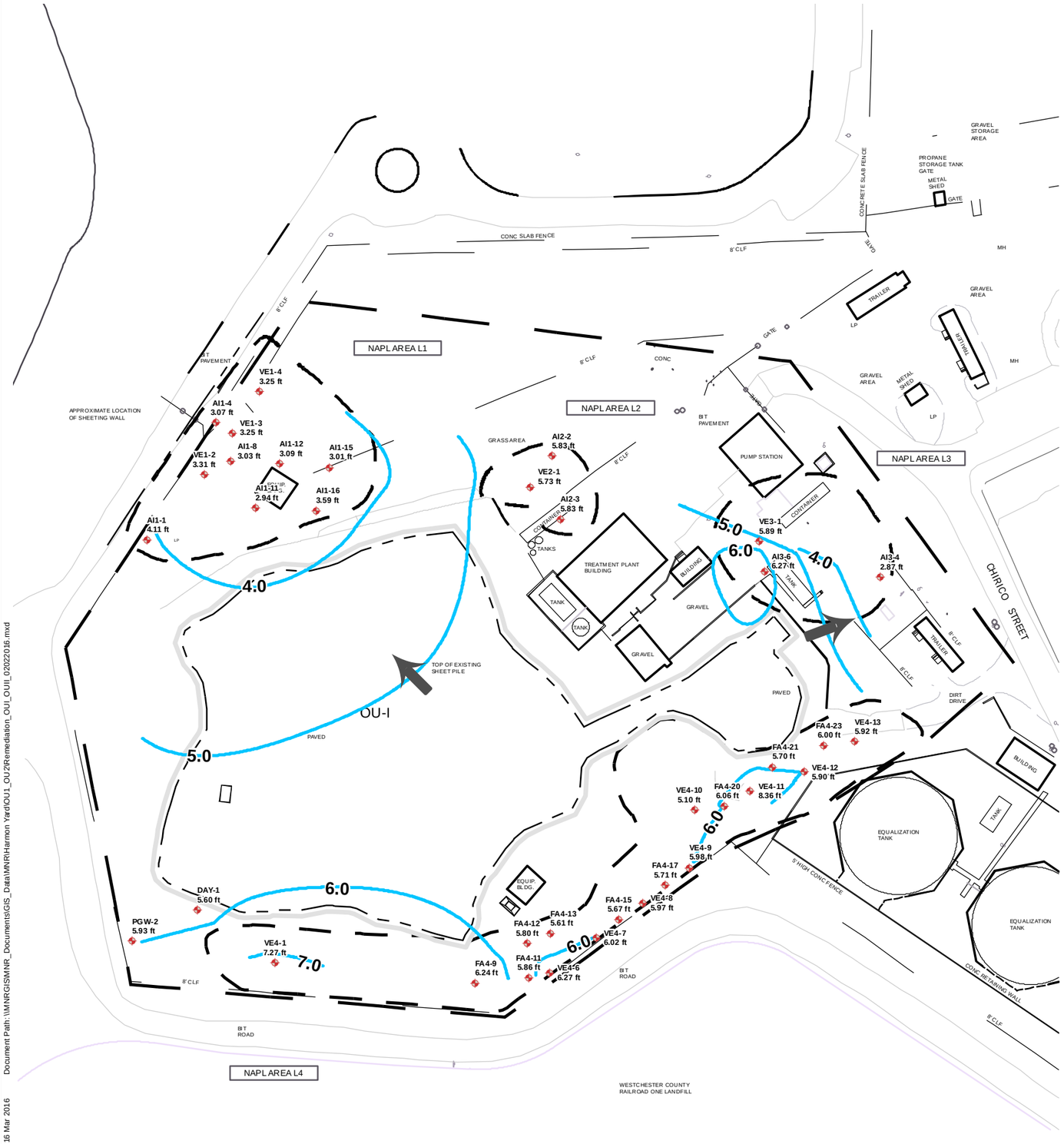
Drawing Title
SITE MANAGEMENT PLAN

Groundwater Conour Map: November 03, 2015

Project No.
15-3356M (46)

FIGURE 1

Last Date Saved: 18 Dec 2015 Document Path: \\Mmgis\MNRMNR_Documents\GIS_Data\MNRHarmon Yard\OU1_OU2\Remediation_OU1_OUII_11032015.mxd



NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

N

LEGEND:

- VE 4-6 (6.27 ft) — Former Vapor Extraction (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- 4.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Extent of OU-I final cover system
- Extent of OU-I final cover system

0 40 80 160 Feet

PROJECT MANAGER	RLK	DATE DRAWN	03-2016
DRAWN BY	CPS/CCD	DATE ISSUED	03-16-2016
		SCALE	As Noted

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ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

Drawing Title
SITE MANAGEMENT PLAN

Groundwater Conour Map: February 02, 2016

Project No.
15-5063M (46)

FIGURE 1

Last Date Saved: 16 Mar 2016
Document Path: \\MNRGIS\MNR_Documents\GIS_Data\MNR\Harmon Yard\OU1_OU2\Remediation_OU1_OU1_02022016.mxd

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

N

LEGEND:

- VE 4-6 (6.62 ft) — Former Vapor Extraction (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- 4.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Extent of OU-I final cover system
- Extent of OU-I final cover system

0 40 80 160 Feet

PROJECT MANAGER	RLK
DRAWN BY	CPS/CCD
SCALE	As Noted
DATE	06-2016
DATE DRAWN	06-2016
DATE ISSUED	06-21-2016

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

Drawing Title
SITE MANAGEMENT PLAN

Groundwater Conour Map: May 19, 2016

Project No.
15-3356M (46)

FIGURE 1

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.
2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

N

LEGEND:

- VE 4-6 (7.07 ft) — Former Vapor Extraction (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- 4.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Extent of OU-I final cover system
- Extent of OU-II final cover system
- WB-9 — Existing NAPL Area L1 Monitoring Well

Proposed Monitoring Wells to be Installed September 2016

- Well-A — Off-Site Monitoring Well
- SP - North — Monitoring Well near Northern Terminus of NAPL Area L1 Sheet Pile Wall

0 40 80 160 Feet

PROJECT MANAGER	RLK
DRAWN BY	CPS/CCD
SCALE	As Noted
DATE	09-2016
DATE DRAWN	09-2016
DATE ISSUED	09-08-2016

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

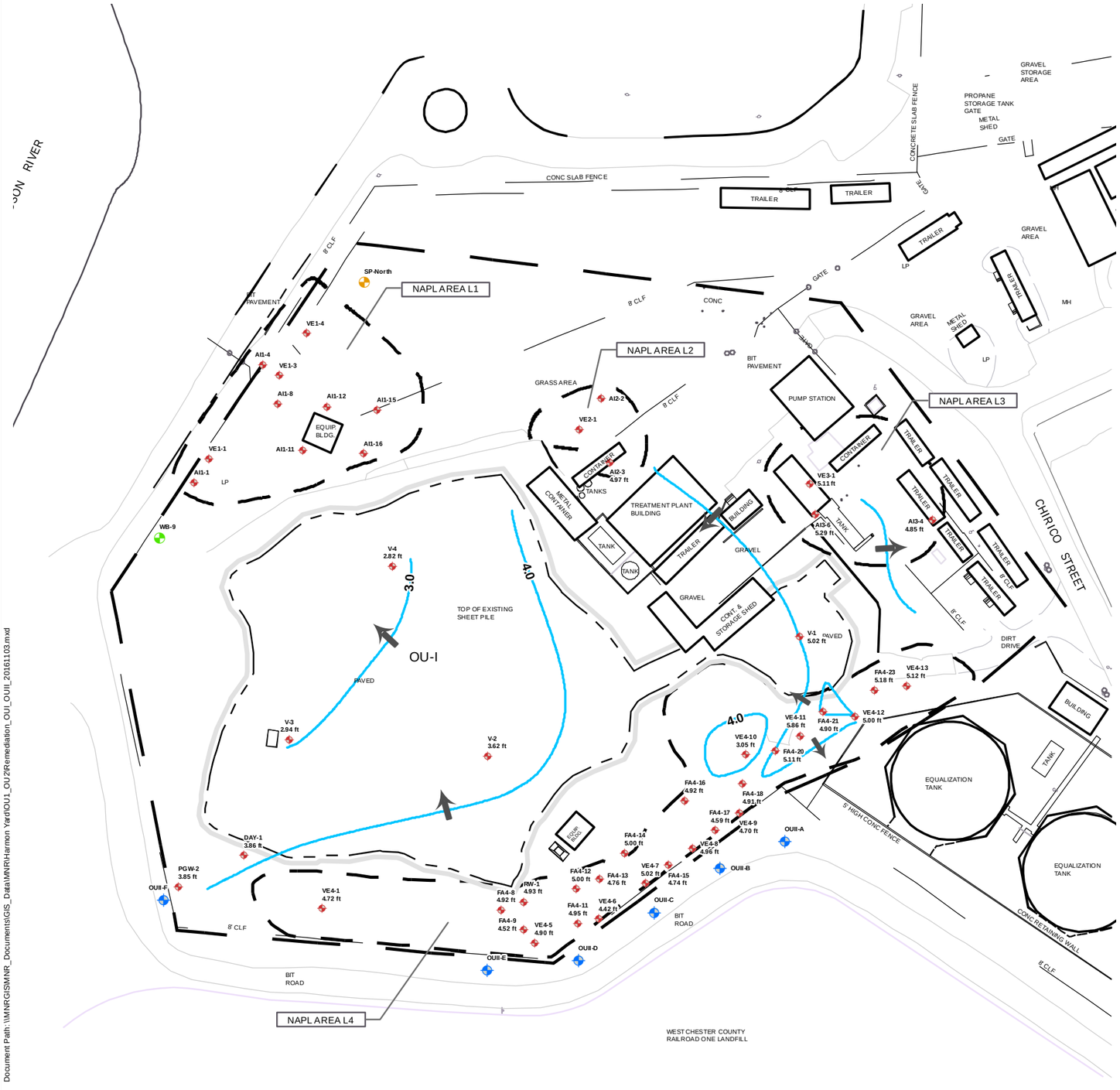
Drawing Title
SITE MANAGEMENT PLAN

Groundwater Contour Map: August 3, 2016

Project No.
15-3356M (46)

FIGURE 1

Document Path: \\Daygis\mmgis\GIS_Data\MNR\Harmon Yard\OU1_OU2\Remediation_OU_OUII_20160803revised.mxd
Last Date Saved: 16 Sep 2016



NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.
2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

N

LEGEND:

- VE 4-6 (4.42 ft) — Former Vapor Extraction (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- Off-site monitoring well installed September 2016
- Existing monitoring well near the southern terminus of the sheet pile wall in NAPL Area L1
- Monitoring well near the northern terminus of the sheet pile in NAPL Area L1
- 4.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Extent of OU-I final cover system
- Extent of OU-I final cover system

0 40 80 160 Feet

PROJECT MANAGER	RLK
DRAWN BY	CPS
SCALE	As Noted
DATE	12-2016
DATE DRAWN	12-2016
DATE ISSUED	12-21-2016

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

Drawing Title
SITE MANAGEMENT PLAN

Groundwater Contour Map: November 2016

Project No.
15-3356M (46)

FIGURE 1

Last Date Saved: 22 Dec 2016 Document Path: \\MNRGIS\MNR_Documents\GIS_Data\MNR\Harmon Yard\OU1_OU2\Remediation_OU_I_OUII_20161103.mxd

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

LEGEND:

- VE 4-6 (4.42 ft) — Former Vapor Extraction (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation; Groundwater elevation for water level measurement made
- Off-site monitoring well installed September 2016
- Existing monitoring well near the southern terminus of the sheet pile wall in NAPL Area L1
- Monitoring well near the northern terminus of the sheet pile in NAPL Area L1
- 4.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Approximate location of L1 sheet pile wall
- Extent of OU-I final cover system
- OU-II Boundary

N

0 40 80 160 Feet

PROJECT MANAGER	RLK
DRAWN BY	CPS
SCALE	As Noted
DATE	03-2017
DATE DRAWN	03-2017
DATE ISSUED	03-28-2017

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

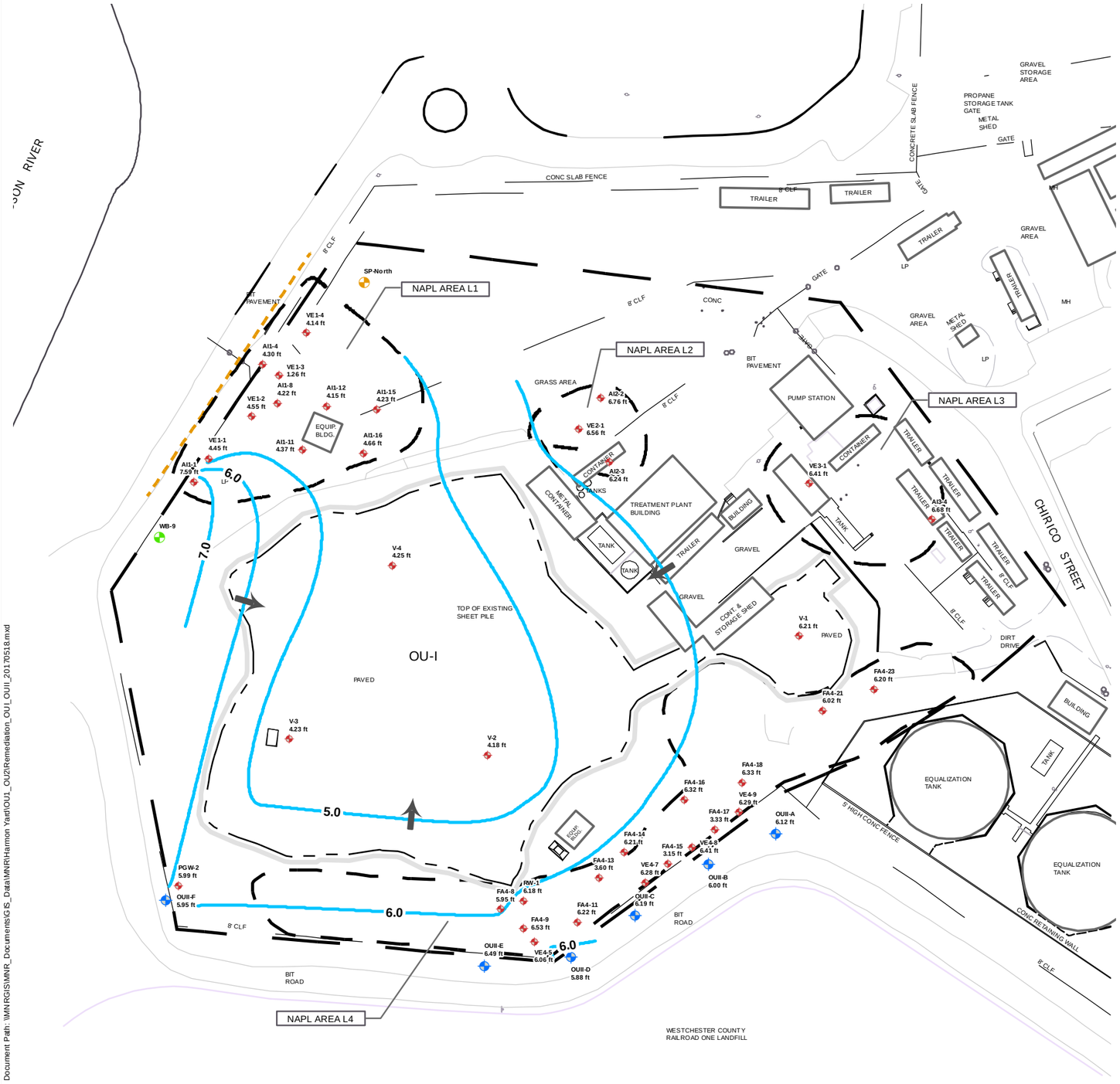
SITE MANAGEMENT PLAN

Drawing Title
Groundwater Contour Map: February 2017

Project No.
15-3356M (46)

FIGURE 1

Last Date Saved: 28 Mar 2017 Document Path: \\MNRGIS\MNR_Documents\GIS_Data\MNRHarmon Yard\OU1_OU2\Remediation_OU_I_OUII_20170223.mxd



N

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.
2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

LEGEND:

- VE 4-6 (6.41 ft) — Former Vapor Extraction (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation; Groundwater elevation for water level measurement made
- Off-site monitoring well installed September 2016
- Existing monitoring well near the southern terminus of the sheet pile wall in NAPL Area L1
- Monitoring well near the northern terminus of the sheet pile in NAPL Area L1
- 4.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Approximate location of L1 sheet pile wall
- Extent of OU-I final cover system
- OU-II Boundary

0 40 80 160 Feet

PROJECT MANAGER	RLK
DRAWN BY	CPS
SCALE	As Noted
DATE	06-2017
DATE DRAWN	06-2017
DATE ISSUED	06-22-2017

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

SITE MANAGEMENT PLAN

Drawing Title
Groundwater Contour Map: May 2017

Project No.
15-3356M (46)

FIGURE 1

Last Date Saved: 23 Jun 2017 Document Path: \\MN\RGIS\MNR_Documents\GIS_Data\MN\Rkharmon Yard\OU1_OU2\Remediation_OUI_OUII_20170518.mxd

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.
2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

LEGEND:

- VE 4-6 (5.73 ft) — Former Vapor Extraction (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- Off-site monitoring well installed September 2016
- Existing monitoring well near the southern terminus of the sheet pile wall in NAPL Area L1
- Monitoring well near the northern terminus of the sheet pile in NAPL Area L1
- 4.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Approximate location of L1 sheet pile wall
- Extent of OU-I final cover system
- OU-II Boundary

0 40 80 160 Feet

PROJECT MANAGER	RLK
DRAWN BY	CPS
SCALE	As Noted
DATE	09-2017
DATE DRAWN	09-2017
DATE ISSUED	09-26-2017

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

SITE MANAGEMENT PLAN

Drawing Title
Groundwater Contour Map: August 2017

Project No.
15-3356M (46)

FIGURE 1

Last Date Saved: 26 Sep 2017 Document Path: \\MNRGIS\MNR_Documents\GIS_Data\MNRHarmon Yard\OU1_OU2\Remediation_OUI_OUII_20170809.mxd

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.
2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

N

LEGEND:

- VE 4-6 (6.66 ft) — Former Vapor Extraction (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- Off-site monitoring well installed September 2016
- Existing monitoring well near the southern terminus of the sheet pile wall in NAPL Area L1
- Monitoring well near the northern terminus of the sheet pile in NAPL Area L1
- 4.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Approximate location of L1 sheet pile wall
- Extent of OU-I final cover system
- OU-II Boundary

0 40 80 160 Feet

PROJECT MANAGER	RLK
DATE	12-2017
DRAWN BY	CPS
DATE DRAWN	12-2017
SCALE	As Noted
DATE ISSUED	12-13-2017

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

DRAFT

Project Title: METRO-NORTH RAIL ROAD HARMON YARD OPERABLE UNITS OU-I AND OU-II CROTON-ON-HUDSON, NEW YORK

Drawing Title: SITE MANAGEMENT PLAN

Groundwater Contour Map: November 2017

Project No. 15-3356M (46)

FIGURE 1

Last Date Saved: 13 Dec 2017 Document Path: \\MNRGIS\MNR_Documents\GIS_Data\MNRHarmon Yard\OU1_OU2\Remediation_OUI_OUII_20171102.mxd

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.
2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

N

LEGEND:

- VE 4-6 (6.63 ft) — Former Vapor Extraction (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- Off-site monitoring well installed September 2016
- Existing monitoring well near the southern terminus of the sheet pile wall in NAPL Area L1
- Monitoring well near the northern terminus of the sheet pile in NAPL Area L1
- 4.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Approximate location of L1 sheet pile wall
- Extent of OU-I final cover system
- OU-II Boundary

0 40 80 160 Feet

PROJECT MANAGER	RLK
DATE	03-2018
DRAWN BY	CPS
DATE DRAWN	03-2018
SCALE	As Noted
DATE ISSUED	03-28-2018

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

SITE MANAGEMENT PLAN

Drawing Title
Groundwater Contour Map: February 14, 2018

Project No.
15-3356M (46)

FIGURE 1

Document Path: \\MNRGIS\MNR_Documents\GIS_Data\MNR\Harmon Yard\OU_OU2\Remediation_OU_OUII_20180214.mxd

Last Date Saved: 28 Mar 2018

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

LEGEND:

- VE 4-6 (6.63 ft) — Former Vapor Extraction (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- Off-site monitoring well installed September 2016
- Existing monitoring well near the southern terminus of the sheet pile wall in NAPL Area L1
- Monitoring well near the northern terminus of the sheet pile in NAPL Area L1
- 4.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Approximate location of L1 sheet pile wall
- Extent of OU-I final cover system
- OU-II Boundary

0 40 80 160 Feet

PROJECT MANAGER	RLK
DRAWN BY	CPS
SCALE	As Noted
DATE	06-2018
DATE DRAWN	06-2018
DATE ISSUED	06-28-2018

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

SITE MANAGEMENT PLAN

Drawing Title
Groundwater Contour Map: May 2018

Project No.
15-3356M (46)

FIGURE 1

Last Date Saved: 28 Jun 2018 Document Path: \\MNRGIS\MNR_Documents\GIS_Data\MNR\Harmon Yard\OU1_OU2\Remediation_OU1_OUII_201805.mxd

N

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

LEGEND:

- VE 4-6 (7.48 ft) — Former Vapor Extraction (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- 4.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Approximate location of L1 sheet pile wall
- Extent of OU-I final cover system
- OU-II Boundary

0 40 80 160 Feet

PROJECT MANAGER	RLK
DATE	09-2018
DRAWN BY	CPS
DATE DRAWN	09-2018
SCALE	As Noted
DATE ISSUED	09-27-2018

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

SITE MANAGEMENT PLAN

Drawing Title
Groundwater Contour Map: August 2018

Project No.
15-3356M (46)

FIGURE 1

Last Date Saved: 28 Sep 2018 Document Path: \\MN\RGIS\MNR_Documents\GIS_Data\MNR\Harmon Yard\OU1_OU2\Remediation_OU1_OU1_20180928.mxd

N

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

LEGEND:

- VE 4-6 (7.48 ft) — Former Vapor Extraction (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- Off-site monitoring well installed September 2016
- Existing monitoring well near the southern terminus of the sheet pile wall in NAPL Area L1
- 4.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Approximate location of L1 sheet pile wall
- Extent of OU-I final cover system
- OU-II Boundary

0 40 80 160 Feet

PROJECT MANAGER	RLK
DATE	12-2018
DRAWN BY	CPS
DATE DRAWN	12-2018
SCALE	As Noted
DATE ISSUED	12-17-2018

day
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ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

Drawing Title
SITE MANAGEMENT PLAN

Groundwater Contour Map: November 6, 2018

Project No.
15-3356M (46)

FIGURE 1

Document Path: \\MN\RGIS\MNR_Documents\GIS_Data\MNR\Harmon Yard\OU1_OU2\Remediation_OU1_OU2_20181106.mxd

Last Date Saved: 18 Dec 2018

N

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.
2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

LEGEND:

- VE 4-6 (7.48 ft) — Former Vapor Extraction (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- Off-site monitoring well installed September 2016
- Existing monitoring well near the southern terminus of the sheet pile wall in NAPL Area L1
- 4.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Approximate location of L1 sheet pile wall
- Extent of OU-I final cover system
- OU-II Boundary

0 40 80 160 Feet

PROJECT MANAGER	RLK
DATE	06-2019
DRAWN BY	CPS
DATE DRAWN	06-2019
SCALE	As Noted
DATE ISSUED	02-04-2019

day
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ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

Drawing Title
SITE MANAGEMENT PLAN

Groundwater Contour Map: February 4, 2019

Project No.
15-3356M (46)

FIGURE 1

Last Date Saved: 20 Jun 2019 Document Path: \\MN\RGIS\MNR_Documents\GIS_Data\MNR\Harmon Yard\OU1_OU2\Remediation_OU1_OU2\20190204.mxd

N

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

LEGEND:

- VE 4-6 (6.52 ft) — Former Vapor Extraction (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- Off-site monitoring well installed September 2016
- Existing monitoring well near the southern terminus of the sheet pile wall in NAPL Area L1
- 4.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Approximate location of L1 sheet pile wall
- Extent of OU-I final cover system
- OU-II Boundary

0 40 80 160 Feet

PROJECT MANAGER	RLK
DATE	10-2019
DRAWN BY	CPS
DATE DRAWN	10-2019
SCALE	As Noted
DATE ISSUED	10-21-2019

day
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Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

Drawing Title
SITE MANAGEMENT PLAN

Groundwater Contour Map: August 2019

Project No.
15-3356M (46)

FIGURE 1

Last Date Saved: 21 Oct 2019
Document Path: \\MN\RGIS\MNR_Documents\GIS_Data\MNR\Harmon Yard\OU1_OU2\Remediation_OU1_OU2\20190802.mxd

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

LEGEND:

- VE 4-6 (6.14 ft) — Former Vapor Extraction (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- Off-site monitoring well installed September 2016
- Existing monitoring well near the southern terminus of the sheet pile wall in NAPL Area L1
- 4.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Approximate location of L1 sheet pile wall
- Extent of OU-I final cover system
- OU-II Boundary

N

0 40 80 160 Feet

PROJECT MANAGER	RLK
DATE	01-2020
DRAWN BY	CPS
DATE DRAWN	01-2020
SCALE	As Noted
DATE ISSUED	01-06-2020

day
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Project Title: METRO-NORTH RAIL ROAD HARMON YARD OPERABLE UNITS OU-I AND OU-II CROTON-ON-HUDSON, NEW YORK

Drawing Title: SITE MANAGEMENT PLAN

Groundwater Contour Map: November 2019

Project No. 15-3356M (46)

FIGURE 1

Last Date Saved: 06 Jan 2020 Document Path: \\MN\RGIS\MNR_Documents\GIS_Data\MNR\North White Plains\Project Status Reports Figures\Remediation_OU_OUI_20191101.mxd

N

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

LEGEND:

- VE 4-6 (7.46 ft) — Former Vapor Extraction (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- Off-site monitoring well installed September 2016
- Existing monitoring well near the southern terminus of the sheet pile wall in NAPL Area L1
- 4.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Approximate location of L1 sheet pile wall
- Extent of OU-I final cover system
- OU-II Boundary

0 40 80 160 Feet

PROJECT MANAGER	RLK
DATE	10-2019
DRAWN BY	CPS
DATE DRAWN	04-2020
SCALE	As Noted
DATE ISSUED	04-17-2020

day
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NEW YORK, NEW YORK 10170

Project Title: METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK
SITE MANAGEMENT PLAN

Drawing Title: **Groundwater Contour Map: February 2020**

Project No.
15-3356M (46)

FIGURE 1

Last Date Saved: 17 Apr 2020 Document Path: \\mmgis1\MNRR\MNR_Documents\GIS_Data\MNRH\Harmon Yard\OU1_OU2\Remediation_OU1_OUII_20200204.mxd

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

LEGEND:

- VE 4-6 (6.02 ft) — Former Vapor Extraction (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation; Groundwater elevation for water level measurement made
- Off-site monitoring well installed September 2016
- Existing monitoring well near the southern terminus of the sheet pile wall in NAPL Area L1
- 4.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Approximate location of L1 sheet pile wall
- Extent of OU-I final cover system
- OU-II Boundary

0 40 80 160 Feet

PROJECT MANAGER	RLK
DATE	07-2020
DRAWN BY	CPS
DATE DRAWN	07-2020
SCALE	As Noted
DATE ISSUED	07-29-2020

day
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NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

SITE MANAGEMENT PLAN

Drawing Title
Groundwater Contour Map: June 2020

Project No.
20-3558M

FIGURE 1

Last Date Saved: 04 Aug 2020 Document Path: \\mmgis1\MNR\MNR_Documents\GIS_Data\MNR\Harmon Yard\OU1_OU2\Remediation_OU1_OUII_20200701.mxd

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

LEGEND:

- VE 4-6 (7.42 ft) — Former Vapor Extraction (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- Off-site monitoring well installed September 2016
- Existing monitoring well near the southern terminus of the sheet pile wall in NAPL Area L1
- 4.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Approximate location of L1 sheet pile wall
- Extent of OU-I final cover system
- OU-II Boundary

0 40 80 160 Feet

N

PROJECT MANAGER	RLK
DATE	10-2020
DRAWN BY	CPS
DATE DRAWN	10-2020
SCALE	As Noted
DATE ISSUED	10-22-2020

day
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NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK
SITE MANAGEMENT PLAN

Drawing Title
Groundwater Contour Map: August 2020

Project No.
20-3558M

FIGURE 1

Last Date Saved: 30 Oct 2020 Document Path: \\mmgis1\MNR\MNR_Documents\GIS_Data\MNR\Harmon Yard\OU1_OU2\Remediation_OU1_OU2\Remediation_OU1_20200801.mxd

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

LEGEND:

- VE 4-6 (7.42 ft) — Former Vapor Extraction (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- Off-site monitoring well installed September 2016
- Existing monitoring well near the southern terminus of the sheet pile wall in NAPL Area L1
- 4.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Approximate location of L1 sheet pile wall
- Extent of OU-I final cover system
- OU-II Boundary

0 40 80 160 Feet

PROJECT MANAGER	RLK
DATE	01-2021
DRAWN BY	CPS
DATE DRAWN	01-2021
SCALE	As Noted
DATE ISSUED	01-26-2021

day
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NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

SITE MANAGEMENT PLAN

Drawing Title
Groundwater Contour Map: December 2020

Project No.
21-3579M

FIGURE 1

Last Date Saved: 27 Jan 2021 Document Path: O:\GIS_Data\MNRH\Harmon Yard\OU1_OU2\Remediation_OU1_OU2\20201201.mxd

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

LEGEND:

- VE 4-6 (7.18 ft) — Former Vapor Extraction (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- Off-site monitoring well installed September 2016
- Existing monitoring well near the southern terminus of the sheet pile wall in NAPL Area L1
- 4.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Approximate location of L1 sheet pile wall
- Extent of OU-I final cover system
- OU-II Boundary

DATE	04-2021
PROJECT MANAGER	RLK
DATE DRAWN	04-2021
DRAWN BY	CPS
DATE ISSUED	04-19-2021
SCALE	As Noted

day
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ROCHESTER, NEW YORK 14606
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Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK
SITE MANAGEMENT PLAN

Drawing Title
Groundwater Contour Map: February 2021

Project No.
21-3590M

FIGURE 1

Document Path: E:\GIS Mapping\RSTW\5491R-18\RSTW\SVIS\Remediation_OUI_OUII_20210201.mxd

Last Date Saved: 19 Apr 2021

NOTES:

1. This drawing was prepared from a CAD base file provides by others, from a drawing by ERM, entitled "EXISTING SITE PLAN AND SURVEY CONTROL" sheet No. C-1 dated 7/31/00 and from a drawing by ERM, "SITE PLAN WITH LOCATIONS OF PROPOSED WELLS AND SHEET PILING", sheet No. C-2, dated 7/31/00.

2. Operable Unit II (OU-II) remedy well locations were determined from coordinate values listed on the ERM drawings identified in note No. 1.

LEGEND:

- VE 4-6 (7.42 ft) — Former Vapor Extraction (VE), Air Inlet (AI), Forced Air Injection (FA), or existing monitoring well and designation
- Groundwater elevation for water level measurement made
- Off-site monitoring well installed September 2016
- Existing monitoring well near the southern terminus of the sheet pile wall in NAPL Area L1
- 4.0 — Groundwater contour
- Apparent groundwater flow direction
- OU-II NAPL area boundaries
- Approximate location of sheet pile wall around remediated former lagoon area (OU-I)
- Approximate location of L1 sheet pile wall
- Extent of OU-I final cover system
- OU-II Boundary

0 40 80 160 Feet

PROJECT MANAGER	RLK
DRAWN BY	CPS
SCALE	As Noted
DATE	08-2021
DATE DRAWN	08-2021
DATE ISSUED	08-04-2021

day
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

Project Title
METRO-NORTH RAIL ROAD
HARMON YARD OPERABLE UNITS OU-I AND OU-II
CROTON-ON-HUDSON, NEW YORK

SITE MANAGEMENT PLAN

Drawing Title
Groundwater Contour Map: May 2021

Project No.
21-3602M

FIGURE 1

Last Date Saved: 06 Aug 2021 Document Path: \\nmrgis1\MNR\MNR_Documents\GIS_Data\MNR\Harmon Yard\OU1_OU2\Remediation_OU_I_OU_II_20210504.mxd

APPENDIX D

SPILL BUDDY™ AND MAGNUM SPILL BUSTER™ TECHNICAL SPECIFICATIONS

Spill Buddy System Specifications

The Complete Spill Buddy includes:

Portable reel with 50 feet (15 meters) of down-well tubing and pump with water interface detector; 120 VAC wall transformer charger, and 10 feet of nylon NAPL discharge tubing.

Minimum skimming thickness:

0.1 inch with no water pumped

0 inches with a small amount of water pumped

Pumping rate:

Approx. 0.7 gpm for Spill Buddy

Pumping head:

100 ft

Pumping time:

1 hour continuous pumping per battery charge (approx. 40 gallons of Product)

Battery:

12VDC, 5 Amp hours sealed lead acid (included) (We recommend a second battery for a backup on site)

Battery charger:

Wall transformer. A cigarette-lighter jack is available as an option for charging between sites.

Fluids:

Most hydrocarbons, floaters (LNAPLS) or sinkers (DNAPLS) Note: The pump used in the Spill Buddy system contains aluminum parts that are potentially reactive with halogenated hydrocarbons.

Viscosity Ranges:

Standard Pump- 0 to 10cp at 70°F

Optional Medium Viscosity Pump- Up to 25cp

Operating temperature:

0° to 130°F ambient temperature

Size:

18 1/2″H x 15″W x 8 1/2″D

Weight:

19 lbs (with battery)

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System Specifications

The Complete Magnum Spill Buster™ System includes:

Magnum Spill Buster™ Control Box, Magnum Spill Buster™ Probe with 50′ cable, Auto Seeker with 30′ cable set, Recovery Tank Overflow Sensor with 30′ cable and Recovery Tank bung, 50′ nylon NAPL discharge tubing.

Input Power

115 VAC or 230 VAC, 100 Watts max. or 24 VDC, 75 watts max.
with optional battery cable and deep discharge batteries.

Operating Temperature Range

-40 to +140 degrees F or
-40 to +60 degrees C

Fluids:

Most hydrocarbons, floaters (LNAPLS) or sinkers (DNAPLS) **Note:** The pump used in the Magnum system contains aluminum parts that are potentially reactive with halogenated hydrocarbons.

Viscosity Ranges

0 to 12cp at 70° F

Pumping Rate

Up to 45 GPH (171 LPH) @ 0 PSI (Zero depth and no discharge back pressure.)
Or Up to 15 GPH (57 LPH) @ 50 PSI (50′ deep and 25 PSI discharge back pressure.)

Standard Well Depth

50′. max.

Maximum Well Depth

150′ on special order with 150′ down-well cable.

Minimum Well Head Clearance for AUTO SEEKER

24″ X 24″ X 22″ deep

Probe Dimensions

1.9″ dia. x 16″ long (cable dia. including the discharge tube is 0.5″)
Standard Probe cable length is 50′.

Control Box Dimensions

14″ wide x 19″ high x 6″ deep. An additional 10″ is required below for cable exit and an additional 14″ is required in

front and to the left for door swing.

Standard Cable Length

30′ from Control Box to well head

NAPL Recovery Tank Overflow Sensor

Threads into a standard 2″ barrel bung. Standard cable length is 30′.

Total system Weight

67 lbs.

---

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Accessories

Immediate Response Box


Magnum Spill Buster
Immediate Response Box

The Immediate Response Box (I.R. Box) is a rugged plastic box that contains a Magnum Spill Buster system. The I.R. Box provides an extremely portable system to start removal of product in a 2″ or larger well with minimal equipment set-up. A large forged shackle is attached on one end of the box for security.

The I.R. Box can easily be carried in a small pick-up or van. The basic setup involves mounting the Auto Seeker onto the well head, connecting the product tank discharge tube and overflow sensor to the product tank, and connecting the Auto Seeker and Probe signal cables to the Control Panel mounted in the I.R. Box.

The system is powered by 115VAC from an extension cord or is hard-wired, or cables can be provided to operate the system from a 24 volt deep cycle battery setup (2 12 volt batteries connected in series).

Solar Panel Charging Option

For sites with no utility connection available, batteries with a photovoltaic recharging system (solar panels) can fully power the Magnum Spill Buster. The Solar Panel Charging system includes the panels, a heavy-duty frame and mounting hardware, deep-cycle batteries, waterproof control box with regulator, and custom cabling. Configuration of

the charging system (size and number of panels) primarily depends on the location of the site and the amount of sunlight available. The duty cycle, or percentage of time the system will run, is also determined by the amount of product present at the site.

Magnum Spill Buster, Solar Panel Charging System

Water Depression Option

A secondary water pump can be used to create a huge hydraulic funnel that pulls product towards the well from greater distances than are attainable with product skimming alone.

The result looks something like Figure A.

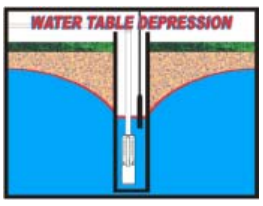

Figure A.
Water Table Depression

Dual pump product recovery operation can be accomplished with the Magnum Spill Buster System plus a Water Depression Control Module and a Grundfos Redi-Flo 3 SQE-NE pump sized to your well (minimum well diameter required is 4 inches). The Magnum Water Depression system is designed specifically to take advantage of all the features of the Grundfos Redi-Flo 3 SQE-NE pump.

Water Depression Control Module

This module obtains its water level signals and control logic from the Magnum system control box and in turn controls water flow by using the soft start feature of the Grundfos pump to turn it on and off. Clean Earth Technology offers this line of Grundfos submersible pumps with NEC fittings to safely bring the high level AC voltage through the recovery zone to the pump.

A set of normally open contacts is provided for use with a safety override probe, which will shut down the water pump when closed.

Grundfos Redi-Flo 3 pump, with NEC fittings

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