FIFTH FIVE-YEAR REVIEW REPORT
POLLUTION ABATEMENT SERVICES SUPERFUND SITE
OSWEGO COUNTY, NEW YORK

Prepared by

U.S. Environmental Protection Agency
Region 2
New York, New York

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Date

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LIST OF ABBREVIATIONS & ACRONYMS

AOC	Administrative Order on Consent
ARAR	Applicable or Relevant and Appropriate Requirement
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FFS	Focused Feasibility Study
FS	Feasibility Study
FYR	Five-Year Review
GWQS	Groundwater Quality Standard
HI	Hazard Index
ICs	Institutional Controls
IGR	Interim Groundwater Removal
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
LCW	Leachate Collection Well
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
NYSDEC	New York State Department of Environmental Conservation
PRP	Potentially Responsible Party
PCB	Polychlorinated Biphenyl
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
SPRDS	Supplemental Pre-Remedial Design Study
VOC	Volatile Organic Compound

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR review for the Pollution Abatement Services Superfund Site (Site) pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP)(40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fifth FYR for the Site. The triggering action for this statutory FYR is January 9, 2014, the signature date of the previous FYR report. The FYR has been conducted because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure.

The Site is being addressed under four operable units (OUs). OU1 involved removal actions taken from 1973 to 1982 by EPA and the New York State Department of Environmental Conservation (NYSDEC); OU2 involves the containment of the landfill and contaminated groundwater; OU3 addresses groundwater contamination found outside of the containment system; and OU4 is associated with PCB-contaminated sediments in White and Wine Creeks which are located adjacent to the Site property. OU2, OU3, and OU4 are evaluated in this FYR.

The FYR was led by Patricia Simmons Pierre, the EPA Remedial Project Manager. Other EPA participants included Joel Singerman (Central New York Remediation Section Chief), Marian Olsen (Human Health Risk Assessor), Mindy Pensak (Ecological Risk Assessor), Rachel Griffiths (Hydrogeologist), Peter Lisichenko (On-Scene Coordinator), and Michael Basile (Community Involvement Coordinator).

Site Background

The Site is located on 15 acres within the eastern city limits of the City of Oswego, New York and is bounded on the south by East Seneca Street and on the east, north and west by wetlands formed along the stream channels of White and Wine Creeks. Just to the north (downstream) of the Site is the confluence of White and Wine Creeks. Wine Creek flows approximately 1,800 feet beyond the confluence (northward) to a channel and into Lake Ontario. Just east of this channel is a wetland which is located next to a residential area known as Smith's Beach (see Figure 1 of Appendix B).

A high-temperature, liquid chemical waste incineration facility operated on the property from 1970 through 1977. Because the incinerator never operated properly, thousands of drums containing various chemical wastes accumulated on-Site and tank loads of liquid waste were stored in on-Site lagoons. Throughout its operational life, the facility experienced continuous operating problems, and numerous air and water quality violations, including liquid waste spills and the overflow of liquid wastes from lagoons into White Creek.

The Site property is zoned for industrial use. The area between the Site and Lake Ontario (to the north) is mostly undeveloped and currently supports multiple land uses, including a cemetery, a wetland, and commercial and residential areas.

Both White and Wine Creeks are used by a wide variety of wildlife, including avian and fish species, the latter utilizing the streams for spawning. The lower reach of Wine Creek, near Lake Ontario, is used for seasonal recreational fishing. The area groundwater is classified as Class GA (drinking water source). However, residents within the Oswego City limits receive public water and the establishment of residential water supply wells within the contaminated area and City limits is prohibited by law.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Pollution Abatement Services		
EPA ID: NYD000511659		
Region: 2	**State:** NJ	**City/County:** Oswego/Oswego
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: EPA		
Author name (Federal or State Project Manager): Patricia Simmons Pierre		
Author affiliation: EPA		
Review period: 1/9/2014 - 12/7/2018		
Date of site inspection: 11/5/2018		
Type of review: Statutory		
Review number: 5		
Triggering action date: 1/9/2014		
Due date *(five years after triggering action date)*: 1/9/2019		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

In 1981, the Site, which was ranked number seven on the original National Priorities List (NPL), was selected as one of the first sites in the nation to receive CERCLA Trust Fund monies for cleanup actions.

From 1982 to 1984, NYSDEC performed a remedial investigation/feasibility study (RI/FS) at the Site, which included a human health risk assessment. The analytical data generated during the RI showed extensive soil and groundwater contamination on-Site. In addition, contaminated surface water and groundwater were found to be migrating off-Site.

Benzene, vinyl chloride, and metals (*i.e.*, arsenic, manganese, and barium) were identified as the contaminants of concern (COCs) in the bedrock aquifer. The human health risk assessment determined that the associated increased cancer risks from the ingestion of groundwater, by adults and children, assuming the aquifer is a drinking water source, exceeded the risk range established under the NCP of $1x10^{-6}$ (or 1 in a million) to $1x10^{-4}$ (one in ten thousand). The cumulative upper-bound increased cancer risk at the Site from groundwater consumption was $7x10^{-4}$ (7 in ten thousand) for children and $8x10^{-4}$ (8 in 10,000) for adults. Arsenic was a primary contributor to the risk. The noncancer hazard indexes (HIs) for this future exposure scenario was estimated at 26 for adults and 15 for children, which are 26 and 15 times greater than the goal of protection of a HI = 1. The noncancer HI for adults was associated with exposures to arsenic and manganese and for the child was associated with arsenic, barium and manganese.

Polychlorinated biphenyls (PCBs) are the COCs in the sediments in White and Wine Creeks and the adjacent wetlands. From 1984 to 1986, NYSDEC performed an environmental assessment of the area in the vicinity of the Site, which included White and Wine Creeks, and determined that no remediation of the creeks was required.

Based upon data collected at the Site between 1991 and 1996, EPA conducted human health and ecological risk assessments to evaluate the risks associated with the creek sediments. The human health risk assessment found increased cancer risks and noncancer hazards from ingestion and dermal contact with sediments were $1.4x10^{-6}$ for adults and $8.8x10^{-6}$ for children, which are within the acceptable risk range established by the NCP. The noncancer HIs from exposure to PCB-contaminated sediments were 0.23 and 1.08 for adults and children, respectively. The noncancer HI for children slightly exceeded the goal of protection of one (*e.g.*, HI = 1).

The ecological risk assessment concluded that the levels of PCBs present in the sediments in the depositional areas of White Creek in the vicinity of the Site posed an unacceptable risk to ecological receptors, as represented by the green backed heron and mink that might use the creek and adjacent wetlands as foraging areas. However, while the Site was a source of PCB contamination before the construction of the containment system, there were several potential current sources of PCB contamination located upstream of the Site. Therefore, it was determined that the Site did not pose an unacceptable risk to ecological receptors in the White Creek area.

Response Actions

Beginning in 1973, a series of incidents, including liquid waste spills and the overflow of liquid wastes from lagoons into White Creek, led to the involvement of EPA and the NYSDEC at the Site. Response actions taken from 1973 to 1982 by EPA, NYSDEC, and the U. S. Coast Guard included an oil spill

cleanup, the removal of the incineration facilities, drummed wastes, bulk liquid wastes and contaminated soils, and the closure of two on-Site lagoons.

Based on the results of the RI/FS, EPA signed a ROD for OU2 in 1984. The remedial action objectives (RAOs) for this ROD were to reduce and minimize the downgradient migration of contaminants in the groundwater and to minimize any potential human health and ecological impacts resulting from the exposure to contaminants at and downgradient from the Site. The selected remedy included the limited excavation and off-Site disposal of contaminated materials, installation of a perimeter slurry wall, Site grading and capping in accordance with Resource Conservation and Recovery Act (RCRA) requirements, installation of a leachate collection and treatment system, and groundwater monitoring. The groundwater remediation goals selected in the OU2 ROD are listed in Table 1, below.

Table 1: OU2 Remediation Goals

COC	Remediation Goal Micrograms/Liter (µg/L)[1]
Benzene	0.7
Toluene	5
Ethylbenzene	5
Xylenes (Total)	5
Chlorobenzene	5
1,1- Dichloroethane	5

From 1984 to 1986, NYSDEC implemented the remedial actions called for in the OU2 ROD, except for the treatment system. Rather than installing an on-Site treatment system, NYSDEC collected the leachate from 1986 through 1991 and transported it off-Site to a RCRA-approved treatment/disposal facility.

The results from groundwater sampling of monitoring wells at the Site conducted between 1987 and 1990 indicated the presence of volatile organic compounds (VOCs) in the groundwater outside the slurry wall containment system. In 1990, an Administrative Order on Consent (AOC) was entered into between EPA and the group of potentially responsible parties (PRPs) to conduct a supplemental RI/FS (OU3) to evaluate the integrity of the existing containment system; to determine the nature, extent and source of the contamination; to identify any threat to human health or the environment caused by the release of hazardous substances outside the containment system; and to identify and evaluate remedial alternatives.

The OU3 supplemental RI report, issued in 1993, concluded that the contamination that was detected in the bedrock groundwater outside the containment system was attributable to the downward migration of contaminants through the lodgment till beneath the containment system, particularly in an area where the lodgment till is relatively thin. The supplemental RI report also noted that the highest level of contaminants occurred in the vicinity of a leachate collection well where downward hydraulic gradients existed prior to the implementation of routine leachate removal from within the containment system. The study concluded that taking this action effectively reversed these downward hydraulic gradients and mitigated releases from this source.

Based upon the results of the supplemental RI/FS, EPA signed a ROD for OU3 in 1993. The RAOs for this ROD were to prevent potential future exposures to contaminated groundwater on-Site, as well as off-Site in the area between the Site and Smith's Beach; restore groundwater quality to levels consistent with federal and state groundwater quality and drinking water standards and mitigate the off-Site migration of

[1] GWQS

contaminated groundwater. The OU3 remedy incorporated all of the existing components of the OU2 ROD, as well as, several additional items including enhancing the source control system by optimizing the leachate extraction rate and other operating parameters in order to achieve, to the degree practicable, inward horizontal gradients in the overburden and upward vertical gradients from the bedrock toward the containment system; bedrock groundwater extraction and treatment; connecting downgradient residents in the Smith's Beach area who were using residential wells to the public water supply to ensure that potential future exposure to contaminants in the bedrock groundwater does not occur; and institutional controls on groundwater usage through deed restrictions, at and downgradient from the Site, up to and including the Smith's Beach area.

In addition, the OU3 ROD identified discharge of the extracted leachate and contaminated groundwater to the City of Oswego's Eastside Wastewater Treatment Plant as the preferred treatment and disposal option, with the construction of an on-Site treatment system with discharge to White or Wine Creek or to groundwater as a contingent option, should the preferred treatment and disposal option be determined not to be feasible. The OU3 ROD also noted that the interim method of handling of the extracted leachate and groundwater via an off-Site treatment facility would continue until the selection and implementation of a final treatment option.

Several investigations related to the enhancement of the source control system were also called for in the OU3 ROD. Furthermore, because there was some uncertainty related to the source of the PCB contamination detected in the sediments in the adjacent wetlands and White and Wine Creeks and the source of pesticides detected in the surface water of Wine Creek, the OU3 ROD called for a study to determine the sources of this contamination.

In 1994, an AOC was entered into by EPA and the group of PRPs to conduct a supplemental pre-remedial design study (SPRDS) related to the investigations called for in the OU3 ROD. EPA and the group of PRPs entered into an additional AOC in 1994 to extend the routine leachate removal and off-Site disposal, and, among other things, to connect residents in the Smith's Beach area (who were using residential wells) to the public water supply as an added measure of protection. These residential connections to the public water supply were completed in 1995.

In 1996, an Explanation of Significant Differences (ESD) was issued. The ESD explained the results of the additional investigations called for in the 1993 ROD and modified the contingent remedy for the treatment of the leachate to provide for continued off-Site treatment and disposal. The ESD also required that a focused feasibility study (FFS) be conducted to evaluate remedial alternatives for the PCB-impacted sediments in the creeks and wetlands adjacent to the Site.

Based upon data collected between 1991 and 1996 that suggested that PCB sediment concentrations were decreasing (presumably due to the deposition of clean sediment and/or the downstream migration and subsequent dilution of contaminated sediment) and the evaluation of remedial alternatives in the FFS, a ROD for OU4 was signed in 1997. The RAO for the OU4 ROD was to minimize exposure of fish and wildlife to PCB-contaminated sediment in White Creek and adjacent wetlands. The OU 4 ROD does not specify remediation goals for PCBs in sediment or biota, however, Site data is compared to a value of 1 mg/kg (milligram per kilogram), which is consistently evaluated and often applied when remediating PCB-contaminated sediments in New York State. The OU4 remedy included no further action with long-term PCB monitoring.

Status of Implementation

Construction of the perimeter slurry wall containment system and leachate collection system called for in the OU2 ROD was completed in 1986. The slurry wall containment system includes a bentonite-clay slurry wall keyed into the underlying lodgment till; a cap, consisting of a synthetic liner, clay and vegetated soils; and a leachate collection system. The leachate collection system consists of collection drains (gravel-filled trenches), four collection wells, a network of polyvinyl chloride force mains, submersible pumps and controls and a leachate collection tank.

Consent Decrees to carry out the remedy called for in the OU3 ROD as modified by the 1996 ESD and the long-term monitoring called for in the OU4 ROD were entered by the Court in 1998 and 1999, respectively.

From 1986 until 2010, leachate extracted from the containment system was transported off-Site to a RCRA-approved treatment/disposal facility. In 2010, EPA issued a second ESD for the Site. This ESD noted that the discharge of leachate into the City of Oswego's wastewater treatment facility was now viable due to decreases in contaminant concentrations and modified the remedy to allow for direct discharge of leachate from the Site to the City of Oswego's Eastside Wastewater Treatment Plant instead of off-Site treatment and disposal.

Institutional Controls Summary

Implemented institutional controls at the Site are summarized in Table 2, below.

Table 2: Summary of Planned and/or Implemented Institutional Controls

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Groundwater	Yes	Yes	OU3	Prevent the utilization of the groundwater underlying the Site proper, prevent the development of the Site for residential use, and allow access for maintenance and monitoring activities.	Easement was recorded by the Oswego County Clerk on April 7, 1987
Groundwater	Yes	Yes	OU3	Prohibit installation of residential wells	All residential properties located in the vicinity of the Site are within the Oswego City limits where the installation of wells is prohibited pursuant to Section 602.3 of the New York State Plumbing Code
Groundwater	Yes	Yes	OU3	Prevent nonresidential (two industrial properties located downgradient of the Site) exposure to contaminated groundwater	Environmental Protection Easement and Declaration of Restrictive Covenants were recorded by the County Clerk on August 6, 2004 and March 1, 2006. October 10, 1996.

System Operations, Monitoring and Maintenance

Annual inspections are conducted at the Site to determine whether any intrusive activities have occurred. In addition, building and property records are reviewed to ascertain whether any filings have been made for such activities. New York State requires annual certification that institutional controls required by RODs are in place, and that remedy-related Operation and Maintenance (O&M) is being performed. This certification is included as an attachment to the annual O&M progress reports.

System Operations

Leachate was initially extracted from within the containment system and transported off-site until 2010. Since 2010, monthly leachate removal activities have been conducted under the 1998 Consent Decree and extracted leachate is discharged directly to the Oswego Eastside Wastewater Treatment Facility.

A pre-pumping inspection of the containment system on February 6, 2018 revealed that the control panel for leachate collection well (LCW) number two (LCW-2) had broken off the mount and severed the wires, rendering the pump inoperable. Corrective actions involved replacement of the electrical control panels at each LCW pump and the master control pump. These repairs were completed on June 21, 2018. During the time required to develop and implement the repairs, LCW-1, LCW-3 and LCW-4 were used to remove the required amount of leachate in accordance with the Site Operation, Monitoring and Maintenance Plan. No adverse impacts to the containment system were observed. As of the most-recent leachate pumping in June 2018, a total of 4,929,984 gallons of leachate have been extracted from the containment system.

Monitoring

The long-term monitoring program, which commenced in 1989, includes routine monitoring of the groundwater and sediment in the vicinity of the Site.

Long-term monitoring associated with OU2 and OU3 includes semiannual (in May and November) sampling of five groundwater wells located at and downgradient of the Site, and the four leachate collection wells located within the containment system. Samples are analyzed for benzene, chlorobenzene, 1,1-dichloroethane, ethylbenzene, toluene and xylene.[2] In addition, quarterly groundwater elevation measurements are collected at selected locations, within and around the containment system, to ensure that horizontal gradients in the overburden aquifer remain inward and vertical gradients remain upward (from the bedrock toward the containment system). During this review period, semiannual groundwater and leachate quality sampling and quarterly groundwater level measurements were continued.

A long-term monitoring plan was developed in 1999 to ensure that PCB concentrations in the creeks continue to be reduced over time, and that further contamination of the area from upstream sources is not occurring. The monitoring program included annual collection of surficial (0 to 3 inches), subsurface (3 to 6 inches and 6 to 12 inches) and suspended (trap) sediment and biota samples at five locations within White and Wine Creeks. Sampling results from the first three years of monitoring indicated that PCBs were not detected in the sediments at depth. Therefore, in 2001, EPA approved a change in the monitoring plan, requiring sampling of only the top 3 inches of sediment, as this is the zone most susceptible to

[2] Although arsenic, barium, and manganese were identified as COCs in the risk assessment, the concentrations of these metals detected in the Site wells were less than regional background concentrations and, therefore, determined not to be Site-related.

change. Surficial and suspended sediment and biota sampling was conducted annually until 2008, when the sampling frequency was reduced to biennial events due to declining PCB levels. In 2014, because PCB concentrations were below 1 mg/kg at most of the sampling locations, sediment monitoring was further reduced to the collection of surficial sediment sampling at one location (SS-301) and sediment trap sampling at one location (ST-401). Biota (fish) samples continue to be collected at all five locations. During this review period, sediment and biota sampling was conducted in 2014 and 2016.

Maintenance

Routine maintenance at the Site includes maintaining the leachate collection system, perimeter fence and access road and mowing the vegetated cap.

Potential impacts from climate change have been assessed at the Site. The performance of the remedy is currently not at risk due to the expected effects of climate change in the region and near the Site.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the 2014 FYR (see Table 3, below). There were no issues identified or recommendations made in the 2014 FYR.

Table 3: Protectiveness Determinations/Statements from the 2014 FYR

OU #	Protectiveness Determination	Protectiveness Statement
02	Protective	The implemented containment remedy for OU2 is protective of human health and the environment because contaminated on-Site soils are contained by an impermeable cap.
03	Protective	The implemented remedy for OU3 is protective of human health and the environment because hydraulic control within the containment system is being maintained, institutional controls preventing well installation and groundwater use are in place and effective and all residents are connected to public water.
04	Protective	The long-term monitoring remedy for OU4 is protective of human health and the environment.
Sitewide	Protective	The Site-wide remedial actions protect human health and the environment because contaminated on-Site soils are contained by an impermeable cap; hydraulic control within the containment system is being maintained; institutional controls preventing well installation and groundwater use are in place and effective; and all residents are connected to public water.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On October 1, 2018, EPA Region 2 posted a notice on its website indicating that it would be reviewing site cleanups and remedies at 42 Superfund sites in New York and New Jersey, including the Site. The announcement can be found at the following web address:

https://www.epa.gov/sites/production/files/2018-10/documents/five_year_reviews_fy2019_for_web_posting.pdf . In addition to this notification, the clerk for the City of Oswego was provided with a flyer on November 7, 2018, for posting at City Hall and on the City of Oswego's website, stating that there was a FYR being conducted for the Site and inviting the public to submit any comments to EPA. The results of the review and the report will be made available in the Site information repositories located at U.S. Environmental Protection Agency Superfund Records Center, 290 Broadway – 18th Floor, New York, NY 10007, 212-637-4308; Oswego City Hall, 13 West Oneida St., 1st Floor, Oswego, NY 13126, (315) 342-8116; and online at https://www.epa.gov/superfund/pas.

Data Review

A review of the long-term leachate quality data shows variability in total VOC concentrations in the leachate since remedy implementation, some of which could be related to seasonality. Total VOC concentrations in extraction well LCW-2 ranged from approximately 100 micrograms per liter (µg/L) to 1,100 µg/L during this review period, while total VOCs at extraction well LCW-4 fluctuated between a low of approximately 800 µg/L to a high of 2,700 µg/L.

Groundwater samples are collected semiannually from the long-term monitoring network of five bedrock monitoring wells. These samples are analyzed for benzene, chlorobenzene, 1,1-dichloroethane, ethylbenzene, toluene, and xylene. Bedrock monitoring wells M-21, LR-8, and LR-6 have been sampled as part of the LTM network since 1998 (see Figure 2). Two additional downgradient bedrock monitoring wells, OD-3 and M-22, have been sampled semiannually since May 2014.

Monitoring well M-21, which is 39 feet deep and located approximately 250 feet downgradient from the containment system, is the furthest downgradient monitoring well in the network (it is located immediately downgradient of the property line). Chlorobenzene was the only observed VOC above its New York State Groundwater Quality Standard (GWQS) of 5 µg/L during the review period, ranging from 1.4 µg/L (November 2016) to 7.94 µg/L (May 2014). The overall concentrations of chlorobenzene during the review period have remained relatively stable. The highest concentration reported for benzene during the review period was 0.27 µg/L, and benzene was frequently not detected.

In monitoring well LR-8, which is 39.7 feet deep and located approximately 125 feet downgradient from the site, the chlorobenzene concentrations have fluctuated during this review period between a low of 4.1 µg/L (May 2016) to a high of 19.9 µg/L (November 2013), but show an overall decreasing trend since the last review period. Benzene, the only other VOC detected above its GWQS of 1 µg/L in this well, has ranged from 0.39 µg/L (May 2016) to a high of 4.31 µg/L (November 2014) with an overall decreasing trend through the review period

In monitoring well LR-6, which is 57 feet deep and located immediately downgradient of the slurry wall to the northwest, 1,1-dichloroethane is the only VOC detected above its GWQS of 5 µg/L since long-term monitoring began at the Site. The detected concentrations of 1,1-dichloroethane have remained below the GWQS since May 2000, with a maximum concentration of 1.98 µg/L during the review period. Concentrations of 1,1-dichloroethane at LR-6 have been decreasing overall since May 2000.

In monitoring well OD-3, which is 42 feet deep and located approximately 150 feet downgradient of the slurry wall to the north, all VOC concentrations have been non-detect since May 2017. Prior to that, only benzene and chlorobenzene had exceeded their GWQS. The maximum concentration of benzene was 2.2 µg/L (November 2014), and the maximum concentration of chlorobenzene was 26.3 µg/L (November

2014). Both contaminants exhibited fluctuating concentration trends with an overall decrease to non-detect.

In monitoring well M-22, which is 49.7 feet deep and located immediately downgradient of the slurry wall to the north, only 1,1-dichloroethane has been detected since May 2006. The concentrations are below its GWQS, with a maximum concentration of 1.27 μg/L (May 2014). Concentrations of 1,1-dichlorethane have remained low and stable during the review period.

Appendix C provides long-term groundwater monitoring concentration graphs for monitoring wells M-21, LR-8, and LR-6.

Horizontal water level gradients across the slurry wall were measured at six well pairs during the review period. Well pair SWW1/SWW2 is located on the upgradient (south) side of the containment system. This well pair always shows inward water level gradients, with a head difference of about seven feet. Well pair SWW3/SWW4 is on the northeastern side of the capped area. Gradients in this well pair are often directed outward and water levels are always below the top of the slurry wall. Well pair SWW5/SWW6 is located at the north corner of the containment system. The gradient direction in this well pair is occasionally outward and water levels are always below the top of the wall. Well pair SWW7/SWW8 is located on the southwest side of the containment system. Water level gradients are usually directed inward. Well pair SWW9/SWW10 is on the west side of the capped area. Gradients at this well pair are inward about 50 percent of the time and water levels are always below the top of the slurry wall. Well pair SWW11/SWW12 is at the northwest corner of the capped area. Gradients at this well pair are most often outward, and water levels are always below the top of the wall. The gradient magnitudes at all the well pairs vary, with larger gradients occurring during seasons with low regional water levels.

Although the gradients at some of the well pairs around the perimeter containment system are outward, because the groundwater levels remain below the top of the wall, it has been concluded that groundwater is effectively contained in the overburden. Groundwater data collected from the bedrock downgradient of the Site show no detections for the majority of the VOCs. For those VOCs that were detected, the concentrations were stable or decreasing during the review period. These two lines of evidence support the conclusion that the slurry wall and leachate and groundwater collection system are containing the wastes remaining on-site. To maintain the effectiveness of the remedy, the increased leachate removal during the summer and fall months should continue.

Currently, PCB monitoring includes surficial sediment sampling at Location 3, suspended sediment (trap) sampling at Location 4, and biota sampling at Locations 1-5, once every two years (see Figure 2). During this review period, samples were collected in 2014 and 2016. Overall, PCB sediment concentrations are much lower than those detected in earlier investigations. Concentrations at Location 3 were 0.51 mg/kg in 2014 and 0.16 mg/kg in 2016 and have remained below 1 mg/kg since 2006. The arithmetic mean PCB concentration in fish tissue was 0.59 and 0.55 mg/kg in 2014 and 2016, respectively, and the arithmetic mean total PCB concentration in sediment decreased from 0.602 mg/kg in 2014 to 0.548 mg/kg in 2016. Recent food chain modeling calculations (conducted using 2014 and 2016 data) and the general downward trend of total PCB concentrations in fish and sediment, indicate that the OU4 RAO is being met. The need for continued long-term PCB monitoring at the Site will be evaluated in the next FYR period.

Site Inspection

The inspection of the Site was conducted on November 5, 2018. In attendance were EPA on-scene coordinator Peter Lisichenko, NYSDEC project manager Payson Long, and Steve Beam of National Grid, Clay McClarnon of de maximis, inc., Jason Vogel of ARCADIS, Martin Koonweki and Mark Byrne of O'Brien and Gere on behalf of the PRPs. The purpose of the inspection was to assess the protectiveness of the remedy.

Messrs. McClarnon and Vogel were interviewed in relation to this FYR. Both indicated that the remedies are functioning as anticipated in the RODs. No issues impacting the current or future protectiveness of the remedy were identified during the site visit; however, significant damage to the chain-link perimeter fence near the White Creek stream crossing, caused by a fallen tree, was observed.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

The primary objectives of the OU2 and OU3 RODs, as modified by the 1996 and 2010 ESDs, were to control the source of contamination at the Site, reduce and minimize the downgradient migration of contaminants in the groundwater, restore groundwater quality to levels consistent with federal and state groundwater quality and drinking water standards, and minimize any potential human health and ecological impacts resulting from the exposure to contaminants at and downgradient from the Site. Groundwater data collected downgradient of the containment wall indicate a decreasing trend in contaminant concentrations, and water levels at locations adjacent to the slurry indicate generally inward hydraulic flow. Therefore, it can be concluded that the current containment system is effectively containing wastes on-Site. To maintain the effectiveness of the remedy, the current leachate removal protocol should continue.

Exposures to remaining Site wastes are also prevented by the implementation of institutional controls. To prevent the utilization of the groundwater underlying the Site proper; to prevent the development of the Site for residential use and to allow access for maintenance and monitoring activities, a permanent easement was acquired by NYSDEC. All the residential properties located in the vicinity of the Site are within the Oswego City limits where the installation of wells is prohibited pursuant to Section 602.3 of the New York State Plumbing Code Section 602.3. All the private wells downgradient of the Site to Smith's Beach were connected to public water. There are two industrial properties located downgradient of the Site. To prevent nonresidential exposure to contaminated groundwater at these properties, Environmental Protection Easement and Declaration of Restrictive Covenants were recorded by the County Clerk on August 6, 2004 and March 1, 2006.

The OU4 ROD called for no further remedial action, with long-term monitoring of the sediment and biota in the creeks and wetlands adjacent to the Site. Overall, PCB sediment concentrations are much lower than those detected in earlier investigations. The arithmetic mean PCB concentrations in the fish tissue were lower in 2016 than in 2014. Further, the observed fish tissue PCB concentrations represent low ecological risk to potential receptors, such as mink and green heron, based upon current food chain modeling calculations. The need for continued PCB monitoring at the Site will be evaluated in the next FYR period.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedies remain valid. On February 6, 2014, EPA issued an update to the default exposure assumptions used at Superfund Sites (OSWER Directive 9200.1-120, February 6, 2014). In general, changes in the exposure assumptions do not significantly change the conclusions in the original risk assessment or the protectiveness of the remedy. The groundwater containment system, RCRA cap, fence and institutional controls identified above continue to remain barriers to direct exposure to on-Site contaminants.

The property is zoned industrial and there have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy since the last FYR.

Soil and groundwater uses at the Site are not expected to change during the next five years. The land use considerations and potential exposure pathways considered in the baseline human health risk assessment remain valid, and the ecological exposure scenarios remain the same.

Because there are no residential/commercial buildings on-Site and none are expected in the future, and there are no residential/commercial buildings located within 100 feet of monitoring well M-21 (located immediately downgradient of the property line), vapor intrusion is not considered a completed pathway at the present time. In the unlikely event of future on-Site construction, further evaluation of this pathway may be necessary. This further evaluation may include Site-specific considerations, such as the type of building, the location of the building relative to the maximum detected concentrations and the subsurface characteristics at the Site.

Since the last FYR, there have been no changes to the toxicity of the Site-related chemicals that would affect the protectiveness of the remedy.

The groundwater applicable or relevant and appropriate requirements (ARARs) established in the OU2 ROD were GWQS (NYCRR, Title 6, Parts 701-703-see Table 2). These ARARS remain protective for the consumption of groundwater.

The groundwater risks identified in the OU2 ROD focused on potential future use of the aquifer as a potable or drinking water source by residents and workers. Residents in the area currently receive public water. At the current time, exposure through consumption of groundwater at the Site and the downgradient properties is not a completed exposure pathway.

The selected soil remedy was designed to reduce the risk to human health and the environment due to contaminants leaching from the waste disposal area. As such, specific ARARs were not established for the soils at the Site although the cap, designed in 1984, was constructed under RCRA requirements, and serves to interrupt exposures.

The OU 4 ROD does not specify remediation goals for PCBs in the creeks and associated wetlands, however, Site data is compared to a value of 1 mg/kg (milligram per kilogram). This value remains protective of human and ecological receptors at the Site. The RAOs established for OUs 2, 3 and 4 continue to be valid. Although biota sediment accumulation factors have been updated since the OU4 ROD was issued, Site-specific fish tissue and sediment data were used to assess the risk to the ecological receptors at the Site (green heron and mink). Current food chain modeling indicates no unacceptable risk to these receptors based on recent PCB sediment and fish tissue data and PCB sediment concentrations

have remained below 1 mg/kg since 2006. The need for continued PCB monitoring at the Site will be evaluated in the next FYR period.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

There is no information that calls into question the protectiveness of the selected remedies.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
OU2, OU3, and OU4

OTHER FINDINGS

Damage to chain-link perimeter fence caused by a fallen tree was observed during the site inspection. The fallen tree should be removed and the damaged section of the fence should be repaired.

VII. PROTECTIVENESS STATEMENTS

Protectiveness Statements	
Operable Unit: 02	*Protectiveness Determination:* Protective
Protectiveness Statement: The implemented containment remedy for OU2 is protective of human health and the environment.	
Operable Unit: 03	*Protectiveness Determination:* Protective
Protectiveness Statement: The implemented remedy for OU3 is protective of human health and the environment.	
Operable Unit: 04	*Protectiveness Determination:* Protective
Protectiveness Statement: The long-term monitoring remedy for OU4 is protective of human health and the environment.	
Sitewide Protectiveness Statement	
Protectiveness Determination: Protective	
Protectiveness Statement: The Site-wide remedial actions protect human health and the environment.	

VIII. NEXT REVIEW

The next FYR report for the Site is required five years from the completion date of this review.

APPENDIX A – Reference List

Record of Decision, EPA, June 1984

Record of Decision, EPA, December 1993

Explanation of Significant Differences, EPA, September 1996

Record of Decision, EPA, September 1997

Consent Decree, United States v. Agway, Inc., et al, Civil Action No. 98-CV-0112, September 1997

Consent Decree, United States v. General Motors Corporation and Niagara Mohawk Power Corporation, Civil Action No. 98-CV-1927, December 1998

PCB Long-Term Monitoring Plan, Blasland, Bouck & Lee, August 1999

Explanation of Significant Differences, EPA, September 2010

Five-Year Review Reports, EPA, December 2003, December 2008 and January 2014

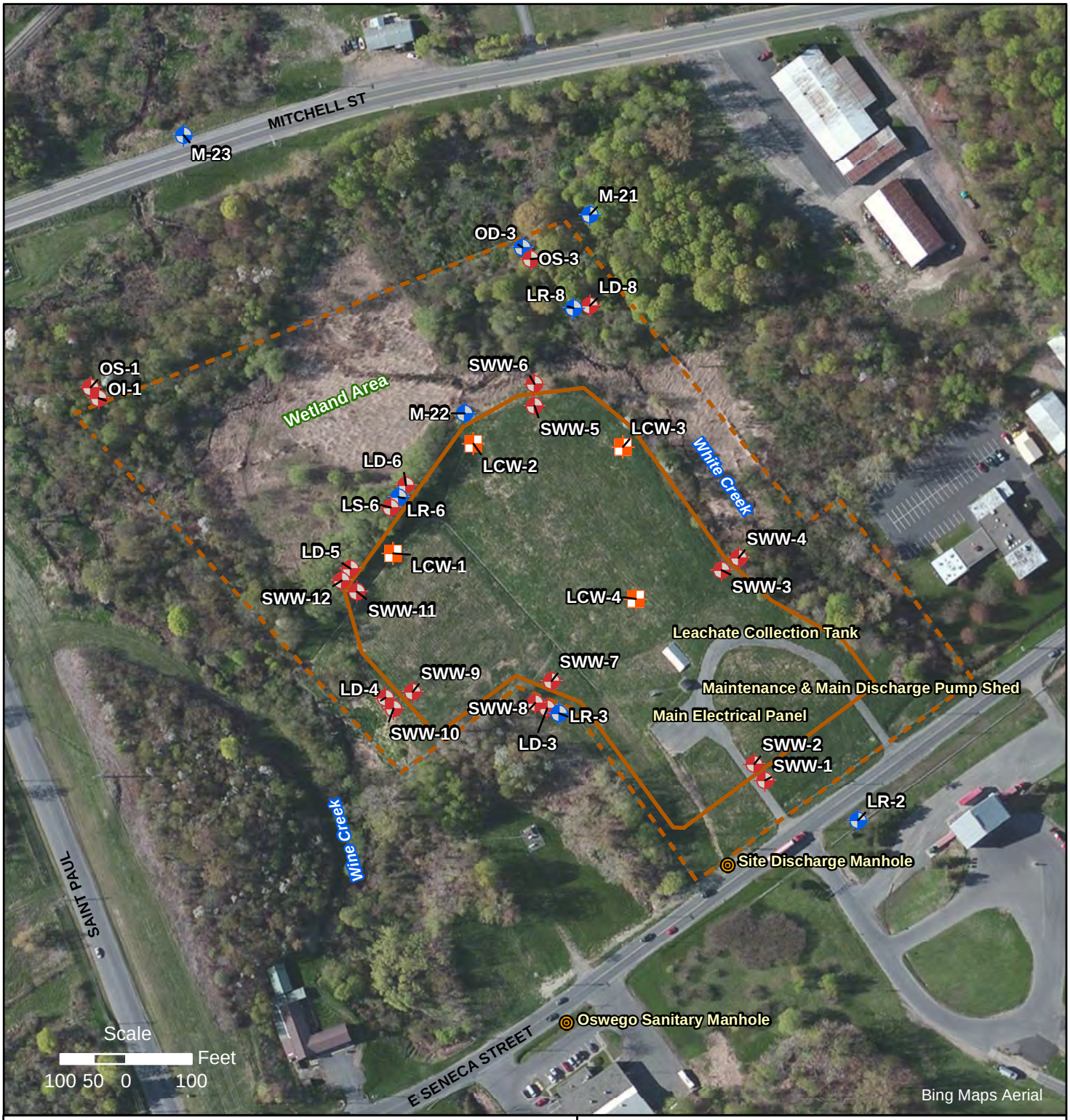
Operation, Maintenance, and Long-Term Monitoring Plan, de maximis, inc., July 2013

Annual Operation, Maintenance, and Monitoring Progress Reports, de maximis, inc., 2014 to 2018

Annual PCB Long-Term Monitoring Progress Reports, ARCADIS, 2014 and 2016

EPA Guidance for Conducting Five-Year Reviews, EPA, 2016.

APPENDIX B – Figures



LEGEND

Sample Locations

- Bedrock Monitoring Well
- Leachate Collection Well (Overburden)
- Overburden Monitoring Well
- Manhole
- Fence (Site Boundary)
- Slurry Wall

WELL LOCATION MAP

PAS Site, Oswego, New York

Figure 1

N

Project No.: 3131
Plot Date: 4 May 2012
Arc Operator: BJAR
Reviewed by:

ddms
1217 Bandana Boulevard North
Saint Paul, Minnesota 55108
Main Phone: (651) 842-4224
www.ddmsinc.com

R:\Projects\DEF\demax-1547\3131-PAS\DataAnalysis\GISData\Projects\120504_SiteMap.mxd

LEGEND:

- 1 — APPROXIMATE LONG-TERM MONITORING FISH SAMPLING LOCATION
- 1 □ — APPROXIMATE LONG-TERM MONITORING SEDIMENT SAMPLING LOCATION
- SS-1 △ — APPROXIMATE PREVIOUS SEDIMENT SAMPLING LOCATION
- SWG-1 ▲ — APPROXIMATE STREAM GAUGE LOCATION
- ● — APPROXIMATE SPRDS PHASE II SEDIMENT SAMPLING LOCATION
- FENCE (SITE BOUNDARY)
- SLURRY WALL
- APPROXIMATE LOCATION OF SUBSURFACE LEACHATE COLLECTION TRENCH
- LAND AREAS SUBJECT TO FREQUENT, SHALLOW INUNDATION
- WETLAND AREAS DELINEATED BY MENZIE-CURA & ASSOCIATES, INC. (AUGUST 1992)
- REACH BOUNDARY

NOTES:

1. BASE MAP ADAPTED FROM TOPOGRAPHIC MAP DEVELOPED BY LOCKWOOD MAPPING, INC. BASED ON AN APRIL 14, 1993 AERIAL PHOTOGRAPH; SOME WELL AND STREAM-GAUGE LOCATIONS ARE INFERRED; LOCATION OF SLURRY WALL BASED ON SITE PLAN DRAWN BY DUNN GEOSCIENCE CORP. (DEC. 1984), TITLED "BORING, WELL & TEST PIT PLOT PLAN;" LOCATION OF SUBSURFACE LEACHATE-RECOVERY TRENCHES BASED ON SITE MAP PROVIDED BY O'BRIEN & GERE ENGINEERING INC.
2. SURFACE WATER IS SHOWN IN BLUE; AREAS SHADED GREEN REPRESENT WETLAND AREAS DELINEATED BY MENZIE-CURA & ASSOCIATES, INC. (AUGUST 1992).
3. BOUNDARIES FOR REACH 10 AND REACH 12, AS WELL AS SPRDS PHASE II SAMPLING LOCATIONS WERE PRESENTED IN THE FINAL FOCUSED FEASIBILITY STUDY FOR PCB-IMPACTED SEDIMENTS IN THE VICINITY OF THE PAS SUPERFUND SITE, OSWEGO, NEW YORK (ENVIRON, AUGUST 20, 1997).

0 200' 400'

GRAPHIC SCALE

POLLUTION ABATEMENT SERVICES SITE
OSWEGO, NEW YORK
PCB LONG-TERM SEDIMENT MONITORING

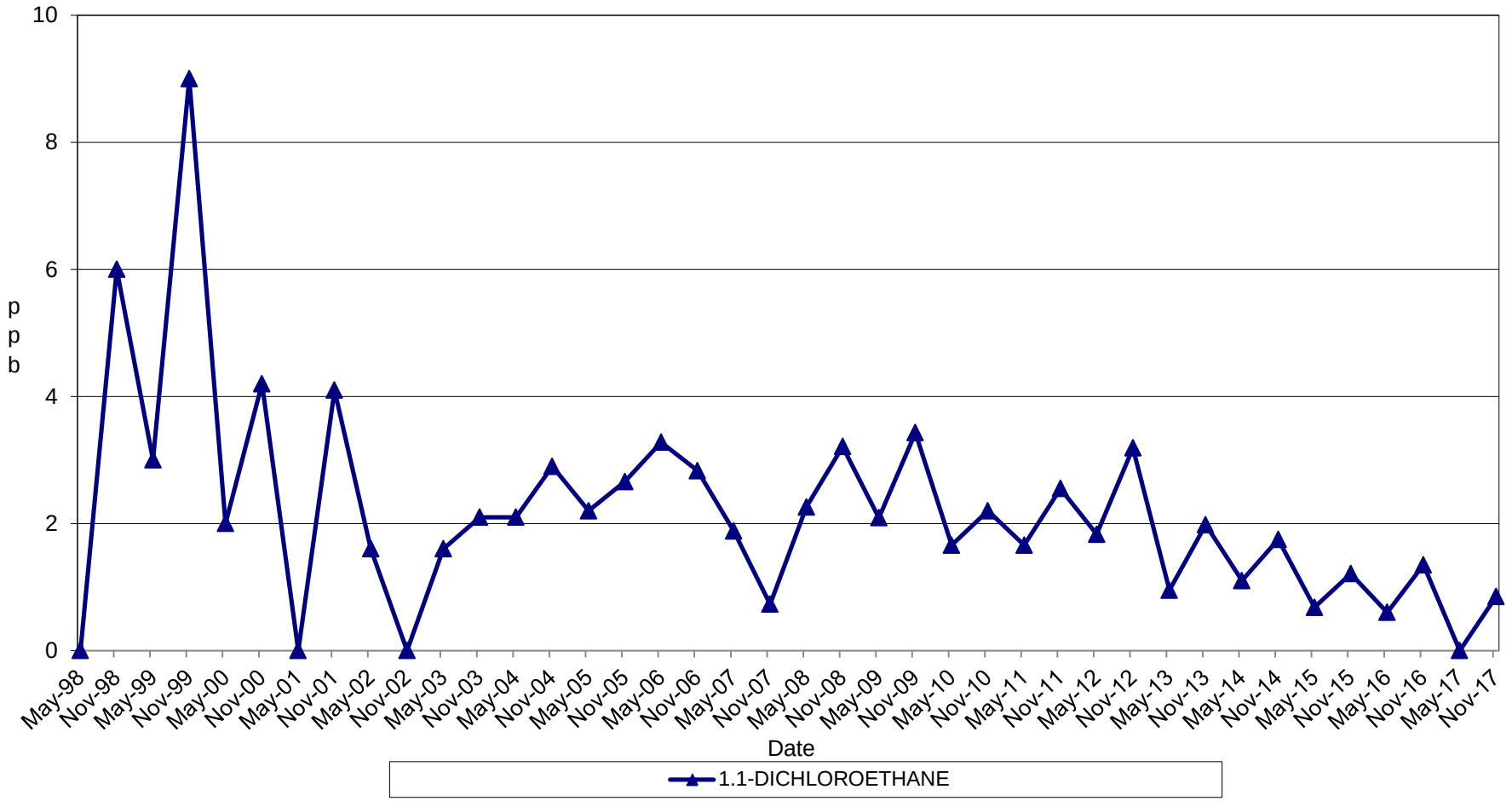
SAMPLE LOCATION MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE 2

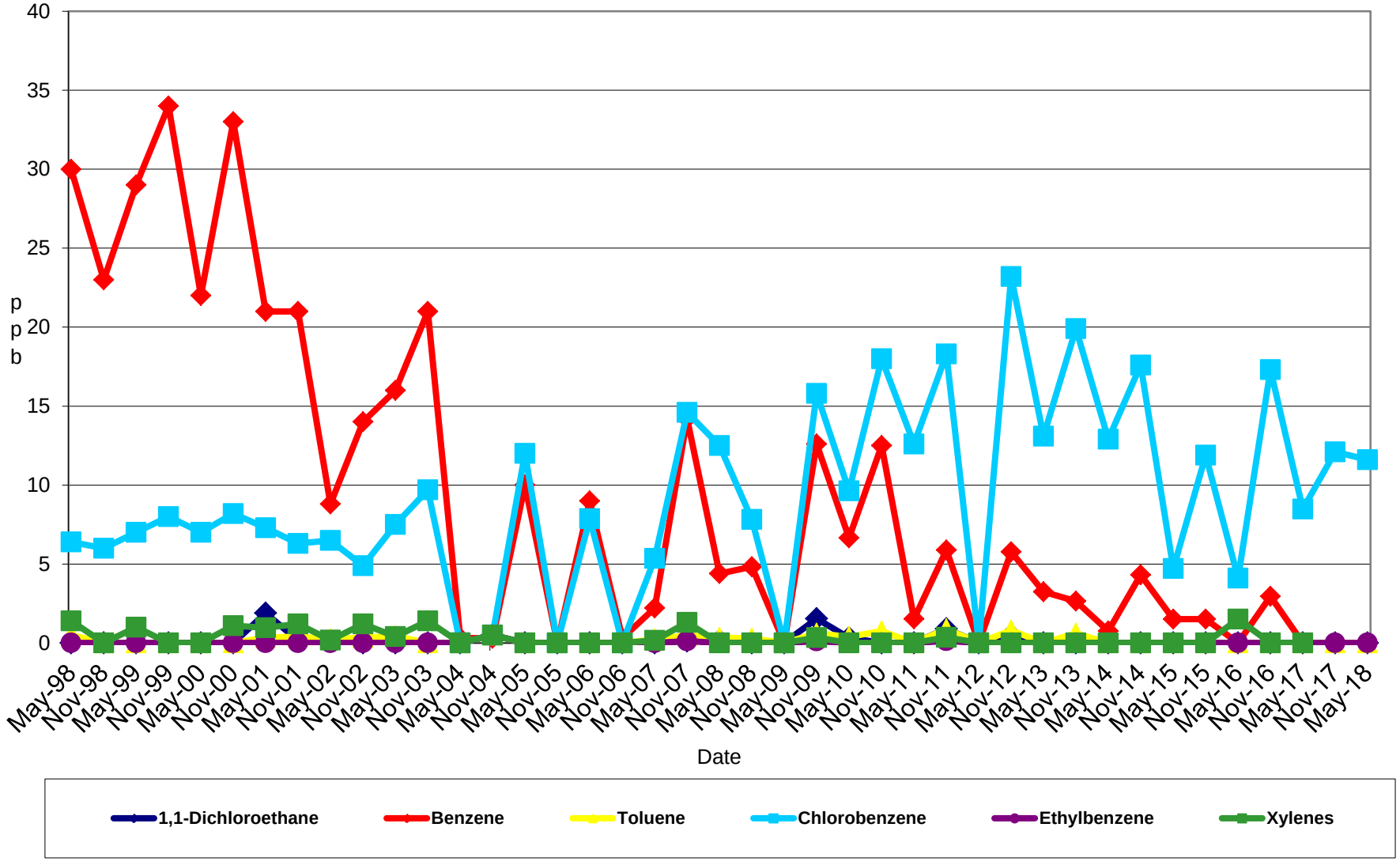
APPENDIX C – Long-Term Groundwater Monitoring Concentration Graphs

Long-Term Groundwater Monitoring at LR-6
PAS Oswego Superfund Site Groundwater
1998 - 2017



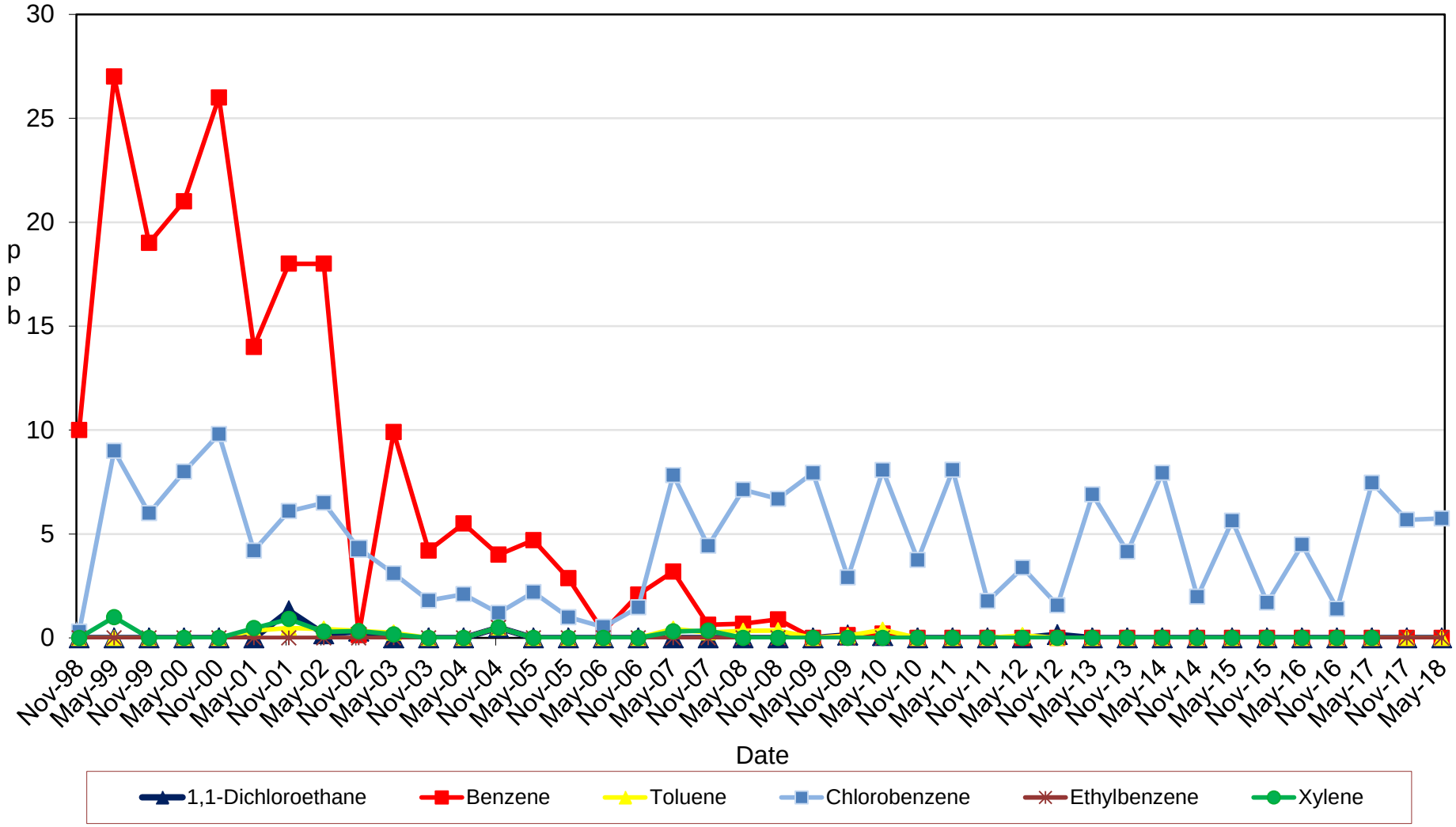
de maximis, inc. 7/19/2018

Long-Term Groundwater Monitoring at LR-8
PAS Oswego Superfund Site Groundwater
1998 - 2018



de maximis, inc. 7/19/2018

Long-Term Groundwater Monitoring at M-21
PAS Oswego Superfund Site Groundwater
1998 - 2018



de maximis, inc.
7/19/2018