SIXTH FIVE-YEAR REVIEW REPORT FOR HAGEN FARM SUPERFUND SITE DANE COUNTY, WISCONSIN

Prepared by

U.S. Environmental Protection Agency
Region 5
Chicago, Illinois

7/15/2021

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ATTACHMENTS

LIST OF ABBREVIATIONS & ACRONYMS

ABS	Activated Biological Sludge
AOC	Administrative Order on Consent
ARAR	Applicable or Relevant and Appropriate Requirement
bgs	Below-ground surface
BRRTS	Bureau for Remediation and Redevelopment Tracking System (State of Wisconsin)
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	Continuing Obligation
COC	Contaminant of Concern
DCE	Dichloroethylene
DO	Dissolved Oxygen
ELCR	Excess Lifetime Cancer Risk
EPA	United States Environmental Protection Agency
ES	Enforcement Standard (State of Wisconsin)
ESD	Explanation of Significant Differences
EW	Extraction Well
FFBT	Fixed Film Biological Treatment
FYR	Five-Year Review
GCOU	Groundwater Control Operable Unit
GEMS	Groundwater Environmental Management System (State of Wisconsin)
GIS	Geographic Information System
gpm	Gallons per Minute
HI	Hazard Index
HQ	Hazard Quotient
ICs	Institutional Controls
ICIAP	Institutional Controls Implementation and Assurance Plan
IG	Infiltration Gallery
ISVE	In-Situ Vapor Extraction
LEL	Lower Explosive Limit
LFAS	Low Flow Air Sparge
LTS	Long Term Stewardship
MCL	Maximum Contaminant Level
MNA	Monitored Natural Attenuation
MW	Monitoring Well
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List

O&M	Operation and Maintenance
ORP	Oxidation/Reduction Potential
OU	Operable Unit
PAL	Preventive Action Limits (State of Wisconsin)
PLC	Programmable Logic Controller
ppb	Parts-per-billion or micrograms per liter (µ/L)
PRP	Potentially Responsible Party
P&T	Pump-and-Treat
RA	Remedial Action
RAOs	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SCOU	Source Control Operable Unit
TBC	To Be Considered
TCE	Trichloroethylene
THF	Tetrahydrofuran
UAO	Unilateral Administrative Order
UST	Underground Storage Tank
UU/UE	Unlimited Use and Unrestricted Exposure
VC	Vinyl Chloride
VOC	Volatile Organic Compound
WAC	Wisconsin Administrative Code
WDNR	Wisconsin Department of Natural Resources
WMWI	Waste Management of Wisconsin, Inc.
WPDES	Wisconsin Pollution Discharge Elimination System

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order 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 United States Environmental Protection Agency (EPA) prepared this FYR report pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP)(40 CFR Section 300.430(f)(4)(ii)) and considering EPA policy.

This is the sixth FYR for the Hagen Farm Superfund Site. The triggering action for this statutory review is the completion date of the previous FYR. The FYR report has been prepared because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of two Operable Units (OUs) which will be addressed in this FYR report. OU1 addresses the source control remedy and OU2 addresses the groundwater remedy.

The Hagen Farm Superfund Site FYR was led by Sheila Sullivan, Remedial Project Manager (RPM). Participants included EPA Community Involvement Coordinator (CIC) Susan Pastor, and Wisconsin Department of Natural Resources (WDNR) Site Manager Trevor Bannister. In February 2021, BJ LeRoy became the WDNR Site Manager. EPA notified WDNR, Waste Management of Wisconsin, Inc. (WMWI or Waste Management) the potentially responsible party (PRP), and the public of the initiation of the FYR, which began on July 31, 2020.

Site Background

The 28-acre Hagen Farm Superfund Site (the Site) is located at 2318 County Highway A in the Town of Dunkirk, approximately one mile east of Stoughton, Dane County, Wisconsin (Figure 1 in Appendix C). The Site includes the capped 10-acre former waste disposal area, which is bounded on the south by Highway A and on the north by an adjacent gravel pit and a private landing strip.

The Site was operated as a sand and gravel pit prior to the late 1950s. From the late 1950s to the mid-1960s, the on-Site gravel pit accepted solvents and other organic materials in addition to municipal waste. Some of the compounds included acetone, butyl acetate, 1,2-dichloroethylene (1,2-DCE), tetrahydrofuran (THF), solid vinyl, sludge containing methyl ethyl ketone and xylenes, and toluene. Hazardous wastes as per the Resource Conservation and Recovery Act (RCRA), 42 U.S.C.§6901, were also disposed of at the Site. The Site stopped accepting waste in 1966, prior to regulation of hazardous waste disposal by RCRA Subtitle C.

The Yahara River is located about 1.5 miles west of the Site and flows to the south. Site topography is flat to gently rolling and slopes toward the river from the higher areas on the

northeast and east. The closest surface water body (Sundby Pond) is located about one-half mile south of the waste disposal area. Groundwater occurs at approximately 20 feet below ground surface (bgs) under the landfill area and ranges from three to 46 feet bgs nearby. Site groundwater flows beneath the main disposal area to the south to southeast (Figure 2 Appendix C). The landfill cap supports a variety of vegetation and the Site area is frequented by wildlife, notably birds, small mammals, and deer. Sensitive ecological habitats or rare or endangered species have not been observed.

The unincorporated Town of Dunkirk (Town) is located about 10 miles southeast of Madison in Dane County. The Town is primarily a rural farming community and most of the land is agricultural. The Town of Dunkirk, together with the nearby towns of Rutland, Dunn, and Pleasant Springs, has adopted the county's exclusive agricultural zoning ordinance that limits non-farm development in rural areas. As of the mid-1990s, over 40 percent of each town's farmland was enrolled in the state's Farmland Preservation Program (Attachment 1). Figure 3 in Appendix C shows the relationship of the towns, Site, and the City of Stoughton (City).

Current land use surrounding the Site includes a private 3,000-foot landing strip, which ends directly at the northwest corner of the Site property. To the east, land is zoned rural residential with a prescribed density of 1 to 35 acres per residence. Planned neighborhood areas are to the northeast and upgradient of the Site. A parcel directly west and adjacent to the Site property (Lot 3) was sold by WMWI to a developer in about 2003 and is planned for future residential development (Figure 4 Appendix C). Other adjacent land is zoned agricultural. Land south of Highway A directly across from the Site property is used commercially, and is occupied by Wingra Redi-Mix, an operating concrete facility. The Hagen Farm Site property is and will remain zoned as industrial. Several other hazardous waste sites are located in southern Dane County, such as the City Disposal Corp. and the Stoughton City Landfill Superfund sites.

The City of Stoughton urban service area, which includes public water supply and sanitary sewer services, includes parts of the Town of Dunkirk. However, some residents living near the Site obtain water from private wells. WMWI annually samples a number of private wells around and downgradient of the Site property (Figure 5 Appendix C).

The Site was listed on the National Priorities List (NPL) in 1987.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Hagen Farm		
EPA ID: WID980610059		
Region: 5	**State:** WI	**City/County:** Stoughton/Dane
SITE STATUS		
NPL Status: Final		

Multiple OUs?	Has the site achieved construction completion?
Yes	Yes

REVIEW STATUS
Lead agency: EPA
Author name (Federal or State Project Manager): Sheila Sullivan, RPM
Author affiliation: EPA
Review period: 7/31/2020 - 4/27/2021
Date of site inspection: EPA did not complete a FYR Site inspection due to COVID-19 travel restrictions; however, WMWI completed a site inspection on 12/21/2020 and its results and observations are included in this report.
Type of review: Statutory
Review number: 6
Triggering action date: 7/26/2016
Due date *(five years after triggering action date)*: 7/26/2021

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

From 1980 to 1986, WDNR sampled the groundwater at on-Site monitoring wells (MWs) and found volatile organic compounds (VOCs). The Remedial Investigation (RI) (Warzyn Inc., 1991) revealed three disposal areas at the Site: Areas A, B, and C (Figure 10, Appendix C). Most of the waste was in Area A—the six-acre main disposal area. Area A contained an estimated 67,650 cubic yards of waste including municipal waste, paint sludge, grease, rubber, and several industrial chemicals.

A total of 56 Chemicals of Potential Concern (COPCs) were detected across all media (i.e., soil, leachate, waste refuse, and on- and off-property groundwater wells) at concentrations above background. The following COPCs were identified in the RI:

VOCs	Semi-VOCs	
Ethylbenzene	Benzyl alcohol	bis(2-chloroisopropyl)ether
Toluene	Phenol	4-chloro-3-methylphenol
Xylenes	4-Methylphenol	1,4-Dichlorobenzene
Tetrahydrofuran (THF)	2,4-Dimethylphenol	4,4’-DDE
2-Butanone	Benzole Acid	Dieldrin
Vinyl chloride (VC)	Naphthalene	Chlorobenzene
Benzene	Diethylphthalate	Di-n-octylphthalate
2-Hexanone	Benzoic Acid	bis(2-ethylhexyl)phthalate
1,2-Dichloroethylene (1,2-DCE)		

1,1-Dichloroethylene (1,1-DCE)
Chloromethane

Metals

Barium	Mercury
Arsenic	Lead
Nickel	Manganese
Vanadium	Zinc
Copper	

Human Health Risk

EPA conducted a human health baseline risk assessment (BRA) as part of the RI. The exposure pathways included direct contact exposure to contaminated waste and soils, and exposure to contaminated groundwater via ingestion, inhalation, and direct contact.

The highest potential human health risk at the Site would be from drinking contaminated groundwater derived from the groundwater contacting contaminated wastes/sub-soil at the Site. VOCs were the contaminants of most concern in groundwater, the most prevalent being THF, with a maximum detected concentration of 630,000 parts per billion (ppb) or micrograms per liter (µg/L). The occurrence, concentration, and distribution of THF in Site monitoring wells suggested that there was a THF plume originating from the disposal area and extending approximately 3,600 feet downgradient (south). Further, the occurrence, concentration, and distribution of benzene, ethylbenzene, toluene, and xylenes suggested the presence of a second plume originating from the same general area as the THF plume. The second plume extended about 800 feet downgradient, or about half the distance traveled by the THF plume. VOCs were not detected in samples collected from nearby private wells.

The potential health risks identified in the RI were calculated for exposures to contaminants in the landfill and in on-property and off-property groundwater. Groundwater risks were based on the assumption that the principal threat waste would be contained under the Source Control Operable Unit (SCOU) or OU1. The risk assessment used to develop the Record of Decision (ROD) for the Groundwater Control Operable Unit (GCOU) or OU2 included groundwater contamination on-property and off-property. The pathways evaluated for current and future use scenarios and the resulting groundwater ingestion and inhalation risks are listed in Table 1.

Table 1: Hagen Farm Baseline Risk Assessment Groundwater Risks from 1991 RI Report

Exposure Pathway	ELCR	HI
Current Resident		
Groundwater Ingestion (off-property shallow wells)		
Downgradient – Near Site	$2x10^{-4}$	3
Downgradient – Far from Site	--	10
Inhalation of Volatiles from Showering (off-property shallow wells)		
Downgradient – Near Site	$2x10^{-5}$	<1
Downgradient – Far from Site	$8x10^{-7}$	<1

Future Resident		
Groundwater Ingestion (on-property wells)		
Shallow wells	$2x10^{-3}$	6,000
Deep wells	$2x10^{-5}$	300
Inhalation of Volatiles from Showering (on-property wells)		
Shallow wells	$2x10^{-4}$	300
Deep wells	$5x10^{-6}$	9

Notes: **ELCR** = Excess Lifetime Cancer Risk **HI** = hazard index

The chemicals that accounted for the majority of the risks listed in Table 1were:

- VC, chloromethane, arsenic, 2-butanone, acetone, 2,4-dimethylphenol, ethylbenzene, 4-methylphenol, benzene, and xylenes (in on-Site shallow wells).
- THF (in on-Site shallow and deep wells); and
- 1,1-DCE (in on-Site deep wells).

The exposure pathway posing the highest potential risk was through ingestion of groundwater from shallow on-property wells with an ELCR of $2x10^{-3}$ and a HI of 6,000. Both exceed EPA's recommended risk levels for carcinogenic and noncarcinogenic risks.[1]

Ecological Risk

EPA conducted an ecological BRA during the RI to evaluate potential impacts on nonhuman receptors at the Site. The ecological BRA identified potential receptors and exposure pathways at the Site and discussed whether endangered or threatened species inhabited the area. Based on information obtained during the RI, exposure of terrestrial plants and soil organisms to COPCs in soil showed that these receptors were not adversely affected. As contaminant levels have decreased over time, no ecological risks are present. Further, no endangered species have been seen at the Site or in the surrounding areas.

Response Actions

Operable Unit 1-SCOU

EPA issued a ROD for the SCOU on September 17, 1990 (Ref. 8, Appendix A). The remedial action objectives (RAOs) included:

[1] EPA calculates the probability of carcinogenic and non-carcinogenic health effects due to actual or potential human exposures to Site contaminants. For carcinogenic risks, EPA calculates an ELCR due to potential human exposure to carcinogens over a 70-year lifetime. EPA recommends that site cleanups achieve a target ELCR range of one in one-million ($1x10^{-6}$) to one in ten-thousand ($l\ x10^{-4}$). For non-carcinogenic risks, EPA calculates a HI, which indicates if human exposure to a mixture of noncarcinogenic chemicals could result in adverse health effects. An HI greater than 1.0 indicates an unacceptable non-carcinogenic risk.

1. Reduce or minimize direct contact with contaminated waste and soil; and
2. Reduce or minimize release of contaminants to the groundwater.

EPA selected the following remedy for the SCOU to address the RAOs:

- Consolidate the three waste disposal areas (A, B, and C) into area A;
- Cap the consolidated waste;
- Install and operate an in-situ vapor extraction (ISVE) system through the landfill cap;
- Evaluate natural microbial degradation of VOCs in the waste and sub waste soils during operation of the ISVE system;
- Prevent installation of drinking water wells within the vicinity of the disposal areas and protect the cap by using deed and access restrictions; and
- During the full-scale ISVE implementation, perform a treatability study to examine the feasibility of adding essential nutrients (e.g., moisture, oxygen, nitrogen, and phosphate) to the waste/sub-soils to enhance the natural microbial degradation of organic compounds.

The waste consolidation and capping portion was to address the source of contamination and reduce potential human health risks by eliminating the direct contact and inhalation exposure routes. The cap and ISVE portion would reduce contaminant loading to the groundwater and were the first steps toward eliminating human health risks associated with groundwater ingestion.

In April 1991, EPA issued an Explanation of Significant Differences (ESD) (Ref. 9, Appendix A) to further refine the ISVE cleanup standard from the ROD goal of 90 percent removal of VOCs in the waste and sub-waste soils. EPA approved the use of a groundwater/soil-gas model for each VOC detected in the waste and sub-waste soils and/or the groundwater to determine the cleanup standard. The predicted soil and corresponding soil-gas cleanup levels for THF were 0.1 micrograms per kilogram (µg/kg) and 0.007 µg/L, respectively. The predicted soil and soil-gas cleanup levels for total xylenes were 2.6 µg/kg and 23.5 µg/L, respectively. This approach ensured cleanup goals that were measurable, reliable, and consistent with the NCP.

Operable Unit 2 - GCOU

EPA issued a ROD for the GCOU on September 30, 1992 (Ref. 10, Appendix A). The RAOs of the ROD included:

1. Restore groundwater quality so that contaminant levels meet appropriate federal and state groundwater quality standards;
2. Stop the flow of contaminated groundwater downgradient of the Site property and to the Yahara River; and
3. Prevent the flow of contaminated groundwater to residential wells.

The selected remedy included:

- Extract and treat on- and off-property[2] groundwater until Wisconsin Preventive Action Limits (PALs) under Chapter NR 140 Wisconsin Administrative Code (WAC) are met at the waste boundary in accordance with the NCP;
- Treat extracted on-property groundwater using Activated Biological Sludge (ABS) and treat extracted off-property groundwater using a separate technology to be determined during remedial design (RD);
- Discharge treated groundwater to neighboring wetlands or to the Yahara River;
- Treat and dispose of sludges generated from the groundwater treatment and treat off-gases emitted from the treatment process;
- Conduct a study to determine the effect of nutrients and/or oxygen on contaminated groundwater in order to enhance bioremediation in the aquifer;
- Monitor all private wells located around the Site; and
- Use deed and access restrictions to prevent the installation of drinking water wells within the vicinity of the disposal area and off-property.

Table 2 provides the maximum concentrations for several COPCs found in the groundwater at the time of the GCOU ROD, as well as the Site-specific cleanup goals (PALs) for Site groundwater. Other groundwater health-based criteria and standards (i.e., Maximum Contaminant Levels (MCL) under the federal Safe Drinking Water Act and Enforcement Standards (ES) under NR 140, WAC) are provided for comparison.

Table 2: Maximum Levels of Groundwater Contaminants and Cleanup Criteria During the 1991 RI

Compounds	Maximum Detected Concentration µg/L)		Federal and State Criteria (µg/L)		
	On Property	Off Property	PAL	ES	MCL
Organics					
Benzene	8	ND	0.067	5	5
1,1-Dichloroethene (1,1-DCE)	1	ND	0.024	7	7
Ethylbenzene	4,400	ND	272	1,360	700
Tetrahydrofuran (THF)	630,000	1,200	10	50	NA
Toluene	2,700	ND	68.6	343	1,000
Xylenes	37,000	ND	124	620	10,000
Vinyl Chloride (VC)	77	5	0.02	0.2	2
Inorganics					
Arsenic	25.2	ND	5	50	50
Barium	1,570	ND	200	1,000	2,000
Iron	17,000	ND	150	300	300[a]

[2] "On-property groundwater" is defined as groundwater at and in the immediate vicinity of the main waste disposal area, limited to lying within the property boundary. “Off-property groundwater" is defined as contaminated groundwater at any site-impacted location outside of the property boundary.

Lead	6	5.6	5	50	15[b]
Manganese	3,330	ND	25	50	NA
Mercury	6.5	ND	0.2	2	2

ES - Enforcement Standard, NR 140, WAC
PAL - Preventive Action Limit, NR 140, WAC
MCL - Maximum Contaminant Level, Safe Drinking Water Act
ND - Not Detected
NA - Not Available as MCLs have not yet been promulgated for this chemical
[a] Secondary MCL based on aesthetic qualities of drinking water
[b] Action Level value

The State of Wisconsin promulgated groundwater quality standards in Chapter NR 140 WAC, which are applicable or relevant and appropriate requirements (ARARs) for the groundwater cleanup. These standards include PALs and ESs for common hazardous compounds. PALs are contaminant-specific limits that signify a potential groundwater contamination problem. When PALs are exceeded for any contaminant measured at a groundwater monitoring point, WDNR must act to manage or control the contamination so that the respective ESs are not exceeded.

EPA promulgated MCLs under the federal Safe Drinking Water Act that are measured at the point of use from public water supplies serving more than 25 people. MCLs are chemical-specific and use conservative assumptions to arrive at a concentration in water that does not pose adverse effects to humans over a 70-year lifetime. Concentrations below the MCL are not expected to cause adverse health effects. With the exceptions of VC and THF, the ESs are set at the same concentration as MCLs for each COC for which an MCL is specified by EPA.

On August 27, 1996, EPA issued an ESD (Ref. 11, Appendix A) to document the following changes made to the 1992 ROD- selected remedy for the GCOU:

- Combine extracted on- and off-property groundwater into one influent stream to be treated in an on-property treatment facility, as opposed to two separate facilities;
- Use Fixed Film Biological Treatment (FFBT) instead of ABS to treat all extracted groundwater for VOCs and metals contaminants; and
- Discharge treated groundwater back into the ground via an Infiltration Gallery (IG) located on-property and upgradient of the capped waste area, instead of to the Yahara River or wetlands.

On September 22, 2017, EPA issued a ROD Amendment (Ref. 15, Appendix A) to the 1992 OU2 ROD. The RAOs were essentially the same as those of the 1992 ROD and were as follows:

1. Restore groundwater quality so that contaminant levels meet state or federal groundwater quality standards;
2. Stop the flow of contaminated groundwater downgradient of the Site property to private wells and other downgradient potential uses; and
3. Restore the groundwater to beneficial use.

The ROD Amendment documented the permanent replacement of the groundwater pump-and-treat (P&T) system by a low flow air sparge (LFAS) system, as discussed in the next section.

Status of Implementation

SCOU Implementation

EPA issued a Unilateral Administrative Order (UAO) to WMWI in 1991 to complete the Remedial Design and Remedial Action (RD/RA) for the SCOU.

WMWI completed the remedial action for waste consolidation and capping in August 1991 by removing about 30,000 cubic yards of refuse and non-native materials from areas B and C for consolidation into area A, and subsequently backfilling areas B and C. Area A, which now contains 97,650 cubic yards of waste, was capped. The six-acre landfill cap complies with § NR 504.07 WAC and consists of (from bottom to top) 24 inches of clay, a 12-inch drainage layer, a non-woven geotextile fabric, 18 inches of rooting zone soil, and 6 inches of topsoil to support grassy vegetation. The cap was fully vegetated. A security fence was installed around the landfill with posted warning signs.

The ISVE system consists of eight vertical vapor extraction wells (EWs), which are screened from the bottom of the waste through the sub-waste soils and down to groundwater, and a blower to generate vacuum at the wells. The exhaust from the blower discharges directly to the air in compliance with the substantive requirements of a Wisconsin air-use permit (Ch. NR 445, WAC). Twenty-nine gas probes were installed to monitor gas migration in and around the landfill (Figure 6 Appendix C). WMWI began operating the system in January 1994.

GCOU Implementation

Under the 1992 UAO for the GCOU, WMWI completed the RD for the groundwater P&T system in May 1995 and finished constructing the system in April 1996. Under the RA work plan, WMWI was to operate the P&T system until cleanup standards (see Table 2) were achieved in the aquifer at the point of compliance (at the waste boundary and in downgradient wells). Per the ROD, this was anticipated to take about 30 years due to limitations in extraction technology. The addition of in-situ bioremediation was considered likely to decrease the remediation time by 5 to 10 years, however EPA predicted the actual cleanup time to be substantially longer due to retardation and dispersion factors.

The groundwater P&T system consisted of four extraction wells (EW) located within the contaminant plume- three on-property near the landfill (E1, EW2, EW3) and one off-property about 800 hundred feet south of the property boundary (EW5) as depicted on Figure 5 (Appendix C). The system was designed to pump between 80 and 130 gallons per minute (gpm).

The treatment plant, constructed on the property along the southern edge of the landfill, was designed to treat between 70 and 100 gpm of moderately- to highly-contaminated groundwater, such as THF concentrations greater than 2,000 µg/L. The treated groundwater was discharged to the IG, in compliance with the substantive requirements of a Wisconsin Pollutant Discharge

Elimination System (WPDES) permit. Design studies had shown that the IG would likely speed the cleanup by flushing contaminants through the ground into the pumping wells. This also would bring dissolved oxygen (DO) into the aquifer to enhance the aerobic breakdown of organic contaminants.

Volatile organic chemicals were treated using submerged FFBT, which destroyed VOCs, making air treatment technologies to capture off-gases unnecessary. The discharge permit levels are the Wisconsin groundwater ESs in shown in Table 2.

The GCOU remedy under the 1992 ROD and 1996 ESD operated for 5.5 years before it became inefficient and costly. After that period, EPA approved pilot testing of a Low Flow Air Sparge (LFAS) system. The P&T and LFAS remedial systems operated together for eight months during the pilot test before EPA approved testing the LFAS alone in August 2001. By that time, contaminant levels had been reduced significantly. The LFAS continues to operate during which time it was expanded four times with new wells and upgraded components, including an oxygen generator and air dryer. The current system includes 13 sparge points (AS0l to AS10, EW1, EW3, and P7B) oriented in a line perpendicular to the direction of groundwater flow plus converted monitoring and EWs, largely downgradient of the capped waste mass (Figure 6 Appendix C). The modified system, often referred to as the "expanded LFAS System" creates a better aerobic treatment zone for groundwater flowing from beneath the waste mass to downgradient on-property and off-property areas.

EPA's July 25, 2016 FYR Report (Ref. 14, Appendix A) recommended the selection of LFAS as the permanent remedy and decommissioning the P&T system. On September 22, 2017, EPA issued a ROD Amendment to the 1992 OU2 ROD, permanently replacing the P&T system with the LFAS system. EPA implemented this change because the LFAS system demonstrated superior remedial effectiveness over the long term by promoting aerobic conditions in the aquifer to accelerate the degradation of the VOCs in the groundwater. The LFAS timeline and stages of expansion are detailed in the 2017 ROD Amendment.

Contaminant Rebound Testing

Based on decreases in concentrations of COCs, WMWI proposed a temporary shut-down of the LFAS and ISVE systems in 2016 to assess if contaminant concentrations in groundwater would increase over time (i.e., rebound test). The rebound test would assess the status of the remedial efforts, with the anticipation that Monitored Natural Attenuation (MNA) would be the final long-term groundwater remedy. At the time, the agencies felt it was premature to conduct the test. As per a follow-up request to EPA in 2019, WMWI began rebound testing in September 2019 (Ref. 5 and 6, Appendix A). EPA conditionally approved the rebound testing but required a more detailed work plan, which was submitted to EPA and WDNR in December 2020. EPA has since requested additional information on the use of the data to support key decisions. The quarterly preliminary assessments to date have not triggered partial or total restart of one or both of the systems. The rebound test is scheduled to end in September 2021, at which time EPA and WDNR will assess the collected data and Site conditions. The agencies will determine if further rebound testing is indicated, as well as other required future activities to evaluate the feasibility of MNA as a permanent remedy.

Institutional Controls

Both the 1990 SCOU ROD and the 1992 GCOU ROD required that Institutional Controls (ICs) and access restrictions be implemented at the Site. The ICs were included as part of the remedy in order to:

- Prevent the installation of drinking water wells in the vicinity of the disposal area;
- Protect the cap and the treatment facility; and
- Protect the remedy and safeguard human health and the environment during implementation of the remedy.

Table 3 provides a detailed summary of IC identification, purpose, objective, and area of coverage. Figures 4 and 7 in Appendix C depict the restricted areas.

Table 3: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Document	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Area of the Site where soil has been remediated to commercial/industrial cleanup levels.	Yes	Yes	PIN# 026-0511-103-9500-0 (16.5 acres) PIN# 026-0511-103-8000-7 (39.7 acres) PIN# 026-0511-103-8905-0 (3.73 acres)	Prohibit residential or commercial use of the on-Site property, including but not limited to filling, grading, excavating, building, drilling, mining, farming, or other development, or placing waste material, except with approval from EPA, in consultation with the state, as consistent with the ROD and CD requirements.	The following on-property deed restrictions and conditions and access restrictions were recorded: All property owned by WMWI Sect.10, Twp. 5 North, Range 11 East, town of Dunkirk, Dane Co. (recorded in Dane Co., WI, May 15, 1991, Vol. 15889, Page 36, Doc. 2262327). All property owned by WMWI Sect. 10, Twp. 5 North, Range 11 East, town of Dunkirk, Dane Co., WI except lots 1-3 south of County Highway A (recorded in Dane Co., WI, August 26, 1991, Vol. 16585, Page 1, Doc. 2284942). East ½ of the Southwest ¼ of Sect. 10, Twp. Range 11 East, town of Dunkirk, Dane Co., WI, except that part south of Co. Highway A (recorded in Dane Co., WI, January 4, 1993, Vol. 24133, Page 13, Doc. 2428937.

Groundwater – On-Site and Off-Site: Areas where groundwater plume exceeds groundwater cleanup goals or PALs				Prohibit any consumptive or other use of the groundwater that could cause exposures to humans or animals until PALs have been achieved, thus guaranteeing the safety of groundwater migrating off-property.	On-property deed and access restrictions to prevent the use of groundwater and the installation of public wells were recorded in 1991 and 1993 (see above). Off-property IC addressing contaminated groundwater is WDNR requirement NR 812.08(4)(g), which prohibits the installation of a water supply well in a known contaminated aquifer or within 1,200 feet of a landfill without prior approval from WDNR. WMWI sold a portion of its property on the west side of the Site property (Lot 3) to a developer, however the sales agreement requires that municipal services be provided to that area if/when development occurs in compliance with current deed restrictions.
				The Registry requires WDNR approval for well construction if residual groundwater COC levels exceed NR 140 ES.	WDNR informational IC that requires placement of hazardous waste sites on an Internet accessible database (GIS Registry).
				Requires active land use control measures to prevent non-farm development, limits residential density and prohibits subdivisions and other residential development in agricultural areas, limited transfer of parcels to ensure that agricultural land is preserved.	Town of Dunkirk Comprehensive Land Use Plan, Ordinance No. 02-2006 to adopt Comprehensive Land use Plan, August 8, 2006.

Waste, Soil, and Groundwater On-Site Remedial Components: - Consolidate and cap waste; - Install and operate an ISVE system in source area (through the cap); - Extract, combine, and treat on-and off-property groundwater via FFBT; - Discharge treated groundwater to re-infiltration area on the Site property and upgradient of cap. - Use LFAS to enhance bioremediation in the aquifer; - Monitor all private wells located around the Site annually.				Prohibit any residential or commercial use including but not limited to filling, grading, excavating, building, drilling, mining, farming, or other use or activity that may interfere with the work to be performed and long-term O&M of all remedial components, including the cap, ISVE, LFAS, groundwater P&T systems, and soil gas and groundwater monitoring.	On-property deed and access restrictions were recorded in 1991 and 1993 (see above). These controls have been applied to all lands owned by WMWI in proximity to the Hagen Farm Site and shall run with the land as provided by law and shall be binding on all parties and all persons claiming under WMWI.

Status of Access Restrictions and ICs:

The existing institutional and administrative controls are discussed below. Attachment 1 provides a summary of parcel-specific ICs and local zoning information.

Governmental Controls

- According to the Dane County Planning & Development department, the potential for future development in the area south of the Hagen Farm Site is minimized by several factors, which include the use of potable water supply wells in the area south of the Site. The Town of Dunkirk and Dane County have implemented local zoning that generally focuses on Farmland Preservation and maintaining the rural/agricultural character of the area. The Town's local ordinances reduce the potential for new residential development in the vicinity of the Site. Farmland Preservation zoning does not allow construction of residential structures. Development density is strictly limited to no more than one residence per 40 acres of land, based on how land was configured/owned in 1979. Zoning decisions made through the Town and County are based on a comprehensive plan https://townofdunkirk.com/images/uploads/files/comp-plan-complete.pdf

- The City of Stoughton comprehensive plan (2017) indicates that the City has no intention to annex this area and has the extraterritorial authority to approve/deny land divisions within 1.5 miles of its boundary (see Figure 8 Appendix C).
- The presence of sensitive environmental features (shorelands, floodplains, wetlands) have been noted on parcel descriptions. The minimum setback from wetlands and surface water bodies for construction activities is 75 feet.
- State Statute NR 812.08(4) WAC requires a WDNR review of potable wells installed within 1,200 feet of a landfill. Figure 9 in Appendix C shows the land parcels around the Site with respect to this 1,200-foot distance.

Proprietary Controls

- In 1991 and 1993, WMWI recorded deed restrictions on portions of all three parcels it owns at the Site. The entire contiguous restricted area is a smaller area than the WMWI property and lies within the property boundary that it currently owns, or has owned in the past, to prevent exposure to Site-related contaminants (Attachment 1, and Figure 4 Appendix C).

Informational Controls

- The Site is currently identified in WDNR's Bureau for Remediation and Redevelopment Tracking System (BRRTS), Remediation and Redevelopment sites map, and is also in the State Geographical Information System (GIS) Registry. BRRTS lists areas where WDNR approval is needed for well construction where residual groundwater COC levels exceed an ES. Continuing Obligations (COs) are currently in effect for the Hagen Farm property remedial components (i.e., cap, ISVE, LFAS, fence) and residual groundwater contamination at the Site. A 1,200-foot setback exists due to the waste area, per state statute. Groundwater data generated as part of the monitoring program at the Site, including from those wells downgradient of the Site beyond the 1,200-foot restrictive boundary [(NR 812.08(4)(g)], are available from the WDNR Groundwater and Environmental Monitoring System (GEMS) website.

- The Well Driller Viewer (https://dnrmaps.wi.gov/H5/?viewer=Well_Driller_Viewer) is an interactive map that shows any sort of well construction restriction area, including waste setbacks, special casing areas, and places where well construction is restricted or prohibited.

Access Controls

- Perimeter fencing, which is six feet tall with three-strand barbed wire topping and controlled access points (i.e., locked gates).
- Signs are posted on access points to WMWI property that indicate the Superfund status of the Site and EPA contact information. The notice signs were updated in November 2016, to improve their condition and ensure that current EPA contact information is provided.

Current Compliance:

Since 2011, EPA has required WMWI to report annually on the status of ICs at the Site. WMWI annual operation and maintenance (O&M) reports provide an assessment of the effectiveness of

the existing institutional and administrative controls based on the activities performed during the prior year. The activities include the annual Site inspection and Site visits by various personnel throughout each year for O&M requirements. A review of the Well Construction Report and Water Well and Well Filling and Sealing Report System (WARs) databases maintained by the WDNR is also conducted. The review includes a search to identify any new wells that were recently installed or abandoned within approximately one mile of the edge of waste at the Site. Review of these databases indicated that no new wells were installed or abandoned throughout the current review period, except for in 2018 when two wells located approximately one-half mile to the west of the Site were reportedly abandoned on April 8 and 27, 2018. The addresses of the former well locations, 2431 and 2439 County Road A, are in the vicinity of the recent development for the new City of Stoughton Public Works Facility. The buildings associated with the new facility are reportedly connected to the public water supply.

During this FYR reporting period there was no evidence that the deed restrictions are not effective. There were no new developments or changes to land use or ownership of the owned portion of the Site. Routine inspections of the perimeter fencing and access controls (i.e., gates) did not show evidence of trespassing. The fence and access gates were maintained as needed in accordance with the Site O&M plan.

ICs are in place for the entire area of the waste mass at the Site and the adjacent property owned by WMWI. Land use downgradient of the Site is primarily commercial or agricultural, thus there is little potential for exposure to contaminated groundwater. As previously indicated, governmental and informational control ICs are in place at off-property monitoring locations (OB8M[3] and P32B) outside of the 1,200-foot radius from the landfill boundary. These ICs limit or prevent the installation of wells in this area. Outside the 1,200-foot setback, COs may be required for properties where a groundwater ES exceedance exists, and the property is not served by municipal water. No such COs have been placed to date, and no well construction has occurred. The WDNR is evaluating CO placement at properties surrounding Hagen Farm. The concentration of VC in OB8M currently exceeds the PAL and ES but is below the MCL. Concentrations of VC are stable or decreasing over the past decade. Monitoring of these wells, and of local private wells will continue. The potential need for additional ICs in this downgradient area will continue to be evaluated.

Long-Term Stewardship:

Since compliance with ICs is necessary to assure the long-term protectiveness of the remedy, planning for long-term stewardship (LTS) is essential to ensure that effective ICs are maintained, monitored, and enforced, and that the remedy continues to function as intended with regard to ICs. At EPA's request, WMWI developed an Institutional Control Implementation and Assurance Plan (ICIAP) in 2021 (Ref. 7, Appendix A) which documents the LTS process. The LTS procedures include regular assessment of the ICs to ensure they are in place and remain effective. In addition, annual monitoring and reporting of ICs are provided as a routine O&M activity within a separate IC monitoring section of the WMWI Annual Reports. Some of the items monitored include change of property ownership, grandfathering of replacement wells, ongoing identification of wells installed within one mile of the edge of the waste boundary on the

[3] In past documents, including the 2016 FYR, this monitoring well has also been referred to as "OB08M".

Site property, and changes to Wisconsin administrative rules or statutes relevant to ICs. These activities will help determine whether additional ICs are needed further downgradient of the Site.

Systems Operations/Operation & Maintenance

In addition to reviewing Site access and ICs, the O&M activities involve the SCOU and GCOU systems operation and performance monitoring. The addition of the ICIAP document is the only recent change to the O&M Plan for the Site. SCS Engineers (SCS) of Menomonee Falls, Wisconsin is the primary O&M contractor. Subcontractors are selected and utilized as needed to perform specialized O&M functions (i.e., mowing landfill cap, hauling condensate etc.). A local contractor, Compressed Air Technologies (CAT) performs non-routine repairs or significant scheduled maintenance of the compressors, oxygen generator, and air dryer. Enterprise Electric, Dairyland Energy Solutions, and Machine Control Specialists (MCS) supported evaluation and resolution of electrical issues associated with the Programmable Logic Controller (PLC). Some O&M activities were suspended following the initiation of rebound testing in September 2019.

SCOU Annual O&M Reporting

The SCOU components include a cap over the waste mass, an ISVE system constructed through the cap into the waste, and institutional and administrative controls at the Site. The contractor visits the Site on a weekly basis to conduct O&M activities and typically performs the following activities:

- Site inspections are conducted in late July of each year;
- Landfill cap mowing to control the growth of woody vegetation is usually completed in August of each year;
- Monthly performance monitoring at both the ISVE blower station and the gas EWs for flow, temperature, header pressure, differential pressure, and vapor composition (oxygen, carbon dioxide, and methane);
- Performance monitoring of the probes for pressure and vapor composition (oxygen, carbon dioxide, and methane);[4]
- Annual (November) sampling for VOCs from the operating gas EWs and the blower inlet station; and
- Periodic measuring of the condensate level in the condensate/underground storage tank (UST), and removing the liquid when necessary.

Routine maintenance of the ISVE system includes checking belt tension, filter function, and lubricant levels at the blower, and management of the liquid condensate that collects in the UST. The air dilution valve regulates the available vacuum to the collection header and gas EWs, and it is typically closed to maximize the available vacuum in the system, without drawing in excessive volumes of water from the extraction points. The water collects in the condensate tank

[4] In 2016, EPA approved discontinuing quarterly gas probe sampling but recommended annual measurements at the 11 probes located outside of the waste mass (i.e., GP16 and GP20 through GP29) to ensure that no off-Site gas migration is occurring. In addition, a round of measurements should be taken at all gas probes once every five years (corresponding to the required FYRs) to provide a "snapshot" of the remedy's effectiveness and to assist in identifying areas for potential optimization.

and causes the system to shut down when the tank becomes full. Vacuum was present throughout the reporting period at nearly all of the probes, indicating that the ISVE system was successfully creating a zone of influence in the waste mass.

The blower for the ISVE system is typically shut down for routine maintenance during Site visits. The blower also shuts down automatically when the condensate collection tank is full. The system is not restarted until after the condensate tank is emptied. The condensate level in the UST is measured periodically. A local septic waste hauler pumps and transports the liquid to the Madison Metropolitan Sewerage District. During this reporting period, about 2,200 gallons were removed. The ISVE was shut down for contaminant rebound testing in September 2019.

Minor maintenance of the gas EWs (i.e., replacing damaged or broken sample ports and connecting/tightening loose fittings) was performed as needed. During this reporting period, well EW1AR was not operated under vacuum, but remained open to promote airflow into the waste mass. Below are the more notable O&M occurrences that led to system downtime.

2017
July - SCS replaced a coupling on the ISVE exhaust piping which had weakened due to vibration and/or elevated temperatures inside the building. The blower was shut down for approximately two days prior to completion of the repairs.

2018
May and June - Above average precipitation resulted in an increase in water elevations at a number of the gas EWs. This decreased the available length of open well screen at several wells, causing an increase in vacuum in the system.

June - The well head at EW2 was replaced because a connection port used to measure differential pressure and the fitting that holds the pitot tube within the well had broken. While these breaks did not affect operation of the ISVE, replacing the parts allowed measurements of differential pressure to be used to calculate flow and improved the vapor composition monitoring.

July - An increase in vacuum within the ISVE system activated the overload for the electric blower motor. The overload was reset, and normal operation resumed. The technician opened the dilution valve approximately 20 percent to reduce the available vacuum on the system and load on the motor. The air dilution valve was partially open for the remainder of the year, so that the vacuum was maintained at less than 30 inches of water. Despite attempts to balance the vacuum and associated load on the blower motor, the motor overloaded on several times in June, July, August, September, and November.

2019
The air dilution valve was open from 10–50 percent during 2019. Despite the attempts to balance the vacuum and associated load on the blower motor, the motor became overloaded on several occasions and was replaced twice in 2019. The ISVE electrical system was inspected after the motor failed the second time in June and no issues were identified.

September - SCS collected an emissions sample and shut off the ISVE system for the temporary rebound test.

2020

Because the ISVE system was not operated during the 2020 reporting period, samples from the gas EWs and blower exhaust were not collected. The gas probes used to assess the operation of the system were monitored in September.

GCOU Annual O&M Reporting

The expanded LFAS system uses two compressors, each rated to produce 77 cubic feet per minute (cfm) of air at 125 pounds per square inch (psi), to provide air to the sparge points. The units run in lead-lag mode, in that one unit provides most, if not all, of the compressed air, while the other unit only contributes air if needed to meet the pressure demand. Therefore, the system operation is not significantly compromised if one of the two compressors is not operating. Both the oxygen generator and air dryer use compressed air as a part of their operation.

Compressed air is routed to two sparge points at a time under the control of the PLC. One is selected from the seven deep sparge points (AS07, AS08, AS09, AS10, EW1NF, EW3, and P7B) and the other is one of six shallow sparge points (AS01, AS02, AS03, AS04, AS05, and AS06). The PLC controls the cycle and sequence of sparge points. At the end of a cycle, the air flow is directed to the next sparge point in that manifold group. The cycle interval during this reporting period between 15 to 20 minutes. The pressure of the compressed air is regulated by valves at the individual sparge points. The PLC also communicates with an auto dialer that provides notification when system operation is disrupted.

Each year, WMWI's contractor typically performs the following activities:

- Conduct weekly Site visits to verify that the compressors, air dryer, and oxygen generator are operating and are maintained (i.e., maintain lubricant levels in the compressors and periodically drain moisture from system components);
- Conduct monthly routine maintenance;
- Perform scheduled maintenance of compressors, oxygen generator, and air dryer;
- Conduct monthly monitoring of the air sparge points for pressure and flow data; and
- Conduct routine groundwater contaminant monitoring, at which time dissolved oxygen (DO) and Oxidation-Reduction Potential (ORP) data are collected. Attachment 2 provides tables showing the comprehensive groundwater monitoring program.

The compressors are shut down for routine maintenance and service. The compressors will also shut down in response to signals from various system sensors, including high temperature, low fluid level, electrical faults, etc. Some short-term shutdowns of one or both compressors occurred during the reporting period. Most of the issues were not significant, so that the compressor(s) operation could resume upon reset of the unit during the periodic visits or in response to the auto dialer call. System downtime and maintenance activities performed during this reporting period include the following:

2017
October - Both compressors suddenly shut down due to an electrical storm that disrupted the power. The sudden shut down caused several problems. SCS added oil to Unit 2 and normal operation resumed. Two days later, Unit 1 was repaired by installing new belts and filters and adding oil. CAT also identified and repaired an oil leak by Unit 2 at that time.

2018
July - An electrical storm disrupted power to the building causing the PLC and compressors to stop functioning. The technician reset the circuit breakers and restarted the compressors. In a follow-up visit, the technician noted that there was no power at the PLC and reset the circuit breaker on the UPS for the PLC and normal system operation resumed.

August - An electrical storm interrupted the power such that the compressors were not functioning and had to be restarted.

2019
February - SCS replaced the flow meters on the air lines to the deep and shallow sparge points because the old flow meters had occasionally stopped working, even after routine maintenance/cleaning. The flow meter measurements are used to balance the air flow to the sparge points; they do not directly affect the operation of the sparge system.

August - The protective surface casings of two shallow air sparge points (AS07 and AS08) were damaged during mowing. The protective casing was loose at AS07. The contractor removed soil from the base of the casing and added bentonite chips to restore the surface seal. The excavated soil was replaced over the bentonite chips to secure the protective surface casing.

SCS replaced the protective surface casing at AS08 because the 2-inch-diameter PVC piping associated with the sparge point, and underground connection with the air line, had been damaged. The contractor replaced the underground fittings that connect the airline to the sparge point, and a section of piping associated with the sparge point. A new protective surface casing was installed, and bentonite chips were placed around the base of the pipe to establish a surface seal. The excavated soil was placed over the bentonite chips to secure the surface casing.

August - MW P17DR was damaged during mowing. SCS replaced the protective casing and restored the surface seal with bentonite chips. A section of the MW's 2-inch PVC casing was replaced, and the sections were connected. A section of the tubing for the dedicated sampling pump was also replaced.

September - The compressors, oxygen concentrator, and air dryer associated with the expanded LFAS system at were shut down in September 2019 to initiate the rebound test.

2020
The LFAS system was not operated during the 2020 reporting period due to rebound testing.

August - MW P29B could not be sampled in August due to an obstruction in the well that was created when water had previously frozen between the outside of the well's PVC casing and

inside of the protective surface casing. The protective surface casing was removed to cut the pipe below the deformation and to replace the damaged section of well casing. The protective casing was reinstalled, and bentonite chips were placed at the base of the protective surface casing to ensure a proper seal. Soil was placed over the bentonite chips to establish a slope away from the well. The repaired well was sampled on September 1.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the last FYR as well as the recommendations from the last FYR and the current status of those recommendations.

Table 4: Protectiveness Determinations/Statements from the 2016 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1	Protective	The remedy for Operable Unit 1 is protective of human health and the environment because waste consolidation, capping, and the ISVE system are functioning as intended such that the source of contamination is not accessible to humans. Access and ICs, including fencing and deed restrictions, respectively, have been implemented to protect the remedy, to prevent current and future exposures to on-Site groundwater, and to prevent residential/ commercial activities for the on-Site property.
2	Short-term Protective	The remedy for Operable Unit 2 currently protects human health and the environment because the LFAS system, which has been employed on a pilot or interim basis to replace the ROD-selected P&T system, has demonstrated its ability to effectively reduce contaminant concentrations. EPA is planning to prepare a ROD Amendment to memorialize this remedy change. Access controls and ICs, including fencing, deed restrictions, and governmental controls have been implemented to prevent current and future exposures to groundwater on the Site property. Receptors downgradient of the Site property that rely on private groundwater wells are sampled annually to ensure their groundwater is safe. Currently, there are no exceedances of VC above the MCL in the off-property monitoring wells and private wells. Long term protectiveness will be achieved by ensuring the continued effective O&M of the LFAS; maintaining and enforcing the effectiveness of existing ICs; and implementing additional enforceable ICs for unrestricted areas downgradient of the Site property, where ROD-specified groundwater cleanup criteria are being exceeded, until groundwater cleanup goals have been achieved at the waste boundary and throughout the plume.
Sitewide	Short-term Protective	On a Site-wide basis, the remedy is currently protective of human health and the environment because the remedy is functioning as intended. However, in order for the remedy to be protective in the long term, the following actions need to be taken: implement ICs further downgradient (south) of the landfill Site property, and develop and implement a LTS plan.

Table 5: Status of Recommendations from the 2016 FYR

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
OU 2	ICs should be implemented downgradient of the Site property where groundwater cleanup standards are exceeded to prevent potable use of contaminated groundwater	WMWI needs to investigate the use of ICs further downgradient (south) of the landfill Site property. The VC levels detected at two downgradient off-property locations (OB8M and P32B) exceed the cleanup criteria (PAL), and in some cases, the ES. These known locations are outside of the authority of Wisconsin Ch. NR 812.08(4)(g), which prohibits the installation of a water supply well in a known contaminated aquifer or within 1,200 feet of a landfill without prior approval from WDNR.	Completed	See Below	4/13/2021
Sitewide	A LTS plan that meets EPA guidelines needs to be prepared and implemented.	WMWI should update the Site O&M plan to include documented procedures that will ensure ICs and LTS at the Site. The LTS plan should include procedures for monitoring and tracking compliance with the ICs, communications procedures, and annual certification to EPA that ICs remain in place and are effective.	Completed	See Below	6/18/2021

Recommendation # 1

In April 2021, WMWI completed an investigation of the properties downgradient and in the vicinity of off-property MWs OB8M and P32B and identified governmental and informational controls that address any potential risk-based exposure concerns in this area (see Attachment 1). The IC review indicates it is unlikely that a potable well could be installed in this area given the zoning controls and comprehensive land use plans of the City, Town, and County. As mentioned, the potential for future development downgradient of the Site is minimal due to Farmland Preservation zoning which does not allow construction of residential structures. The Township ordinances reduce the potential for new residential development in the vicinity of the Site. The City does not intend to annex this area and has the extraterritorial authority to approve/deny land divisions within 1.5 miles of its boundary. The VC concentrations in this area are below the

MCL and thus do not present a health risk. Downgradient MWs and private wells will continue to be monitored under the O&M plan, and ICs will be reviewed annually under the ICIAP to identify any necessary adjustments should conditions change.

Recommendation # 2

To assure proper maintenance and monitoring of effective ICs, LTS procedures have been included in an ICIAP developed by WMWI and approved by EPA. The LTS procedures include regular review of ICs and annual certification to EPA and WDNR that ICs are in place and effective. The ICIAP is considered part of the O&M plan. The IC compliance review and certification tasks are included in the annual O&M/ progress reports.

Other Findings

In addition, a status update is provided for the following recommendations that were identified during the 2016 FYR that do not affect current or future protectiveness:

• The annual sample result letters sent by WMWI to the downgradient private well owners should explain both the state and federal groundwater quality and drinking water criteria. When detections are found, the letter should state the chemical-specific criteria that have been exceeded and the potential health or regulatory implications of the results, and actions that should be taken, if necessary. In response to this finding, the private well letters were revised in June 2021 to identify and provide information on contaminants exceeding health and public welfare criteria and identifies those criteria. The RPM contact information is provided for further consultation.

• The EPA Site contact (RPM) information should be updated on the signs posted on the perimeter fence and gates at the Site property. In response to this finding, the signs were updated in November 2016.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

A public notice was made available by a newspaper posting in the *Stoughton Courier-Hub* on September 3, 2020, stating that there was a FYR and inviting the public to submit any comments to EPA (see Attachment 3). At the same time, EPA posted an update to the Site web page (See https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0505071). The results of the review and the report will be made available at the Site information repository located at the Stoughton Public Library, 304 South Fourth Street, Stoughton, Wisconsin.

Because this is the sixth FYR at this Site and no community-related issues have been brought to EPA and WDNR's attention, formal community interviews were not conducted. Representatives of WMWI and its contractor SCS visit the Site regularly and have indicated to EPA that no community concerns or issues have been raised over the past five years that require follow-up.

Data Review

SCOU (OU1)

The remedial components of the SCOU include the landfill cap over the waste mass, the ISVE system, and the institutional and access controls at the Site. The ISVE system has operated for over 20 years and its performance is regularly monitored. During the FYR period, monthly samples from the seven vapor EWs and the annual blower stack sample were analyzed for VOCs and field parameters (methane, carbon dioxide, oxygen, pressure). During this time, EW1AR remained open to the atmosphere.

The annual blower stack samples identified between seven and 12 different VOCs in the discharge, with xylenes contributing the greatest proportion of mass. The daily total VOC mass discharged from the blower stack was less than one pound per day, substantially less than the potential air emission limit of 216 pounds per day allowed under Ch. NR 419 WAC. The sample results from this reporting period are generally consistent with results from recent past sampling events. Table 6 of Appendix D summarizes blower station data.

During this review period, methane concentrations greater than 5 percent by volume (%-vol), the lower explosive limit (LEL), were seen at EWs 2, 3, 4, and 6. Extraction wells 3 and 6 consistently showed a higher methane percentage than the other wells. The highest methane value was reported at EW6 (48 %-vol). The highest reported values for EW2 and EW3 were 34 and 31 %-vol, respectively. These higher values are expected since they were generally reported after the ISVE system was temporarily shut down. Table 7 Appendix D summarizes gas EW field parameter data.

During the review period, the 86 gas probes were periodically monitored for field parameters. EPA recommended that 11 probes (GP16, GP20 through GP29) located outside of the waste mass be sampled annually and that all probes be monitored every five years. During this period, all probes were sampled in 2018-2020 as shown in Table 8 Appendix D. Prior to 2020, methane was identified at concentrations above the LEL at a subset of the probes within the limits of waste but not at probes outside the waste limits. Oxygen was reported at concentrations greater than 10 %-vol (i.e., at about 50 percent of the atmospheric concentration of 20.9 %-vol) in 2019 at 82 of the 86 probes sampled. The data suggest that the ISVE system is promoting oxygen movement through the waste mass.

Gas detection data from 2019 to 2020 shows an increase in the number of probes (40) showing methane and carbon dioxide. Methane was detected above its LEL at one location (GP29) outside of the waste mass. These areas will continue to be monitored for further changes or indications that active treatment should be resumed.

Review of the VOC and field parameters over time indicates that conditions within the waste mass have stabilized and that the ISVE system was no longer removing a significant mass of VOCs from within the waste mass. The ISVE system has contributed to the protectiveness of the SCOU remedy by accelerating stabilization of the waste mass by removing contaminants from within the waste mass that could potentially impact groundwater.

GCOU (OU2)

Groundwater monitoring has been regularly conducted during the FYR period. Attachment 2 provides tables of the parameters monitored, wells sampled and sampling schedules. These and other hydrogeological data were provided by WMWI in the Annual Reports from 2016 through 2020 (Ref. 2 through 6, Appendix A).

Table 9 Appendix D shows the applicable PALs and ES for chemicals found at the Site, as well as the maximum concentrations of COCs from this reporting period. The "Cleanup Standards" column provides the Site-specific cleanup goals of the GCOU ROD (PALs) as well as other types of groundwater cleanup standards (MCLs and ESs) for comparison. The table shows a comparison of each cleanup standard in place at the time of the ROD to the current 2021 regulatory levels. The water level data during this reporting period continue to indicate a downward gradient from the water table to deeper pervious strata over the majority of the past five years. Contaminants migrating downward into the fractured bedrock are more difficult to monitor and remediate. The COCs with data to be evaluated include VOCs such as THF, VC, benzene and several inorganics and field parameters to assess the protectiveness of the remedy.

Attachment 5 provides graphs depicting concentration trends for THF and VC in groundwater in selected on-and off-property MWs over the past five years. Figures 5 and 6 of Appendix C show the MW locations. The monitoring data in recent years has reported VC, and occasionally THF concentrations in excess of the groundwater PALs. Since its 2014 expansion, the LFAS has been effective in reducing the THF and VC concentrations even in the fractured bedrock and in off-Site wells. Data collected since the shut-down have shown a rebound in VC concentrations in source area wells MW22 and P22B and a rebound in THF concentrations in MW22 above the ES from levels that had been consistently below the PAL. This behavior demonstrates the effectiveness of the LFAS. The rebound test period will end in September 2021, at which time EPA and WDNR will assess the Site conditions and whether the collection of additional rebound test data should continue at this stage of the remediation. In order for the remedy to remain protective, one or both remediation systems may need to be restarted.

Tetrahydrofuran

THF concentrations have historically been in the thousands of ppb at the waste boundary and decreasing with distance outside the boundary. In recent years, WMWI has made substantial progress in reducing THF levels. Since 2016, while the LFAS was operating, THF levels have been non-detect at all monitored wells, except for one detection (3 µg/L) in well MW22, which was below the PAL and ES of 10 ug/L and 50 ug/L, respectively. After the LFAS system shutdown, THF was detected during the three most recent sampling events from MW22 at concentrations of 7.3, 18, and 18 µg/L, in May, August, and November 2020, respectively. The August and November 2020 results exceed the PAL. The post-shutdown concentration increase at MW22 is consistent with rebound and would be expected (Graphs 1 and 2, Attachment 5).

Vinyl Chloride

The LFAS has been less effective in reducing VC concentrations than it has been with THF. After addition of the oxygen concentrator in 2007 and the addition of air sparge points in 2014,

concentrations have declined or stabilized. VC concentrations have been decreasing in off-property wells OB8M and P32B (Graph 5, Attachment 5). The decreases at OB8M have all occurred during the current reporting period.

Since 2015, VC concentrations exceeding the ES (0.2 µg/L) have been detected in MW22, OB8M, P17C and P26B. Source area wells P22B and MW22 had consistently been below the PAL (0.02 µg/L), however, in 2020, after shut-down of the LFAS, VC concentrations exceeded the ES in May 2020 and the PAL in August and November 2020 at both locations (Graph 4, Attachment 5). As with THF, a rebound at these locations was anticipated and needs continuing attention.

At on-property locations, there were 32 ES exceedances (16 at P17C and 16 at P26B) and 42 PAL exceedances (two at P17B in 2016- 2017, 20 at P17C, and 20 at P26B). All of these are near the southern property boundary (Figure 6 Appendix C). As shown on Graph 3 in Attachment 5, on-property well P17C, which is located within about 300 feet of the waste boundary, had shown VC concentrations above the MCL (2 µg/L) during the prior reporting period. All detections in well P17C have been below MCL since August 2014, and below the ES since February 2020. Concentrations of VC in on-property well P17B continue to decline and have been near the PAL or below since the addition of air sparge points in 2014. Recent data may suggest that a shift to a very slowly increasing trend may have begun. P26B is downgradient and proximate to EW3, a former groundwater EW that was converted to a sparge well.

VC concentrations ranging between the ES and MCL have occurred at off-property downgradient well OB8M for the entire life of the remedy. During this period, there were 19 ES exceedances at OB8M, and 24 PAL exceedances were found (19 at OB8M and five at P32B). MW OB8M is about 1,900 feet from the waste boundary and therefore not subject to Wisconsin Chapter NR 812.08(4)(g) requirements. A visual scan of the plot of VC concentrations over time at OB8M shows that the concentrations have decreased below 1 µg/L after the addition of air sparge points in 2014 and were nearing the ES when last sampled in 2020. There has been a steady decrease in VC concentrations at OB8M during this review period (Graph 5, Attachment 5). During this same time, DO concentrations have also increased and remained approximately above 6 mg/L in OB8M after the addition of sparge points in 2014.

These data suggest that the LFAS expansion may have the capacity to intercept and adequately treat the plume extending to this off-property area. This is further supported by the significant downward VC concentration trend in off-property well P32B where VC concentrations have been consistently below the ES since 2013 and below the PAL since 2017. The data suggest a lag time of 8 to 9 years between behaviors at on-property wells and P32B and a lag time of about another 3 years between P32B and OB8M. Assuming these behaviors are correlated to remedial activities, it seems reasonable to expect similar time lag times in response to shutdown of the ISVE and LFAS.

Benzene

The remedy has demonstrated significant progress in reducing benzene concentrations.

Benzene was only detected at off-property wells OB8M and P35B during this review period. Detections were slightly above or below the PAL (0.5 µg/L), ranging from 0.48 to 0.64 µg/L. Benzene was not detected in P17C.

Tetrachloroethylene

Tetrachloroethylene (PCE) was detected in nine out of 385 results during the reporting period. All were located at upgradient IG04 (Figure 4 Appendix C) and were below the ES (5 ug/L) but above the PAL (0.5 ug/L). Before 2011, there was only one sub-PAL detection at IG04 out of 30 reported results (3 of these non-detects had limits of detection greater than PAL and are not useable to evaluate PAL exceedances). However, from 2011 through 2020, 16 of 19 sample detections exceeded the PAL. WMWI should investigate the increase in these now-routine PAL exceedances.

Trichloroethylene

TCE has not been found above the detection limit in any of the Site-related MWs during this or the prior monitoring period (385 sample results during 2016 through 2020). Of the five private wells that are annually sampled by WMWI, TCE exceeded the PAL (0.5 µg/L) on one occasion during the 2018 sampling of private wells at PW3 on the former Sundby property. The concentration was 0.87 µg/L. While it exceeded the PAL, the concentration was less than the ES and MCL (5 µg/L). TCE has not been found at other private wells.

Cis-1,2-Dichloroethylene

Cis-1,2 DCE was not detected during this review period.

Inorganics

During this reporting period, key dissolved metals—aluminum, arsenic, barium, iron, lead, manganese, mercury, and vanadium—have been consistent with previous results. PAL-exceedances (and an occasional ES-exceedance) by arsenic, iron, and manganese are not unusual due to their natural occurrence in the area. Iron and manganese are sensitive to the DO concentration and are important indicators of the subsurface environment.

Since 2016, arsenic concentrations exceeding the PAL (1 µg/L) were observed at 14 MWs (IG-04, MW7, MW22, MW23, MW26, MW27, MW32, MW-100, OBS1B, OBS1C, P17C, P22B, P26B, P27B). Arsenic concentrations continue to exceed the ES and MCL (both 10 µg/L) at MWs P22B (waste area) and P27B (off-property); the maximum concentration observed in P22B was 40.7 µg/L and 14.3 µg/L in P27B.

Annual sampling of five private wells during the period of 2016 to 2020 showed no arsenic exceedance of the PAL, ES, or MCL. Arsenic occurs naturally in some Wisconsin groundwater. While there is no evidence that the dissolved arsenic originates in the landfill, it does not necessarily mean that dissolved arsenic is unrelated to the Site.

Nitrate-plus-nitrite was not found in concentrations greater than ES (10 mg/L) in the Site wells but did exceed the PAL (2 mg/L) at most locations. In the private wells, nitrite plus nitrate highest annual levels ranged from 10.7 to 12.4 mg/L, above the PAL and ES. The detected concentrations are consistent with past results and are likely related to agricultural fertilizer use near the Site or other human activities.

Most of the wells showed sulfate in the 20-50 mg/L range. The most elevated sulfate concentrations across the Site (50-90 mg/L range) have been found at P28B. Several wells had lower dissolved sulfate concentrations; no values greater than 20 mg/L were found at IG04, MW23, MW29, MW30, MW32, MW33, OBS1A, P17DR, and P30B. Except for P17D, all of the wells are relatively shallow. The results are generally consistent with earlier ones.

Since 2016, no lead concentrations exceeded the PAL (1.5 µg/L) or other action levels in the Site MWs. The maximum concentration observed was 1 µg/L in well OBS1C. The private well samples showed no lead exceedances.

No mercury was found at concentrations greater than the PAL in any MW since 2011. Mercury has not been detected in private wells. Iron and manganese concentrations greater than the PAL, and in some locations the ES and MCL, are common or even typical. The highest annual iron concentrations ranged from 0.35 to 3.1 mg/L, exceeding the PAL (0.15 mg/L) and ES (0.3 mg/L). These criteria are public welfare groundwater standards (Ch. NR 140 WAC, Table 2) and are based on welfare issues (i.e., taste, odor, and staining). Concentrations above these criteria are not a public health concern. The highest annual manganese levels ranged from 95 to 147 mg/L and exceeded both its PAL (25 µg/L) and ES (50 µg/L). The PAL and ES are public welfare groundwater standards and therefore, may indicate a welfare issue but not a public health concern. In January 2011, a second manganese PAL of 60 µg/L and ES of 300 µg/L were added to Table 1 of Ch. NR 140 WAC for public health parameters. The manganese concentration of 95 µg/L exceeded the Table 1 PAL.

Dissolved Oxygen

DO is a key indicator for degradation of THF and VC. DO concentrations below 1 mg/L indicate anaerobic conditions and those above 1 mg/L indicate aerobic conditions; this is a useful first-order indication of the subsurface environment. The Annual Reports for this Site use a value of 2 mg/L as a screening threshold for aerobic/anaerobic environments.

DO in groundwater was measured with a field sensor 366 times in the reporting period, with concentrations ranging from 0.5 to 23.8 mg/L (as compared to a range of 0.6 to 16.9 mg/L in the prior five years). Of these DO results, only three were below 1 mg/L indicating anaerobic environment; one was located at MW23 near the waste boundary and two were at P17C near the property boundary). Using the alternative DO threshold of 2 mg/L, 36 results were less than 2 mg/L; 18 were on-property (MW22, MW23, MW26, MW33, P17C, P22B, P26B) and 18 were off-property (MW27, MW30, OB11M, P27B, P28B, and P32B).

Oxidation Reduction Potential

The oxidation reduction potential (ORP) is measured in the field. The 2020 Annual Report notes that the average ORP is lower in 2020 than it was in 2019, which would be consistent with lower average DO and would reasonably correlate with the shutdown of the ISVE and LFAS systems. While not definitive, these data should continue to be collected and reviewed.

Site Inspection

Due to travel restrictions associated with the COVID-19 pandemic, EPA was unable to complete a FYR Site inspection. EPA will complete a FYR Site Inspection as soon as feasible. This has been included as a recommendation of this FYR.

At EPA's request a Site inspection was conducted on December 21, 2020 by WMWI and SCS. Personnel from WMWI and SCS completed the FYR Inspection Checklist provided by EPA to document their observations. Attachment 4 provides the completed checklist and photographs.

The access controls, including the perimeter fencing and gates, were in good condition. Signs with current contact information are posted on access gates and on perimeter fencing. There has been no evidence of trespassing or vandalism.

The grassy vegetation on the landfill cap is well-established and healthy. Annual mowing effectively controls the growth of woody vegetation. The surface grade of the cap does not appear to be uniform in one area (i.e., less than ¼ acre) on the northeast corner of the cap, indicating potential settlement. The settlement does not appear to be significant in that the vegetation is healthy and prevents storm water from ponding for long periods. Because storm water may not run off as quickly as on other areas of the cap, the area should be monitored and repaired if necessary.

The IC evaluation is included in annual O&M/monitoring reports. No new residential development has occurred within one-quarter mile of the Site. A new public works building was built approximately 2,500 feet west of Site since the last FYR. Sand and gravel are being commercially removed and processed (washed and sorted) within about 1,000 feet of the Site on the property immediately north of the Site.

V. TECHNICAL ASSESSMENT

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

Yes. During this FYR period, a review of documents and the results of the WMWI Site inspection were used to assess the remedy. Although an EPA-led FYR Site inspection did not occur in 2020 or 2021 due to COVID-19 work travel restrictions and concerns, a Site inspection was performed by WMWI and its O&M Contractor in 2020 using EPA's Site Inspection Checklist and photo documentation. The information gathered and monitoring data collected indicate that the SCOU portion of the remedy is functioning as intended by the ROD and ESD and is effectively achieving the RAOs. The cap and drainage structures remain intact, preventing

direct contact with the wastes and controlling infiltration of precipitation that could result in leaching of contaminants to groundwater. WMWI has effectively operated and maintained the ISVE system such that contaminant loading from the source to the groundwater has been successfully reduced. The ISVE system has been temporarily shut down to better determine performance of the system. The system is being closely monitored to track landfill gas composition and migration.

The GCOU remedy included P&T as its main remediation component. The LFAS system began as a pilot, and was enhanced several times, with the most recent expansion at the end of 2014. The improvements to the system have increased the overall effectiveness of contaminant reduction in groundwater. EPA issued a ROD Amendment in 2017 to replace the P&T component with the LFAS system. The system has been effectively operating during the current FYR period and groundwater contaminant concentrations have declined or been stable. As with the ISVE, the LFAS system was temporarily shut down to better determine performance of the system. The rebound test data collected to date confirm that the systems have been effective. The rebound test is scheduled to end in September 2021, at which time EPA and WDNR will assess the collected data and Site conditions. The agencies will determine if further rebound testing is indicated and/or if other actions should be undertaken to evaluate the feasibility of MNA as a permanent remedy.

Both the SCOU and GCOU have been effectively maintained during this period and system downtime has been minimal overall. The most prevalent issue involved increases in vacuum pressure within the ISVE system causing an overload of the electric blower motor. Despite attempts to balance the vacuum and associated load on the blower motor, the motor overloaded several times in 2018 and 2019. These occurrences have been addressed as needed and have not affected the protectiveness of the remedy. There are no indications of potential future O&M problems. Reductions in the frequency of sampling, or the analytical parameters may be considered in the future if contaminant concentrations become stabilized or decrease over time.

EPA has required WMWI to report annually on the status of ICs at the Site. WMWI annual O&M reports provide a periodic assessment of the effectiveness of the existing institutional and administrative controls based on the activities performed during the prior year. During the FYR reporting period, deed restrictions have been effective. There were no new developments or changes to land use or ownership during this reporting period. Routine inspections of the perimeter fencing and access controls (i.e., gates) did not show evidence of trespassing. The fence and access gates were maintained as needed in accordance with the Site O&M plan.

Deed restrictions are in place for the entire area of the waste mass at the Site and the adjacent property owned by WMWI. WMWI investigated properties downgradient of the Site and in the vicinity of off-property MWs OB8M and P32B to identify ICs that would address potential exposure concerns. The IC review indicated that it is unlikely that a potable well could be installed in this area given the current zoning controls and comprehensive land use plans of the City, Town, and County. Currently, VC levels exceed the PAL and ES at OB8M, but are well below the MCL. The quarterly monitoring of these wells has indicated that VC levels are stable or decreasing. VC levels should be closely tracked, particularly during rebound testing, and the

need for additional ICs at this location will continue to be assessed as conditions may potentially change.

WMWI developed an ICIAP to document existing ICs and the LTS process. The LTS procedures include regular inspection of ICs and annual certification to EPA and WDNR that ICs are in place and effective.

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

Yes. There have been no changes in standards or other cleanup criteria that could affect the protectiveness of the remedy. Groundwater cleanup standards identified as ARARs in the 1992 GCOU ROD have changed for some COCs, as was documented in the 2016 FYR. There have been no changes since the 2016 FYR. The RAOs remain valid and continue to be addressed by the remedies.

There have been no changes in toxicity factors or other contaminant characteristics, or risk assessment methods that could affect the protectiveness of the remedy. Emerging contaminants are not a concern. A WDNR review of Site historical records and data indicated there was no potential for PFAS/PFOA contamination of groundwater. Similarly, there is no information that indicate a need to perform sampling for 1,4-dioxane.

The exposure pathways used at the time of remedy selection were less conservative for public health protection than the potential exposure pathways under the current ICs. For example, groundwater ingestion and inhalation were the pathways of concern identified under the original risk assessment, however groundwater use is prohibited under the current ICs. Given the layered ICs and associated land and groundwater use restrictions, the exposure pathways evaluated in the original risk assessment are no longer applicable. The downgradient private wells that are annually monitored have not shown Site-related contaminants. No human health or ecological routes of exposure or receptors have been newly identified or changed, and there have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy.

The remedy is progressing as expected toward meeting Site RAOs. Because contaminant concentrations have been declining or are stable, it was reasonable to initiate rebound testing of the systems. Results of this testing will provide more data to determine if the system O&M can be optimized, and whether MNA is a viable next step in groundwater remediation at this Site. No new information has become apparent that would impact progress toward meeting RAOs.

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

No. There has been no new information that could call into question the protectiveness of the remedy. Potential Site vulnerabilities include increased frequency of electrical storms which have interrupted power to the LFAS building causing the compressors to shut down, however system alerts, such as the auto dialer, provide notification when system operation is disrupted. Related flooding is also a potential issue.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations				
OU(s) without Issues/Recommendations Identified in the Five-Year Review:				
OU1				
Issues and Recommendations Identified in the Five-Year Review:				
OU2	**Issue Category:** Other			
	Issue: Tetrachloroethylene (PCE) was detected at upgradient IG04 location during the reporting period at concentrations below the ES (5 µg/L) but above the PAL (0.5 µg/L). Before 2011, there was only one sub-PAL detection at IG04 out of 30 reported results. However, since 2011, 16 of 19 sample detections exceeded the PAL.			
	Recommendation: Investigate the increased occurrence of PAL exceedances of tetrachloroethylene at IG04 and address as necessary.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	12/31/2021

Other Findings

In addition, the following are recommendations that were identified during the FYR which may improve O&M efficiency and reduce O&M costs but do not affect current nor future protectiveness of the remedy:

- Because some of the on-Site wells were damaged by mowing and maintenance activities, WMWI should explore the use of new and/or improved bollards to protect surface casings of air sparge wells, MWs and EWs during such activities.

- Increases in vacuum pressure within the ISVE system have caused overloads of the electric blower motor on several occasions in 2018 and 2019. Additional investigation into the root cause may ultimately save O&M costs.

- EPA will complete a FYR Site inspection with FYR Site Inspection Checklist and photographs for inclusion in Site files as soon as is feasible.

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)	
Operable Unit: OU1	*Protectiveness Determination:* Protective
Protectiveness Statement: The remedy for Operable Unit 1 is protective of human health and the environment because waste consolidation, capping, and the ISVE system are functioning as intended such that the source of contamination is not accessible to humans. Access controls and ICs, including fencing and deed restrictions, respectively, have been implemented to protect the remedy, to prevent current and future exposures to Site-related contaminants, and to prevent residential/commercial activities at the on-Site property.	
Protectiveness Statement(s)	
Operable Unit: OU2	*Protectiveness Determination:* Short-term Protective
Protectiveness Statement: The remedy for Operable Unit 2 currently protects human health and the environment because the LFAS system has been effectively reducing contaminant concentrations in the on- and off-property groundwater. Access controls and ICs, including fencing and deed restrictions have been implemented to prevent current and future exposures to groundwater on the Site property. Receptors downgradient of the Site property that rely on private groundwater wells are sampled annually to ensure their groundwater is safe. Currently, there are no exceedances of VC or other Site-related contaminants above the MCL in the off-property monitoring wells and private wells. However, in order for the remedy to be protective in the long-term, the following action needs to be taken to ensure protectiveness: Investigate the increased frequency of Tetrachloroethylene concentrations exceeding the PAL at location IG04 and address the issue as necessary.	
Sitewide Protectiveness Statement	
Protectiveness Determination: Short-term Protective	
Protectiveness Statement: On a Site-wide basis, the remedy currently protects human health and the environment because the remedies for both Operable Units 1 and 2 are functioning as intended and access controls and ICs are in place. These ICs will continue to be reviewed to prevent current and future exposures to groundwater. However, in order for the remedy to be protective in the long term, the following action needs to be taken to ensure protectiveness: Investigate the increased frequency of Tetrachloroethylene concentrations exceeding the PAL at location IG04 and address the issue as necessary.	

VIII. NEXT REVIEW

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

APPENDIX A – REFERENCE LIST

1. SCS Engineers. "Documentation Report: Low-Flow Air Sparge System Enhancement, Hagen Farm Superfund Site, Town of Dunkirk, Dane County, Wisconsin". Prepared on behalf of Waste Management of Wisconsin, Inc. for U.S. EPA Region 5. January 2015, SEMS ID: 511333.

2. SCS Engineers. "2016 Annual Report, Hagen Farm, Town of Dunkirk, Dane County, Wisconsin." Prepared for Waste Management of Wisconsin, Inc., March 2017. SEMS ID: 516212.

3. SCS Engineers. "2017 Annual Report, Hagen Farm, Town of Dunkirk, Dane County, Wisconsin". Prepared for Waste Management of Wisconsin, Inc., March 2018. SEMS ID: 966082.

4. SCS Engineers. "2018 Annual Report, Hagen Farm, Town of Dunkirk, Dane County, Wisconsin." Prepared for Waste Management of Wisconsin, Inc., March 2019. SEMS ID: 966083.

5. SCS Engineers. "2019 Annual Report, Hagen Farm, Town of Dunkirk, Dane County, Wisconsin." Prepared for Waste Management of Wisconsin, Inc., March 2020. SEMS ID: 966084.

6. SCS Engineers. "2020 Annual Report, Hagen Farm, Town of Dunkirk, Dane County, Wisconsin." Prepared for Waste Management of Wisconsin, Inc., March 2021. SEMS ID: 966085.

7. SCS Engineers, "Institutional Control Implementation and Assurance Plan (ICIAP), Hagen Farm, Town of Dunkirk, Dane County, Wisconsin." Prepared for Waste Management of Wisconsin, Inc., June 11, 2021, SEMS ID: 966184.

8. U.S. Environmental Protection Agency, "Hagen Farm Site, WI. Source Control Operable Unit Declaration for the Record of Decision", September 17, 1990. SEMS ID: 92113.

9. U.S. Environmental Protection Agency, "Explanation of Significant Differences for the Hagen Farm Superfund Site Groundwater Contro1 Operable Unit, Dane County, WI". August 27, 1991, SEMS ID: 579765.

10. U.S. Environmental Protection Agency, "Hagen Farm Site, WI. Groundwater Control Operable Unit Declaration for the Record of Decision", September 30, 1992. SEMS ID: 92103.

11. U.S. Environmental Protection Agency, "Explanation of Significant Differences; Hagen Farm Superfund Site, Groundwater Control Operable Unit, Dane County, Wisconsin", August 27, 1996, as an attachment to: "Superfund Preliminary Close-Out Report, Hagen Farm Superfund Site, Dane County, Wisconsin". August 27, 1996, SEMS ID: 165056.

12. U.S. Environmental Protection Agency, "Institutional Controls: A Site Managers Guide to Identifying, Evaluating and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups", Office of Solid Waste and Emergency Response. OSWER Directive 9355.0-74FS-P. EPA 540-F-00-005, September 2000.

13. U.S. Environmental Protection Agency. "Comprehensive Five-Year Review Guidance, Office of Solid Waste and Emergency Response." Directive 9355.7-03B-P, June 2001.

14. U.S. Environmental Protection Agency, “Five-Year Review Report, Fifth Five-Year Review for Hagen Farm Superfund Site, Town of Dunkirk, Wisconsin”, Prepared by U.S. EPA Region 5, July 26, 2016. SEMS ID: 508832.

15. U.S. Environmental Protection Agency, “Record of Decision Amendment for the Groundwater Control Operable Unit, Hagen Farm Superfund Site, Town of Dunkirk, Dane County, Wisconsin”, September 22, 2017. SEMS ID: 541525.

15. Warzyn Inc., “Final Remedial Investigation Report, Hagen Farm RI/FS, Town of Dunkirk, Dane County, Wisconsin, Volume 1of 4”. Prepared for Waste Management of Wisconsin, Inc., November 1991, SEMS ID: 91974.

16. Warzyn Inc., “Remedial Action Implementation Report, In-situ Vapor Extraction System Source Control Operable Unit, Hagen Farm Site, Town of Dunkirk, Dane County, Wisconsin. Volume 2, Appendix N, Operations and Maintenance Plan” Prepared for Waste Management of Wisconsin, Inc., February 1994, SEMS ID: 492429.

17. Rust Environment & Infrastructure, “Final Design Report, Groundwater Control Operable Unit, Hagen Farm Site, Stoughton, Wisconsin (Appendix G, Final Operations and Maintenance Plan)”, April 1995, SEMS ID: 274955.

APPENDIX B – SITE CHRONOLOGY

EVENT	DATE
Site Operated as Sand and Gravel Pit	Prior to Late 1950s
Waste Disposal occurs in the Gravel Pit	Late 1950s to mid-1960s
Property purchased by Orrin Hagen	November 1977
WDNR sampled private groundwater wells in response to complaints	November 1980 - 1986
WDNR brings an enforcement against WMWI and Uniroyal for public nuisance. A civil suit was also filed by residents and was settled in 1986.	1983
Site Proposed on NPL	September 18, 1985
Site Listed on NPL and WDNR dismisses its enforcement action against Uniroyal and WMWI	July 22, 1987
AOC Signed by WMWI to conduct the RI/FS	July 27, 1987
RI/FS Conducted for the entire Site	July 1988 - April 1992
ROD Signed for OU 1- SCOU	September 17, 1990
ICs and access restrictions (Deed Restrictions, Site Fence) Implemented	1991 - 1993
EPA issues UAO to PRP for SCOU RD/RA work	March 1991
ESD signed for SCOU to refine ISVE cleanup standard	April 1991
Remedial Design for SCOU Cap Completed	August 1991
RI/FS for GCOU Completed	April 1992
Construction Completion of SCOU Cap	May 1992
Final Inspection of SCOU Cap	July 28, 1992
ROD Signed for OU 2- GCOU	September 30, 1992
UAO to PRP for GCOU RD/RA Work	November 25, 1992
RD for SCOU In-Situ Vapor Extraction (ISVE) System Completed	September 1993
Construction of the SCOU ISVE system Completed	January 1994
Final Inspection of SCOU ISVE system	January 12, 1994
RD for GCOU Completed	May 19, 1995
Construction of the GCOU Completed	April 1996
Final Inspection of GCOU and Entire Site	April 17, 1996
First Five-Year Review Completed	August 14, 1996

EVENT	DATE
ESD for GCOU Signed	August 27, 1996
Preliminary Closeout Report Signed (Site-wide construction completed)	August 27, 1996
EPA Approval of Low-Flow Air Sparging System (LFAS) Implementation Plan	January 22, 2001
Second Five-Year Review Signed	September 21, 2001
Temporary Shut-down of Pump & Treat System	September 4, 2001
Start of Shallow Air Sparging System Operation	January 2001
Start of Expanded, Deeper Air Sparging System Operation	April 2005
Third Five Year Review Report Completed	September 21, 2006
Implementation of Enhanced Air Sparge System	April 2007
Fourth Five-Year Review Report Completed	September 21, 2011
Installation of Three Deep Air Sparge Points	November 2014
Fifth Five-Year Review Completed	July 26, 2016
GCOU ROD Amendment signed to replace P&T with LFAS	September 22, 2017
Pilot Shutdown of ISVE and LFAS Systems	September 2019

APPENDIX C – FIGURES

Figure 1 – Site Location Overview Map

Figure 2 – Site Features Map

Figure 3 – Stoughton Jurisdictional Boundary Map

Figure 4 – Site Map Showing Waste Management of Wisconsin-owned Parcels

Figure 5 – Expanded Area Map Showing Remediation and Monitoring Wells

Figure 6 – Landfill Map Showing Remediation and Monitoring Wells

Figure 7 – Institutional Controls Review Map

Figure 8 – Stoughton Comprehensive Plan Map

Figure 9 – Map of Parcels near Hagen Farm Site

Figure 10 – Map of Site Waste Disposal Areas on the Hagen Farm Site

Site Location

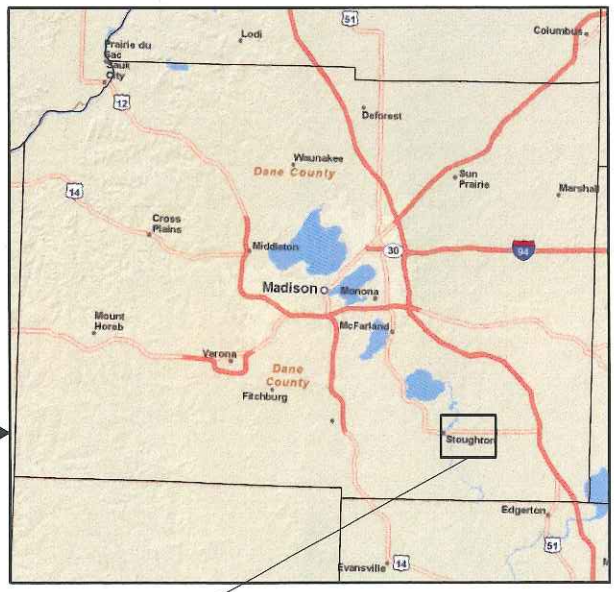
U.S. Environmental Protection Agency

Superfund

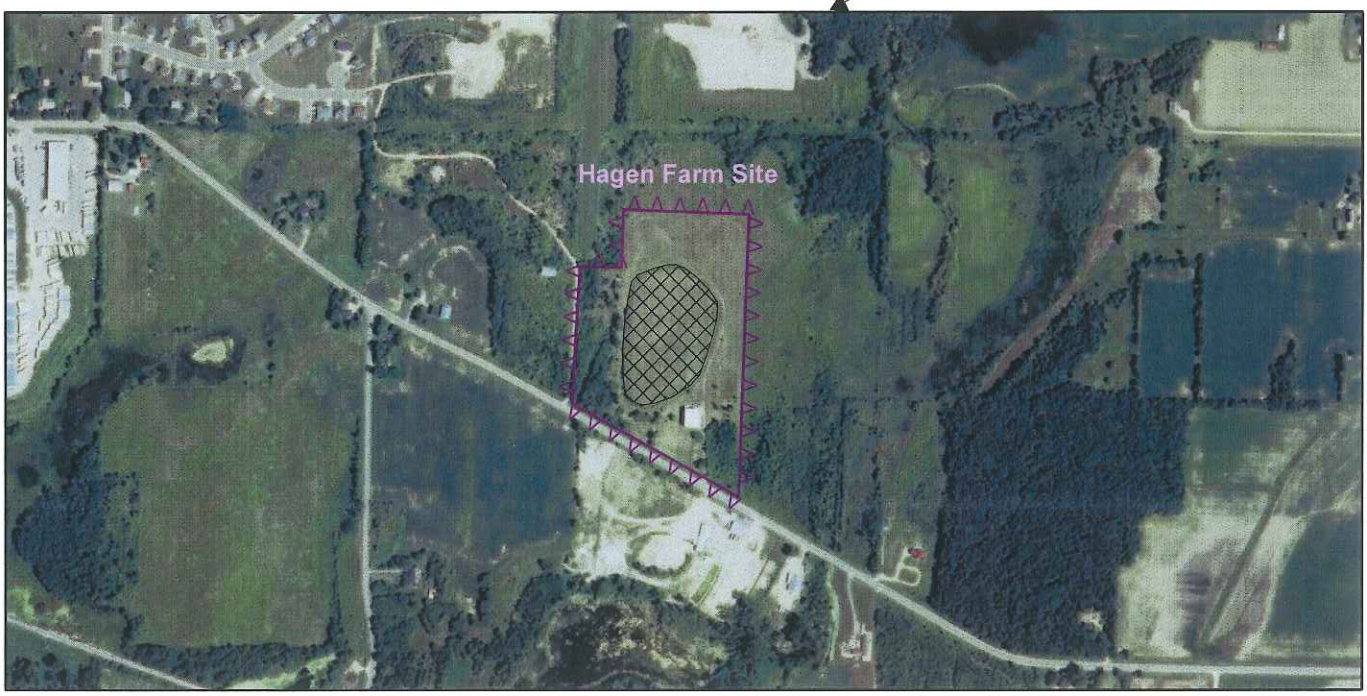
Hagen Farm
Dane County, WI

EPA ID# WID980610059

State



County



Site

Legend

Fence

Landfill

N

0 90 180 360 540 720 Meters

Figure 1

Produced by Andrea Hicks
U.S. EPA Region 5 on May 6, 2011
Image Date: 2009/2010

EPA Disclaimer: Please be advised that aeras depicted in the map have been estimated. The map does not create any rights enforceable by any party. EPA may refine or change this data and map at any time.

GEOS
Groundwater Evaluation and Optimization System

Site Features

Superfund
U.S. Environmental Protection Agency

Hagen Farm
Dane County, WI

WID980610059

Legend

- Hagen Farm Property
- Fence
- Capped Main Disposal Area
- Groundwater Treatment Building
- Ditch
- Ponds
- Wisconsin and Southern Railroad

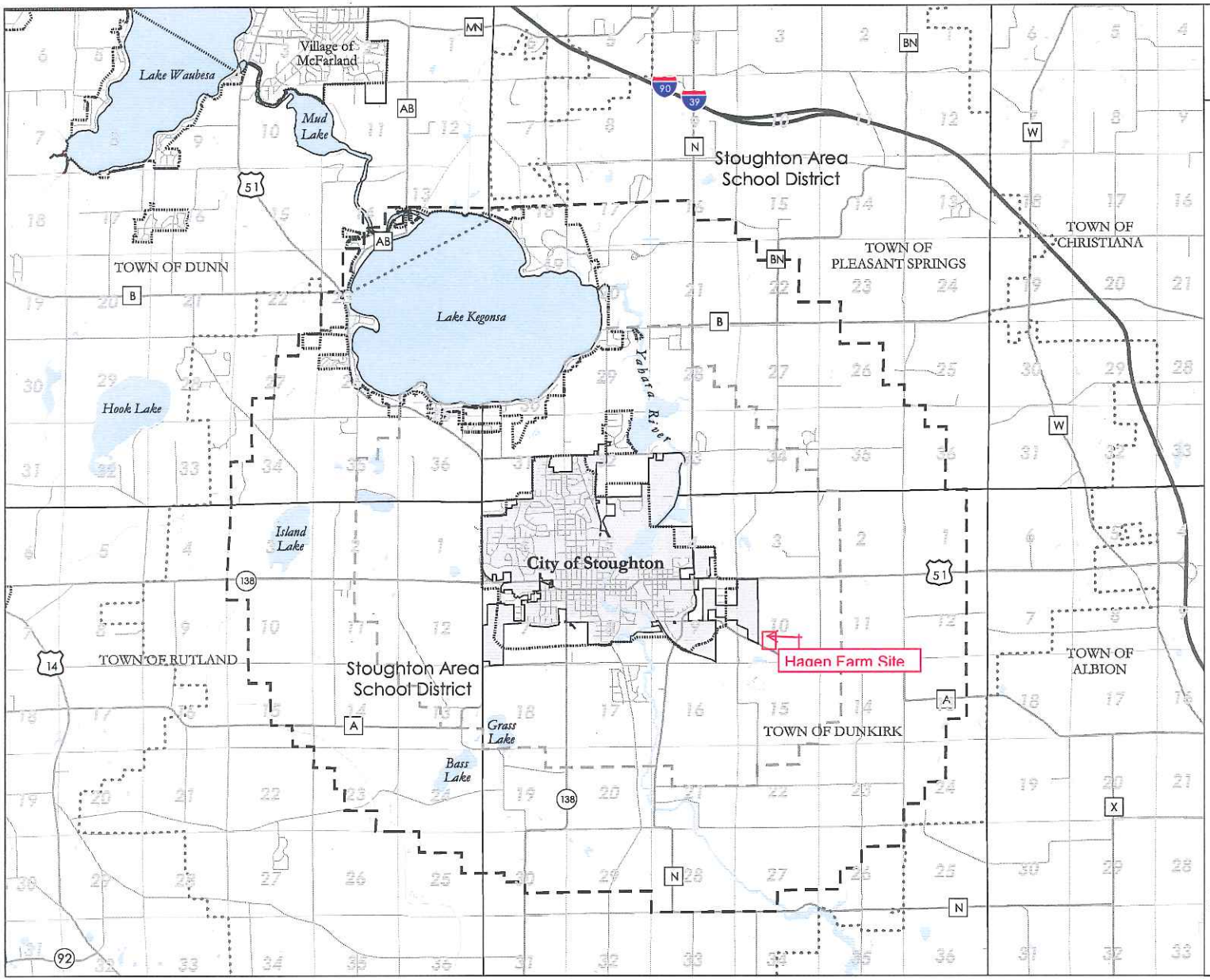
0 300 600 Feet

N

GEOS

Created by Sarah Backhouse
U.S. EPA Region 5 on 9/18/06

Figure 2



City of Stoughton Comprehensive Plan

Map 1

Jurisdictional Boundaries

- Existing ETJ Boundary (3 Miles)
- Existing ETJ Boundary (1.5 Miles)
- Municipal Boundaries
- Urban Service Areas
- School District Boundary
- Interstates
- US & County Highways
- Local Roads
- Section Boundaries

6000 0 6000 Feet

Scale: One inch equals 6,000 feet

Figure 3

Adopted: May 31, 2005

Sources: Dane County LIO.

Vandewalle & Associates
Madison, Wisconsin
Planning - Creating - Rebuilding

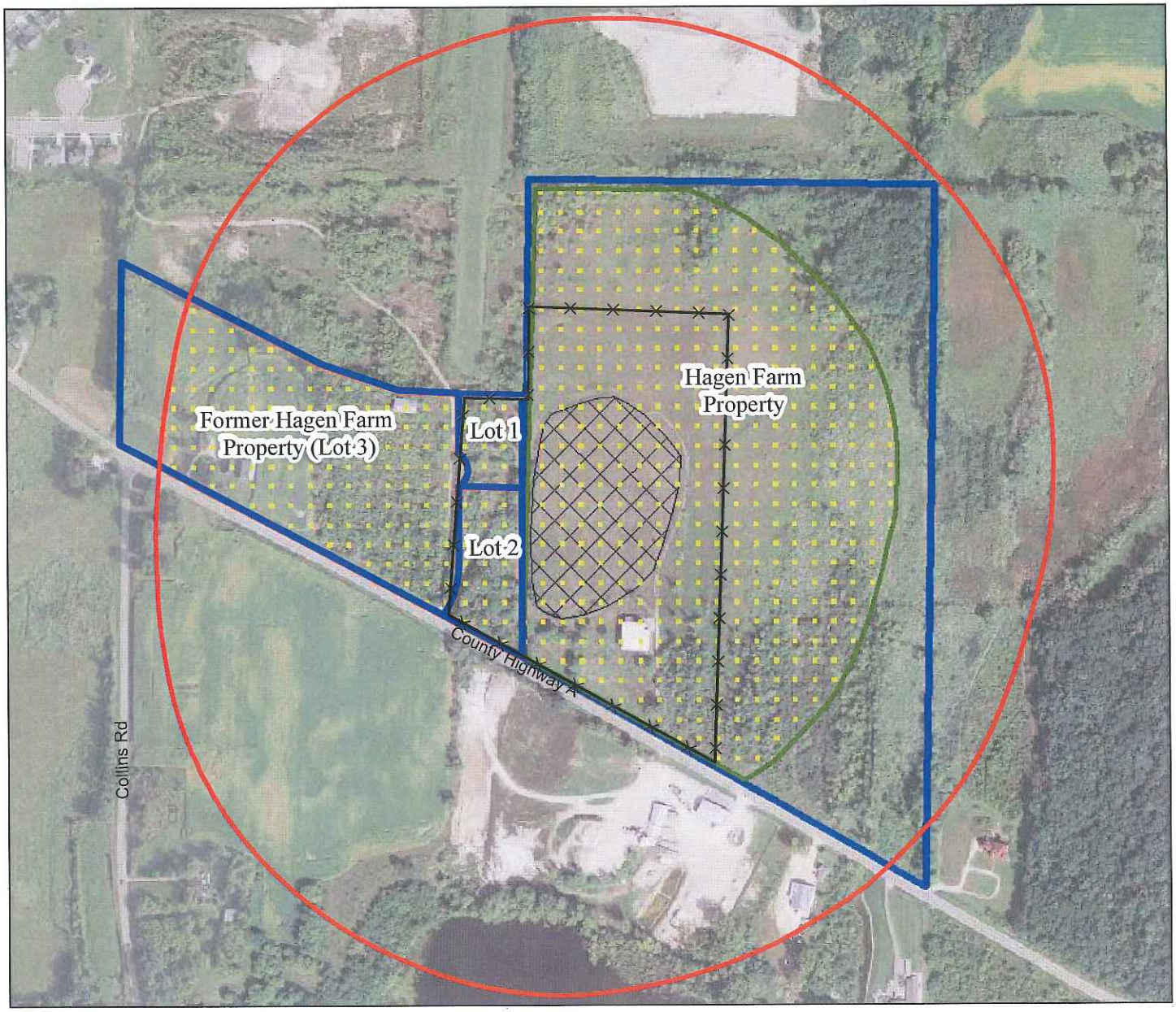
N

Institutional Control (IC) Review
Implemented Institutional Controls

Superfund
U.S. Environmental Protection Agency

Hagen Farm
Dane County, WI

WID980610059



Legend

- Land and Groundwater Use Restrictions *
- Well Restricted Area: 1200 feet from landfill **
- Well Restricted Area: 700 feet from landfill for exempted property only **
- Landfill
- Fence

0 50 100 200 300 400 Meters

N

GEOS Groundwater Evaluation and Optimization System

* Deed Restrictions found in the "Hagen Farm Institutional Control Study, pg.33- 38" (2006)

** Well Restrictions found in the "WDNR Approved Private Water System Area" (1995)

Figure 4

EPA Disclaimer: Please be advised that areas depicted in the map have been estimated. The map does not create any rights enforceable by any party. EPA may refine or change this data and map at any time.

BASE IMAGE: USGS DIGITAL ORTHOPHOTO, 2010.

LEGEND

- APPROXIMATE LIMITS OF WASTE
- FENCE
- MW29 MONITORING WELL/PIEZOMETER
- PW9 PRIVATE WELL
- PW1 PRIVATE WELL NO LONGER IN MONITORING PROGRAM
- GAS EXTRACTION WELL
- GAS PROBE
- SHALLOW AIR SPARGE WELL
- DEEP AIR SPARGE WELL

N

500 0 500

SCALE: 1" = 500'

PROJECT NO.	25212002.00	DRAWN BY:	KP
DRAWN:	11/09/12	CHECKED BY:	RJJ
REVISED:	02/01/16	APPROVED BY:	

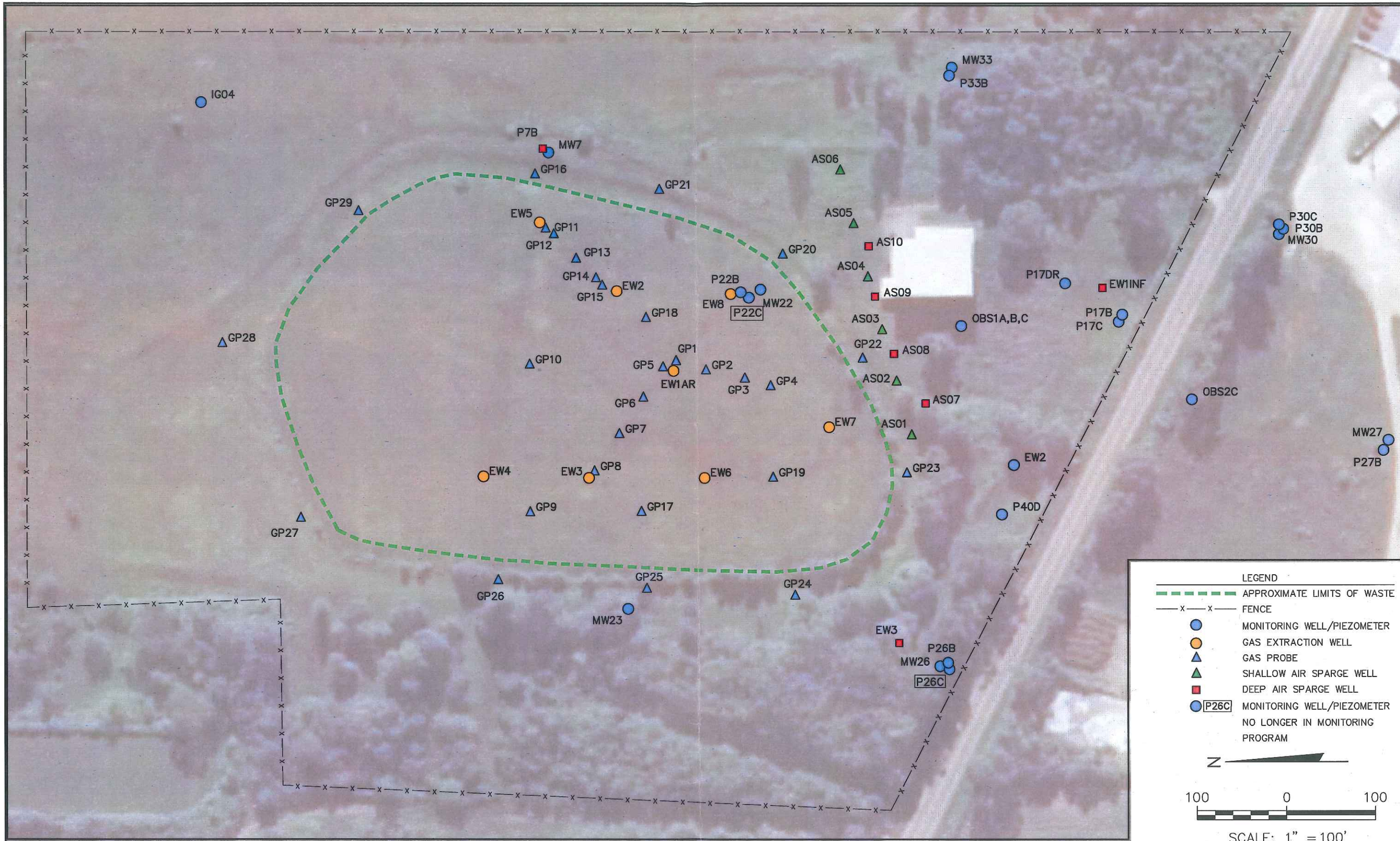
ENGINEER: SCS ENGINEERS, 2830 DAIRY DRIVE MADISON, WI 53718-6751, PHONE: (608) 224-2830

CLIENT: WASTE MANAGEMENT

SITE: HAGEN FARM SITE, TOWN OF DUNKIRK, DANE COUNTY WISCONSIN

SITE FEATURES MAP

Figure 5



BASE IMAGE: USGS DIGITAL ORTHOPHOTO, 2010.

PROJECT NO.	25212002.00	DRAWN BY:	AHB
DRAWN:	02/11/13	CHECKED BY:	ZTW
REVISED:	02/06/19	APPROVED BY:	GS

ENGINEER: SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

CLIENT: WASTE MANAGEMENT

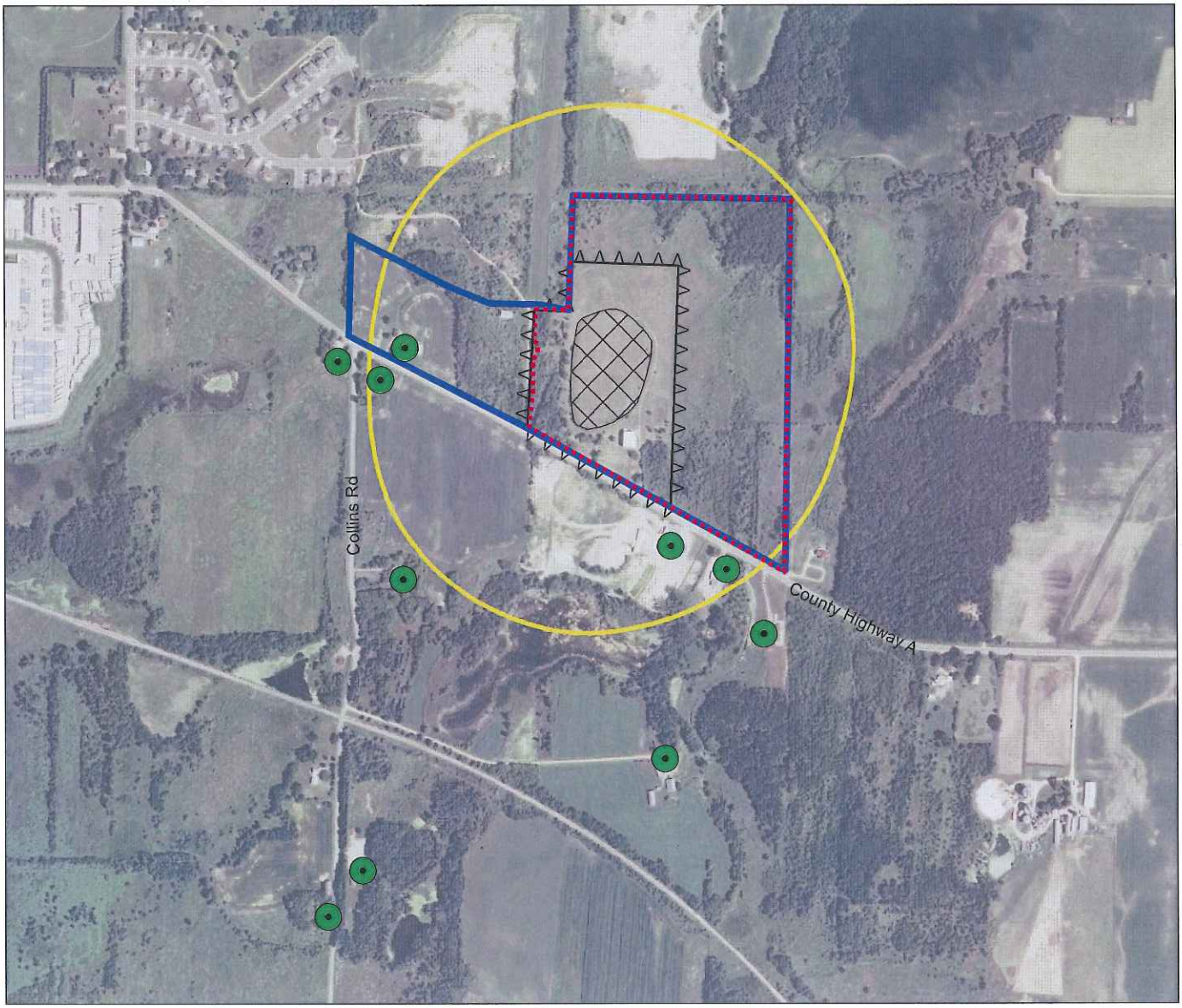
SITE: HAGEN FARM SITE
TOWN OF DUNKIRK, DANE COUNTY
WISCONSIN

EXPANDED SITE FEATURES MAP

Figure 6

Hagen Farm
Dane County, WI

WID980610059



Legend

- Hagen Farm Property
- Land and Groundwater Restrictions*
- Well Restricted Area: 1200 feet from landfill *
- Landfill
- Fence
- Private Well Locations

N

0 0.05 0.1 0.2 0.3 0.4 Miles

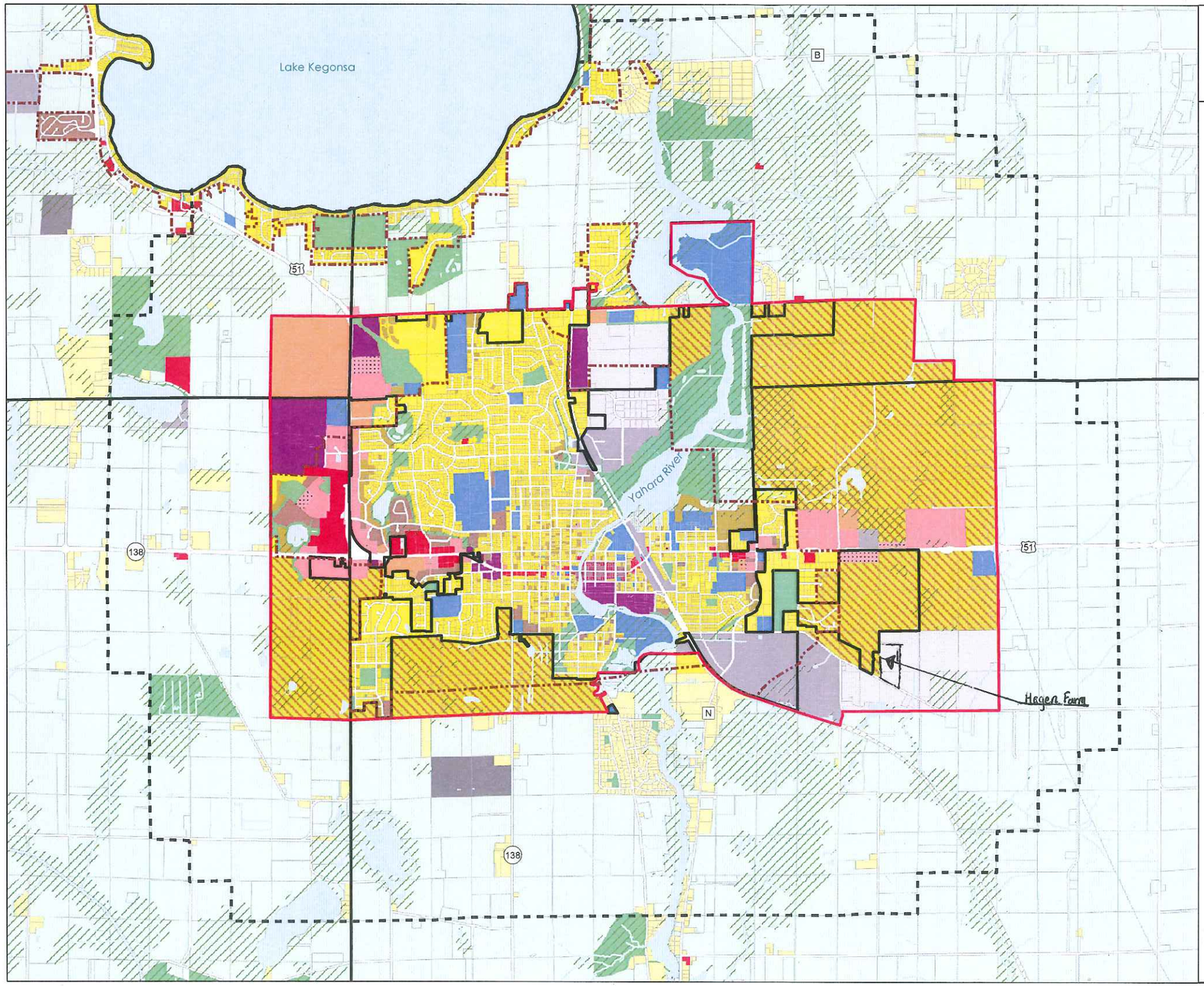
Produced by Andrea Hicks
U.S. EPA Region 5 on April 29, 2011
Image Date: 2009

GEOS
Groundwater Evaluation and Optimization System

* Well Restrictions found in the "WDNR Approved Private Water System Area" (1995)

EPA Disclaimer: Please be advised that areas depicted in the map have been estimated. The map does not create any rights enforceable by any party. EPA may refine or change this data and map at any time.

Figure 7



City of Stoughton Comprehensive Plan

Map 6b

Planned Land Use

- Planned Stoughton Urban Development Area**
- 2012 Urban Service Areas
- 2012 Municipal Boundaries
- 2012 ETJ Boundary

Planned Land Use

- Agriculture/Rural
- Exurban Residential
- Single Family Residential
- Two-Family Residential
- Mixed Residential
- Planned Neighborhood
- Central Mixed Use
- Planned Mixed Use
- Planned Office
- Neighborhood Office
- Planned Business
- Neighborhood Business
- General Business
- Planned Industrial
- General Industrial
- Landfill/Extraction
- Institutional
- Public Open Space
- Environmental Corridor*
- Surface Water
- Right-of-Way

1. Single Family
2. Two-Family
3. Mixed Residential
4. Institutional
5. Neighborhood Office
6. Neighborhood Business
7. Public Open Space

Shapes on map represent general recommendations for future land use. Actual boundaries between different land use types and associated zoning districts may vary somewhat from representations on this map.

*Environmental Corridors depicted on this map use generalized boundaries of environmental features identified on air photos by the DNR and the Dane County RPC. These generalized boundaries are refined through detailed on site investigation at the time of land division and site plan review.

** See Table 9 for Acreage Totals.

3,000 1,500 0 3,000 Feet

Adopted: May 31, 2005
Amended: June 26, 2012

Sources: Dane County LIO, City of Stoughton.

N

Figure 8

Dane County Map

January 22, 2021

0 250 500 1,000 Feet

Dane County Mask

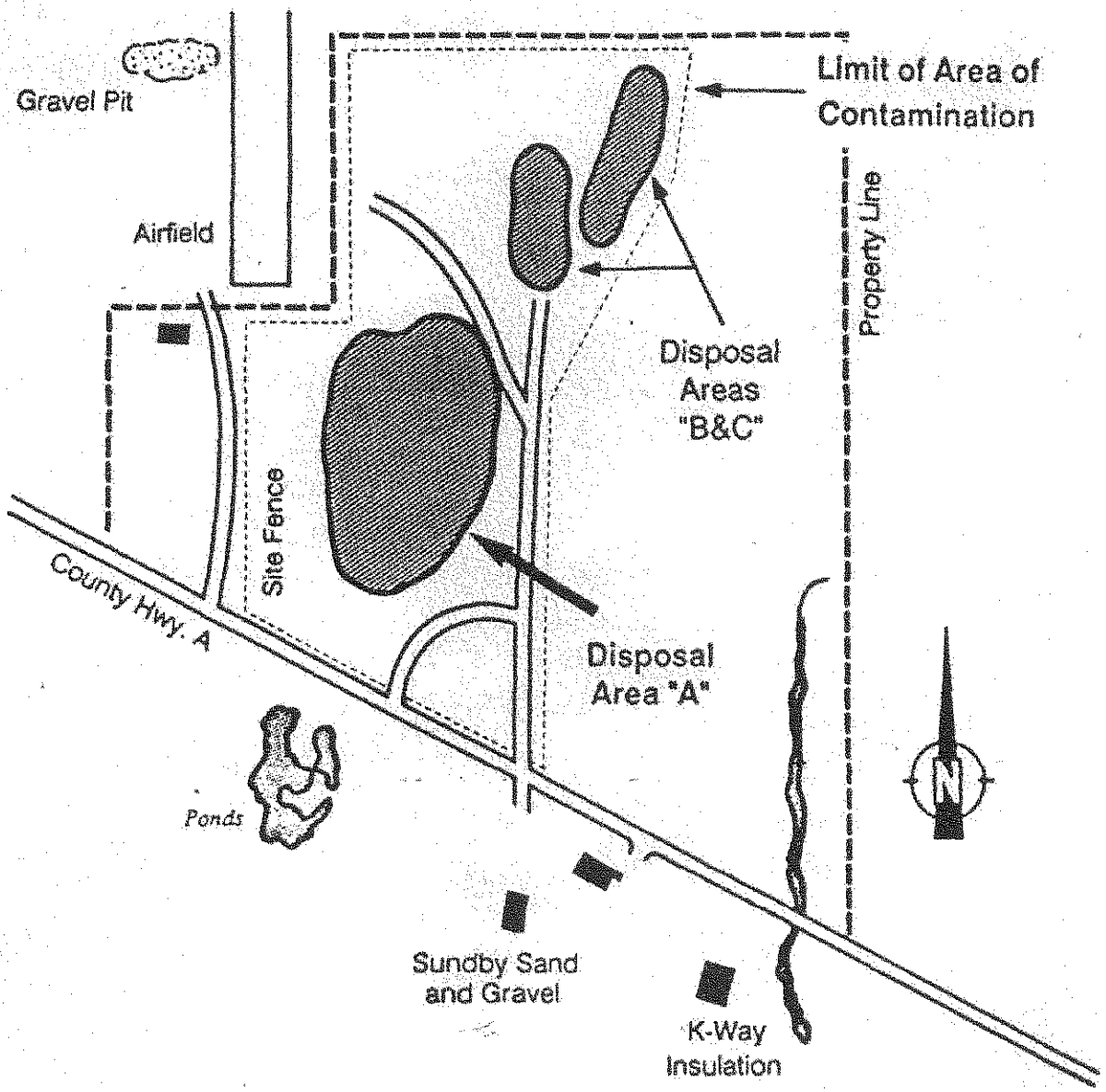
- Dane County Mask
- Parcel Number
- Parcels
- Well Restricted Area: 1200 feet from landfill (approximate)

N

Figure 9

Site Diagram
Hagen Farm Site
Dunkirk Township, Wisconsin

(Not To Scale)



Prepared by Jacobs Engineering Group Inc. Chicago
for the U.S. Environmental Protection Agency, 7/22/90

Figure 10

APPENDIX D – TABLES

Table 6

2015 - 2019 Blower Station Data Ranges - In Situ Vapor Extraction System
Hagen Farm Site, Town of Dunkirk, Dane County, WI

Year	Flow (cfm)	Temperature (Fahrenheit)	Header Pressure (Inches of water)	Air Dilution Valve (% open)	Methane (% by volume)	Carbon Dioxide (% by volume)	Oxygen (% by volume)
2015	NR	37 - 65	-25.0 to -14.2	0 - 0	0.2 - 0.4	3.0 - 3.6	16.1 - 18.6
2016	69 - 100	38 - 67	-21.4 to -13.9	0 - 0	0.2 - 0.9	2.1 - 6.4	11.2 - 19.0
2017	51 - 92	39 - 67	-53.0 to -18.6	0 - 20	0.0 - 4.8	2.8 - 9.0	8.0 - 18.6
2018	39 - 95	38 - 92	-37.9 to -18.8	0 - 40	0.0 - 3.7	0.0 - 7.4	8.1 - 20.9
2019	30 - 70	33 - 63	-23.7 to -25.5	10 - 50	1.1 - 8.7	0.8 - 11.6	6.2 - 17.4

Abbreviations:
cfm = cubic feet per minute
NR = No readings

Notes:
1) Flow calculated from differential pressure measurements across orifice plate.
2) Minimum and maximum monthly values used to provide range.
3) In Situ Vapor Extraction System shutdown initiated on September 12, 2019.

Created by: ZTW Date: 4/22/2021
Revised by: ZTW Date: 4/22/2021
Checked by: MJP Date: 4/22/2021

Table 7

2015 - 2019 Extraction Well Data Ranges - In Situ Vapor Extraction System
Hagen Farm Site, Town of Dunkirk, Dane County, WI

Extraction Well		Temperature (Fahrenheit)	Header Pressure (inches of water)	Well Pressure (inches of water)	Differential Pressure (inches of water)	Flow (cfm)	Methane (% by volume)	Carbon Dioxide (% by volume)	Oxygen (% by volume)
EW1AR									
2015 - 2019				Open to Atmosphere					
EW2									
2015	Minimum	53.7	-18.6	-14.7	-0.221	22.8	0.1	0.2	11.1
	Maximum	70.0	-9.7	-7.9	0.305	34.1	1.7	5.7	20.9
2016	Minimum	54.0	-18.6	-15.3	-0.701	0.0	0.3	1.0	7.3
	Maximum	69.2	-11.6	13.9	0.325	35.5	3.7	9.4	20.0
2017	Minimum	55.3	-59.8	-58.9	0.089	18.0	0.0	0.1	9.6
	Maximum	76.0	-16.3	-13.4	1.062	63.9	3.4	6.8	20.8
2018	Minimum	45.7	-40.3	-28.4	0.000	0.0	0.0	0.0	0.2
	Maximum	81.6	-16.6	-14.2	0.306	36.6	14.9	15.4	20.9
2019	Minimum	35.1	-24.7	-25.1	0.008	5.0	1.1	7.0	0.0
	Maximum	74.3	-18.7	-18.5	1.175	74.6	34.0	22.6	12.4
EW3									
2015	Minimum	50.0	-19.2	-19.4	-0.163	10.6	0.0	4.0	10.0
	Maximum	74.1	-10.3	-10.4	0.076	24.8	0.9	7.4	17.5
2016	Minimum	41.6	-19.1	-19.2	-0.521	0.0	0.0	3.5	3.0
	Maximum	74.6	-12.0	-12.1	0.038	11.5	2.9	11.4	17.5
2017	Minimum	24.9	-64.5	-64.6	-0.513	3.6	0.0	0.2	1.0
	Maximum	88.5	-16.6	-16.5	0.031	10.2	16.5	13.5	20.1
2018	Minimum	27.7	-42.5	-42.9	-0.519	0.0	0.0	0.0	0.2
	Maximum	83.7	-16.4	-15.8	1.848	90.2	12.5	15.1	20.9
2019	Minimum	17.6	-25.0	-24.8	0.017	9.3	1.2	8.5	1.1
	Maximum	77.9	-18.7	-18.5	1.962	94.0	31.0	21.8	15.1
EW4									
2015	Minimum	53.4	-18.7	-11.0	-0.279	13.4	0.1	2.7	13.5
	Maximum	62.1	10.0	-5.3	0.659	41.1	1.0	6.5	18.4
2016	Minimum	51.2	-18.4	-13.2	0.014	7.2	0.2	2.5	10.6
	Maximum	62.9	-11.5	11.1	0.372	38.3	1.2	6.2	18.6
2017	Minimum	42.8	-64.8	-59.2	-0.244	15.8	0.2	2.3	3.2
	Maximum	73.6	-16.1	-11.6	0.250	29.2	2.2	10.6	19.2
2018	Minimum	33.4	-41.8	-36.7	-0.624	0.0	0.0	0.0	5.7
	Maximum	73.2	-16.3	-13.0	0.393	38.9	4.9	14.0	20.9
2019	Minimum	39.9	-24.8	-24.4	0.000	0.0	2.0	6.3	1.9
	Maximum	71.8	-18.1	-18.0	0.209	31.0	17.7	15.4	16.2

2015 - 2019 Extraction Well Data Ranges - In Situ Vapor Extraction System
Hagen Farm Site, Town of Dunkirk, Dane County, WI

Extraction Well		Temperature (Fahrenheit)	Header Pressure (inches of water)	Well Pressure (inches of water)	Differential Pressure (inches of water)	Flow (cfm)	Methane (% by volume)	Carbon Dioxide (% by volume)	Oxygen (% by volume)
EW5									
2015	Minimum	40.0	-17.3	-13.7	-0.521	49.0	0.0	0.1	17.0
	Maximum	61.1	18.6	-6.8	1.054	55.3	0.1	2.0	20.9
2016	Minimum	49.8	-18.6	-13.9	0.063	15.5	0.0	0.1	12.3
	Maximum	60.7	-11.1	-8.0	1.154	68.5	0.0	5.6	20.7
2017	Minimum	40.0	-57.9	-54.5	0.163	25.0	0.0	0.1	15.3
	Maximum	65.3	-16.3	-12.1	0.758	59.7	0.1	2.2	20.8
2018	Minimum	48.7	-34.7	-28.2	0.000	0.0	0.0	0.0	5.7
	Maximum	81.1	-16.6	-13.7	0.934	60.1	1.2	4.9	20.9
2019	Minimum	44.4	-25.0	-24.5	0.003	3.8	0.0	0.0	6.9
	Maximum	60.0	-18.6	-18.5	1.027	67.0	3.5	7.9	20.7
EW6									
2015	Minimum	18.0	-19.5	-8.5	-0.016	2.5	0.8	14.4	0.0
	Maximum	80.1	-10.6	-4.0	0.138	22.6	10.4	22.5	5.4
2016	Minimum	36.3	-19.5	-9.7	-0.646	0.0	0.7	14.2	0.0
	Maximum	86.4	-12.2	-6.0	0.032	10.6	9.5	22.2	6.7
2017	Minimum	21.5	-64.3	-17.7	-0.440	3.8	1.2	15.2	0.6
	Maximum	81.7	27.1	-5.7	0.045	12.4	32.1	22.1	5.3
2018	Minimum	26.4	-42.9	-21.2	-0.318	0.0	0.0	0.0	0.3
	Maximum	80.2	-16.6	-3.5	0.489	49.3	22.1	22.2	20.9
2019	Minimum	15.4	-25.0	-14.1	0.017	9.1	5.6	1.1	0.0
	Maximum	65.7	-18.7	-5.3	0.933	70.9	48.0	31.2	18.6
EW7									
2015	Minimum	51.5	-19.3	-10.9	-0.203	27.0	0.0	1.6	14.8
	Maximum	70.0	10.6	-4.7	0.223	29.4	0.0	5.5	20.3
2016	Minimum	47.2	-19.5	-17.1	-0.810	0.0	0.0	0.2	12.5
	Maximum	63.9	-11.9	-6.0	0.189	26.8	0.0	5.2	20.3
2017	Minimum	37.7	-63.0	-61.6	0.001	2.0	0.0	0.1	13.6
	Maximum	93.1	-16.8	-10.3	0.176	26.3	0.1	6.2	20.8
2018	Minimum	27.5	-42.3	-42.5	-0.462	0.0	0.0	0.0	10.3
	Maximum	83.1	-16.6	-16.6	0.600	51.3	0.1	7.6	21.1
2019	Minimum	12.9	-24.8	-25.1	0.000	0.0	0.0	0.0	2.7
	Maximum	81.9	-18.7	-18.5	0.572	52.0	0.5	2.9	20.9

2015 - 2019 Extraction Well Data Ranges - In Situ Vapor Extraction System
Hagen Farm Site, Town of Dunkirk, Dane County, WI

Extraction Well		Temperature (Fahrenheit)	Header Pressure (inches of water)	Well Pressure (inches of water)	Differential Pressure (inches of water)	Flow (cfm)	Methane (% by volume)	Carbon Dioxide (% by volume)	Oxygen (% by volume)
EW8									
2015	Minimum	51.0	-19.4	-6.0	-0.206	28.6	0.0	1.5	16.9
	Maximum	65.4	-10.4	-3.2	0.296	31.9	0.0	3.0	19.9
2016	Minimum	49.8	-19.5	-6.5	-0.713	0.0	0.0	1.4	16.0
	Maximum	63.6	-12.1	-3.7	0.510	44.9	0.2	3.2	20.1
2017	Minimum	51.4	-62.0	-13.2	0.122	21.7	0.0	1.4	14.9
	Maximum	80.0	-16.9	-5.9	0.728	58.4	0.2	5.3	19.8
2018	Minimum	49.2	-42.2	-21.4	0.000	0.0	0.0	0.0	14.3
	Maximum	65.6	-16.6	-6.5	0.512	47.3	3.2	3.9	20.9
2019	Minimum	50.0	-24.8	-10.4	0.215	33.0	0.0	2.8	8.6
	Maximum	62.0	-18.9	-8.1	1.300	80.3	1.6	10.1	17.7

Abbreviations:
cfm = cubic feet per minute

Notes:
1) In Situ Vapor Extraction System shutdown initiated on September 12, 2019.

Created by: ZTW Date: 4/22/2021
Last revision by: ZTW Date: 4/22/2021
Checked by: MP Date: 4/22/2021

C:\Users\SSULLI02\Documents_MovedData\EPAWork\Hagen Farm\2020 FYR Stuff\[Extraction Well Data 2015 - 2019.xls]ExtractionWell

Table 8

2018 Probe Data - In Situ Vapor Extraction System
Hagen Farm Site, Town of Dunkirk, Dane County, WI / SCS Engineers Project #25212002.00

Probe	Pressure (inches of water)	Methane (%)	Carbon Dioxide (%)	Oxygen (%)	Probe	Pressure (inches of water)	Methane (%)	Carbon Dioxide (%)	Oxygen (%)
GP01S	-0.07	34.2	30.0	1.9	GP15M	-0.51	4.2	3.4	17.8
GP01M	-0.06	26.6	23.4	5.8	GP15D	-1.63	0.0	0.3	19.9
GP01D	-0.11	0.5	0.6	19.7	GP16S	0.01	0.0	0.8	17.6
GP02S	-0.06	19.2	18.3	8.2	GP16M	0.01	0.0	0.1	20.0
GP02M	-0.09	12.2	13.5	10.7	GP16D	-3.17	0.0	0.1	20.0
GP02D	-0.16	0.2	1.7	18.7	GP17S	0.00	9.6	9.9	10.4
GP03S	-0.09	9.7	8.7	11.6	GP17M	-0.12	11.2	11.5	9.2
GP03M	-0.12	2.2	6.7	7.9	GP17D	-0.07	0.0	6.3	19.9
GP03D	-0.06	0.0	0.3	19.7	GP18S	-0.13	0.0	4.3	6.6
GP04S	-0.14	0.5	2.4	14.9	GP18M	-0.19	4.0	9.3	11.1
GP04M	-0.12	0.1	4.5	5.2	GP18D	-0.92	0.0	0.7	19.6
GP04D	-0.06	0.1	0.3	19.8	GP19S	-0.13	10.2	10.7	13.0
GP05S	-0.11	0.3	14.6	14.9	GP19M	-0.13	18.7	20.2	5.6
GP05M	-0.01	30.6	28.5	3.4	GP19D	0.03	0.0	0.2	20.0
GP05D	-0.10	0.1	0.3	20.3	GP20S	-0.15	0.0	0.0	20.2
GP06S	-0.06	22.4	23.3	4.5	GP20M	-0.08	0.1	0.1	20.0
GP06M	-0.12	19.4	22.8	2.9	GP20D	-0.19	0.3	0.9	19.7
GP06D	-0.11	0.1	0.2	20.4	GP21S	0.03	0.0	1.5	18.4
GP07S	-0.14	9.7	17.9	5.6	GP21D	-0.03	0.0	0.0	17.1
GP07M	-0.13	14.5	15.3	8.9	GP22S	-0.16	0.0	1.6	19.8
GP07D	-0.12	36.1	35.2	5.0	GP22M	-0.22	0.0	4.2	17.6
GP08S	-0.15	1.1	2.7	18.4	GP22D	-0.11	0.0	7.8	8.6
GP08M	-0.14	0.1	0.2	20.5	GP23S	-0.42	0.0	2.1	15.2
GP08D	-1.33	0.3	0.4	20.2	GP23M	-0.15	0.0	3.7	15.7
GP09S	-0.08	11.1	13.3	6.6	GP23D	-0.17	0.0	2.6	16.4
GP09M	-0.08	10.5	10.3	0.0	GP24S	-0.13	0.0	3.4	14.8
GP09D	-0.21	0.0	0.6	19.6	GP24M	-0.14	0.0	2.7	15.5
GP10S	-0.12	0.1	13.0	8.0	GP24D	-0.15	0.0	2.3	15.9
GP10M	-0.10	26.2	17.9	9.3	GP25S	-0.21	0.0	5.6	7.5
GP10D	-0.12	0.0	6.3	15.9	GP25M	0.01	0.0	5.7	7.4
GP11S	-0.36	0.0	0.1	20.1	GP25D	0.13	0.0	0.2	20.0
GP11M	-0.46	0.0	0.1	20.1	GP26S	0.00	0.0	3.3	14.7
GP11D	-0.02	0.1	0.2	19.9	GP26M	-0.04	0.0	4.4	11.8
GP12S	-0.33	0.0	0.1	20.1	GP26D	-0.06	0.0	0.9	18.6
GP12M	-0.36	0.0	0.0	20.1	GP27S	0.00	0.0	4.4	11.8
GP12D	-0.11	0.0	0.1	20.1	GP27M	-0.07	0.0	0.1	19.9
GP13S	-0.36	0.0	0.0	20.1	GP27D	-0.99	0.0	0.3	19.7
GP13M	-0.34	0.0	0.0	20.1	GP28S	-0.10	0.0	3.0	16.2
GP13D	-0.15	0.0	0.2	20.0	GP28M	0.00	0.0	2.6	16.7
GP14S	NR	NR	NR	NR	GP28D	-2.03	0.0	0.1	20.0
GP14M	NR	NR	NR	NR	GP29S	0.02	0.0	2.7	12.8
GP14D	NR	NR	NR	NR	GP29M	0.00	0.0	0.3	19.7
GP15S	-0.15	0.6	11.0	13.9	GP29D	0.00	0.0	2.5	13.3

Abbreivations:
NR = No Reading

Notes:
1) Probe data collected by SCS personnel on September 19 and 20, 2018.
2) Lock unable to be opened at GP14; no data collected.

Created by: ZTW Date: 2/6/2019
Revised by: ZTW Date: 2/8/2019
Checked by: CAB Date: 2/8/2019

Z:\Projects\25212002.00\Reports\Annual Reports\2018\Tables\[Table 3 - Probe Data.xls]Table 3

2019 Probe Data - In Situ Vapor Extraction System
Hagen Farm Site, Town of Dunkirk, Dane County, WI / SCS Engineers Project #25212002.00

Probe	Pressure (inches of water)	Methane (%)	Carbon Dioxide (%)	Oxygen (%)	Probe	Pressure (inches of water)	Methane (%)	Carbon Dioxide (%)	Oxygen (%)
GP01S	0.02	0.0	1.3	20.2	GP15M	-0.44	9.2	9.2	10.9
GP01M	-0.22	0.2	1.7	18.2	GP15D	0.00	0.0	0.6	20.5
GP01D	-1.74	0.0	0.2	20.5	GP16S	-0.07	0.0	0.0	20.9
GP02S	-0.38	0.0	0.0	20.9	GP16M	-0.08	0.0	0.0	20.8
GP02M	-0.45	0.0	0.0	20.9	GP16D	-0.17	0.0	0.0	20.9
GP02D	0.02	0.0	0.0	20.8	GP17S	-0.18	0.0	0.0	20.6
GP03S	-0.32	0.0	0.0	20.9	GP17M	-0.20	7.4	6.6	14.2
GP03M	-0.40	0.0	0.0	20.9	GP17D	-0.02	0.0	1.0	20.1
GP03D	0.11	0.0	0.0	20.8	GP18S	0.00	0.0	9.7	2.7
GP04S	-0.23	0.0	0.0	20.9	GP18M	-0.39	0.0	0.3	20.7
GP04M	-0.24	2.0	6.9	8.2	GP18D	-0.05	0.0	0.1	20.8
GP04D	-0.49	0.0	0.6	20.5	GP19S	-0.12	0.0	0.0	20.9
GP05S	0.05	0.0	13.8	15.5	GP19M	-0.19	1.4	1.4	17.5
GP05M	-0.25	0.0	0.3	20.7	GP19D	-0.07	0.0	0.3	20.7
GP05D	0.00	0.0	0.0	20.9	GP20S	-0.01	0.0	0.0	20.5
GP06S	-0.35	39.2	35.9	0.0	GP20M	-0.08	0.0	0.0	20.2
GP06M	-0.36	6.7	6.2	14.7	GP20D	-0.13	0.0	0.1	20.2
GP06D	-0.02	0.0	0.3	20.7	GP21S	0.00	0.0	0.0	20.3
GP07S	-0.34	3.7	0.7	17.6	GP21D	0.00	0.0	0.0	20.0
GP07M	-0.36	5.3	2.3	16.8	GP22S	0.00	0.0	4.9	13.7
GP07D	-0.18	23.6	26.5	10.4	GP22M	0.00	0.0	1.3	16.2
GP08S	-0.20	0.0	0.1	20.8	GP22D	-0.02	0.0	0.4	20.5
GP08M	-0.28	0.0	0.0	20.9	GP23S	0.00	0.0	0.6	17.6
GP08D	-0.03	0.0	0.0	20.8	GP23M	0.00	0.0	1.0	18.5
GP09S	-0.11	0.0	0.0	19.5	GP23D	-2.07	0.0	0.4	20.5
GP09M	-0.13	0.0	0.8	19.3	GP24S	0.00	0.0	0.2	19.5
GP09D	-0.01	0.0	0.8	19.5	GP24M	0.00	0.0	0.6	19.4
GP10S	-0.25	13.6	20.9	4.8	GP24D	0.00	0.0	0.9	18.4
GP10M	-0.34	21.6	10.8	12.6	GP25S	0.00	0.0	0.0	20.9
GP10D	-1.17	0.0	6.0	17.0	GP25M	-0.01	0.0	2.6	16.4
GP11S	-0.60	0.0	0.0	20.9	GP25D	-0.01	0.0	0.2	20.8
GP11M	-1.06	0.0	0.0	20.9	GP26S	0.00	0.0	0.2	19.8
GP11D	-0.01	0.2	0.0	20.5	GP26M	0.00	0.0	1.1	18.5
GP12S	-0.49	0.0	0.0	20.9	GP26D	0.00	0.0	0.4	20.7
GP12M	-0.63	0.0	0.0	20.9	GP27S	0.00	0.0	4.5	10.8
GP12D	0.01	0.3	0.0	20.4	GP27M	0.00	0.0	0.3	20.5
GP13S	-0.34	0.0	0.1	20.2	GP27D	0.12	0.0	0.0	20.5
GP13M	-0.39	0.0	0.5	19.6	GP28S	0.00	0.0	0.0	20.4
GP13D	-0.39	0.0	0.5	20.7	GP28M	-0.05	0.0	0.0	19.7
GP14S	-0.37	0.0	0.0	20.9	GP28D	0.00	0.0	0.0	20.4
GP14M	-0.39	0.0	0.0	20.0	GP29S	-0.06	0.0	0.0	20.7
GP14D	0.01	0.0	0.0	20.9	GP29M	-0.06	0.0	0.0	20.3
GP15S	-0.35	0.1	4.3	11.1	GP29D	-0.04	0.0	0.1	19.2

Notes:
1) Probe data collected by SCS personnel on August 30, 2019.

Created by: ZTW Date: 2/6/2019
Revised by: ZTW Date: 11/21/2019
Checked by: LMH Date: 2/13/2020

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2020 Probe Data - In Situ Vapor Extraction System
Hagen Farm Site, Town of Dunkirk, Dane County, WI / SCS Engineers Project #25212002.00

Probe	Pressure (inches of water)	Methane (%)	Carbon Dioxide (%)	Oxygen (%)	Probe	Pressure (inches of water)	Methane (%)	Carbon Dioxide (%)	Oxygen (%)
GP01S	0.07	0.0	0.2	21.1	GP15M	0.13	59.2	33.8	0.0
GP01M	0.08	37.0	22.2	7.2	GP15D	0.09	59.9	33.2	0.1
GP01D	0.04	0.1	0.3	20.9	GP16S	-0.08	0.0	3.5	17.0
GP02S	0.14	48.4	31.3	0.0	GP16M	-0.07	0.0	3.2	17.0
GP02M	0.18	60.4	33.8	0.7	GP16D	-0.13	0.0	0.1	20.4
GP02D	0.14	3.4	1.6	19.4	GP17S	0.09	58.4	34.8	0.1
GP03S	0.14	46.3	27.3	1.8	GP17M	0.02	59.3	35.7	0.1
GP03M	0.09	51.0	23.5	2.3	GP17D	-0.08	0.1	0.7	20.0
GP03D	0.48	0.5	0.3	20.8	GP18S	0.01	7.3	12.1	2.6
GP04S	0.07	36.5	21.5	0.2	GP18M	0.02	54.6	35.1	0.1
GP04M	0.03	28.3	15.0	4.2	GP18D	0.05	7.8	3.2	16.0
GP04D	0.02	0.0	0.1	21.1	GP19S	0.02	17.7	13.0	12.9
GP05S	-0.08	0.1	9.2	17.4	GP19M	0.05	38.0	31.3	1.6
GP05M	0.12	49.3	34.7	2.2	GP19D	0.05	0.0	0.3	20.2
GP05D	0.02	0.0	0.1	20.9	GP20S	-0.12	0.0	5.3	13.4
GP06S	0.18	47.2	31.2	1.8	GP20M	-0.11	0.0	1.1	19.1
GP06M	0.06	45.4	28.3	4.0	GP20D	-0.14	0.0	0.7	18.6
GP06D	0.06	0.0	0.1	20.8	GP21S	-0.09	0.0	2.0	19.1
GP07S	0.09	1.6	9.1	13.0	GP21D	-0.08	0.0	0.4	20.1
GP07M	0.19	43.9	27.3	4.0	GP22S	-0.04	0.0	8.3	14.0
GP07D	0.17	32.5	31.0	7.1	GP22M	-0.05	0.0	4.2	12.4
GP08S	0.15	32.8	25.1	0.5	GP22D	0.00	0.0	0.1	20.4
GP08M	0.10	47.4	27.8	3.5	GP23S	-0.02	0.0	5.4	15.6
GP08D	0.13	0.4	0.3	20.6	GP23M	0.00	0.0	4.3	16.5
GP09S	0.03	55.1	29.0	1.2	GP23D	-0.02	0.0	0.8	19.7
GP09M	0.09	48.3	25.5	0.4	GP24S	0.00	0.0	3.8	17.1
GP09D	0.02	0.2	0.7	20.3	GP24M	-0.03	0.0	4.8	15.8
GP10S	-0.11	0.5	6.0	16.4	GP24D	0.04	0.0	6.0	14.8
GP10M	0.20	46.5	29.4	4.0	GP25S	0.03	0.0	5.9	15.3
GP10D	0.06	12.1	14.9	11.3	GP25M	-0.01	0.0	10.2	10.0
GP11S	0.02	43.1	21.2	1.7	GP25D	-0.04	0.0	0.6	19.8
GP11M	0.01	37.3	17.9	0.7	GP26S	-0.06	0.0	5.5	15.1
GP11D	0.11	5.7	3.2	18.0	GP26M	-0.05	0.0	8.9	11.1
GP12S	0.06	50.6	24.9	2.1	GP26D	-0.04	0.0	0.8	19.5
GP12M	-0.03	0.0	5.2	18.3	GP27S	-0.06	0.0	6.9	14.6
GP12D	-0.05	0.1	0.2	20.6	GP27M	-0.07	0.0	2.4	16.0
GP13S	0.08	54.9	29.5	0.0	GP27D	-0.01	0.0	0.7	18.8
GP13M	0.00	47.5	27.5	0.7	GP28S	0.02	0.0	4.3	12.9
GP13D	0.01	46.9	23.7	3.6	GP28M	-0.03	0.0	2.3	18.2
GP14S	0.03	54.2	28.0	0.6	GP28D	-0.09	0.0	0.5	19.7
GP14M	0.05	57.8	32.8	0.0	GP29S	-0.04	11.1	7.8	7.0
GP14D	0.05	61.0	30.7	0.0	GP29M	-0.09	12.9	7.5	5.0
GP15S	0.07	54.9	28.6	0.0	GP29D	-0.02	0.9	0.7	16.5

Notes:
1) Probe data collected by SCS personnel on September 1, 2020

Created by: ZTW Date: 2/6/2019
Revised by: ZTW Date: 12/17/2020
Checked by: MCK Date: 12/23/2020

Z:\Projects\25212002.00\Reports\Annual Reports\2020\Tables\[Table 1 - Probe Data.xls]Table 1

Table 9: Maximum Groundwater Contaminant Concentrations (2016-2021) and Cleanup Criteria

Chemicals	Maximum Concentration in Samples Collected between 8/2016 - 2/2021		Cleanup Standards (µg/L)					
	Date	Concentration (Well)/Location	ES		PAL		MCL	
			GCOU ROD	2021	GCOU ROD	2021	GCOU ROD	2021
Organic								
Benzene	8/28/17	0.64 µg/L (P35B)/ off-property	5	5	0.067	0.5	5	5
1,1-DCE		ND	7	7	0.024	0.7	7	7
cis-1,2-DCE		ND	NL	70	NL	7	NL	70
trans-1,2-DCE		ND	NL	100	NL	20	NL	100
Ethylbenzene		ND	1360	700	272	140	700	700
Tetrachloroethene (NL)	2/3/21 & 8/12/20	2.3 µg/L (IG04)/ on-property (4)	NL	5	NL	0.5	NL	5
Tetrahydrofuran	8/12/20 & 11/23/20	18 µg/L (MW22)/ on-property (5)	50	50	10	10	NA	NA
Toluene	8/12/20	1.8 µg/L (P17DR)/ on-property	343	800	68.6	160	1,000	1,000
Trichloroethene		ND	NL	5	NL	0.5	NL	5
Xylenes	8/12/20	1.1 µg/L (P17DR)/ on-property	620	2,000	124	400	10,000	10,000
Vinyl Chloride	11/7/16	0.85 µg/L (OB8M)/ off-property	0.2	0.2	0.0015	0.02	2	2
Inorganic (dissolved)								
Arsenic	8/4/16	37.9 µg/L (P22B)/ on-property (5)	50	10	5	1	50	10
Barium	8/23/17	135 µg/L (MW32)/ off-property	1000	2000	200	400	2000	2000
Iron	8/11/20	8,600 µg/L (MW100)/ on-property (4)	300	300 [3]	150	150 [3]	300 [1]	300 [1]
Lead	2/2/21	4.3 µg/L (MW33)/ on-property	50	15	5	1.5	15 [2]	15 [2]
Manganese	11/23/20	712 µg/L (MW22)/ on-property (5)	50	300 and 50 [3]	25	60 and 25 [3]	50 [1]	50 [1]
Mercury	ND		2	2	0.2	0.2	2	2

NL - Not Listed in the ROD Document
ES - Enforcement Standard, Chapter NR140 Wis. Adm. Code
PAL - Preventive Action Limit, Chapter NR140 Wis. Adm. Code
MCL - Maximum Contaminant Level, Federal Safe Drinking Water Act
NA - Not Available; Standard(s) not established
ND - Not Detected
1 - Secondary MCL based on aesthetic qualities of drinking water; not enforceable as cleanup standard
2 - treatment technique action level; not enforceable as cleanup standard
3 - Public Welfare Standard; concentrations not associated with health impacts
4 - Upgradient Monitoring Point/Well
5 - Monitoring Point/Well Located within Waste
□ - Concentration(s) in excess of the MCL or current ES (2021)

ATTACHMENTS

Attachment 1 – Summary of Parcels and Zoning Information

Attachment 2 – Comprehensive Groundwater Quality Monitoring Program

Attachment 3 – Newspaper Notice Announcing Start of Five-Year Review

Attachment 4 – Five-Year Review Site Inspection Checklist for Hagen Farm and Photo Log from December 21, 2020 Inspection

Attachment 5 – Concentration Trends for THF and VC in groundwater (Graphs 1-5)

Summary of Existing Institutional Controls (ICs)
Hagen Farm Site, Town of Dunkirk, WI

Map Label	Parcel ID	Zoning	Sensitive Environmental Features?	Building Present? (2020 aerial photos)	Water Source	Property Address	Municipality	Property Owner	Owner Mailing Address	Factors Limiting the Potential for Development Including Installation of a Potable Water Supply Well that Encounters Contaminated Groundwater from the Site.
A	0511-103-9060-3	FP-35	Y	N	UND	N/A	Town of Dunkirk	Private Party	[redacted]	A-2, B, C-1, D, F
B	0511-103-9845-0	FP-1	Y	Y	PW*	2279 County Hwy A	Town of Dunkirk	Sundby Sand & Gravel Co, Inc.	[redacted]	A-2, B, C-2, D, F
C	0511-103-9860-0	FP-1	Y	N	UND	N/A	Town of Dunkirk	Private Party	[redacted]	A1, B, C-2, D, F
D	0511-103-9815-0	HC	Y	Y	PW*	2259 County Hwy A	Town of Dunkirk	Private Party	[redacted]	A-2, D, F. Most of the parcel area is utilized for manufacturing in accordance with the current Heavy Commercial (HC) zoning.
E	0511-103-9875-0	RR-4	Y	Y	PW^	2245 County Hwy A	Town of Dunkirk	not listed	[redacted]	A-1, B, C-3, D, F
F	0511-104-9210-0	FP-35	N	N	UND	N/A	Town of Dunkirk	Private Party	[redacted]	Parcel outside area of interest (A-1).
G	0511-103-9230-7	RR-8	Y	Y (shed)	PW^ (on adjacent parcel with residence)	1072 Collins Rd	Town of Dunkirk	Private Party	[redacted]	A-1, B, C-3, D, F. Development potential limited to western portion of parcel which is outside the area of interest.
H	0511-152-8501-0	FP-35	Y	N	UND	N/A	Town of Dunkirk	Private Party	[redacted]	A-2, B, C-1, F. Monitoring wells MW-32, P32B and OB8M are located on the parcel.
I	0511-152-8050-0	FP-35	Y	Y	PW*	1036 Collins Rd	Town of Dunkirk	Private Party	[redacted]	A-2, B, C-1, F
J	0511-151-8600-3	FP-35	Y	N	UND	N/A	Town of Dunkirk	Private Party	[redacted]	A-1, B, C-1, F
K	0511-152-9501-0	FP-35	Y	N	UND	N/A	Town of Dunkirk	Private Party	[redacted]	Parcel outside area of interest.
L	0511-151-9000-7	FP-35	Y	N	UND	N/A	Town of Dunkirk	Private Party	[redacted]	Parcel outside area of interest.
WMWI-1	0511-103-8000-7	FP-1, FP-35	Y	N	N/A	2298 County Hwy A	Town of Dunkirk	Waste Management of WI Inc	[redacted]	
WMWI-2	0511-103-9500-0	FP-1, FP-35	Y	Y	N/A	2298 County Hwy A	Town of Dunkirk	Waste Management of WI Inc	[redacted]	
WMWI-3	0511-103-8905-0	FP-1	N	N	N/A	N/A	Town of Dunkirk	Waste Management of WI Inc	[redacted]	A-2, B, C-1, C-2, D, E, F

PW = Private Well
* = Private well is included in the landfill groundwater monitoring program.
^ = Private well is no longer included in the landfill groundwater monitoring program.
UND = Property is undeveloped
Parcels previously sold by WMWI with deed restrictions (parcels 386501 and 389212) located west of the site are not included in this summary.
A-1 - Existing conditions include the definition of groundwater quality through periodic analysis of samples collected at the Site.
A-2 - Existing conditions include the definition of groundwater quality through periodic analysis of samples collected at the Site and parcel.
B - Potential for development including installation of a potable well is limited by presense of sensative environmental features including wetlands or surface water bodies with associated setbacks and other zoning requirements as noted on the parcel description(s).
C-1 - Potential development typically including installation of a potable well is limited by local zoning. Among other items, FP-35 (General Farmland Preservation) zoning includes a lot area minimum of 35 acres, and construction of a residence after February 20, 2010 requires a condition use permit.
C-2 - Potential development typically including installation of a potable well is limited by local zoning. Among other items, FP-1 (Small Lot Farmland Preservation) zoning includes a lot area from 1 to 35 acres and no provisions for residential use.
C-3 - Potential development typically including installation of an additional potable well is limited by local zoning. Among other items, Rural Residential zoning (RR-4 and RR-8) restricts development to one single family home/parcel.
D - Installation of a private well within 1,200 feet of a landfill requires WDNR review and approval in accordance with Chapter NR 812.08 Wis. Adm. Code.
E - Installation of a potable well prohibited by deed restriction. The deed restriction on WMWI parcels was deemed appropriate and confirmed by USEPA's prior FYR.
F - Potential for development including installation of a potable well without knowledge of the Site is limited by notice of the existing Site (signs and perimeter fencing, WDNR BRRTs website, etc.)

Attachment 1

This 2019 document is intended for reference only. Please contact Dane County Zoning Division (608) 266-4266 for specific ordinance language.

FP-1 (Small Lot Farmland Preservation) Zoning District

Zoning district for to provide modest range of agricultural uses on lots less than 35 acres
CH. 10-Zoning, Section 10.221

Permitted uses 10.221(2)

- Agricultural uses (see below for livestock)
- Agricultural accessory uses (except farm residences and those listed as conditional uses below)
- Large animal boarding
- Farm-related exhibitions, sales or events less than 11 days/year
- Seasonal storage of recreational equipment and motor vehicles (including those not owned by the landowner) inside existing accessory buildings
- Sales of agricultural products produced on the farm
- Undeveloped natural resource and open space uses
- Utility services associated with a permitted use
- Transportation, utility, communication or other use required by law

Conditional uses 10.221(3)

- Agricultural accessory uses:
  - Agricultural entertainment
  - Limited farm business
  - Farm related exhibitions, sales, or events exceeding 10 days/year
  - Sale of agricultural and dairy products not produced on the premises
  - Incidental sale of non-alcoholic beverages and snacks
  - Sanitary facilities in an agricultural accessory building
  - Livestock on parcels 5 acres or less
  - Livestock in excess of 1 animal unit/acre on parcels between 5 and 35 acres
- Transportation, communication, pipeline, electric transmission, utility, or drainage uses not required by law
- Electric generating facilities derived from renewable energy resources

Setbacks and Height requirements for structures 10.221(5-6)

Front setback for all structures from Highway centerline / right-of-way line (whichever is greater)
State or Federal Highway: 100/42 feet minimum
County Highway: 75/42 feet minimum
Town Road: 63/30 feet minimum
Subdivision streets platted prior to ordinance: 20 feet minimum
All other streets: 30 feet minimum from right-of-way

Lots without road frontage: Structures must be at least 50 feet from the lot line where primary access is provided.

Maximum Height:
Agricultural buildings: No height requirements

Rear and side yards:
Not housing livestock: 10-feet
Housing livestock:
100 feet from Residential or Hamlet zoning districts
50 feet from Rural Residential zoning districts
10 feet from all other zoning districts

Lot Size 10.221(4)

Minimum: 1 acre
Maximum: 35 acres

Minimum lot width: None

Lot Coverage 10.221(7)

Lots 2 acres or less:
Interior lots: 30% Corner lots: 35%

Lots over 2 acres: None

FP-1 (Small Lot Farmland Preservation) Zoning District

Zoning district for to provide modest range of agricultural uses on lots less than 35 acres
CH. 10-Zoning, Section 10.221

Accessory Buildings Requirements 10221(8)

- Accessory buildings may be constructed only if it is clearly related to a legitimate farm operation or agricultural accessory use.
- Sanitary fixtures are prohibited in accessory buildings, unless authorized by a conditional use permit.
- No living spaces are allowed in accessory buildings.
- Zoning Permit fees are only exempt for farm buildings on farms of 35 acres or larger.

NOTE: A Zoning Permit is required for every building larger than 120 square feet in size. Zoning Permits are not required for accessory buildings equal to or less than 120 square feet on non-permanent foundations, provided they meet setback, height, and lot coverage requirements.

For more information on the regulation of accessory buildings please see the Dane County Zoning *Guide for Accessory Buildings* Handout.

Livestock 10.222(2)

- Unless authorized under a conditional use permit, livestock are prohibited on parcels of five acres or less.
- Unless authorized under a conditional use permit, livestock are limited to one animal unit per acre on parcels between five and thirty-five acres.
- Livestock and large animal boarding must comply with state soil and water conservation rules (ATCP 50, Wis. Administrative Code).

FP-35 (General Farmland Preservation) Zoning District

Primary zoning district for farmland preservation -- CH. 10-Zoning, Section 10.222

Permitted Uses 10.222(2)

- Agricultural uses
- Agricultural accessory uses (except those listed as conditional uses below)
- Agricultural accessory buildings
- Agricultural entertainment less than 10 days/year
- Farm-related exhibitions, sales or events less than 11 days/year
- Seasonal storage of recreational equipment and motor vehicles (including those not owned by the landowner) in existing accessory buildings
- Residences existing as of Feb. 20, 2010 (see below)
- Large animal boarding
- Sales of agricultural products produced on the premises
- Undeveloped natural resource and open space uses
- Utility services associated with a permitted use
- Transportation, utility, communication or other use required by law

Conditional Uses 10.222(3)

- Agricultural accessory uses:
  - Agricultural entertainment, 10 days/year or more
  - Airports, landing strips, heliports for owner of farm
  - Farm related exhibitions, sales or events, over 10 days/year
  - Farm Residence, subject to 10.103(11)
  - Attached accessory dwelling units associated with a farm residence
  - Limited Farm Business, subject to 10.103(13)
  - Sale of agricultural and dairy products not produced on the premise
  - Incidental sale of non-alcoholic beverages and snacks
  - Secondary farm residences
- Transportation, communication, pipeline, electric transmission, utility, or drainage uses not required by law
- Non-metallic mineral extraction
- Asphalt & ready-mix concrete plants
- Limited asphalt or concrete plants
- Renewable energy electricity generators

Setbacks and Height requirements for Structures 10.222(5) & 10.222(6)

Front setback for all structures from Highway centerline / right-of-way line (whichever is greater)
State or Federal Highway: 100/42 feet minimum
County Highway: 75/42 feet minimum
Town Road: 63/30 feet minimum
Subdivision streets platted prior to ordinance: 20 feet minimum
All other streets: 30 feet minimum from right-of-way

Maximum Height:
Residences: 2½ stories or 35 feet maximum
Accessory buildings: 35 feet maximum
Agricultural buildings: No height requirement

Permitted residences:
Side yard: 25 feet total, with no single side less than 10 feet minimum
Rear yard: 50 feet minimum
Uncovered decks/porches: 38 feet minimum

Rear and side yards:
Not housing livestock: 10-feet
Housing livestock:
100 feet from Residential or Hamlet zoning districts
50 feet from Rural Residential zoning districts
10 feet from all other zoning districts

Lot Width & Area 10.222(4)

Minimum: 35 acres
Maximum: None

Minimum lot width: None

Maximum Lot Coverage all buildings and structures

None.

Accessory Buildings Requirements 10.222(8)

- Accessory buildings may be constructed on property without a principal residence only if it is clearly related to a legitimate farm operation or agricultural accessory use.
- Sanitary fixtures are permitted in agricultural accessory buildings

- No living spaces are allowed in accessory buildings.
- Reduced setbacks may be used for residential accessory buildings on lots. The buildings must be located in the rear yard and must be at least 10 feet away from the principal building.
- Zoning Permit fees are exempt for farm buildings on farms of 35 acres or larger.

NOTE: A Zoning Permit is required for every building larger than 120 square feet in size. Zoning Permits are not required for accessory buildings equal to or less than 120 square feet on non-permanent foundations, provided they meet setback, height, and lot coverage requirements.

For more information on the regulation of accessory buildings please see the Dane County Zoning *Guide for Accessory Buildings* Handout.

Existing Residences in FP-35 10.222(b)1.

- Any residence lawfully existing as of February 20, 2010 shall be considered a permitted use. Such structures may be added to, altered, restored, repaired, replaced or reconstructed, without limitation, provided **all** of the following criteria are met:
  1. The use remains residential.
  2. The structure complies with all building height, setback, side yard and rear yard standards of this ordinance.
  3. For replacement residences, the structure must be located within 100 feet of the original residence, unless site-specific limitations or town residential siting standards in town plans adopted by the county board require a greater distance. Proposals for a replacement residence that would exceed the 100 foot limitation must be approved by the town board and county zoning committee.

- Residential accessory buildings, home occupations, foster care for less than 5 children, community living arrangements for less than 9 people, and incidental room rental are permitted when associated with:
  - An existing residence as permitted above
  - A farm residence approved by conditional use permit
- Existing residences or secondary residences located on a farm, but which are no longer utilized in the operation of the farm may be rented.

Limited Farm Businesses 10.004(85) &10.103(13)

Limited farm businesses are an agricultural accessory use and must meet the following criteria:

- ✓ Consists of a business, activity, or enterprise, whether or not associated with an agricultural use, that is conducted by the owner or operator of a farm
- ✓ Requires no buildings, structures, or improvements other than existing agricultural buildings or a farm residence
- ✓ Employs no more than 4 full-time equivalent employees annually, who are not members of the family residing on the farm
- ✓ Does not impair or limit the current or future agricultural use of the farm or other protected farmland

In addition, a **limited farm business** as a conditional use in the FP-35 district is further restricted:

- The uses are limited to those listed as permitted uses in the LC or GC zoning districts, provided the use does not conflict with the overall purposes of the FP-35 district
- The area dedicated to the limited farm business use must not exceed 10,000 square feet in indoor floor area
- The use must be contained entirely within building(s) in existence prior to April 30, 2005
- The landowner must maintain, restore, or enhance the existing exterior character of the building(s)
- No more than 4 non-family employees may be employed.

Groundwater Monitoring Program
February 2013
Hagen Farm / SCS Engineers Project #25212002.00

Well ID	Well Type	Sampling Frequency and Parameter Set		
		May/November (Quarterly)	February (Semi-annual)	August (Annual)
IG04	WT		X	X
MW100	WT	(1)	(1)	X
MW7	WT		X	X
MW22	WT	X	X	X
MW23	WT		(1)	X
MW26	WT		X	X
MW27	WT		X	X
MW29	WT		(1)	X
MW30	WT	(1)	(1)	X
MW32	WT	(1)	(1)	X
MW33	WT	(1)	X	X
OBS1A	WT	X	X	X
OBS1B	PZ(BD)	X	X	X
OBS1C	PZ(BD)	X	X	X
OBS2C	PZ(BD)	X	X	X
OB8M	PZ(BD)	X	X	X
OB11M	PZ(USD)		X	X
P17B	PZ(USD)	X	X	X
P17C	PZ(BD)	X	X	X
P17DR	PZ(BD)	(1)	X	X
P22B	PZ(USD)	X	X	X
P26B	PZ(USD)		X	X
P27B	PZ(USD)		X	X
P28B	PZ(USD)		X	X
P28C	PZ(BD)		(1)	X
P29B	PZ(USD)		(1)	X
P29C	PZ(BD)		(1)	X
P30B	PZ(USD)		(1)	X
P30C	PZ(BD)		(1)	X
P32B	PZ(BD)	X	X	X
P33B	PZ(BD)		(1)	X
P35B	PZ(BD)		(1)	X
P40D	PZ(BD)		(1)	X
PW2	PW			X
PW3	PW			X
PW4	PW			X
PW5	PW			X
PW9	PW			X

Abbreviations:
(1) = Water Level Only
X = Monitoring well proposed to be sampled
PW = Private Well
PZ(BD) = Piezometer screened in bedrock
PZ(USD) = Deep piezometer screened in unconsolidated sediment
WT = Shallow piezometer screened in unconsolidated sediment

Notes:
1) Water elevations are not measured at private wells.
2) Private well samples are not filtered.

Groundwater Monitoring Program
February 2013
Hagen Farm / SCS Engineers Project #25212002.00

Groundwater Parameter List		
Annual	**Semiannual**	**Quarterly**
Indicator Parameters		
Hardness-Total As $CaCO_3$ (Filtered)	Sulfate-Dissolved	Sulfate-Dissolved
Total Dissolved Solids (TDS)	Alkalinity, Filtered	Alkalinity, Filtered
Total Suspended Solids (TSS)	Nitrate+Nitrite-Dissolved	Nitrate+Nitrite-Dissolved
Chloride-Dissolved		
Sulfate-Dissolved		
Alkalinity, Filtered		
Cyanide - Soluble		
Ammonia - Dissolved		
Soluble Total Kjeldahl Nitrogen		
Nitrate+Nitrite-Dissolved		
Chemical Oxygen Demand-Dissolved		
Phosphorous-Dissolved		
Field Parameters		
pH (Field)	pH (Field)	pH (Field)
Temperature (Field Test)	Temperature (Field Test)	Temperature (Field Test)
Electrical Conductance (Field)	Electrical Conductance (Field)	Electrical Conductance (Field)
Field EH/ORP	Field EH/ORP	Field EH/ORP
Color	Color	Color
Dissolved Oxygen (DO) (Field Test)	Dissolved Oxygen (DO) (Field Test)	Dissolved Oxygen (DO) (Field Test)
Odor	Odor	Odor
Turbidity	Turbidity	Turbidity
Water Elevation	Water Elevation	Water Elevation
Metals		
Aluminum, Dissolved	Barium, Dissolved	Iron, Dissolved
Barium, Dissolved	Iron, Dissolved	Manganese, Dissolved
Calcium, Dissolved	Manganese, Dissolved	
Chromium, Dissolved	Arsenic, Dissolved	
Cobalt, Dissolved	Lead, Dissolved	
Copper, Dissolved	Mercury, Dissolved	
Iron, Dissolved		
Magnesium, Dissolved		
Manganese, Dissolved		
Nickel, Dissolved		
Potassium, Dissolved		
Silver, Dissolved		
Sodium, Dissolved		
Vanadium, Dissolved		
Zinc, Dissolved		
Antimony, Dissolved		
Arsenic, Dissolved		
Beryllium, Dissolved		
Cadmium, Dissolved		
Selenium, Dissolved		
Thallium, Dissolved		
Mercury, Dissolved		
VOCs		
See Attached List of Compounds (8260C)	**See Attached List of Compounds (8260C)**	**See Attached List of Compounds (8260C)**
Vinyl Chloride (SIM)	**Vinyl Chloride (SIM)**	**Vinyl Chloride (SIM)**

Abbreviations:
SIM = Select Ion Methodology

Notes:
1) Water elevations are not measured at private wells.
2) Private well samples are not filtered.

Groundwater Monitoring Program
February 2013
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Volatile Organic Compounds		
1,1,1-Trichloroethane	Bromoform	Methyl Ethyl Ketone
1,1,2,2-Tetrachloroethane	Bromomethane	Methyl Isobutyl Ketone
1,1,2-Trichloroethane	Carbon Disulfide	Methylene chloride
1,1-Dichloroethane	Carbon Tetrachloride	Methyl-t-Butyl Ether (MTBE)
1,1-Dichloroethene	Chlorobenzene	Naphthalene
1,2,4-Trichlorobenzene	Chloroethane	Styrene
1,2-Dibromo-3-Chloropropane DBCP	Chloroform	Tetrachloroethene
1,2-Dibromoethane (EDB)	Chloromethane	Tetrahydrofuran
1,2-Dichlorobenzene	cis-1,2-Dichloroethene	Toluene
1,2-Dichloroethane	cis-1,3-Dichloropropene	Total Xylenes
1,2-Dichloropropane	Dibromochloromethane	trans-1,2-Dichloroethene
1,3-Dichlorobenzene	Dibromomethane	trans-1,3-Dichloropropene
1,4-Dichlorobenzene	Dichlorobromomethane	Trichloroethene
2-Hexanone	Dichlorodifluoromethane	Trichlorofluoromethane
Acetone	Ethylbenzene	Vinyl chloride
Benzene		

Stoughton Area School District

Photo submitted

While students won't be in classes starting Sept. 1, teachers are encouraged to work from schools to provide as normal of a routine as possible. The district welcomed new educators during a virtual orientation session last month, including top row, from left: Luke Thompson, Smith, and Rebecca Meyer; middle row, from left: Sheila Hosseini, Anna Koehne and Gabby Saunders; bottom row, from left: Mary Menon and Anna Slowiak.

Getting back in the classroom

No students yet, but some teachers have returned

SCOTT DE LARUELLE
Unified Newspaper Group

While students weren't yet attending classes in person as the new school year started Tuesday, Sept. 1, many Stoughton Area School District teachers are back in their classrooms.

That's restored a bit of the "normal" routine interrupted by the COVID schools shutdown.

Dane County has mandated a virtual start to the year for students in grades 3-12, and the Stoughton Area School District has stuck with its original plan for a fully virtual start for students in grades K-12. But teachers are allowed to return to their classrooms to set up virtual lessons from there.

Because district buildings haven't been shut down by the state as they were during the "Safer at Home" order this spring, district superintendent Tim Onsager has been actively encouraging staff to work from their schools, district community information and resource coordinator Molly Shea told the Hub.

"There is reliable internet access, teachers have access to their classroom supplies and environment, the ability to see and collaborate with coworkers, from afar and with safety precautions," she wrote in an email to the Hub Monday. "We think that students will feel some normalcy if they see teachers teaching from their schools."

Many staff members have been working in buildings to some extent in the past few weeks, or in some cases, throughout the summer. Those include teachers, maintenance and custodial staff, administrators and administrative assistants.

"We have stocked PPE supplies for staff, including masks and lots of hand sanitizer," Shea wrote. "We also have safety protocols in place, such as requiring staff to take their temperature before coming into work; staying home if they feel sick; and a system for alerting custodial staff about which rooms have been used, for cleaning purposes."

With the 2020-21 school year now underway, district officials are still planning to reassess the situation in mid-September with county health officials to see whether bringing in small groups of K-2 students is "safe and feasible."

"As our families and staff know, things change and then they change again, so we continue to make plans that are flexible and can be adapted to new information," Shea said.

Email Unified Newspaper Group reporter Scott De Laruelle at scott.delaruelle@wcinet.com.

Bjoin Park would restore courts, add Native plantings

MACKENZIE KRUMME
Unified Newspaper Group

People might soon be able to play tennis at Bjoin Park again.

A draft master plan to update Bjoin Park, which is located on seven acres of land east of Page Street and near the Yahara River trail, includes a new half basketball/tennis court, relocated playground, a native plant prairie and new accessible trails.

The park, which is rumored to have been a camp for homeless people during the Great Depression, was previously home to a half-basketball and tennis court, but the city parks department removed them in 2019 after the facilities fell into disrepair.

The draft master plan is expected to be discussed at an upcoming Common Council meeting, where it can be approved, denied or be sent back for more changes.

According to a 2018 Comprehensive Outdoor Recreation Plan, Bjoin Park is the third most used park in the city, with neighbors frequently using it for walks, nature viewing and the playground.

The park's proximity to a wetland, however, creates flooding that makes the baseball diamond unusable and park maintenance is unable to mow, according to the documents. In order to help with the wetness, the native plantings would be in the northern part of the park.

"This will improve park aesthetics, reduce the amount of mowing, and provide for better habitat for insects," the document states.

The draft plan shows the project completed in three phases.

The multi-use sport court, an accessible pathway to the courts, restrooms and playground and two solar lighting poles would be in the first phase, with an estimated cost of $30,000, according to the master plan documents. The sports court and lighting could be installed as early as the fall, Dan Glynn parks and recreation director wrote to the Hub in an email.

The second phase would convert the baseball diamond to an open space with a backstop and the native plant prairie.

The last phase would include moving the playground, finishing the accessible pathway and installing a drinking fountain that is compliant with the Americans with Disabilities Act.

With in the final phase, a shared-use path and railroad crossing would be installed, with the aim to make a safe and user friendly connection to the Yahara River Trails, according to the draft plan. The installment, however, would require future discussions with the railroad company.

In a survey sent to neighbors of the park in September 2019, most of the 67 neighborhood respondents said they use the park for nature watching (70%) and the playground (62%).

Contact Mackenzie Krumme at mackenzie.krumme@wcinet.com.

EPA

EPA Begins Review of Hagen Farm Superfund Site
Town of Dunkirk, Wisconsin

U.S. Environmental Protection Agency is conducting a five-year review of the Hagen Farm Superfund site, 2318 County Highway A, town of Dunkirk, about one mile east of Stoughton, Wis. The Superfund law requires regular checkups of sites that have been cleaned up – with waste managed on-site – to make sure the cleanup continues to protect people and the environment. This is the sixth five-year review of this site.

EPA's cleanup of contaminated soil consisted of consolidating three waste disposal areas into one, capping the consolidated waste, and installing and operating an in-place soil vapor extraction system. A separate plan for contaminated groundwater originally consisted of installing and operating a pump-and-treat system. Recently, a new groundwater cleanup technology was selected to replace the pump-and-treat system. Known as low-flow air sparge, it injects air into the groundwater to aerate and remove the contaminants.

More information is available at the Stoughton Public Library, 304 S. Fourth St.; Dunkirk Town Hall, 654 County Road N, Stoughton; and at www.epa.gov/superfund/hagen-farm.

The review should be completed by July 2021.

The five-year-review report is an opportunity for you to tell EPA about site conditions and any concerns you have. Contact:

Susan Pastor
Community Involvement Coordinator
312-353-1325
pastor.susan@epa.gov

Sheila Sullivan
Remedial Project Manager
312-886-5251
sullivan.sheila@epa.gov

You may call EPA toll-free at 800-621-8431, 8 a.m. to 4:30 p.m., weekdays.

adno=175081

Site Inspection Checklist

I. SITE INFORMATION	
Site name: Hagen Farm	**Date of inspection:** December 21, 2020
Location and Region: Town of Dunkirk, Dane Co. WI	**EPA ID:** WID980610059
Agency, office, or company leading the five-year review: USEPA Region 5	**Weather/temperature:**

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☒ Groundwater pump and treatment
- ☒ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other; Long-term monitoring, soil vapor extraction (SVE), low-flow air sparging (LFAS). SVE and LFAS systems currently shut down for rebound test.

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Michael Peterson, Waste Management of Wisconsin, Inc. (WMWI) District Manager, Environmental Legacy Management Group 12/21/2020
   Name Title Date
   Interviewed ☒at site ☐at office ☐by phone Phone no. 262-509-5638, e-mail: mpeterso2@wm.com
   Problems, suggestions; ☐Report attached _____

2. **O&M staff** Michael Prattke, SCS Engineers, Division Leader 12/21/2020
   Name Title Date
   Interviewed: ☒at site ☐at office ☐by phone Phone no. 262-345-1220, e-mail: mprattke@scsengineers.com
   Problems, suggestions; ☐Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

   Agency Wisconsin Department of Natural Resources (WDNR)
   Contact Trevor Bannister Hydrogeologist 12/22/2020 608-347-0058
   Name Title Date Phone no.
   Problems; suggestions; ☐Report attached _____
   Respondent indicates that he is not aware of any issues at this time.

   Agency _____
   Contact _____ _____ _____ _____
   Name Title Date Phone no.
   Problems; suggestions; ☐Report attached _____

   Agency _____
   Contact _____ _____ _____ _____
   Name Title Date Phone no.
   Problems; suggestions; ☐Report attached _____

   Agency _____
   Contact _____ _____ _____ _____
   Name Title Date Phone no.
   Problems; suggestions; ☐Report attached _____

4. **Other interviews** (optional) ☐ Report attached.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☒ O&M manual — ☒ Readily available — ☒ Up to date — ☐ N/A
   - ☒ As-built drawings — ☒ Readily available — ☒ Up to date — ☐ N/A
   - ☒ Maintenance logs — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks Documents that are needed for O&M activities are kept in the treatment building on site. Other documents are kept at WMWI's office and/or O&M contractor offices.

2. **Site-Specific Health and Safety Plan** — ☒ Readily available — ☒ Up to date — ☐ N/A
   - ☐ Contingency plan/emergency response plan — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks Copies are available at the site and kept by WMWI and O&M contractors.

3. **O&M and OSHA Training Records** — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks Copies of training records are kept at WMWI and the O&M contractor's offices.

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☒ Other permits - Septic System — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks Landfill gas management is not a remedy component.

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks

7. **Groundwater Monitoring Records** ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks Periodic monitoring data are sent to U.S. EPA and WDNR and summarized in Annual Reports. Electronic data records are maintained by WDNR in their Groundwater and Environmental Monitoring System (GEMS) and are available to the public.

8. **Leachate Extraction Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks

10. **Daily Access/Security Logs** — ☐ Readily available — ☐ Up to date — ☒ N/A

    Remarks Perimeter fencing restricts access to the waste mass at the site. Signs are posted at gates on fences. Gates and on-site buildings are locked except when authorized personnel are on site.

    No evidence of unauthorized access to the site at the time of the inspection.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☒ PRP in-house ☒ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other__

SCS Engineers is primary O&M contractor. Subcontractors are selected and utilized as needed to perform specialized O&M functions, i.e., mowing landfill cap, hauling condensate etc.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate_____ ☐ Breakdown attached

Total annual cost by year for review period if available

From January 1, 2019 To December 31, 2019 $160,000 ☐ Breakdown attached
Date Date Total cost

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: NA

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☒ Location shown on site map ☒ Gates secured ☐ N/A
Remarks Perimeter fencing is in good condition. Fence is 6 feet tall with 3-strand barbed wire topping. No evidence of trespassing or vandalism.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A
Remarks Signs are posted on access gates and on perimeter fencing. Phone numbers are current.

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented	☐ Yes	☒ No	☐ N/A
Site conditions imply ICs not being fully enforced	☐ Yes	☒ No	☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Periodic site visits and annual evaluation
Frequency Annual evaluation included in annual O&M/monitoring reports
Responsible party/agency WMWI
Contact Mike Peterson (Name) District Manager, WMWI (Title) _____ (Date) _____ (Phone no.)

Reporting is up-to-date	☒ Yes	☐ No	☐ N/A
Reports are verified by the lead agency	☒ Yes	☐ No	☐ N/A
Specific requirements in deed or decision documents have been met	☒ Yes	☐ No	☐ N/A
Violations have been reported	☐ Yes	☐ No	☒ N/A

Other problems or suggestions: ☐ Report attached
ICs protect remedy and prohibit groundwater use on site and within 1,200 feet of landfill boundary. ICs include a variety of state and local requirements that would restrict or require review of any development in proximity to the site.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A
Remarks ICs are in place for the entire area of the waste mass at the site and adjacent property owned by WMWI. ICs are not in place at one off-property location, outside the 1,200-foot radius from the landfill boundary, where groundwater quality is periodically monitored. The concentration of one parameter (i.e., vinyl chloride) currently exceeds the groundwater cleanup goals (i.e., WDNR NR 140 PAL and ES), but not the federal MCL. Concentrations of vinyl chloride at this well are stable or decreasing over time. Continued monitoring of this well and local private wells is appropriate; ICs should not be required at this location unless contaminant concentrations increase over time.

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident
Remarks

2. **Land use changes on site** ☒ N/A
Remarks Verified by annual inspections and documented in the annual reports.

3. **Land use changes off site** ☐ N/A
Remarks No new residential development within ¼ mile of the site. A new public works building was built approximately 2,500 feet west of site since the last five-year review. Sand and gravel is being commercially removed and processed (i.e. washed) within approximately 1,000 feet of the site, from the property immediately north of the site.

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A
Remarks On-site access roads are in good condition.

B. Other Site Conditions

Remarks The grassy vegetation atop the landfill cap is well established, thick and healthy. Annual mowing is successful in mitigating the growth of woody vegetation.

VII. LANDFILL COVERS ☒ Applicable ☐ N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☒ Settlement not evident
Areal extent_____ Depth_____
Remarks Settlement may be occurring in the NE corner of the cap in that the surface grade in that area does not appear to be uniform. The settlement does not appear to be significant in that the vegetation is healthy, indicating that any storm water ponding is not of long duration, and the affected area is small (i.e., less than ¼ acre), but storm water may not run off as quickly in that area as on other areas of the cap. The area should be monitored and repaired if necessary.

2. **Cracks** ☐ Location shown on site map ☒ Cracking not evident
Lengths_____ Widths_____ Depths_____
Remarks_____

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident
Areal extent_____ Depth_____
Remarks_____

4. **Holes** ☐ Location shown on site map ☒ Holes not evident
Areal extent_____ Depth_____
Remarks_____

5. **Vegetative Cover** ☒ Grass ☒ Cover properly established ☒ No signs of stress
☐ Trees/Shrubs (indicate size and locations on a diagram)
Remarks_____

6. **Alternative Cover (armored rock, concrete, etc.)** ☒ N/A
Remarks_____

7. **Bulges** ☐ Location shown on site map ☒ Bulges not evident
Areal extent_____ Height_____
Remarks_____

8. **Wet Areas/Water Damage** ☒ Wet areas/water damage not evident
☐ Wet areas ☐ Location shown on site map Areal extent_____
☐ Ponding ☐ Location shown on site map Areal extent_____
☐ Seeps ☐ Location shown on site map Areal extent_____
☐ Soft subgrade ☐ Location shown on site map Areal extent_____
Remarks_____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☒ No evidence of slope instability
Areal extent_____
Remarks_____

B. Benches ☐ Applicable ☒ N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☒ N/A or okay
Remarks_____

2. **Bench Breached** ☐ Location shown on site map ☒ N/A or okay
Remarks_____

3. **Bench Overtopped** ☐ Location shown on site map ☒ N/A or okay
Remarks_____

C. Letdown Channels ☐ Applicable ☒ N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☒ No evidence of settlement
Areal extent_____ Depth_____
Remarks_____

2. **Material Degradation** ☐ Location shown on site map ☒ No evidence of degradation
Material type_____ Areal extent_____
Remarks_____

3. **Erosion** ☐ Location shown on site map ☒ No evidence of erosion
Areal extent_____ Depth_____
Remarks_____

4. **Undercutting** ☐ Location shown on site map ☒ No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____

5. **Obstructions** Type_____ ☒ No obstructions
☐ Location shown on site map Areal extent_____
Size_____
Remarks_____

6. **Excessive Vegetative Growth** Type_____
☒ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent_____
Remarks_____

D. Cover Penetrations ☒ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A
Remarks_____

2. **Gas Monitoring Probes**
☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks Gas probes, associated with the SVE system, are currently monitored annually.

3. **Monitoring Wells** (within surface area of landfill)
☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks _____

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A
Remarks_____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☒ N/A
Remarks_____

E. Gas Collection and Treatment ☐ Applicable ☒ N/A

1. **Gas Treatment Facilities**
   ☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
   ☐ Good condition ☐ Needs Maintenance
   Remarks_____

2. **Gas Collection Wells, Manifolds and Piping**
   ☐ Good condition ☐ Needs Maintenance
   Remarks_____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   ☐ Good condition ☐ Needs Maintenance ☒ N/A
   Remarks_____

F. Cover Drainage Layer ☒ Applicable ☐ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☒ N/A
   Remarks_____

2. **Outlet Rock Inspected** ☒ Functioning ☐ N/A
   Remarks_____

G. Detention/Sedimentation Ponds ☒ Applicable ☐ N/A

1. **Siltation** Areal extent_____ Depth_____ ☐ N/A
   ☒ Siltation not evident
   Remarks The sediment control pond, in Southeast area of site, is typically dry._____

2. **Erosion** Areal extent_____ Depth_____
   ☒ Erosion not evident
   Remarks_____

3. **Outlet Works** ☒ Functioning ☐ N/A
   Remarks_____

4. **Dam** ☐ Functioning ☒ N/A
   Remarks_____

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement_____ Vertical displacement_____
   Rotational displacement_____
   Remarks_____ N/A_____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
Remarks N/A

I. Perimeter Ditches/Off-Site Discharge ☒ Applicable ☐ N/A

1. **Siltation** ☐ Location shown on site map ☒ Siltation not evident
Areal extent Depth
Remarks

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
☒ Vegetation does not impede flow
Areal extent Type
Remarks

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident
Areal extent Depth
Remarks

4. **Discharge Structure** ☐ Functioning ☒ N/A
Remarks

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
Areal extent Depth
Remarks N/A

2. **Performance Monitoring** Type of monitoring
☐ Performance not monitored
Frequency ☐ Evidence of breaching
Head differential
Remarks N/A

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
   ☐ Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A
   Remarks Low flow air sparging replaced the prior groundwater pump and treat system at the site. The low flow air sparge (LFAS) system is currently shut down as part of the rebound test.

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ☐ Good condition ☐ Needs Maintenance
   Remarks

3. **Spare Parts and Equipment**
   ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
   Remarks

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps, and Electrical**
   ☐ Good condition ☐ Needs Maintenance
   Remarks N/A

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ☐ Good condition ☐ Needs Maintenance
   Remarks N/A

3. **Spare Parts and Equipment**
   ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
   Remarks N/A

C. Treatment System ☒ Applicable ☐ N/A (Low Flow Air Sparge System)

1. **Treatment Train** (Check components that apply)
   ☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
   ☐ Air stripping ☐ Carbon adsorbers
   ☐ Filters
   ☐ Additive (*e.g.*, chelation agent, flocculent)
   ☒ Others Air sparge points
   ☒ Good condition ☐ Needs Maintenance
   ☒ Sampling ports properly marked and functional
   ☐ Sampling/maintenance log displayed and up to date
   ☒ Equipment properly identified
   ☐ Quantity of groundwater treated annually
   ☐ Quantity of surface water treated annually
   Remarks The LFAS system is currently shut down to conduct the rebound test.

2. **Electrical Enclosures and Panels** (properly rated and functional)
☐ N/A ☒ Good condition ☐ Needs Maintenance
Remarks

3. **Tanks, Vaults, Storage Vessels**
☐ N/A ☒ Good condition ☐ Proper secondary containment ☐ Needs Maintenance
Remarks

4. **Discharge Structure and Appurtenances**
☐ N/A ☒ Good condition ☐ Needs Maintenance
Remarks

5. **Treatment Building(s)**
☐ N/A ☒ Good condition (esp. roof and doorways) ☐ Needs repair
☒ Chemicals and equipment properly stored
Remarks

6. **Monitoring Wells**
☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition
☒ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks

D. Monitoring Data

1. Monitoring Data
☒ Is routinely submitted on time ☒ Is of acceptable quality

2. Monitoring data suggests:
☒ Groundwater plume is effectively contained ☒ Contaminant concentrations are stable or declining

E. Monitored Natural Attenuation

1. **Monitoring Wells**
☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition
☒ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Data from the rebound test that is currently underway is expected to provide information to evaluate the need for continued operation of the LFAS and SVE systems at the site. If warranted, monitored natural attenuation may be appropriate to replace operation of the active systems at the site. The rebound test was begun in August 2019 and will not likely be concluded for a minimum of 2 years.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

While in operation in the past, the low flow air sparge (LFAS) system and in-situ vapor extraction (SVE) systems effectively reduced contaminant concentrations in groundwater. The LFAS and SVE systems have been temporarily shut-down as part of a rebound test and to assess the effectiveness of monitored natural attenuation as a long-term remedy to address the residual contaminant concentrations in groundwater at the site. Preliminary review of the data from the rebound test is encouraging. No significant increases in contaminant concentrations in groundwater outside the waste mass have been identified to date. Thus, the remedy is currently effective and functioning as designed.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

WMWI has operated and maintained the SVE system at the site for more than 20 years, and implemented active groundwater remediation, including pump and treat and/or LFAS for more than 15 years. The current groundwater monitoring program, implemented as part of the O&M activities for the site, is effective and achieves the stated goals in that data is periodically generated to demonstrate that the remedy is protective. Site related contaminants are not identified in periodic samples from local private wells, and data from analysis of periodic samples from groundwater monitoring wells have shown that contaminant concentrations in wells near the site are stable or decreasing over time, thus the remedy is expected to be protective in the future (i.e., long-term).

Concentrations of two volatile organic compounds (VOCs), including tetrahydrofuran (THF) and vinyl chloride, have decreased over time such that the current concentrations of THF in groundwater outside the waste mass are less than the concentration established as Preventive Action Limit (PAL) or Enforcement Standard (ES) in Chapter NR140 Wis. Adm. Code. The PAL and/or ES are potential groundwater cleanup goals, as there is no federal Maximum Contaminant Level (MCL) established for THF. Concentrations of vinyl chloride in groundwater at several monitoring wells outside the waste mass are currently above the PAL or ES, but no concentrations in groundwater within or outside of the waste mass are currently higher than the MCL of 2 micrograms/liter. The reduction in contaminant concentrations over time suggests that the remedy will be protective in the long-term, but long-term monitoring is expected to continue to demonstrate the performance of the remedy.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

WMWI has operated and maintained the SVE system at the site for more than 20 years, and implemented active groundwater remediation, including pump and treat and/or LFAS for more than 15 years. Contaminant concentrations in groundwater have decreased over time, and are currently stable or decreasing, thus the remedy is expected to be protective in the future.

D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. A periodic groundwater monitoring program, similar to that which is currently in place, is expected to be necessary if monitored natural attenuation is demonstrated to be effective in addressing the remaining contaminant concentrations in groundwater. Reductions in the frequency of sampling, or the parameters for which samples are analyzed, may be warranted in the future if contaminant concentrations continue to be stable or decrease over time.

Hagen Farm – Site Inspection Photograph Log
December 21, 2020

Photo 1: View of entrance gate from County Hwy A.

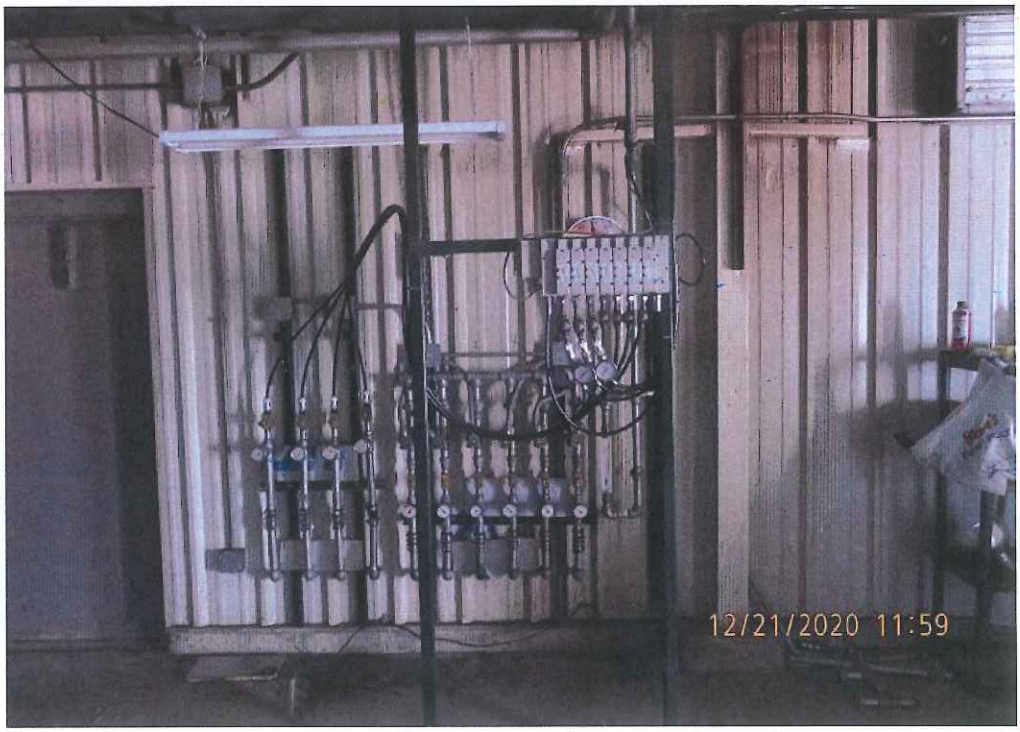


Photo 2: Low Flow Air Sparge (LFAS) Manifold

Photo 3: LFAS Components – Air Compressors, Oxygen Concentrator, Air Dryer

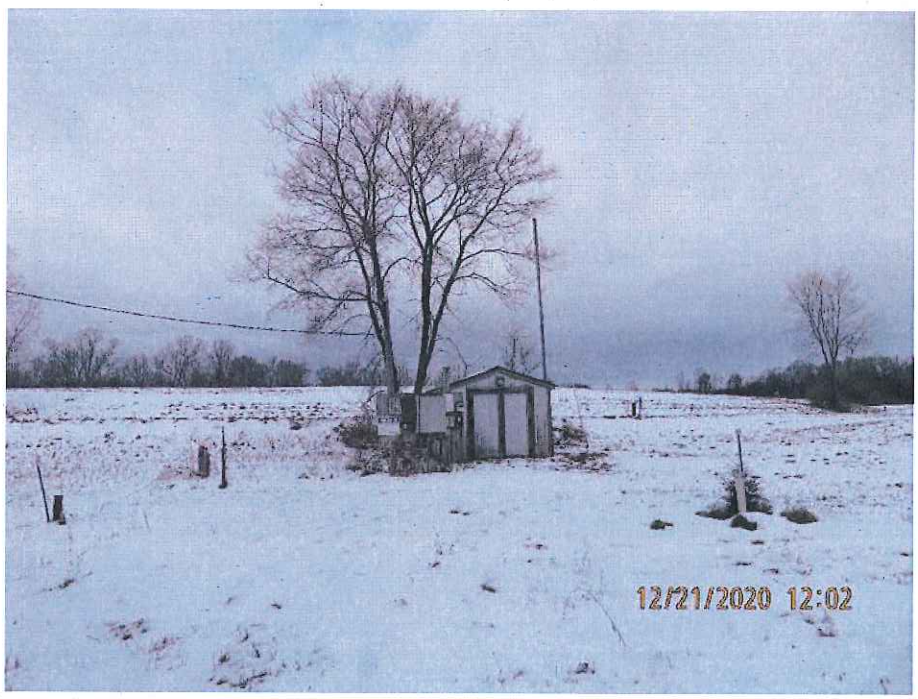


Photo 4: Soil-Vapor Extraction (SVE) Blower Building

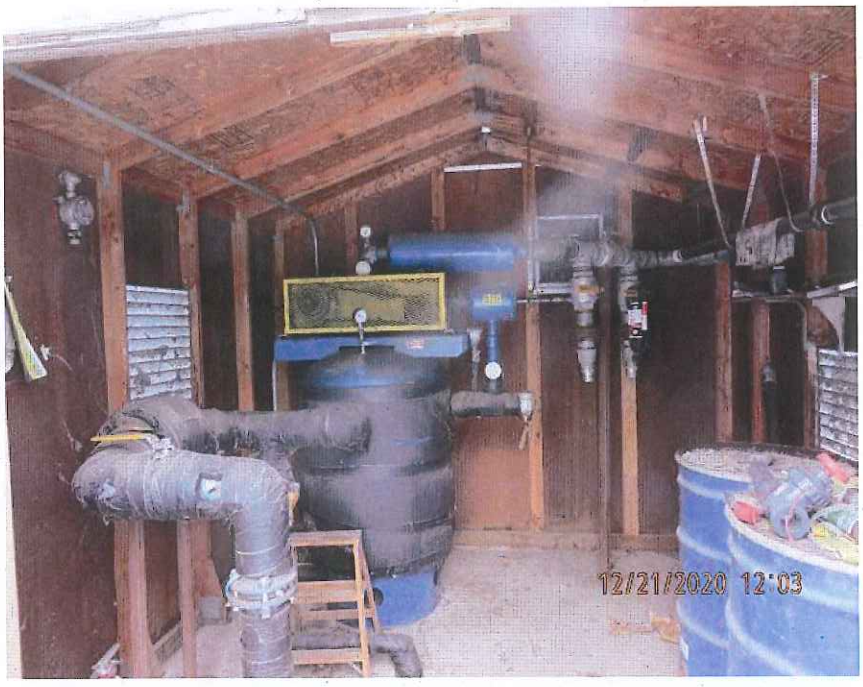


Photo 5: SVE Blower and Header Piping

Photo 6: Sedimentation Basin. Photo taken from atop inlet culverts, looking southeast. The outlet structure for the basin is visible in the distance.

Photo 7: Photo taken looking north along the inside east edge of the fenced property at the site.

Photo 8: Groundwater Monitoring Well MW7 and LFAS point P7B.

Photo 9: View from inside the perimeter fence looking to the east at the gate on the north-south fence.

Photo 10: Groundwater Monitoring Well IG04 – view looking north.

Photo 11: View to the west along the inside of the north perimeter fence.

Photo 12: View to the southeast from inside the northwest corner of the perimeter fence. The former groundwater pump and treat building is visible in the distance.

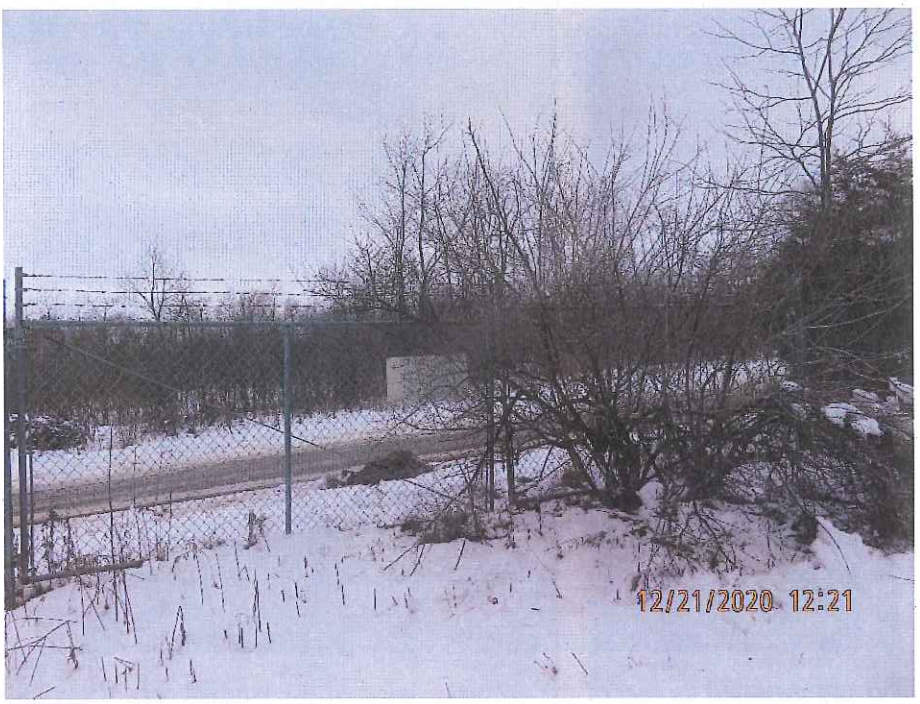


Photo 13: View from inside the west perimeter fence, looking toward the west at a gate.

Photo 14: View looking to the south along the west perimeter of the landfill cap.

Photo 15: Rip-rap installed as part of the drainage layer of the landfill cap. View looking to the east from the west edge of the cap.

Photo 16: Groundwater Monitoring Wells MW26 and P26B. View looking south toward County Hwy A.

Photo 17: View of the landfill cap from the south edge – looking north.

Photo 18: Groundwater Monitoring Wells MW22 and P22B. View looking north/northeast.

Photo 19: SVE well EW1AR, open to atmosphere to promote air flow into the waste mass. View is to the north from atop the landfill cap.

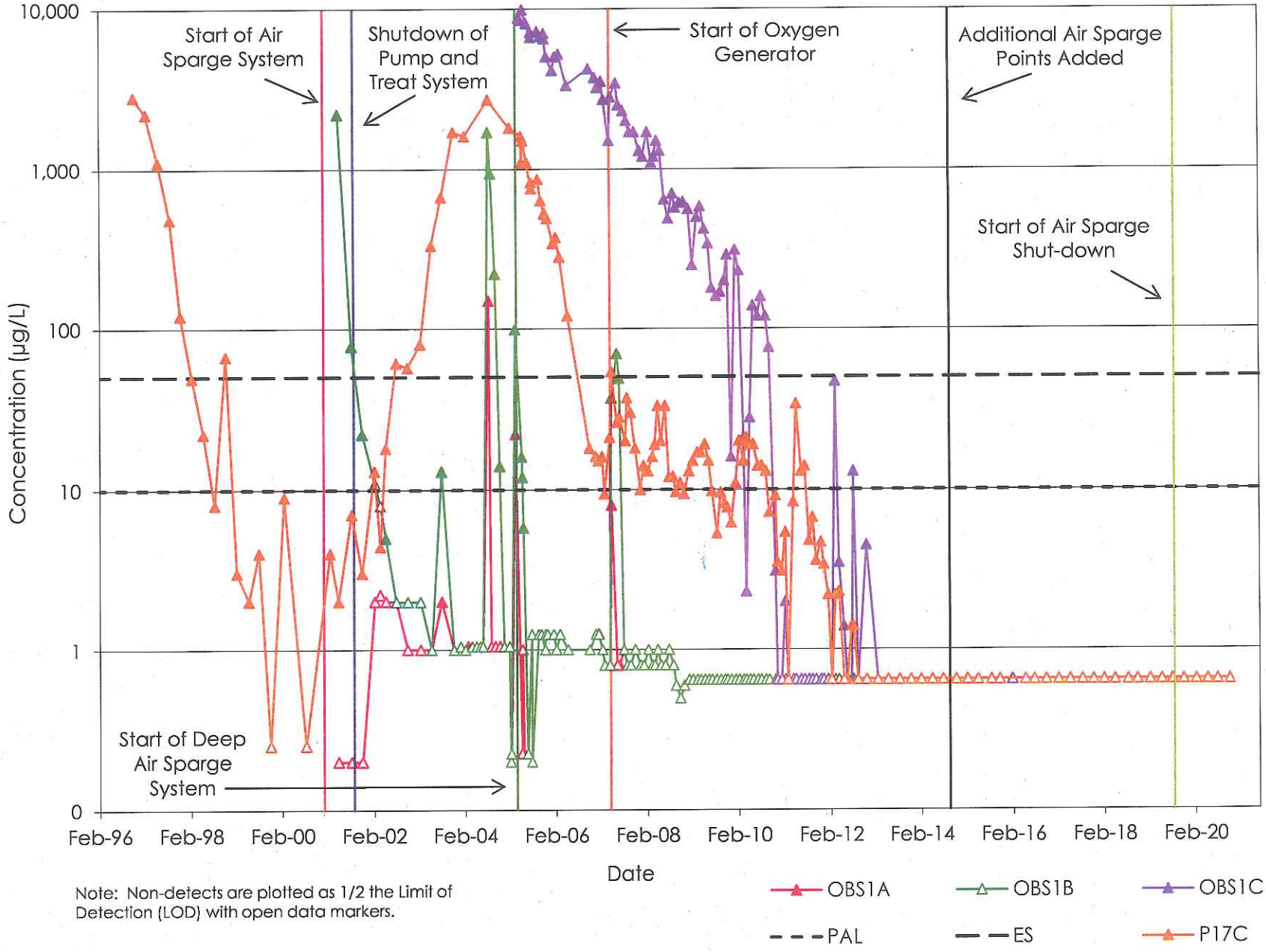
Photo 20: Minor area of settlement in northeast area of the landfill cap – view is to the north.

Photo 21: Groundwater Monitoring Wells P17B and P17C.

Photo 22: Groundwater Monitoring Well OB8M – view is to the north.

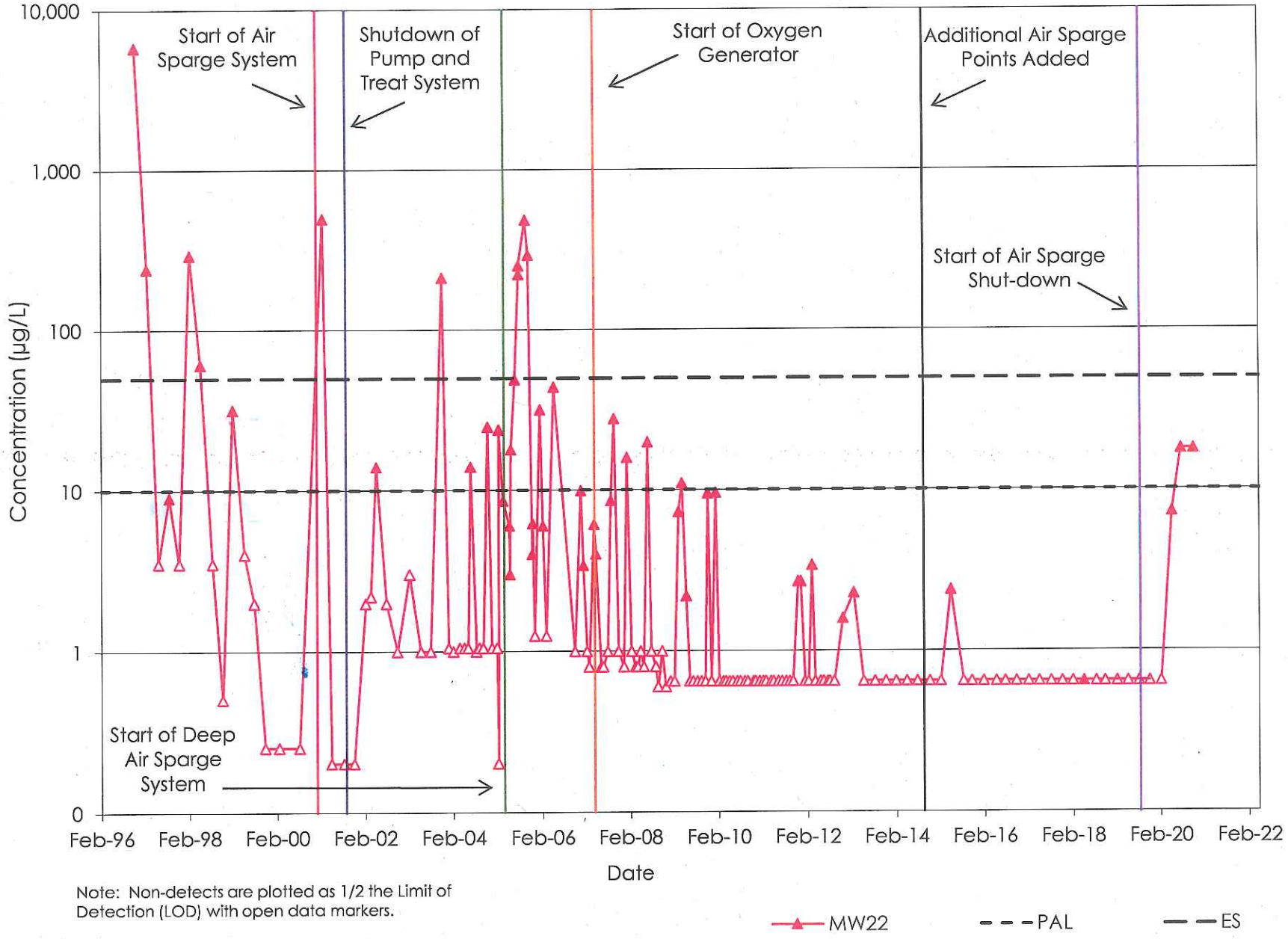
Attachment 5

Graph 1
Tetrahydrofuran
On-Property Wells - Hagen Farm Site



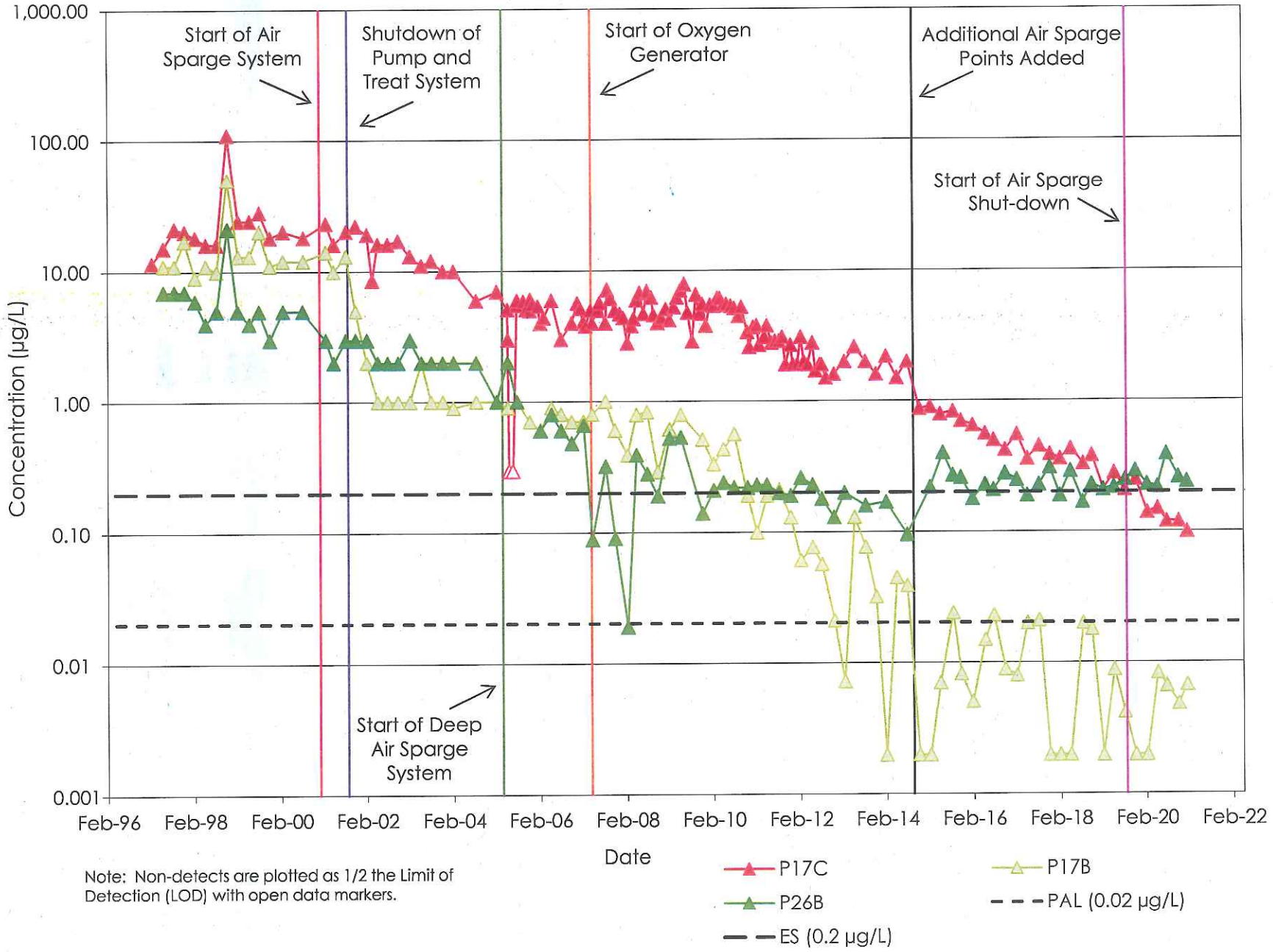
Note: Non-detects are plotted as 1/2 the Limit of Detection (LOD) with open data markers.

Graph 2
Tetrahydrofuran
Source Well - Hagen Farm Site



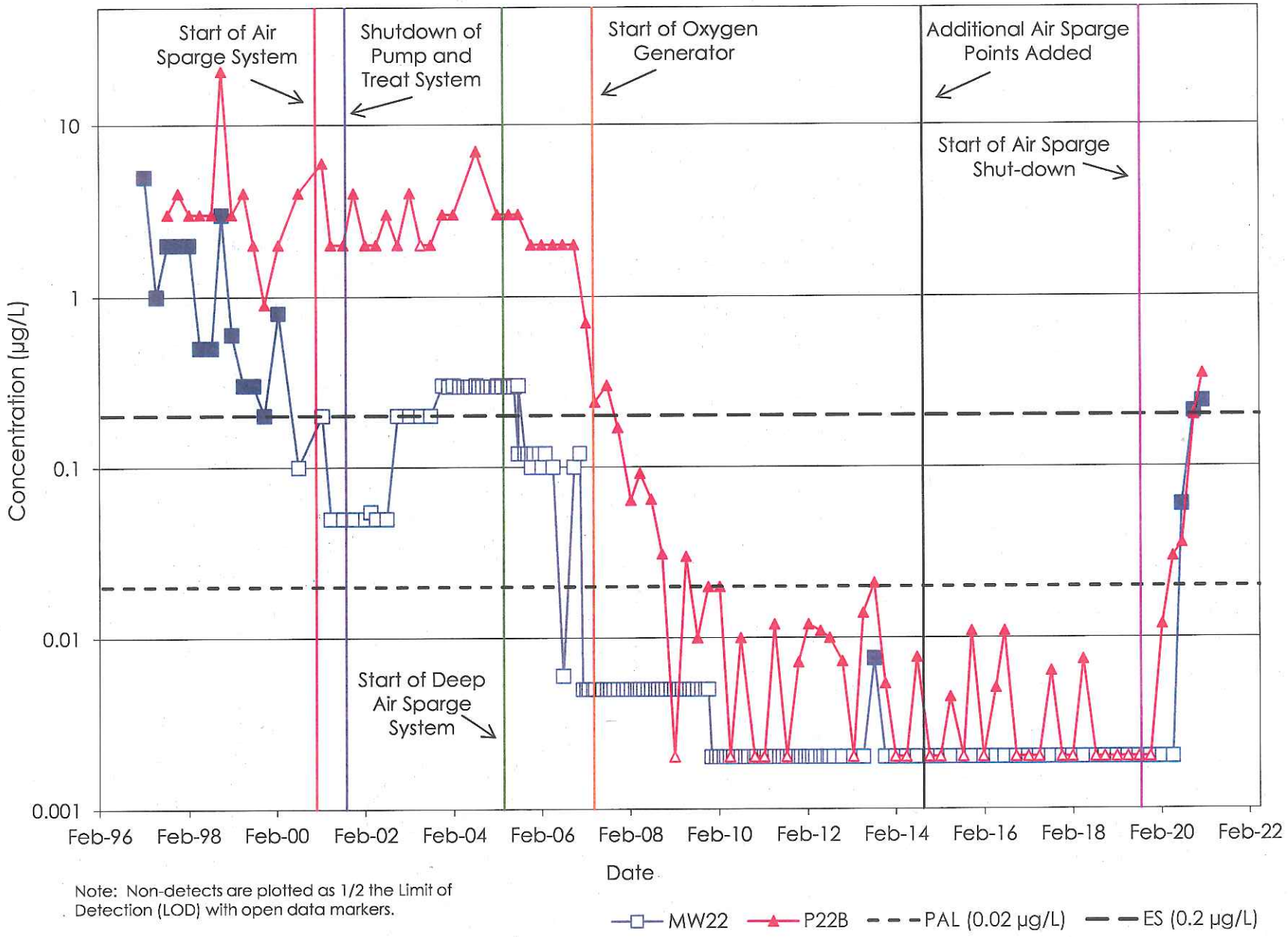
Note: Non-detects are plotted as 1/2 the Limit of Detection (LOD) with open data markers.

Graph 3
Vinyl Chloride
On-Property Wells - Hagen Farm Site



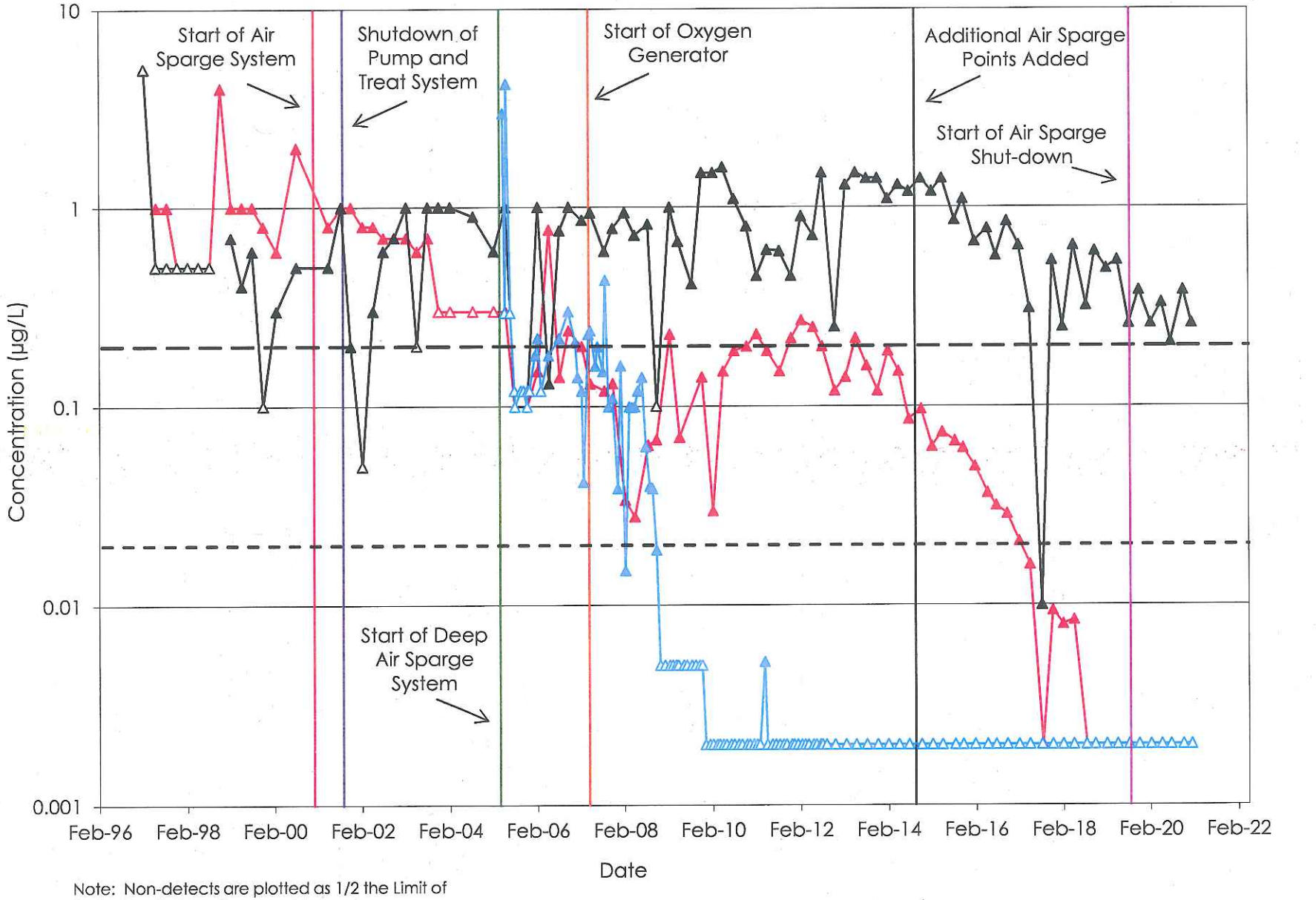
Note: Non-detects are plotted as 1/2 the Limit of Detection (LOD) with open data markers.

Graph 4
Vinyl Chloride
P22B and MW22 - Hagen Farm Site



Note: Non-detects are plotted as 1/2 the Limit of Detection (LOD) with open data markers.

Graph 5
Vinyl Chloride
Off-Property Wells - Hagen Farm Site



Note: Non-detects are plotted as 1/2 the Limit of Detection (LOD) with open data markers.