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FOURTH FIVE-YEAR REVIEW REPORT FOR FIELDS BROOK SUPERFUND SITE ASHTABULA COUNTY, OHIO

Prepared by

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

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LIST OF ABBREVIATIONS & ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
cm/sec	Centimeters per second
COC	Contaminants of concern
CRG	Confidence Removal Goal
CUG	Cleanup Goal
DNAPL	Dense Non-Aqueous Phase Liquid
DNR	Department of Natural Resources
DRE	Destruction Removal Efficiency
DS Tributary	Detrex Tributary
EC	Environmental Covenant
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
ESMI	Environmental Soil Management Companies
EU	Exposure Unit
FBAG	Fields Brook Action Group
FFS	Focused Feasibility Study
FS	Feasibility Study
FSCA	Facility Stormwater Collection Area
FWA	Floodplains/Wetlands Area (OU4)
FYR	Five-Year Review
ft	Feet
GLNPO	Great Lakes National Program Office
ICIAP	Institutional Control Implementation and Assurance Plan
LTS	Long-Term Stewardship
mg/kg	Milligram per kilogram
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
Ohio EPA	Ohio Environmental Protection Agency
O&M	Operation and Maintenance
OM&M	Operation, Maintenance and Monitoring
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
PAHs	Polycyclic aromatic hydrocarbons
PCBs	Polychlorinated biphenyls
pCi/g	Pico-curies per gram
pH	Measure of acidity
ppm	Parts per million
PRP	Potentially Responsible Party
PVC	Polyvinyl chloride
QAPP	Quality Assurance Project Plan
RA	Remedial Action
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design

RI	Remedial Investigation
ROD	Record of Decision
RMI	Reactive Metals Incorporated
RPM	Remedial Project Manager
sq ft	Square Feet
Site	Fields Brook Superfund Site
SVOC	Semi-volatile organic compound
$TiCl_4$	Titanium tetrachloride
TSCA	Toxic Substances Control Act
UAO	Unilateral Administrative Order
UECA	Uniform Environmental Covenants Act
USACE	U.S. Army Corps of Engineers
UU/UE	Unlimited use/unrestricted exposure
VOCs	Volatile organic compounds

EXECUTIVE SUMMARY

This is the fourth Five-Year Review (FYR) for the Fields Brook Superfund Site (Site) located in Ashtabula, Ashtabula County, Ohio. The purpose of this FYR is to review information to determine if the remedy is and will continue to be protective of human health and the environment. The triggering action for this statutory FYR was the signing of the previous FYR on May 23, 2014.

The Site is located in the city and county of Ashtabula, Ohio. It is a six square-mile watershed (Fig. E-1) of a brook where, from 1940 to the present, at least 19 separate facilities operated. Activities range from metals-fabrication to chemicals production. Fields Brook flows into the Ashtabula River (Fig. E-2), which flows into Lake Erie approximately 1-1/2 miles downstream of the Site. Sediments and surface water of Fields Brook, and soils on the Fields Brook floodplain/wetlands area (FWA), were contaminated with a wide variety of contaminants including polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), heavy metals, phthalates and low-level radionuclides. Approximately 23,000 people live within one mile of the Site, in the city of Ashtabula.

There is separate terminology for defining areas and media at the Site. An "Operable Unit" (OU) defines a portion of the Site with which actions are associated. An "Exposure Unit" (EU) defines the area within the Fields Brook Sediment and FWA (OUs1 & 4) and the parameters of human health risk and the Site cleanup goals (CUGs). EUs are directly relevant to the cleanup of Fields Brook OUs 1 & 4. They do not geographically extend into, nor are they a part of the Record of Decision for the source areas. The source area cleanups (OUs 5 through 10) were designed to protect Fields Brook from recontamination and did not remediate the facilities involved. The scope of the required cleanups at OUs 5 through 10 were implemented pursuant to the remedial action objective (RAO) of preventing Fields Brook from recontamination. Figure E-3 shows how OUs and EUs relate spatially.

Upper reaches of the Brook (EUs 4 through 8 on Fig. E-3) flow through areas that are currently heavily industrialized. The expected future use in these areas is that they will remain industrial. In these areas, the remedy included cleanup to meet industrial use scenarios and address ecological risks.

Lower reaches of the Brook (areas designated as EUs 1 through 3 on Fig. E-3) flow between residential neighborhoods prior to discharge to the Ashtabula River adjacent to a rail yard. The expectation is that the current-residential neighborhoods will remain residential use in the future and the rail yard will remain in industrial use. Residential-use scenarios were used to create cleanup levels for EU1 through EU3 to address ingestion and direct contact pathways at Fields Brook. Although not required by the Record of Decision (ROD), the rail yard cleanup also met a residential cleanup level.

The remedies for the Site included the removal of contaminated sediment and floodplain soil from Fields Brook. In addition, remedial actions were implemented at six separate source control OUs to prevent additional contamination (Fig. E-4). The remedies in these areas were designed to protect Fields Brook from recontamination and did not remediate the facilities involved. Institutional controls (ICs) were included in the remedies to the extent necessary for protection of Fields Brook and the components of the remedy.

Below is a summary of cleanup work at the Site by OU:

Fields Brook Sediment and Floodplain/Wetland Soils (OU1 and OU4) – Construction of an on-site landfill was completed in the summer of 2000 (shown on Fig. 1-1 as "Landfill Area"). Excavation of sediments and FWA soils contaminated with PCBs, low-level radioactive materials and dense non-aqueous phase liquids (DNAPL) was completed in December 2002. Thermal treatment was performed onsite for soils and sediment impacted by DNAPL, but not regulated under the Toxic Substances Control Act (TSCA). Restoration activities were completed in spring 2003. IC requirements are in place at the landfill and in the floodplain in EU8.

In 2009, the Fields Brook Action Group (FBAG) prepared a Focused Feasibility Study to evaluate containment measures for EU8. FBAG rerouted the Brook in EU 8 through a lined sedimentation basin and diversion channel and completed the work in 2010. FBAG made significant repairs to the liner system in 2012. During the previous FYR period and in 2014-2015, routine monitoring of the Brook's sediment and floodplain soil identified additional contamination. FBAG conducted soil removal to address these areas of contamination in 2014 and 2016.

Source Control (OU2) – OU2 was broken down into OUs 5 – 10 (see below).

Ashtabula River (OU3) – OU3 was historically the northern portion of the Ashtabula River (north of the confluence of Fields Brook) and Harbor. The entire length of the Ashtabula River is not considered part of the Fields Brook Superfund Site. The United States Environmental Protection Agency (EPA) Great Lakes National Program Office (GLNPO) addressed the River's contaminated sediments.

Detrex Corporation (OU5) – Detrex was issued a Unilateral Administrative Order (UAO) in 1997 to address source control contamination. Detrex completed construction of a slurry wall in 2000. Construction of DNAPL extraction wells began in 2001. Detrex constructed the first phase of the DNPAL extraction system in 2002. To date, Detrex has removed over 29,142 gallons of DNAPL from the property and work is on-going. An Explanation of Significant Differences (ESD) signed in January 2014, revises the extraction well technology to be used, and provides metrics for measuring progress and achieving closure of the UAO. Detrex completed construction of the DNAPL passive collection well remedy in June 2016. ICs are in place on all Detrex-owned property, including its plant operations and former lagoons areas, and the EU 8 Fields Brook floodplain adjacent north of the Millennium property. In 2012 and 2013, Detrex removed contaminated sediments from the Detrex Tributary (DS Tributary) and restored the box culvert under State Road.

Millennium Titanium Tetrachloride ($TiCl_4$) Plant (OU6) – Millennium was issued a UAO in 1997 to address source control contamination. Millennium completed excavation of approximately 60,000 cubic yards of PCB- and radium-contaminated soil and mining residuals in the fall of 1999. The excavated materials are in the existing Millennium on-site landfill, approximately one-mile northeast of the plant. Upon discovering Therminol FR DNAPL in the EU 8 floodplain, EPA issued a UAO to Millennium in 2007 requiring the company to address the associated PCB contamination in sediment and floodplain soils. Millennium completed this removal action in 2008. In 2011, Millennium also placed ICs for its property in the EU 8 floodplain where PCB contamination remains above unrestricted exposure criteria.

North Sewers (OU7) – A UAO was issued in 1997 to address source control contamination. The PCB-contaminated North Sewers were cleaned out and closed by filling with cement grout. Work was completed in the fall of 2000. ICs were placed in 2004 to prevent excavation.

Acme Scrap Iron and Metals / South Sewers (OU8) – A UAO was issued in 1997 to address source control contamination. The excavation and disposal of PCB-contaminated soil and the cleaning of the south sewers was completed in the fall of 2000. ICs were recorded in 2010.

Conrail Bridge Yard (OU9) – Conrail was issued a UAO in 1997 to address source control contamination. It completed physical construction in December of 1998. All arsenic-contaminated soil was excavated to residential cleanup standards and shipped for disposal off-site. Therefore, no ICs were required.

RMI Metals Property (OU10) – RMI was issued a UAO in 1997 to address source control contamination. Excavation and disposal of PCB-contaminated soils to meet industrial use standards was completed in the summer of 2001. No ICs were required because material left on-site does not exceed residential Fields Brook cleanup levels.

Completion of remedial actions for each OU (based on the approval date for the report summarizing the completion of the remedial action) were achieved as follows:

Operable Unit		**Completion of Remedial Action Date (based upon approval date of final report)**
Operable Unit 1 -	Sediment	9/30/2003
Operable Unit 2 -	Historically known as the Source Control Operable Unit, OU2 was further broken down into OUs 5 - 10 to allow for facility-specific design and enforcement activities. No construction completion date or status is therefore noted for this OU.	
Operable Unit 3 -	OU3 was historically the northern portion of the Ashtabula River, south of the confluence of Fields Brook and Harbor, which is currently being addressed outside of the EPA Superfund program by the GLNPO. No ROD was signed, and no construction completion date or status is therefore noted for this OU.	
Operable Unit 4 -	Floodplain/Wetlands	9/30/2003
Operable Unit 5 -	Detrex Corporation – The passive DNAPL collection system is in on-going operation and functional. System is being optimized to increase removal of DNAPL. ESD signed by EPA January 2014 and EPA approved the remedial action construction completion on June 14, 2017.	
Operable Unit 6 -	Millennium $TiCl_4$ Plant	6/28/2000
Operable Unit 7 -	North Sewers	5/14/2001
Operable Unit 8 -	Acme Scrap Iron and Metal / South Sewers	3/17/2003
Operable Unit 9 -	Conrail Bridge Yard	4/17/2000

This FYR focuses on the data collected, decisions made, and work completed since June 2014, although the full history of the Site is also summarized. The review addresses OUs 1, 4, 5, 6, 7, and 8.

No review is required for the Ashtabula River (OU3) because it is being addressed outside of the Superfund Program. No reviews are required for the Conrail Bridge Yard (OU9) and RMI Metals Property (OU10). EPA determined the remedial actions conducted at these OUs were sufficient in protecting Fields Brook from recontamination and meeting unlimited use/ unrestricted exposure (UU/UE) standards. Specifically, the Conrail (OU9) cleanup met the residential CUG and did not leave soils on Site above health-based levels. The RMI (OU10) cleanup also met a health-based level for unrestricted land use (pursuant to TSCA voluntary cleanup standards). ICs are not required as these two OUs meet the standard for UU/UE. The last FYR for these two OUs was conducted in 2004 after which further FYRs were discontinued.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Fields Brook		
EPA ID: OHD980614572		
Region: 5	**State:** OH	**City/County:** Ashtabula/Ashtabula

SITE STATUS	
NPL Status: Final	
Multiple OUs? Yes	**Has the site achieved construction completion?** No

REVIEW STATUS
Lead agency: EPA
Author name (Federal or State Project Manager): Jenny Davison
Author affiliation: EPA Region 5
Review period: 8/15/2018 - 4/5/2019
Date of site inspection: 8/20-22/2018
Type of review: Statutory
Review number: 4
Triggering action date: 5/23/2014
Due date *(five years after triggering action date)*: 5/23/2019

I. INTRODUCTION TO FIELDS BROOK SITE

The purpose of a 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.

EPA is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP)(40 CFR Section 300.430(f)(4)(ii)) and considering EPA policy.

This is the fourth FYR for the Fields Brook Superfund Site. The triggering action for this statutory review is the completion date of the previous FYR. The FYR has been prepared due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for UU/UE.

The Site consists of 10 OUs, some of which are addressed in this FYR. The review addresses the following OUs: sediment and FWA operable units (OU1 and OU4), and the source control actions at Detrex (OU5), Millennium (OU6), North Sewer (OU7), and Acme Scrap Iron (OU8). This FYR does not address the Ashtabula River (OU3) because it was addressed outside of the Superfund Program, nor the Conrail and RMI Metals source control OUs 9 and 10 respectively because EPA had determined that they meet the standard for UU/UE. The last FYR for these two OUs was conducted in 2004 after which further FYRs were discontinued.

The Fields Brook Superfund Site FYR was led by Jenny Davison, EPA, Remedial Project Manager (RPM) for the Site. Regan S. Williams of the Ohio Environmental Protection Agency (Ohio EPA) assisted in the review as the representative for the support agency.

Ohio EPA and the responsible party groups for FBAG (OU1 and OU4), Detrex (OU5), Millennium (OU6), and Acme Scrap Iron (OU8) were formally notified of the initiation of the FYR on August 15, 2018; however, informal discussions happened in the months prior to the review.

This section of the FYR documents information that is applicable sitewide. To improve continuity of discussions, the information for the FYRs for OU1 & 4 and for four of the six-source control OUs that have contamination in place are presented in separate sections of this document. Sitewide information will not be repeated in those sections.

As was stated above, four of the six source control OUs are included in this FYR. The source area remedies discussed in the OU5, OU6, OU7, and OU8 sections of this report were included because they leave waste in place above levels that allow for UU/UE and rely on common long-term elements to maintain their protectiveness. To varying degrees, each source area remedy has a component of O&M, monitoring, ICs and access control. No reviews of OU9 and OU10 source areas are necessary because both were remediated for UU/UE.

Please see the Table of Contents for the location of the Sediment OU1 & Floodplains/Wetlands Area O4 and each of the source control (OU5, OU6, OU7, and OU8) reviews. Sections VI through X below provide details on the backgrounds, response action summaries, and summaries of the progress since the last FYR, for each OU. A description of the FYR process, including the data reviews and Site

inspections are also encompassed for each OU Section. The Site Inspection checklists and photos are provided in appendices B and C, respectively. Any issues impacting current and/or future protectiveness are highlighted for each OU.

Site Background

The Fields Brook Site was placed on the National Priorities List (NPL) for hazardous waste sites on September 8, 1983. The Site consists of Fields Brook, its tributaries, and any surrounding areas that contribute, potentially may contribute, or have contributed to the contamination of the Brook and its tributaries. The Site is a multi-source Site and involves multiple media, including soil, sediment, groundwater and surface water, although CUGs were ultimately required only for soil and sediment.

Early in the remedial investigation process, the EPA divided the Fields Brook Site into four areas of concern, three of which have been designated as OUs associated with the Fields Brook Superfund site. The Sediment OU (OU1) involves the cleanup of contaminated sediment in Fields Brook and its tributaries. The Source Control OU (OU2) involves the location and cleanup of sources of contamination to Fields Brook to prevent recontamination of the Brook and adjacent floodplains and wetlands area. These OU2 areas ultimately became OUs 5 through 10. The Ashtabula River Area of Concern (OU3) includes contaminated areas of the Ashtabula River and Harbor. The cleanup of the Ashtabula River and Harbor has been addressed outside of the Superfund process using funding through the Great Lakes Legacy Act. The FWA OU4 encompasses contaminated floodplain and wetlands soils and sediments located within the 100-year floodplain area surrounding Fields Brook and outside of the channel and side-slope areas of Fields Brook.

II. SITEWIDE FYR PROCESS FOR FIELDS BROOK SITE

Community Notification, Involvement & Site Interviews

Activities to involve the community in the FYR process were initiated with a meeting in May 2018 between the RPM and Community Involvement Coordinator for the Site. Although the FYR is divided by OU, community involvement activities were conducted concurrently for all parts of the site. A notice was published in the local newspaper, the "Ashtabula Star-Beacon," on 8/30/2018, stating that there was a FYR and inviting the public to submit any comments to EPA (Figure E-5). The results of the review and the report will be made available at the Site information repository located at the Ashtabula County District Library, at 4335 Park Avenue, Ashtabula, Ohio and at www.epa.gov/superfund/fields-brook. On August 21, 2018 the RPM visited the library and spoke with the Reference Coordinator, Douglas Anderson. Mr. Anderson had the Fields Brook Administrative Site files located on CD-ROMs readily available and indicated that there is minimal interest in the Site files. EPA also engaged with Ohio EPA regarding 2018 and 2019 Fish Consumption advisories and how they are communicated to the public.

III. ISSUES/RECOMMENDATIONS FOR FIELDS BROOK SITE

Issues/Recommendations Summary Tables				
OU(s) without Issues/Recommendations Identified in the FYR:				
None				
Issues and Recommendations Identified in the FYR:				
OU(s): 1, 4	**Issue Category: Operations and Maintenance**			
	Issue: Reassessment of Operation, Maintenance and Monitoring (OM&M) requirements.			
	Recommendation: Update OM&M Plan after additional field work is completed.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	5/23/2022
Issues and Recommendations Identified in the FYR:				
OU(s): 1, 4	**Issue Category: Institutional Controls**			
	Issue: An Institutional Control Implementation and Assurance Plan (ICIAP) is needed to ensure that effective ICs are implemented, monitored and maintained.			
	Recommendation: Develop and submit an ICIAP which describes the plan for ensuring that all remaining required ICs at the Site are implemented, and for ensuring that all ICs, once implemented, are monitored and maintained.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	5/23/2022
Issues and Recommendations Identified in the FYR:				
OU(s): 1, 4, 5, 6, 7, 8	**Issue Category: Institutional Controls**			
	Issue: Procedures are not in place to ensure long-term stewardship (LTS) of ICs at the Site.			
	Recommendation: Develop and implement a LTS Plan for monitoring and tracking compliance with existing ICs, communicating with EPA, and providing an annual certification to EPA that the ICs remain in place and are effective.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	5/23/2022

Issues and Recommendations Identified in the FYR:				
OU(s): 1, 4	**Issue Category: Site Access/Security**			
	Issue: Warning signs are missing from fence surrounding the landfill.			
	Recommendation: Install warning signs on fence surrounding landfill.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	6/1/2020

Issues and Recommendations Identified in the FYR:				
OU(s): 5	**Issue Category: Operations and Maintenance**.			
	Issue: The OM&M Plan and Quality Assurance Project Plan (QAPP) for the chlorinated DNAPL passive collection system in the DNAPL source area have not been finalized.			
	Recommendation: Finalize the OM&M Plan and QAPP for the chlorinated DNAPL passive collection system in the DNAPL source area.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	6/1/2022

Issues and Recommendations Identified in the FYR:				
OU(s): 6	**Issue Category: Operations and Maintenance**			
	Issue: There is inadequate monitoring of the interceptor trenches for potential recontamination of Fields Brook.			
	Recommendation: Develop and implement an OM&M Plan to monitor and respond to any collected material in the interceptor trenches so that is appropriately removed for treatment and disposal, and to prevent recontamination of the Brook.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	5/22/2022

Issues and Recommendations Identified in the FYR:				
OU(s): 7	**Issue Category: Institutional Controls**			
	Issue: The deed notice was recorded in 2004, prior to Ohio promulgating the Uniform Environmental Covenant Act (UECA) and may not be effective.			
	Recommendation: Evaluate the effectiveness of the current ICs.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	5/23/2022

Issues and Recommendations Identified in the FYR:				
OU(s): 8	**Issue Category: Institutional Controls**			
	Issue: A recent review of the parcel information shows that the Lakeside Industrial Park & Rail Yard, Inc. property (the property with the recorded Environmental Covenant (EC)) has been split into two parcels. EPA was not notified in accordance with the EC's Paragraph 11, "Notice of Conveyance" when these properties were transferred.			
	Recommendation: Conduct a title search to identify parcel owners and ensure the owners are aware of the EC requirements.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	5/23/2022

IV. PROTECTIVENESS STATEMENT FOR FIELDS BROOK SITE

Protectiveness Statements Summary Table (s)	
Operable Unit:	*Protectiveness Determination:*
OU1 and OU4	Short-term Protective

Protectiveness Statement:

The remedy for the Fields Brook Sediment and FWA OUs (OU1 and OU4) currently protects human health and the environment. The response actions selected in the 1986 and 1997 RODs and subsequent ESDs to remove and contain contaminated sediments and floodplain soils within an on-Site landfill, and on-Site thermal treatment of the significantly contaminated or mobile sediments, have proven to be effective in addressing the risks associated with the site. Effective ICs in the form of ECs have been recorded. However, in order for the remedy to remain protective in the long term, the following actions need to be taken to ensure protectiveness: update the OM&M Plan after additional field work is completed; install warning signs on the fence surrounding landfill; develop and submit an ICIAP which describes the plan for ensuring that all remaining required ICs at the Site are implemented, and for ensuring that all ICs, once implemented, are monitored and maintained; and develop and implement a LTS Plan for monitoring and tracking compliance with existing ICs, communicating with EPA, and providing an annual certification to EPA that the ICs remain in place and are effective.

Protectiveness Statement(s)	
Operable Unit:	*Protectiveness Determination:*
OU5	Short-term Protective

Protectiveness Statement:

The remedy at OU5 currently protects human health and the environment by preventing recontamination of Fields Brook from organic chemical contamination in Site soils, groundwater, and DNAPL. The remedial actions outlined in the January 15, 2014 ESD modifying the DNAPL recovery system in the Detrex source area to reduce releases to the Brook were implemented in 2016 and are proving to be effective. An effective IC in the form of an EC was recorded in 2009. However, in order for the remedy to be protective in the long-term, the following actions need to be taken to ensure protectiveness: finalize the OM&M Plan and QAPP for the chlorinated DNAPL passive collection system in the DNAPL source area; and develop and implement a LTS Plan for monitoring and tracking compliance with existing ICs, communicating with EPA, and providing an annual certification to EPA that the ICs remain in place and are effective.

Protectiveness Statement(s)	
Operable Unit:	*Protectiveness Determination:*
OU6	Short-term Protective

Protectiveness Statement:

The remedy at the Millennium TiCl4 Plant Source Area (OU6) currently protects human health and the environment. The cleanup in non-plant areas exceeded ROD requirements by excavating to a stricter cleanup level and meets the remedial action objective of preventing recontamination of Fields Brook in excess of PCB and radium CUGs. An effective IC is in-place in the plant area and on EU8 where excavation of PCB and DNAPL contaminated soils occurred to prevent recontamination of the Brook. However, in order for the remedy to be protective in the long-term, the following actions need to be taken to ensure protectiveness: develop and implement an OM&M Plan to monitor and respond to any collected material in the interceptor trenches so that is appropriately removed for treatment and disposal, and to prevent recontamination of the Brook; and develop and implement a LTS Plan for monitoring and tracking compliance with existing ICs, communicating with EPA, and providing an annual certification to EPA that the ICs remain in place and are effective.

Protectiveness Statement(s)	
Operable Unit:	*Protectiveness Determination:*
OU7	Short-term Protective

Protectiveness Statement:

The remedy for the North Sewers Source Area (OU7) currently protects human health and the environment. The sewers have been closed and grouted and are no longer in use, and there is no mechanism for any sediment within the sewers to move to the Fields Brook since it has been rendered immobile. ICs are in place to prevent activities that would disrupt or disturb the grouted and sealed sewers. However, in order for the remedy to be protective in the long-term, the following actions need to be taken to ensure protectiveness: evaluate the effectiveness of the current ICs; and develop and implement a LTS Plan for monitoring and tracking compliance with existing ICs, communicating with EPA, and providing an annual certification to EPA that the ICs remain in place and are effective.

Protectiveness Statement(s)	
Operable Unit:	*Protectiveness Determination:*
OU8	Short-term Protective

Protectiveness Statement:

The remedy for the Acme Scrap Iron and Metals and South Sewers Source Area (OU8) currently protects human health and the environment because it is functioning as designed. Monitoring demonstrates that the risk of recontamination of the Fields Brook has been abated. An EC was recorded with Ashtabula County on March 9, 2010 and will be regularly evaluated for protectiveness in future FYRs. However, in order for the remedy to be protective in the long-term, the following actions need to be taken to ensure protectiveness: conduct a title search to identify parcel owners and ensure the owners are aware of the EC requirements; and develop and implement a LTS Plan for monitoring and tracking compliance with existing ICs, communicating with EPA, and providing an annual certification to EPA that the ICs remain in place and are effective.

V. NEXT REVIEW

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

VI. OPERABLE UNITS 1 & 4: SEDIMENT AND FLOODPLAIN/WETLANDS

VI.1 OPERABLE UNITS 1 & 4: INTRODUCTION

OU Summary

The purpose of this FYR is to determine if the remedy selected to address the contamination at the Sediment and Floodplain/Wetlands (OU1, OU4) of the Fields Brook Superfund Site is protective of human health and the environment (See Figs. E-1 and E-3). The remedy included excavation of contaminated sediment and soil, and placement into a landfill constructed on-site; thermal treatment of soils and sediment impacted by DNAPL; long-term OM&M; and ICs.

During the most recent FYR period, routine monitoring of the Brook's sediment and the floodplain soil identified additional contamination in sediment and floodplain soils that posed a threat to human health and the environment. Follow-up investigations found that the contamination was related to PCBs in the Brook. The potentially responsible parties (PRPs) mobilized and completed excavation of the sediment and floodplain soil area in June of 2014 and October through November 2016 and are described further below.

Background, Land and Resource Use

The Site is located in northeast Ohio, in Ashtabula County, approximately 55 miles east of Cleveland, Ohio (Fig. E-1). Fields Brook drains a six square-mile watershed.

The eastern portion of the watershed drains Ashtabula Township and the western portion drains the eastern portion of the city of Ashtabula. The main channel is 3.9 miles long and begins at Cook Road, just south of the Penn Central Railroad tracks. From this point, Fields Brook flows northwest to Middle Road, then west to its confluence with the Ashtabula River. From Cook Road downstream to State Route 11, Fields Brook flows through an industrialized area. Downstream of State Route 11 to near its confluence with the Ashtabula River, Fields Brook flows through undeveloped and residential areas in the City of Ashtabula. Fields Brook discharges to the Ashtabula River approximately 8,000 feet upstream from Lake Erie.

The industrial zone of Ashtabula is concentrated around Fields Brook and is comprised of several chemical industries and waste disposal sites. Manufacturing has occurred since the early 1940s in this area. Activities ranging from metal-fabrication to production of complex chemical products occurred on approximately 18 separate industrial properties, and the decades of industrial activity along Fields Brook and its tributaries resulted in the release of chemical contamination to the Fields Brook watershed, particularly the sediments of Fields Brook, the floodplain soils and sediments, and the soils surrounding the industries.

History of Contamination

In the last 60 years, the industrial area of Fields Brook has been the location of manufacturing activities ranging from metal-fabrication to chemical production. Brook sediments and floodplain soils were contaminated with PCBs, radionuclides, chlorinated benzene compounds, chlorinated solvents, hexachlorobutadiene, PAHs, arsenic, and other hazardous substances.

VI.2 OPERABLE UNITS 1 & 4: RESPONSE ACTION SUMMARY

Basis for Taking Action

The 3.5-mile main channel of Fields Brook flows through an industrial area that is one of the largest and most diversified concentrations of chemical plants in Ohio. Industrial sources contaminated Fields Brook sediments and soils with a variety of organic and heavy metal contaminants including PCBs.

Between April 1983 and July 1986, the EPA performed a Remedial Investigation/Feasibility Study (RI/FS) for the Sediment OU (OU1). EPA completed the RI Report in March 1985 and the FS report in July 1986. The RI included a baseline human health risk assessment that demonstrated human health risks from the brook sediment. The FS Report described several alternatives for remedial action of the Sediment OU. In 1986, EPA issued a ROD for the Sediment OU1.

Ecological risks were also addressed. EPA prepared a "Focused Ecological Risk Assessment" in 1997 to estimate post-remediation risk levels to ecological receptors such as mink which are or may be exposed to the Brook. This focused assessment indicated the potential for significant risks to ecological populations associated with exposure to PCBs and HCB. The assessment concluded that hazard quotient (HQ) calculations for post-remediation average concentrations may exceed 1.0 for several species involved. However, EPA believes that the Sediment OU1 remedy is protective of the various populations of ecological receptors which exist within the Brook or rely upon food sources associated with the Brook.

The 1985 RI also addressed health risks from exposure to soils in the floodplain area adjacent to Fields Brook. In 1993, the PRPs initiated a voluntary assessment of the nature and extent of contamination in the FWA OU4 of Fields Brook. The PRPs' investigation of the FWA OU4 was conducted under the oversight of EPA, Ohio EPA and the U.S. Army Corps of Engineers (USACE) and was completed by the spring of 1995. After completion of the Site investigation, the PRPs prepared a FS to evaluate cleanup alternatives. The FS report was finalized in October 1996. In July 1997, EPA issued the ROD for the FWA OU4.

Because it was recognized that the cleanup of the Fields Brook sediment should not be performed unless the source(s) of contamination are addressed prior to the cleanup, the EPA required the PRPs to investigate the industrial area of the Fields Brook watershed. From 1992 to 1995, the PRPs evaluated 94 properties in the Fields Brook watershed to determine whether the properties could cause future recontamination once the Brook cleanup is underway. Contamination could be caused by discharges from pipes, the movement of contaminated soil or sediment during rainstorms, and subsurface releases to the Brook from flowing groundwater. As a result of the Source Control evaluation, the EPA identified six industrial areas as possible sources of recontamination to Fields Brook. Detailed information about the types and extent of contamination at the source areas can be found in the Source Control RI Report, which was approved by EPA in May of 1997. In conjunction with the preparation of the Source Control RI report, the PRPs prepared a Source Control FS to identify and evaluate cleanup alternatives. The Source Control FS was finalized in June 1997, with the Source Control ROD issued on September 29, 1997.

As documented in the ROD, the goal of the source area remedial actions at the Fields Brook Site was to prevent recontamination of Fields Brook sediment above CUGs. Where ICs were required, those

controls were intended to limit the future use of areas to ensure that contamination does not migrate to the Brook.

Response Actions

Remedial actions for OU1 were selected in the September 30, 1986 Fields Brook Sediment ROD. Remedial actions for OU4 were selected in the June 30, 1997 Floodplains/Wetlands Area ROD. The Sediment ROD was subsequently clarified by an ESD issued in 1997, and both RODs were clarified by ESDs issued in 1999 and 2001. Although a Remedial Action Objective (RAO) was not specifically called out in the 1986 Sediment ROD, the goal for the Sediment OU was to manage, prevent or minimize the release of contaminants from the sediment of Fields Brook and its tributaries, and therefore eliminate or reduce the risks to public health and the environment. Specifically, the risk associated with exposure to or ingestion of contaminated sediment would be reduced by sediment removal to levels that are protective of public health and welfare and the environment. The RAOs for the 1997 FWA ROD included reducing: the potential for human health cancer and non-cancer risks; and ecological risks to levels that would protect populations for animals which exist in the FWA. The FWA OU4 RAOs also included an objective to avoid or minimize destructive impacts to the FWA from construction activities and the final remedy to the extent practicable to protect the ecological value and existing habitats of the FWA. A chronology of significant response events is included in Appendix D.

A. Sediment Operable Unit (OU1)

The response action selected in the 1986 Sediment ROD involved excavation and containment of contaminated sediments within an on-Site landfill, and on-Site thermal treatment of the significantly contaminated or mobile sediments. Specifically, the 1986 ROD included the following components:

1. Excavation of organically contaminated sediment with a greater than $1x10^{-6}$ excess lifetime cancer risk level, and inorganically contaminated sediment to health-based levels or background levels, whichever was higher (based on residential use scenarios) in Fields Brook. The ROD estimated that approximately 52,000 cubic yards would be excavated;
2. Construction of an on-Site RCRA/TSCA landfill with separate cells for solidified sediments, solidified sediments containing arsenic, and a temporary storage cell for sediment to be thermally treated;
3. On-Site thermal treatment of both excavated sediments which are above 50 ppm PCBs, and sediments with high potential for mobility which have a soil/water partition coefficient of below 2400. Treated material would be disposed via landfilling in either: a) the on-Site landfill if analysis of the ash from thermal treatment indicates it requires management as a hazardous waste; or b) in the on-Site landfill or in an off-Site solid waste landfill if analysis of the ash from thermal treatment indicates it does not require management as a hazardous waste. The ROD estimated 16,000 cubic yards of sediment would be thermally treated;
4. Solidification of the remaining quantity of excavated sediment, and disposal via landfilling in the on-Site landfill. The ROD estimated sediment volume before solidification was 24,000 cubic yards;
5. Treatment of wastewaters generated during construction activities in an on-Site treatment system, with discharge to the Ashtabula Publicly Owned Treatment Works or directly to Fields Brook;
6. Completion of various pre-design studies;
7. Operation and maintenance of the remedy;
8. Completion of a RI/FS to address any ongoing sources of contamination to Fields Brook; and

9. Completion of an investigation to address the nature and extent of contamination in the Ashtabula River.

As a result of discussions with and information provided by the PRPs and information from pre-design studies, an ESD was issued in August of 1997 to refine the work to be performed as part of the Fields Brook sediment cleanup. The following significant changes were made to the remedial action:

1. Elimination of solidification requirements for excavated sediments landfilled on-Site;
2. Thermal treatment of the excavated sediments would be conducted at an off-Site facility instead of at an on-Site facility;
3. Refinement of the CUGs/standards for the sediment to be excavated (identification of specific CUGs, based on the desired risk endpoints established in the 1986 OU1 ROD);
4. Reduction of the excavated sediment estimated total volume from 52,000 cubic yards to 14,000 cubic yards, including a reduction of the estimated thermal treatment sediment volume from 16,000 cubic yards to 3,000 cubic yards; and
5. Elimination of the chemical waste landfill requirement of Section 761.75(b)(3) which specifies a fifty-foot distance between the bottom liner and the historical high-water table.

When the RD for the cleanup of the Fields Brook sediment and the FWA soils was at an approximately 90% complete stage, the EPA received information regarding possible radionuclide contamination in the Ashtabula River and the Fields Brook watershed. EPA evaluated the available data and the PRPs, under EPA and Ohio Department of Health Bureau of Radiation Protection oversight, conducted follow-up sampling and determined that radium should be added as a contaminant of concern for the cleanup of the Millennium facility and for the Fields Brook sediments and the FWA soils. In addition, because of the presence of radium, specific components of the remedial action were modified to address soils and sediment that contain radium. The 1999 Site-Wide ESD made the following modifications in the cleanup requirements for the Brook's sediment and floodplain soils:

1. Thermal treatment (incineration and/or low-temperature thermal desorption) was not appropriate for sediment that contains levels of radium (and other radionuclides) above background. For sediment with background levels of radionuclides, off-site thermal treatment would proceed as planned. For sediment with levels of radionuclides above background, the sediment would be chemically stabilized prior to disposal in the on-site landfill.
2. The design of the on-site landfill built to contain Site soils and sediment from Sediment OU1 and FWA OU4 would be upgraded. OU4 is discussed further below.
3. Monitoring wells around the landfill would be routinely sampled, and the samples would be analyzed for radionuclides. Air monitoring would be performed at the landfill to ensure that levels of radon gas emanating from the landfill do not present any risk to human health.
4. Additional soil and sediment would be excavated from the Site to meet the radium cleanup level of 5 pCi/g above background, for combined levels of radium-226 and radium-228 for residential areas and 10 pCi/g above background for combined levels of radium-226 and radium-228 in industrial areas of the Site.
5. Consistent with the decommissioning project at the RMI Extrusion property (adjacent to Fields Brook), EPA utilized a 30 pCi/g cleanup level for uranium (U-238) in floodplain soils and brook sediment.

In the summer of 2000, the Fields Brook landfill was constructed (See Fig. 1-1 for Drawing of Landfill and Monitoring Well Locations) and cleanup of the Sediment and FWA OUs 1 & 4 began. In the fall of

2000, during excavation of brook sediments, pockets of chlorinated DNAPL were found below brook sediments and floodplain soils. An ESD was issued in August of 2001 to address the newly-identified volume of material. Because the volume of highly-contaminated material at the Site had significantly increased with the DNAPL discovery, it now made financial sense to reverse the earlier ESD that had moved the thermal treatment off-site. Therefore, the 2001 ESD made the following modification to the Sediment OU1 cleanup requirements:

1. On-site thermal treatment of DNAPL-impacted soils;
2. Supplemental field sampling and pre-treatment monitoring to ensure that sediment and soils to be thermally treated do not contain elevated levels of radionuclides; and
3. Off-site thermal treatment of liquid DNAPL.

B. FWA Operable Unit (OU4)

The major components of the June 30, 1997 selected remedy for the FWA OU4 included:

1. Excavation or cover of contaminated soils and sediments in the FWA OU4 that exceed cleanup action levels; backfill of all excavation and cover areas with hydric-compatible soil;
2. Removal of all trees in excavation areas, and removal of all trees below 12" diameter at basal height in cover areas, with vegetation in response areas considered contaminated, and with live vegetation above ground surface considered clean if it can be decontaminated;
3. Revegetation of all backfill and cover areas, and revegetation of all areas disturbed during construction, using erosion mats and native vegetation;
4. Construction of a temporary access road to allow access to and along the floodplain from the roadways during construction, made of crushed stone and 1/4-inch thick geonet liner, and to be removed after construction and disposed of either in the on-site landfill or if clean in other on-site or off-site areas;
5. Consolidation of excavated soils and sediments, construction debris, and roadways constructed to implement the remedy if determined to be contaminated, within an on-site fenced-in containment cell (landfill) to be built on one of the industrial properties located within the Fields Brook watershed;
6. Construction of a minimum of three down-gradient and one up-gradient monitoring wells to evaluate the long-term effectiveness of the landfill;
7. Long-term operation and maintenance and post closure care of the remedial action to help ensure its effectiveness;
8. Long-term monitoring including sampling of FWA surface soils and sediments, and backfill and cover areas, and monitoring of wetland conditions at specific locations and for parameters defined in the ROD summary, to verify the effectiveness of the remedial action;
9. Placement of ICs on deeds and title for properties where: contamination will remain in the FWA; the landfill will be constructed; or hazardous substances, pollutants or contaminants will remain above levels that allow for UU/UE. For the landfill, the deed restrictions must prevent residential, industrial or other development on the landfill. For all other properties, the deed restrictions must provide notice to any subsequent purchaser or prospective developer of the presence of hazardous substances and of the requirement to conduct all development activities in such a manner as to not release contamination towards Fields Brook; and
10. Implementation of access restrictions, including enclosing the entire landfill area with a fence and posted warning signs.

During the remedial design (RD) process, it was determined by all parties that the 6" soil cover was impractical since inspection and long-term maintenance would be difficult. Therefore, the PRPs voluntarily agreed to excavate all soils in the residential area of the FWA OU4 that contained 6 ppm or greater total PCBs thereby eliminating the need for ICs in these areas.

During the preparation of the RD for the FWA OU4, the issue of radionuclides arose. The FWA OU4 RD required modifications due to the discovery of radionuclides. As discussed in Section VI.2.A above, the 1999 Site-Wide ESD added cleanup criteria for radionuclides (specifically, radium and uranium). In addition, the discovery of DNAPL below the Brook and floodplain in the fall of 2000 impacted remedial work on the FWA OU4. The August 2001 ESD allowed the on-site thermal treatment of DNAPL-impacted soil and sediment.

Since the issuance of the UAO for remedial design/remedial action (RD/RA) for OU1 and OU4 (and the subsequent negotiation of a Consent Decree (CD) between EPA and the PRPs), the sediment and FWA OUs 1 & 4 have been addressed together for design and construction. This made sense because the cleanup of the streambed and adjacent floodplain would be performed as a single project. The CD was lodged on May 14, 1999 and entered on July 7, 1999. Upon entry of the CD, the UAO for OUs 1 and 4 was vacated.

The design work that began in 1998 built on earlier conceptual design work for the brook sediment. Design reviews were conducted by EPA and USACE. The 100% RD for OU1 and OU4 was approved on August 9, 2000.

Cleanup Standards

The RDs for the Sediment and FWA OUs 1 & 4 were based on an area-wide averaging approach by dividing Fields Brook into sections that were termed “Exposure Units (EUs)” (See Fig. E-3). EUs are bounded by geographical features such as roads and bridges and were used to quantitatively assess risk in each area. For the Sediment OU1, the 1986 ROD and 1997 ESD together served as the basis for the selection of CUGs for contaminants of concern. Each numerical CUG is established at a concentration which is protective of human health under the exposure and risk assumptions used. CUGs for sediment in EUs 1 through 6 are based on residential use; the CUGS for EU7 and EU 8 are based on occupational (industrial use). CUGs for soil in EUs 1-3 are based on residential use; the CUGS for EU4 through are based on occupational (industrial use). CUGs for soil were only required for EU2 and EU3 and EU 4, 6, and 8. Land use is residential adjacent to EUs 1 through 3; and industrial/vacant industrial for EUs 4 through 8.

Using the assumption that no person would be repeatedly exposed to the exact same area for a long period of time, the RD allowed an averaging approach over areas. The “Confidence Removal Goal” (CRG) is a statistical approach to meet CUGs based on the arithmetic mean (average) of the contaminant concentrations within an EU. It is a value above which remediation is required so that the overall average concentration in each EU meets the CUGs. Because there are some areas with very low to no concentrations of contaminants, the CRG can be significantly higher than the CUG, while achieving the CUG for the EU.

Ohio EPA did not agree with the CRG approach and did not concur with either the OU1 or OU4 RODs.

The Fields Brook CUGs and CRGs were either issued by EPA in decision documents or developed by the PRPs and approved by EPA in several Site documents. The current values have been summarized by EPA in this FYR Report. Sediment Cleanup Standards are presented in Table 1-1, and Soil Cleanup Standards are presented in Table 1-2. The CUGs and CRGs for hexachlorobenzene and associated chlorinated organics, and PCBs, which have been the contaminants "driving" the risk for the Fields Brook cleanup, are shown on Figure 1-2.

The CUG for PCBs in sediment was set at 1.3 ppm for residential areas of the Brook and 3.1 ppm for industrial areas of the Brook. For hexachlorobenzene, the sediment CUG was set at 6.38 ppm for residential areas of the Brook and 15 ppm for industrial areas. Sediment CRGs varied within the Brook, depending on contaminant distributions. Upon issuance of the 1999 site-wide ESD that addressed radionuclide contamination, a sediment cleanup standard of 10 pCi/g total radium (ra-226 + ra-228) above background was established for industrial areas of the Brook. For residential areas, sediment would need to meet a standard of 5 pCi/g of total radium above background. A uranium standard of 30 pCi/g was established for sediment within the Brook (both residential and industrial areas) to be consistent with the U.S. Department of Energy cleanup of the RMI Extrusion facility.

For the FWA OU4, two indicator parameters were initially established to guide the cleanup, PCBs and hexachlorobenzene. Like the Sediment OU1, the remedy for the FWA OU4 was an area-wide averaging approach and was designed to result in a protective cleanup. The CUG for PCBs was set at 1 ppm, on average, for residential areas of the Fields Brook floodplain and 6 to 8 ppm, on average, in industrial areas of the floodplain. As part of the RD, supplemental chemical sampling was performed in the floodplain. The RD then developed grid-based excavation cut lines based on PCB and hexachlorobenzene contamination. In industrial areas of the Brook, areas with total PCB concentrations at or above 50 ppm and/or a hexachlorobenzene concentration of 200 ppm were to be excavated. In residential areas, grids with 6 ppm total PCBs and/or 80 ppm hexachlorobenzene were to be excavated. As with the Sediment OU1, the identification and ultimate excavation of additional soils due to radionuclide contamination is thought to have further reduced residual chemical contamination to even lower levels. For industrial areas of the floodplain, a cleanup standard of 10 pCi/g total radium (ra-226 + ra-228) above background was established. For residential areas, soils were required to meet a standard of 5 pCi/g of total radium above background.

Status of Implementation

Remedial action fieldwork began on May 25, 2000 with the construction of the on-site "TSCA-equivalent" landfill (Fig. 1-1). This "Fields Brook Landfill" was built for the disposal of all excavated Fields Brook sediment and floodplain soils that did not require thermal treatment. In addition, the on-site landfill was to be made available to the PRPs for disposal associated with the remediation of the Source Control OUs. Landfill construction was completed on September 6, 2000.

Excavation began in the Brook on September 22, 2000. Excavation of contaminated soil and sediment continued until October 16, 2000 when chlorinated solvent DNAPL was discovered under sediment and floodplain soils in the upper industrial reaches of the Brook. Additional field investigations were performed to determine the extent of the problem and estimate the volume of additional material that would require thermal treatment. On May 7, 2001, excavation work recommenced in other areas of the Brook while work within the DNAPL-impacted areas remained on hold. EPA ultimately issued the August 17, 2001 ESD to address the volume of DNAPL-impacted material and allow on-site thermal treatment of the material.

The FBAG proposed an on-site thermal treatment system that utilized low temperature thermal desorption for contaminant destruction. A trial burn was conducted at the Site in October 2002. By the time the results of the trial burn were available, all the contaminated material had been treated at the Site. The results of the trial burn found that the unit had met all emissions requirements but failed to obtain the "four nines" (99.99%) Destruction Removal Efficiency (DRE) for hexachloroethane required under Subpart O standards for hazardous waste incinerators. The trial burn recorded a DRE of 99.67% for hexachloroethane. The system completed the small amount of remaining material at a reduced feed rate, which increased treatment time and maximized the DRE. The operation of the EMSI thermal desorption unit ceased on December 20, 2002.

The excavation of Fields Brook sediments and floodplain soils continued until December 16, 2002. Upon placement of the final materials in the landfill, the landfill was closed. The contractors demobilized in February 2003.

At completion, 53,094 cubic yards of contaminated sediment and floodplain soil were excavated from Fields Brook. Of this, 1,435 cubic yards of contaminated sediment and floodplain soil were sent off-site for thermal treatment (before the discovery of the DNAPL-impacted area and the issuance of the ESD allowing on-site treatment). Approximately 20,420 cubic yards of contaminated soil and sediment were thermally treated on-site. Treated soils were utilized for backfill on-site. Approximately 30,514 cubic yards of excavated sediment and floodplain soil were sent to the on-site landfill, which ultimately housed not only material from the Brook, but from source control cleanups as well.

Site restoration in the Brook and floodplain was performed in late 2002 and completed in March 2003. In addition to the normal seeding and planting of impacted areas, the PRPs worked with EPA and Ohio EPA to determine what additional activities would be necessary to allow the stream and floodplain system to return to a natural state. Restoration activities included the addition of willow snags in the Brook, the placement of logs horizontally on the ground to provide habitat, and the vertical placement of logs to provide perches for raptors. Vegetation and wildlife have begun to return to the area. Unfortunately, some of the logs that were placed at the Site ended up being utilized by residents as firewood.

In 2009, EPA modified the Statement of Work for the 1999 CD necessary to achieve and maintain the Performance Standards or to carry out and maintain the effectiveness of the remedy set forth in the RODs to address contamination in EU8 of the Sediment OU1 and FWA OU4 at the Site. The Fields Brook channel in EU8 was relocated to provide long-term protection of human health and the environment by eliminating exposure to contaminated sediments and preventing contaminant migration into Fields Brook and included: construction of DNAPL collection trench under the channel; construction of sedimentation basin in the Millennium excavation; construct lined connecting channels, re-route the Brook to the south; cover entire stream channel with an impermeable liner and stone riprap; hot spot removal of contaminated soils; reconstruct Detrex NPDES Outfall; fill in the old Brook channel; and restore EU8 floodplain.

The RDs for the Sediment and FWA OUs 1 & 4 were based on an area-wide averaging approach to address samples that exceeded CRGs for specific COCs.

Locations of PCBs exceeding Site CRGs were discovered in the annual soil and sediment sampling activities from 2009-2013, but EPA agreed to defer a cleanup because 1) The extent was limited and did

not represent an immediate threat to the Ashtabula River, and 2) An evaluation of the potential ongoing DNAPL releases from the Detrex source area needed to be completed. On December 5, 2013, EPA approved an excavation work plan to address the removal and disposal of remnant PCB contamination in the Fields Brook sediment and floodplain soils. The areas where the PCBs were cleaned up are presented in Figures 1-3 through 1-7.

Remedial implementation began on June 12, 2014 and was completed on June 26, 2014. A total of 15 areas (8 sediment and 7 soil areas) were identified in the excavation work plan where PCB contamination levels exceeding the established site-specific CRGs for PCBs required excavation. The excavation areas included EU1 with 1 sediment area and 1 soil area, EU2 with 4 soil areas, EU3 with 1 sediment area, EU4 with 4 sediment areas and 1 soil area, and EU6 with 2 sediment areas and 1 soil area. Excavated sediment and soils were directly loaded into a lined off-road haul truck and transported to a temporary staging pad for loading and transport to the designated disposal facility. All excavated material was transported to the Cristal (formerly Millennium) Landfill located in Ashtabula, Ohio.

The "Relocation & Floodplain Restoration Final Completion Report" summarizing the findings was submitted to EPA on September 10, 2014.

In August 2014 there was one soil CRG exceedance of the PCBs in soil in EU4 (SS13X) and sediment exceedances of the CRGs in EU3 (SD04), EU4 (SD07) and EU6 (SD08). Follow up sampling in October 2014, demonstrated that these exceedances were no longer present. The results were documented in the "Soil, Sediment, and Surface Water Sampling, Performed Aug and Oct 2014" dated November 11, 2014.

Sampling in August 2015 resulted in in two areas (1 soil (SS13X) and 1 sediment (SD05) of EU 4) where PCB levels exceeded the established site-specific CRGs for PCBs. Follow up sampling in November 2015 was completed to further delineate the areas of the observed CRG exceedances. The results were included in the "Site Monitoring Report, Soil, Sediment, and Surface Water Sampling Performed August 2015" dated November 1, 2015. Additional November 2015 sampling defined the extent of contamination in the soil at SS13X. The need for additional sampling was identified in May 1, 2016 "Site Monitoring Report Supplemental Soil and Sediment Sampling in EU4 Report" to further delineate the sediment (SD05) exceedance. On August 31, 2016 de maximus on behalf of FBAG submitted a "Workplan, Excavation of Soils and Sediments" for excavation of soils and sediments to address the remnant PCB contamination in the Fields Brook floodplain soils and sediment.

Marion Environmental, Inc. (MEI) began the remedial implementation on October 3, 2016 and completed this work on October 7, 2016. Due to rising water during and immediately following a storm event, a secondary mobilization on November 7, 2016 was necessary to remove approximately 1 yard of rip-rap from the centerline of the Brook channel. 56.76 tons of the excavated PCB impacted material were transported to an offsite landfill in Belleville, MI. The "Fields Brook Superfund Site, Excavation of Soils and Sediments Final Completion Report" was submitted on November 23, 2016 (dated November 28, 2016). Figures 1-8 through 1-10 show the excavated areas.

Institutional Controls

Table 1: Summary of Implemented ICs at OU1 & OU4

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Landfills: Soil, Groundwater	Yes	Yes	P.P.N. #03-014-00-05, Vol. 440/1373	Residential use, groundwater consumption, or any other intrusive use is restricted.	EC pursuant to Ohio UECA, plat map, recorded 9/27/10, SDMS #384258
Floodplain: Soil, Groundwater	Yes	Yes	EU8 Only Detrex Property	Restricts residential use, well installation and ground water use	EC pursuant to Ohio UECA, recorded 11/16/09, SDMS #353273
Floodplain, Soil, Groundwater	Yes	Yes	EU8 Only Millennium Property Restricted Zone Survey Drawing Exhibit C	Restricts residential use, well installation and ground water use	EC pursuant to Ohio UECA, recorded 2/10/11, SDMS #421768

Maps of the parcels with the recorded ICs are shown on Figures 1-11, 1-12 and 1-13.

Status of Access Restrictions and ICs:
ICs are required to assure the long-term protectiveness for any areas that do not allow for UU/UE, and to maintain the integrity of the remedy. ICs are required at OU1 and OU4 because the remedy has not achieved UU/UE.

The EU8 floodplain is owned by Detrex Corp. (more recently known as Detrex Div., Elco Corp.) and Millennium Inorganic Chemicals, Inc. (more recently known as Cristal USA, Inc., and real estate is held in the name of ABC Chemicals, Inc.). ECs were executed and delivered pursuant to Ohio UECA, Sections §§ 5301.80 to 5301.92 of Ohio Revised Code. These ECs were in place for each of these properties during this FYR period. See also the Detrex (OU5) and Millennium (OU6) sections of this report for details about the ICs in this area. An EC was executed and delivered pursuant to Ohio UECA for the on-Site (Fields Brook) Landfill and was in place during this FYR period.

A State of Ohio Sport Fish Consumption Advisory has been in place for the section of the Ashtabula River which includes the discharge point for Fields Brook since 1983. The Ohio Department of Health, in cooperation with Ohio EPA and the Ohio Department of Natural Resources (Ohio DNR), issues this advice under Ohio law (Ohio Revised Code Chapter 3701). The 2018 Advisory recommended limited fish consumption State-wide as well as for specific species in segments of the Ashtabula River and tributaries to Lake Erie. The state-wide advice listed in the Table 1-3 was first published in 2007; prior to this, a state-wide "1 meal/week" was applied to all fish not specified in the advisory due to mercury. The advisory addresses information, including PCBs and mercury for a variety of species. Fish move

freely between the Ashtabula River and Fields Brook when water levels in the Brook are sufficiently high. Fishing occurs both in the Ashtabula River and near the mouth of Fields Brook, where the Brook is somewhat wider and deeper than farther upstream. Although Fields Brook was a significant pathway for PCB contaminant movement to the River, fishing along upstream reaches of the Brook is not a significant risk pathway due to its small size and lack of access. The State of Ohio and EPA consider the Ashtabula River advisory and the State-wide advisory to be protective of fishing impacts from contamination in Fields Brook.

The Fish Consumption Advisory is posted on the Ohio EPA website and is available where licenses are purchased (Table 1-3). In addition, advisories and other outreach materials are sent to county Women, Infant and Children offices. In 2019, Ohio Department of Health will be publishing and distributing the advisory.

Current Compliance: Based on the FYR inspection, EPA is not aware of Site or media uses which are inconsistent with the stated objectives to be achieved by the ICs. The remedy appears to be functioning as intended.

IC Follow up Actions Needed: The 1997 FWA OU4 ROD required that the landfill "… would be surrounded by a fence with signs posted every 100 feet warning of the presence of hazardous substances and would have future monitoring and sampling to ensure it remains protective." Signs were not observed on the fence surrounding the Fields Brook landfill during the 8/21/2018 inspection. Warning signs should be placed on the fence per the 1997 ROD.

An ICIAP should be developed. The purpose of the ICIAP is to conduct additional IC evaluation activities to ensure that the implemented ICs are effective, to explore whether additional ICs are needed and ensure their implementation, and to ensure that LTS procedures are in place so that ICs are properly maintained, monitored, and enforced. IC evaluation activities will include, as needed, developing updated maps depicting current conditions in areas that do not allow for UU/UE, reviewing current zoning and city or township ordinances, and reviewing recording and title work for properties impacted by the Site.

Finally, a LTS Plan for the Source Area OUs should be developed and implemented to ensure that the ICs are maintained, monitored and enforced at Source Area properties, so that the remedy for Sediment and FWA OUs 1 & 4 continue to function as intended.

Long-Term Stewardship: Since compliance with ICs is necessary to assure the protectiveness of the remedy, planning for LTS is required to ensure that the ICs are maintained, monitored and enforced at Source Area properties, so that the remedy continues to function as intended. LTS involves assuring effective procedures are in place to properly maintain, monitor and enforce the ICs. A LTS Plan (or revision to the O&M Plan) should be completed to document LTS procedures. LTS procedures should describe at a minimum: (1) monitoring activities and schedules; (2) responsibilities for performing each task; (3) reporting requirements; and (4) a process for addressing any potential IC issues that may arise during the reporting period. The LTS Plan should include the LTS components as outlined in the ICIAP guidance titled "Institutional Controls: A Guide to Preparing Institutional Control Implementation and Assurance Plans at Contaminated Sites," OSWER 9200.0-77.

A report should be submitted regularly to EPA to demonstrate: that the Site was inspected to ensure no inconsistent uses have occurred; that ICs remain in place and are effective; and that any necessary

contingency actions have been executed. Results of IC reviews should be provided to EPA in an annual ICs report and with a certification that the ICs remain in-place and are effective. Finally, development of a communications plan and use of the State's one call system shall be explored (see notes related to North Sewer OU7).

Systems Operations/Operation & Maintenance

The "Operation, Maintenance and Monitoring Plan for the Sediment and Floodplain/Wetland Operable Units" was approved on May 4, 2004. The OM&M Plan addresses post-remediation sampling within the Brook, in terms of both scope and the duration. Since approval of the OM&M Plan, sediment and FWA soils have been sampled and analyzed annually to monitor the status of the Brook. Samples have been taken from backfill areas within the floodplain and streambed (where excavation occurred, and clean fill materials have been placed) to ensure that residual levels of contamination have not contaminated what should be clean areas. In addition, samples have been taken from areas that were not excavated to ensure that health-based levels are not exceeded and to track residual contamination.

In addition to the sampling within the Brook, the OM&M Plan includes long-term activities associated with the upkeep of the Fields Brook on-site landfill. The OM&M Plan includes the semi-annual sampling regime for the groundwater monitoring wells around the landfill, monthly inspections, routine maintenance associated with the landfill cover, and the collection and disposal procedures for leachate. Appendix A includes a list of the monthly OM&M reports, which include summaries of a landfill cap inspection, leachate collection and other monitoring.

The air-monitoring requirement to check for emissions of radon at the landfill has been eliminated and is not required as part of OM&M because EPA determined that radon was not a concern in the open air surrounding the landfill.

VI.3 OPERABLE UNITS 1 & 4: 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.

Protectiveness Determinations/Statements from the 2014 FYR

Table 2: Protectiveness Determinations/Statements from the 2014 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1, 4	Short-term Protective	The remedy for the Fields Brook Sediment and FWA (OU1 and OU4) currently protects human health and the environment because the response actions selected in the 1986 and 1997 RODs to remove and contain contaminated sediments and floodplain soils within an on-Site landfill, and on-Site thermal treatment of the significantly contaminated or mobile sediments have been shown to be effective in addressing the risks associated with the site. ICs in the form of Environmental Covenants have been recorded and appear to be effective. However, in order for the remedy to be protective in the long term, the following actions need to be taken: addressing the elevated PCBs found in EU1, EU2, EU3, EU4, and EU6 to ensure recontamination of Fields Brook does not occur; and updating the Operation, Maintenance, and Monitoring Plan.

Status of Recommendations from the 2014 FYR

Table 3: Status of Recommendations from the 2014 FYR

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description*	Completion Date (if applicable)
1, 4	Elevated PCB detections in EU6 and EU4	Investigate and remediate elevated PCB detections in EU1, EU2, EU3, EU4, and EU6	Complete	Remediation occurred June 12-26, 2014 in parts of EU4 and EU6 and is documented in "Fields Brook Superfund Site, Relocation & Floodplain Restoration Final Completion Report" dated Sept 10, 2014 (SEMS 939428)	9/10/2014
1, 4	Reassessment of O&M Requirements	Update Operation, Maintenance, and Monitoring Plan after additional field work completed	Ongoing	Discussion related to updating the OM&M Plan was limited over the past five years. A Quality Assurance Project Plan Revision 4, to update sampling procedures under the OM&M Plan, dated June 19, 2018 was reviewed and approved by EPA on June 27, 2018. EPA and FBAG will establish a schedule to complete the updated OM&M Plan by May 2022.	

VI.4 OPERABLE UNITS 1 & 4: FYR PROCESS

Data Review

A list of technical reports and administrative records reviewed to support the remedy are included in Appendix A-Reference List. The data were analyzed, and the general observations include:

1. FBAG submits Soil, Sediment and Surface Water data to EPA annually, and Landfill Groundwater Sampling data semi-annually. CRGs exceedances were detected in the annual 2014, 2015, and 2016 soil and/or sediment samples during the monitoring events. Remedial actions were completed in 2014 and in 2016 and none of the soil or sediment samples have exceeded the CRGs in the August 2016, Aug 2017 and Aug 2018 monitoring events for sediments and soils.
2. Landfill issues were reviewed by evaluation of groundwater data and quarterly maintenance notes. In 2014, Gross beta particle activity[1] and arsenic were detected in separate wells. The subsequent review of these wells in 2018 for radiological and arsenic came back below detection limits.
3. One semi-volatile organic compound (SVOC), benzo(a)pyrene detected in 2014, was detected above the action limit of 0.20 µg/1 at 0.25 µg/1 in monitoring well FB01. Benzo(a)pyrene is a PAH found in coal tar and based on follow up sampling appeared to be an anomaly at this location.
4. Outside the PAH detection, no PCB, SVOC or VOC compounds were detected above the reporting limits in any of the monitoring wells sampled from 2014-2018.
5. The engineered Fields Brook relocation structures appear to be successfully isolating the Brook from the existing contamination below it as there has been no CRG exceedances in EU8 since it was completed. Since the completion of the additional excavation in 2014 and 2016, there have been no detections of CRG exceedances in the downstream segments of the Brook (EU4 and EU6).

[1] Gross Beta particle activity is a measure of the total amount of radioactivity in a water sample attributable to the radioactive decay of beta-emitting elements

6. OM&M sediment sampling of Fields Brook has not shown a CRG exceedance of Detrex-related chemicals since 2008, however four additional VOCs that were marker compounds for Detrex DNAPL were detected at low concentrations throughout all five surface water events.
7. On May 28, 2015 EPA issued a letter which addressed some OM&M comments regarding the sampling approach in relation to meeting sediment and FWA (OU4) CUGs. The letter recommended adopting an Incremental Sampling Methodology approach to compare sampling data to CUGs (vs using a single composite to compare to CRGs). It also recommended consideration of moving soil sample locations from year to year. An evaluation of the sampling design, rationale methodology will be required as part of the review of the OM&M update.

Site Inspection

The inspection of the Fields Brook Site OU1 and OU4 was conducted on 8/21/2018. In attendance were Jenny Davison, EPA; William Earle (EPA Contractor for SulTRAC), and Regan S. Williams, Ohio EPA. Valerie Rule, de maximis, inc., representing the Fields Brook Action Group participated. The purpose of the inspection was to assess the protectiveness of the remedy. No formal interviews were conducted as part of the fourth FYR. Details of the inspection are provided in the FYR Inspection Checklist (Appendix B, Section 1) and Photos (Appendix C).

The weather during the Site inspection was sunny with temperatures in the 70s (Fahrenheit) in the afternoon.

1. Photos of the Site inspection are presented in Appendix C, with observations noted in the captions.
2. The inspection was targeted to those elements of the Brook and source area remedies that were pertinent to completing the FYR.
3. ICs and access controls were observed; no signs were observed on the landfill. No other inconsistencies were noted with CERCLA decision documents or ECs that are on record for the site.
4. No on-site OM&M documents, costs or Site records were reviewed during the inspection. This information is regularly provided to EPA in monthly reports and was reviewed at the office.
5. Landfill covers appear to be well maintained.

Engineered elements of the remedies, e.g. EU8 Brook Realignment Structure, groundwater and DNAPL interception trenches, monitoring wells, are generally functioning as currently required. Some minor issues are discussed in the FYR and will be resolved in upcoming revisions to OM&M Plans.

VI.5 OPERABLE UNITS 1 & 4: TECHNICAL ASSESSMENT

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

Question A Summary:

Yes. The response actions selected in the 1986 and 1997 RODs and 1997, 1999, 2001 ESDs to remove and contain contaminated sediments and floodplain soils within an on-Site landfill, and on-Site thermal treatment of the significantly contaminated or mobile sediments, have been shown to be effective in addressing the risks associated with the Site. Effective ICs in the form of ECs have been recorded.

An ICIAP and LTS Plan should be developed and implemented to ensure that the effective ICs are in place, and are maintained, monitored and enforced at Source Area properties, so that the remedy continues to function as intended.

During routine monitoring, small areas of PCB CRG exceedances within EU1, EU2, EU3, EU4, and EU6 sediments and soil were found. Excavation and disposal of this material was completed in 2014 and 2016. Follow-up monitoring has not identified any further exceedances. The engineered Fields Brook relocation structure appears to be successfully isolating the Brook from the existing contamination below it.

Chlorinated DNAPL contamination has not emerged as a potential problem during this FYR in EUs 4, 5 and 6. With the modified DNAPL recovery system in the Detrex source area (OU5) constructed and operating, the potential for future releases to the Brook have been further minimized.

Based upon a review of the monthly inspection reports and the "Site Monitoring Report Groundwater Sampling Performed May 2018 Five-Year Review Event", and a Site inspection, the on-Site Fields Brook landfill appears to be performing adequately. Soils and sediment from OU1, OU4 and some of the source control OUs were disposed in the landfill. The landfill cover is in excellent condition, the property is fully fenced with locked gates, and procedures are in place to document entry into and exit from the Site. While the fence surrounding the landfill is intact, warning signs were not observed on the fence during the 8/21/2018 inspection. The signs need to be replaced. Site monitoring has not identified any ongoing exceedances of action levels for primary contaminants of concern when compared to baseline conditions.

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

Question B Summary:

Yes. The exposure assumptions used to establish the CUGs for the residential and industrial areas of the Brook are still valid. Land use along the Brook is still consistent with the assumptions used to determine where residential and industrial cleanups would be performed.

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

No. No other information has come to light that would cause the Agency to question the protectiveness of the remedy. However, additional remedial actions are a necessary component of the confidence-based removal approach chosen to clean up the Brook. OM&M activities may identify pockets of contamination due to random movement of the stream channel, or due to possible failure of upstream containment structures such a slurry walls and stream channel liners. Supplemental work could be necessary to remove contamination within the floodplain and isolate the Brook from material that could cause an exceedance of CUGs.

Cleanup levels for the Brook and floodplain were based on a risk assessment that considered possible short and long-term exposures in the residential and industrial areas of the Brook.

VI.6 OPERABLE UNITS 1 & 4: ISSUES/RECOMMENDATIONS

Issues/Recommendations				
OU(s) without Issues/Recommendations Identified in the FYR:				
None				
Issues and Recommendations Identified in the FYR:				
OU(s): 1, 4	**Issue Category: Operations and Maintenance**			
	Issue: Reassessment of OM&M requirements.			
	Recommendation: Update OM&M Plan after additional field work completed.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	5/23/2022
OU(s): 1, 4	**Issue Category: Institutional Controls**			
	Issue: An ICIAP is needed to ensure that effective ICs are implemented, monitored and maintained.			
	Recommendation: Develop and submit an ICIAP which describes the plan for ensuring that all remaining required ICs at the Site are implemented, and for ensuring that all ICs, once implemented, are monitored and maintained.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	5/23/2022
OU(s): 1, 4	**Issue Category: Institutional Controls**			
	Issue: Procedures are not in place to ensure LTS of ICs at the Site.			
	Recommendation: Develop and implement a LTS Plan for monitoring and tracking compliance with existing ICs, communicating with EPA, and providing an annual certification to EPA that the ICs remain in place and are effective.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	5/23/2022
OU(s): 1, 4	**Issue Category: Site Access/Security**			
	Issue: Warning signs are missing from fence surrounding the landfill.			
	Recommendation: Install warning signs on fence surrounding landfill.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	6/1/2020

Other findings

In addition, the following are recommendations that were identified during the FYR and may improve performance of the remedy, improve management of O&M, and/or accelerate Site close out, but do not affect current nor future protectiveness:

1. During the September 2010 OM&M Site inspection, the impermeable liner of the Brook was observed to be bulging and floating. Repairs were completed by FBAG in late 2011. As documented in the 2014 FYR, FBAG has not yet submitted a completion report for the liner repairs required in Part 4 of the 2009 SOW Modification, so EPA has not officially closed out this work under the CD (1999 CD Section XI "EPA approval of Plans and other Submissions"). However, the work is documented in oversight reports from EPA's RAC Contractor and appears to be complete.

2. Cleanup levels for the Brook and floodplain were based on a risk assessment that considered possible short and long-term exposures in the residential and industrial areas of the Brook. From the cleanup levels, CRGs were developed that statistically determined the necessary amount of excavation required to achieve cleanup levels within an exposure area and may need additional evaluation. Long-term protection of the remedy will require evaluation of the exposure assumptions used in developing the CRGs as outlined in the EPA May 28, 2015 "Discussion Points" letter.

VI.7. OPERABLE UNITS 1 & 4: PROTECTIVENESS STATEMENT

Protectiveness Statement(s)	
Operable Unit:	*Protectiveness Determination:*
OU1 and OU4	Short-term Protective
Protectiveness Statement:	
The remedy for the Fields Brook Sediment and FWA OUs (OU1 and OU4) currently protects human health and the environment. The response actions selected in the 1986 and 1997 RODs and subsequent ESDs to remove and contain contaminated sediments and floodplain soils within an on-Site landfill, and on-Site thermal treatment of the significantly contaminated or mobile sediments, have proven to be effective in addressing the risks associated with the site. Effective ICs in the form of ECs have been recorded. However, in order for the remedy to remain protective in the long term, the following actions need to be taken to ensure protectiveness: update the OM&M Plan after additional field work is completed; install warning signs on the fence surrounding the landfill; develop and submit an ICIAP which describes the plan for ensuring that all remaining required ICs at the Site are implemented, and for ensuring that all ICs, once implemented, are monitored and maintained; and develop and implement a LTS Plan for monitoring and tracking compliance with existing ICs, communicating with EPA, and providing an annual certification to EPA that the ICs remain in place and are effective.	

VII. OPERABLE UNIT 5: DETREX CORPORATION SOURCE AREA

VII.1 OPERABLE UNIT 5: INTRODUCTION

OU Summary

The purpose of this FYR is to determine if the remedy selected to address the contamination at the Detrex Corporation Source Area OU (Detrex OU5) of the Fields Brook Superfund Site remains protective. The remedy, which only addressed potential sources of recontamination to Fields Brook included the construction of a partial slurry wall, excavation and disposal of sediments within a retention basin and drainage ditch, installation of a soil cover over an area of low-level soil contamination, construction of a groundwater intercept trench; installation of DNAPL extraction wells; and ICs. The extraction wells were replaced by DNAPL passive collection wells over 2014 through 2016.

The Detrex Site Map in Fig. 5-1 shows the remedy as presented in the 1997 Source Control ROD. The Detrex Map in Fig. 5-2 shows Site features and soil borings as they exist currently.

The purpose of the cleanup at the Detrex OU5 was to address contaminated surface soils, sediment and DNAPL that had the potential to move into Fields Brook. The remedial action at Detrex was initiated in August 2000 and became operational and functional in October 2002, with the start of operation of the DNAPL extraction system. The revised remedy required by the 2014 ESD that allowed for the DNAPL passive collection system was fully operational by the end of 2016.

This is the fourth FYR for the Detrex OU5 of the Fields Brook Site.

Background, Land and Resource Use

The Detrex Corporation is in the northeastern portion of the Fields Brook watershed adjacent to the north bank of the main channel of Fields Brook. The facility encompasses 58 acres. Structures on the property include a process building, office building, and numerous above ground storage tanks that are either within diked areas, paved areas, or on ground surfaces. The northern one-third of the property is used as an active manufacturing area and the southern two-thirds are largely undeveloped.

The area is in the Lake Plain physiographic province of Ashtabula County. The elevation of the Lake Plain ranges from 620 ft. mean sea level to 660 ft. In general, the subsurface geology of the Fields Brook watershed near Detrex consists of three geologic formations. In descending order, these formations are: glacial-lacustrine, glacial till, and shale bedrock.

As noted above, Detrex is an operating facility. It is a chemical manufacturing company, currently producing zinc dialkyldithiophosphates and high purity 37% hydrochloric acid. Past operations at this plant included the chlorination of acetylene to produce trichloroethene and tetrachloroethene.

According to information from Ohio DNR, the groundwater production potential of the area within the watershed is considered very limited and not capable of yielding water at rates greater than 3 gallons per minute. No drinking water wells are located within the industrialized portion of the watershed. The water supply for the industries and residences in the area is from Lake Erie.

History of Contamination

The primary chemicals of interest at Detrex from past operations include trichloroethene, 1,1,2,2-tetrachloroethane, hexachlorobutadiene (HCBD), hexachlorobenzene (HCB) and tetrachloroethene.

Results from sampling conducted during the Source Control RI indicated that surface soil exceedances for Fields Brook contaminants of concern were identified in several areas of the Detrex facility. These areas include: the stormwater collection ditch on the northern property line, several abandoned retention ponds, construction debris piles, sediment in the stormwater settling collection basin, and a catalyst pile. In addition, the recontamination assessment identified a DNAPL in the groundwater on the Detrex facility. The assessment determined that the following areas should be addressed to reduce possible sources of future contamination to Fields Brook:

1. Seven Closed Lagoons

The closed lagoons are in the northeastern portion of the Detrex facility. Subsurface soil samples collected from the area surrounding the lagoons were found to contain several VOCs and SVOCs at concentrations exceeding occupational CUGs. In addition, DNAPL was identified in the shallow groundwater bearing formation both in the closed lagoon area and at off-site locations on RMI Sodium, the adjacent property. A sample of DNAPL was collected from one of the on-site monitoring wells to characterize this material. Four VOCs (1,1,2,2-tetrachloroethane, 1,2-dichloroethene, tetrachloroethene, and trichloroethene) and three and SVOCs were identified (hexachlorobenzene, hexachlorobutadiene, and hexachloroethane) were identified.

2. Sources Within the Surface Water Treatment System

The surface drainage system in the northern industrialized portion of the Detrex facility was modified to collect and treat surface water. Of the area within the bounds of the surface water treatment system, approximately 60,000 sq ft of surface area had soil with CUG exceedances. The ponded area in the lagoon area covers approximately 4,000 sq ft. In addition, approximately 1,500 sq ft along the drainage ditch had surface soil CUG exceedances. The area that is located within the bounds of the surface drainage system is underlain by the subsurface DNAPL plume.

3. Sources Outside the Surface Water Collection System

In the Source Control RI Report, the catalyst piles were not considered a potential source of sediment recontamination. A surface soil sample located downslope of the floodplain detected a concentration of 40 ppm PCBs. Subsequent sampling of the catalyst material found the presence of PCBs greater than occupational CUGs for the Fields Brook sediment. Additional sampling of the three catalyst piles indicated PCB concentrations ranged from 2 to 5 ppm. These catalyst piles were located on the southern portion of the Detrex property, near Fields Brook.

VII.2 OPERABLE UNIT 5: RESPONSE ACTION SUMMARY

Basis for Taking Action

Evaluations of organic chemical contamination in Detrex's soils and groundwater and the presence of DNAPL below Detrex led EPA to believe that Detrex was a potential source of recontamination to the Brook.

In late 1986, EPA began negotiating with several PRPs to conduct the source control RI/FS activities. In 1989, the PRPs were issued a UAO to complete a RI to identify the sources and potential sources of contamination to the Brook and develop and evaluate cleanup alternatives for the sources of contamination. From 1992 to 1995, the PRPs evaluated 94 areas of potential contamination within the Fields Brook watershed to determine whether they were a source of past contamination or could cause future recontamination once the Brook cleanup was underway. Contamination could be caused by discharges from pipes, the movement of contaminated soil or sediment during rainstorms, and subsurface releases to the Brook from flowing groundwater.

As a result of this evaluation, the PRPs identified five industrial properties as sources of contamination or potential contamination to Fields Brook. The industrial properties include Detrex, Millennium Plant II TiCl4 (formerly SCM), Acme Scrap Iron and Metal, RMI Metals, and Conrail. In addition, several sewer systems located to the north and south of Fields Brook were also found to be potential sources of contamination. Detailed information about the types and extent of contamination at the source areas, including Detrex, can be found in the Source Control RI reports. The final Phase 1 Source Control RI was approved in May of 1997.

In conjunction with the preparation of the Source Control RI Report, the PRPs prepared a Source Control FS to identify and evaluate cleanup alternatives. The Source Control FS was finalized in June 1997.

Response Actions

Remedial actions for the Detrex Corporation OU5 were selected in the September 29, 1997 Source Control ROD. The selected remedy for the Detrex source area required the containment and treatment of groundwater contamination by the construction of a partial slurry wall and vacuum-enhanced extraction wells. Although a RAO was not specifically called out in the Source Control ROD, the goal of the Source Control OU is to remediate source areas that have the potential to cause sediment contamination to Fields Brook and its tributaries, thereby preventing the recontamination of the areas that will be addressed by the Sediment OU1 and FWA OU4 by containment of surface soil contamination, ditch cleaning, catalyst pile removal and retention pond sediment removal. See Fig. 5-1 for a map showing features relevant to the Site remediation. A chronology of significant events is included in Appendix D.

More specifically, the selected remedy for the Detrex OU5 consisted of the following:

1. Clear Debris and Vegetation, Remove Physical Hazards

In order to implement the remedial action, debris and vegetation were to be cleared in response and work areas. Physical hazards that could threaten workers were also to be addressed prior to the remedial action.

2. Construction of Partial Slurry Wall

A partial slurry wall was to be constructed to restrict the flow of groundwater contamination from the Detrex property. The slurry wall component was to extend beyond the downgradient portion of the on-site and off-site DNAPL and dissolved phase plume and be located outside of the DNAPL area of impact. In addition, the slurry wall was to extend as necessary to ensure that the DNAPL and contaminated groundwater flowing towards Fields Brook or the DS Tributary, particularly along the northern and western directions from the Detrex facility, would be contained or captured.

The slurry wall was to be constructed of a soil-bentonite slurry or other clay mineral slurry. The permeability of the slurry wall was to be designed to be approximately 1×10^{-6} cm/sec. Due to the high percentage of naturally occurring clay soil material in the proposed slurry wall area, the ROD noted that it may be possible to reuse a portion of the excavation spoils by incorporating them into the slurry wall. The remaining excavation spoils were to be temporarily stockpiled on-site and characterized to evaluate on-site and off-site disposal options.

3. Passive DNAPL Recovery System to replace Vacuum-Enhanced Extraction Wells

Prior to the 2014 ESD, the 1997 ROD required vacuum-enhanced extraction wells to be installed near the leading edge of the DNAPL plume near the slurry wall and within the plume to lower groundwater and collect DNAPL in source areas. Based on pilot test results, approximately 36 extraction wells were anticipated.

Fluids collected from the vacuum-enhanced extraction wells were to be routed to a knockout tank to separate the vapor phase from the liquid phase. The vapor phase was to be treated with granular activated carbon to remove organic contaminant vapors before being released into the atmosphere.

The liquid phase from the knockout tank was to be conveyed to a DNAPL/water separator where DNAPL would be separated from water. The separated DNAPL was to be collected and transported to an off-site facility for treatment or recycling. The separated water was to be conveyed to the existing activated carbon treatment system at the Detrex facility.

4. Surface Water and Erosion Control / Soil Cover

Low-lying areas within the existing surface water collection system area on the Detrex facility and areas with surface soil occupational CUG exceedances were to be filled and re-graded. In addition, these areas were to be covered with a 12-inch thick soil cover, an erosion control blanket, and a vegetative or crushed stone layer surface. Clean clay soil would be used for backfill. Regrading and vegetative cover would prevent ponding of surface water in former source areas and reduce infiltration of surface water into the ground. Sediments lying within retention basin DET7 and in the drainage ditch on the northern boundary that collects surface water were to be excavated and analyzed to evaluate disposal options. Following cleaning, the ditch was to be filled with gravel or cement.

5. Catalyst Pile Excavation and Disposal

The catalyst pile material was to be excavated, evaluated, characterized and disposed of. Approximately 100 cubic yards of catalyst material contained in the three small piles and underlying soil was to be removed from the catalyst pile area. Upon completion of the removal of visible catalyst and excavation to the six-inch depth, confirmation samples would be collected from the base of the excavation, prior to backfilling. Clean soil would be replaced in the excavation and the area would be re-graded and re-vegetated.

6. Off-site Surface Water Control in the DS Tributary

In order to reduce the potential for subsurface DNAPL and associated COCs to enter the DS Tributary in the northeast portion of the Site, a 30-inch diameter collection trench was installed beneath DS Tributary to contain surface water flow and keep groundwater from entering the stream flow. This culvert was used to connect to the existing culvert beneath State Road and extend along the northern side of the railroad spur, approximately 600 feet upstream. This configuration was meant to entirely contain the surface water in the DS Tributary north of the Detrex facility, seal off potential groundwater seepage and prevent soil erosion. All joints were to be sealed to eliminate seepage. Sediment beneath the culvert was to be excavated to a depth of approximately 2.0 feet. The sediment excavated beneath the culvert would be analysed to evaluate disposal options.

7. Chemical Monitoring and O&M

O&M activities for the vacuum-enhanced extraction well system included routine inspections of blowers, electrical equipment, belts, fuses, and pertinent operating parameters. O&M requirements for the slurry wall and re-graded areas were to consist of inspections, with regrading and re-vegetating, as necessary. Routine sampling of selected extraction wells was to be required to monitor the effectiveness of the system. At a minimum, annual groundwater monitoring was to be conducted at points of compliance, with samples to be analyzed for DNAPL, VOC and SVOC parameters. In addition, water level data is to be gathered on a semi-annual basis from all monitoring wells and piezometers installed inside and outside of the slurry wall to evaluate groundwater gradients within the remedial response area.

Storm water treatment system O&M activities, such as carbon replacement, were to remain the same as are currently used at the facility; however, the frequency of replacement was expected to increase depending on the concentration of contaminants in the water pumped out of the extraction wells. O&M activities were to also include separator maintenance, handling and disposal of DNAPL, and inspection and periodic sediment removal from the settling pond at DET7.

The outfall from the existing stormwater treatment system was to be monitored to ensure compliance with NPDES monitoring requirements and DNAPL constituents not included as part of the current monitoring program.

8. Points of Compliance

In conjunction with completion of the remedial action and performance of required O&M, sheet flow erosion and runoff from the Detrex facility would need to meet the occupational CUGs established for the FWA and Sediment OUs. The points of compliance for surface runoff were the property boundary and the DS Tributary. Groundwater contamination also would need to meet the occupational CUGs to prevent recontamination of the Brook. At a minimum, the points of compliance for the contaminants present in groundwater would be the edge of the slurry wall or, for areas without the slurry wall, the property boundary and the DS tributary. Contaminant levels at the Detrex outfall must meet residential CUGs to ensure that the 48" combined sewer can meet residential CUGs when it discharges to Fields Brook.

In addition to providing direction concerning points of compliance for monitoring, the Source Control ROD also provided considerations for the evaluation of the performance of a DNAPL extraction system. The ROD references EPA guidance that recommends that long-term remediation objectives of DNAPL remedies should be to remove free-phase, residual and vapor phase DNAPL "to the extent practicable". The ROD also notes that the DNAPL is a principal threat, selects a remedy requiring a combination of containment and active removal of DNAPL and states that "Complete removal of DNAPL in low permeability clay soils is not possible with currently available technology and treatment to asymptotic levels is expected". While recognizing the difficulties of DNAPL removal, the Source Control ROD emphasized DNAPL removal as an important element in the selected remedial action for the Detrex OU.

8. The 2014 ESD

Deficiencies with operating the vacuum-enhanced DNAPL recovery system lead to limited recovery of the DNAPL. After additional investigations, on January 15, 2014, EPA issued an ESD. The ESD eliminated the vacuum-enhanced DNAPL extraction wells installed at Detrex, as they were not effective. The ESD required the conversion to a passive well extraction system, by using a greater number of non-vacuum wells. In addition, the ESD incorporated the inclusion of a groundwater interception trench (constructed in 2006-2007) on the southern property line. The ESD provided metrics for well type, spacing and bounding of the DNAPL. It also provided criteria for determining when DNAPL is no longer mobile, and for closing and abandoning the extraction wells. The 2014 ESD did not affect the previous RODs for Fields Brook sediment or floodplain. The number of wells, their design, and location were required to be in place and operational by June 30, 2016 as discussed in further detail in the "Status of Implementation" Section below.

Status of Implementation

Because the design of the DNAPL extraction system would take longer than the design of the slurry wall, the designs were submitted separately so that remedial action work at the Site could proceed as soon as possible. The RD for the slurry wall, groundwater culverts and soil work were approved in May of 2000. Debris and physical hazards were removed from the work area. Construction of the slurry wall, installation of groundwater collection trenches and the excavation of accumulated sediment from drainage ditches began in August of 2000 and were completed in mid-2001. The slurry wall controls the movement of groundwater and provides for a system of drains that collect groundwater and runs it through Detrex's existing water treatment plant. Site contaminants of concern are addressed in the

facility's existing NPDES permit. In addition to the construction of the slurry wall and groundwater culverts, the catalyst piles were removed from the property and small areas of surface soil contamination were re-graded and covered to prevent recontamination to the Brook.

EPA and Detrex agreed that the DNAPL extraction system could be phased in to allow the system to be expanded based on field performance data and so that the design could be modified to address any problem experienced in the first phase of extraction wells. On October 4, 2001, EPA approved the RD for the phase 1 of the DNAPL extraction system. Detrex constructed the system in the summer of 2002. Upon start up in October 2002, Detrex encountered some severe operational difficulties (such as product crystallization and plugging of wells) and eventually had to move to a less automated approach to running the system since they found the extraction system requires close operator attention to maintain.

In 2009, Detrex removed 47 cubic yards of sediment, and installed two DNAPL collection trenches in the DS Tributary west of State Road. In, 2011, visual observations of DNAPL under the box culvert under State Road resulted in Detrex excavating 269 tons of sediment/soil from the DS Tributary. The excavated area was lined with Aqua-block (a proprietary pea gravel/bentonite mixture), and then the stream channel was lined with a grouted rock. Detrex removed two DNAPL collection trenches and installed one larger replacement trench 130 feet downstream from the culvert. There was additional restoration work on the box culvert in 2012. All 2011-2012 response actions on the DS Tributary and box culvert are discussed in a letter report "Additional Excavation of DS Tributary and State Road Culvert Restoration" dated July 11, 2012.

The DNAPL recovery approach was reevaluated, culminating in issuance of a January 14, 2014 ESD by EPA which changes the operation of the source area extraction well system with collection of DNAPL by passive (non-vacuum enhanced) wells. Remedy implementation since the last FYR included the following:

1. DNAPL Recovery Point Installation

Detrex submitted a Work Plan to EPA on April 8, 2014 and it was approved on May 1, 2014. Recovery point installation was conducted in three phases, the larger diameter (4-inch) recovery points were installed as Phase I and Phase II. A total of 151 larger diameter recovery points were installed between June 2014 and August 2015.

As described in the ESD, an Initial Measurement (IM) event was to be used as a baseline for identifying the presence and thickness of DNAPL in recovery points that were installed. The IM was conducted as two monitoring events following the initial two (2) phases. The Phase I recovery point IM event was conducted from August 11-14, 2014 and the Phase II recovery point IM event was conducted from September 2-9, 2014. Since completion of both phases, all recovery points have been monitored monthly and the data has been reported to EPA during project conference calls and in the Monthly Status Reports.

On June 23, 2014, Detrex requested a modification to the implementation schedule to add an additional Phase to accommodate an additional Phase III. Phase III was determined based on results from monitoring DNAPL in the Phase I and Phase II recovery points installed in 2014. On June 26, 2014, EPA approved the modified schedule, and noted that the ESD provides the flexibility to add as many phases of installation as needed, so long as the final phase is operational by June 30, 2016.

2. Perimeter DNAPL Recovery Point Installation

In addition to large diameter recovery point installation, Detrex submitted a request to EPA to install approximately 142 perimeter DNAPL recovery points on July 30, 2015. On July 31, 2015, EPA approved Detrex's request to install 142 perimeter DNAPL recovery points as outlined in Detrex's July 30, 2015 "Request for Perimeter DNAPL Recovery Point Installation."

These perimeter recovery points were installed as Phase III of the recovery system and were installed on approximate 15-foot spacings to meet the requirements of the ESD. A total of 121 of the 142 perimeter DNAPL recovery points were installed in 2015. Due to issues with obtaining a rail crossing agreement from Norfolk and Southern, the remaining 21 perimeter recovery points were not installed until June 2016, consistent with the June 2016 deadline.

As described in the ESD and as conducted on the large diameter recovery points, an internal IM event was to be used as a baseline for identifying the presence and thickness of DNAPL in all recovery points that were installed. The IM for perimeter recovery points was conducted after the completion of each perimeter recovery point installation event (2015 and 2016). The IM for the first 121 perimeter recovery points was conducted from November 6 and 25, 2015. The IM for the remaining 21 perimeter recovery points was conducted from July 27 through July 29, 2016.

3. Construction Completion of Passive and Perimeter DNAPL Collection Points and Modification to Monitoring Frequency:

On December 1, 2016, Detrex submitted a "Draft Passive DNAPL Collection System Completion Report," that describes the work that was performed during the Phase 1 and Phase 2 design and installation programs completed since approval of the Installation Work Plan.

On June 22, 2017, EPA, in consultation with Ohio EPA issued and Approval Letter "Final Passive DNAPL Collection System Completion Report (dated June 5, 2017)". The report documented Detrex's implementation of the modified source control remedy in OU5 as spelled out in the 2014 ESD. The letter memorialized that the construction of the remedy required by the ESD in OU5 had been completed and that Detrex was in full compliance with the requirements of the ESD, in particularly having the Final Phase of the DNAPL collection system operational by June 30, 2016.

In March 21, 2018, after reviewing Detrex's requests from January 25, 2017 and January 22, 2018, EPA approved the changes in monitoring the frequencies of some DNAPL passive collection points. Specifically, the following frequency was initiated in March 2018:

- 59 recovery points are currently monitored annually
- 103 recovery points are currently monitored monthly

The changes in monitoring requested were consistent with the performance requirements of the 2014 ESD. The locations of the passive collection wells in the current program is in Figure 5-2.

Institutional Controls

Table 4: Summary of 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 Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Soil, Groundwater	Yes	Yes	P.P.N. 03-014-006,7 &8	Shall not affect remedy components of the Source Control ROD; prohibits residential land use or consumptive use of groundwater	EC pursuant to Ohio UECA, November 16, 2009 SDMS #353273

A map of the parcels with the recorded ICs for Detrex is shown in Fig. 1-12.

Status of Access Restrictions and ICs: For source areas at the Fields Brook Site, ICs are required where hazardous substances, pollutants or contaminants could re-contaminate the Brook above cleanup levels, and to maintain the integrity of the remedy. Detrex recorded an EC, pursuant to Ohio UECA, in November 2009. The EC is on the entire 58 acres of its property and prohibits any action that would conflict with the source control remedy and prohibits use of the property as a residence or as a drinking water source. The covenant also provides for future right of access for EPA. The covenant extends from the plant operations property boundary on the north, to the Fields Brook Relocation Structure sedimentation basin on the south. The Detrex property also extends from State Road on the west to the CSX railroad right of way on the east (See Fig. 1-12).

Signs are posted and access controls (not themselves considered ICs) are in place in the form of fencing and Site security to limit access to critical areas of the facility, where remedial structures are primarily located. Areas to the south of the main production are posted with signs to discourage trespassers.

Detrex does not own the properties through which the DS Tributary flows, west of State Road. Although not required by the ROD, additional ICs are in place for the DS Tributary:

1. The properties are zoned industrial.
2. According to county records, the property is on land owned by the Ashtabula County Port Authority (Parcel #03-014-00-029-00) and Cristal USA (Parcel #03-014-00-028-00. This property is covered by the Affidavit of Facts discussed in the North Sewer (OU7) Section IX.2 of the FYR Report. The Port Authority does not normally build or own residential properties.

Current Compliance:

Based on the FYR inspection, EPA is not aware of Site or media uses which are inconsistent with the stated objectives to be achieved by the ICs. The remedy appears to be functioning as intended.
FYR.

IC Follow up Actions Needed:

A LTS Plan for the Source Area OUs should be developed and implemented to ensure that the ICs are maintained, monitored and enforced at Source Area properties, so that the remedy continues to function as intended.

Long-Term Stewardship:

Since compliance with ICs is necessary to assure the protectiveness of the remedy, planning for LTS is required to ensure that the ICs are maintained, monitored and enforced at Source Area properties, so that the remedy continues to function as intended. LTS involves assuring effective procedures are in place to properly maintain, monitor and enforce the ICs. A LTS Plan (or revision to the draft OM&M Plan) should be completed to document LTS procedures. LTS procedures should describe at a minimum: (1) monitoring activities and schedules; (2) responsibilities for performing each task; (3) reporting requirements; and (4) a process for addressing any potential IC issues that may arise during the reporting period. The LTS Plan should include the LTS components as outlined in the ICIAP guidance ("Institutional Controls: A Guide to Preparing Institutional Control Implementation and Assurance Plans at Contaminated Sites", OSWER 9200.0-77).

A report should be submitted regularly to EPA to demonstrate: that the Site was inspected to ensure no inconsistent uses have occurred; that ICs remain in place and are effective; and that any necessary contingency actions have been executed. Results of IC reviews should be provided to EPA in an annual/biennial ICs report and with a certification that the ICs remain in-place and are effective. Finally, development of a communications plan and use of the State's one call system shall be explored.

Systems Operations/Operation & Maintenance

Sampling of the Detrex outfall, which assesses the performance of the on-site water treatment system, is addressed by monitoring required under Detrex's NPDES permit. Detrex provides copies of its monthly status reports to EPA.

Currently the Detrex Passive collection system is operating and functional. Detrex submitted a "Draft Operations, Maintenance, and Monitoring Plan for the Detrex Source Control Area" on November 29, 2017 and a revised version on October 29, 2018. The draft OM&M Plan includes the inspection and upkeep of the passive collection system and the sampling of monitoring wells. Detrex also submitted a revised "Draft Quality Assurance Project Plan" submitted on November 2, 2018. At the time of this review, EPA was in the process of reviewing the requirements of the draft OM&M plan and draft QAPP and it is anticipated that these documents will be modified and finalized prior to the next FYR.

VII.3 OPERABLE UNIT 5: 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.

Protectiveness Determinations/Statements from the 2014 FYR

Table 5: Protectiveness Determinations/Statements from the 2014 FYR

OU #	Protectiveness Determination	Protectiveness Statement
5	Short-term Protective	The remedy at OU5 protects human health and the environment in the short-term by preventing recontamination of Fields Brook from organic chemical contamination in Site soils, groundwater, and DNAPL. An Environmental Covenant (EC) was recorded in 2009 and appears to be effective. In order for the remedy to be protective in the long term, the remedial actions outlined in the January 15, 2014 ESD need to be implemented. The ESD modifies the remedy by changing the operation of the source area extraction well system by requiring pumping of accumulated DNAPL periodically from passive (non-vacuum) wells. The goal is for the entire Detrex source area to achieve a "residual (non-mobile) concentration" of DNAPL in soil, thus rendering the DNAPL immobile.

Status of Recommendations from the 2014 FYR

Table 6: Status of Recommendations from the 2014 FYR

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description*	Completion Date (if applicable)
5	Increase effectiveness of chlorinated DNAPL Extraction system in DNAPL source area.	Implement actions outlined in the 1/15/2014 ESD.	Completed	Actions outlined in the 1/15/2014 ESD have been implemented as of 6/30/2016. Remedy is now performing as expected and PRPs are performing O&M as documented in "Approval of Passive DNAPL Collection System Completion Report" dated 6/22/17 (SEMS 934352).	6/22/2017

Recommendation 1 Status:

On June 22, 2017 EPA issued an Approval Letter Final Passive DNAPL Collection System Completion Report (dated June 5, 2017). This Report documents Detrex Corporation's implementation of the modified source control remedy in OU5 spelled out in the 2014 ESD. EPA, in consultation with Ohio EPA, approved the report and certified that construction of the remedy required by the ESD in OU5 has been completed. In consideration of the information provided in the Completion Report, Detrex is in compliance with the requirements of the ESD, in particularly having the Final Phase of the DNAPL collection system operational by June 30, 2016.

VII.4 OPERABLE UNIT 5: FYR PROCESS

Data Review

A list of technical reports and administrative records reviewed to support the remedy are included in Appendix A-Reference List. The data were analyzed, and the general observations include:

1. As of March 2019, Detrex has recovered over 29,142 gallons of DNAPL from the source area.
2. Groundwater monitoring and recovery/collection trench data are not indicative of an ongoing DNAPL release towards Fields Brook.
3. Since 2008, the annual OM&M sampling of Fields Brook sediments and FWA soils have not shown exceedances of CRGs attributable to Detrex-related contaminants, although there are trace detections of VOCs in the annual reporting.
4. Chlorinated organic contamination previously noted in DS Tributary sediments west of State Road appear to have originated from historical soil contamination surrounding the State Road box culvert and associated wastewater discharge structures. As indicated above, additional measures have been implemented to control these sources, and they appear to be working.

Site Inspection

The inspection of the Detrex OU5 was conducted on 8/20/2018. In attendance were Jenny Davison, EPA; and William Earle (EPA Contractor for SulTRAC). Martin Schmidt and Tom Doll, representing Detrex Group participated. The purpose of the inspection was to assess the protectiveness of the remedy. No formal interviews were conducted as part of the fourth FYR. The inspection included observations of the passive collection wells, on-site treatment system, and the trenches. Details of the inspection are provided in the FYR Inspection Checklist (Appendix B, Section 2) and Photos (Appendix C).

VII.5 OPERABLE UNIT 5: TECHNICAL ASSESSMENT

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

Question A Summary:

Yes. EPA issued an ESD for OU5 on January 15, 2014, modifying the DNAPL recovery system in the Detrex source area to reduce releases to the Brook. On June 22, 2017, EPA approved the "Final Passive DNAPL Collection System Completion Report" documenting that the installation of the passive collection wells to collect DNAPL pursuant to the January 15, 2014 ESD and that the schedule in the ESD was met. Based upon monthly inspection reports and the Site inspection, the remedy appears to be performing as intended by the decision documents. As of March 2019, more than, 29,142 gallons of DNAPL have been collected from the source area, thereby reducing the potential for future releases to the Brook. Based on the data from the OM&M sediment sampling of Fields Brook, CRG exceedances chemically attributable to Detrex have not been seen since 2008.

An effective IC in the form of an EC was recorded in 2009. A LTS Plan should be developed and implemented to ensure that the ICs are maintained, monitored and enforced so that the remedy continues to function as intended.

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

Question B Summary:

Yes. There has been no change to the hexachlorobenzene cleanup requirements for Fields Brook. The RAOs for the Detrex Corp. Source Area are still valid. The goal of the Detrex source cleanup is to ensure that contaminants do not move from the facility to the Brook in excess of CUGs.

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

No. No other information has come to light that would cause the Agency to question the protectiveness of the remedy.

VII.6 OPERABLE UNIT 5: ISSUES/RECOMMENDATIONS

Issues/Recommendations				
OU(s) without Issues/Recommendations Identified in the FYR:				
None				
Issues and Recommendations Identified in the FYR:				
OU(s): 5	**Issue Category: Operations and Maintenance**.			
	Issue: The OM&M Plan and QAPP for the chlorinated DNAPL passive collection system in the DNAPL source area have not been finalized.			
	Recommendation: Finalize the OM&M Plan and QAPP for the chlorinated DNAPL passive collection system in the DNAPL source area.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	6/1/2022
Issues and Recommendations Identified in the FYR:				
OU(s): 5	**Issue Category: Institutional Controls**			
	Issue: Procedures are not in place to ensure LTS of ICs at the Site.			
	Recommendation: Develop and implement a LTS Plan for monitoring and tracking compliance with existing ICs, communicating with EPA, and providing an annual certification to EPA that the ICs remain in place and are effective.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	5/23/2022

VII.7 OPERABLE UNIT 5: PROTECTIVENESS STATEMENT

Protectiveness Statement(s)	
Operable Unit:	*Protectiveness Determination:*
OU5	Short-term Protective
Protectiveness Statement:	
The remedy at OU5 currently protects human health and the environment by preventing recontamination of Fields Brook from organic chemical contamination in Site soils, groundwater, and DNAPL. The remedial actions outlined in the January 15, 2014 ESD modifying the DNAPL recovery system in the Detrex source area to reduce releases to the Brook were implemented in 2016 and are proving to be effective. An effective IC in the form of an EC was recorded in 2009. However, in order for the remedy to be protective in the long-term, the following actions need to be taken to ensure protectiveness: finalize the OM&M Plan and QAPP for the chlorinated DNAPL passive collection system in the DNAPL source area; and develop and implement a LTS Plan for monitoring and tracking compliance with existing ICs, communicating with EPA, and providing an annual certification to EPA that the ICs remain in place and are effective.	

VIII. OPERABLE UNIT 6: MILLENNIUM TICL4 PLANT SOURCE AREA

VIII.1 OPERABLE UNIT 6: INTRODUCTION

OU Summary

The purpose of this FYR is to determine if the remedy selected to address the contamination at the Millennium $TiCl_4$ Plant Source Area (OU6) of the Fields Brook Superfund Site remains protective. The remedy, which only addressed potential sources of recontamination to Fields Brook, included the excavation of PCB and radium-contamination soil and mining residuals. The cleanup was performed from July to October 1999. Excavated soils and mining residuals were sent to Millennium's existing, permitted solid waste industrial landfill located within the Fields Brook watershed. No on-Site OM&M was required. Millennium's OM&M responsibilities for its landfill were and are defined by the permit issued by Ohio EPA, with the only addition being the expansion of the monitoring parameters to include PCBs and radionuclides.

Upon discovery of the Therminol FR (Therminol) DNAPL in the EU8 floodplain, a UAO was issued to Millennium in 2007 requiring the company to address the associated PCB contamination in sediment and floodplain soils. This removal action included construction of interceptor trenches along the northern edge of the facility to capture any Therminol DNAPL that might be present and excavation of PCB-contaminated soils with disposal off-site. This work was completed in 2008, and a completion report was submitted to EPA in 2009. The EU8 portion of Fields Brook was subsequently relocated by the FBAG into the area of the Millennium PCB soil removal. This relocation project is discussed in the Section VI.2 for OUs 1 & 4 of this FYR Report. In 2011 Millennium placed ICs for its property in the EU8 floodplain.

Background, Land and Resource Use

Millennium Plant II, the $TiCl_4$ (titanium tetrachloride) facility, is located in the south-central portion of the industrialized area near Fields Brook. The structures currently at the Site include several process buildings, numerous aboveground storage tanks, a clarifier, and three settling ponds. The western half of the property contains most of the process-related structures, whereas the eastern half remains largely undeveloped and was historically covered by a large pile of mining wastes and filter residue.

The $TiCl_4$ plant was designed, constructed and initially operated by the Stauffer Chemical Company. Construction was completed in 1956. The facility was sold to National Distillers and Chemicals in 1959 and was operated for the next five years by National Distillers (and its affiliates Mallory-Sharon Metals and RMI Titanium). Cabot Titania acquired the plant in 1963 and operated it until 1972, when it was leased to Gulf and Western Industries, Inc. Gulf and Western purchased the plant in 1975. SCM purchased the $TiCl_4$ facility in 1983. The name of the company was changed to Millennium Inorganic Chemicals in 1997. Lyondell Chemical acquired the facility in 2004. The National Titanium Dioxide Company of Saudi Arabia, known as Cristal Global, purchased in the facility in 2007. Cristal Global changed the name of its Millennium operations to Cristal USA, Inc. in 2012.

History of Contamination

At the commencement of operations at the $TiCl_4$ facility, the plant utilized a heat transfer system that used Aroclor-based fluids (Therminol FR). This system remained in use until Gulf and Western had pure Aroclor removed from the heat transfer system in 1974 and replaced it with Monsanto PCB-Free Therminol.

Prior to Superfund involvement, there were multiple investigations of contamination at the $TiCl_4$ facility. A TSCA action in 1983 led to the excavation and disposal of PCB-contaminated sediment from rainwater trenches (up to 660 ppm) and overflow channels (up to 330 ppm). In 1990, the presence of PCB contamination (up to 41,000 ppm) was detected in plant area soils below the Therminol storage tank. This was reported to the Region 5 TSCA office. TSCA required the preparation of a work plan and an investigation to determine the extent of soil contamination and identify buried drums. This work was postponed in 1991, to allow coordination with the Fields Brook Source Control RI.

As part of the Source Control RI, the Recontamination Assessment of Millennium identified the Mining Residuals Pile, the Non-Traffic Area and the North Traffic Area as areas that possess the potential to re-contaminate Fields Brook. Remedial action was also planned for the Laydown Area; the Plant Process Area; and the Existing Soil Piles, other plant areas that have PCB concentrations greater than the Fields Brook CUG. These three plant areas were determined not to be potential sources of recontamination of Fields Brook. Descriptions of the six plant areas and analytical results are summarized in the following sections. See Fig. 6-1 for a facility diagram showing the various areas of historical contamination.

1. Non-Traffic

Site investigations identified PCBs in surface soils (approximately the upper 6 feet) in the west-central portion of the facility, extending north beyond the existing security fence-line. The area extending north beyond the fence-line to the 100-year floodplain is the Non-Traffic Area. PCB concentrations in surface soils in the Non-Traffic Area ranged from 3.1 ppm to 50 ppm. However, a few sampling locations near the old outfall were found to have concentrations of PCBs greater than 50 ppm, and some borings had soils containing greater than 500 ppm.

2. North Traffic Area

Site investigations identified PCBs in surface soils (approximately the upper 6 feet) in the west-central portion of the facility, extending north beyond the existing security fence-line. The area south of the fence-line and north of the Plant Process Area is defined as the North Traffic Area. The surface area in the North Traffic Area was covered with pavement, structures, or gravel. The gravel was placed to prevent further contact with on-site surface soils in this area and to reduce the potential for erosion of the surface soils. PCB concentrations in surface soils in the North Traffic Area were identified in the range of 3.1 ppm to 50 ppm.

3. Laydown Area

The Laydown Area was located immediately south of a concrete pad in the east central portion of the plant. The Laydown Area consisted of bare soils and vegetated soils. The average PCB concentration in the Laydown Area was 3.5 ppm, and the maximum concentration was 37.9 ppm (at 1.5 to 3.0 ft depth). The Recontamination Assessment found neither groundwater nor overland erosion to be pathways for recontamination of Fields Brook.

4. Plant Process Area

The Plant Process Area was the active, operating portion of the $TiCl_4$ facility. The Plant Process Area is almost completely covered with either pavement or structures. PCB concentrations in surface soils in the Plant Process Area were identified in the range of 3.1 ppm to 50 ppm. However, a few scattered sampling locations have identified PCB concentrations greater than 50 ppm and a small area was found with PCB concentrations greater than 500 ppm. The primary area with elevated PCB concentrations was associated with the old Therminol system.

5. Soil Piles

The Soil Piles were located on a concrete storage pad in the east central portion of the $TiCl_4$ facility. Standard plant maintenance and upgrades occasionally required the excavation of small amounts of soil. These soils were stockpiled on the concrete pad. Historic sampling results from the excavation locations indicate that some of these soils contained concentrations greater than 50 ppm PCBs. The soil piles were not designated as having the potential for recontamination to Fields Brook.

6. Mining Residuals Pile

The inactive Mining Residuals Pile was located in the eastern portion of the facility between Middle Road and Fields Brook. The pile received "Bevill" exempt mining residuals (e.g., iron hydroxide) from previous plant operations prior to Millennium's operations. As stated in the Bevill exemption, the mining residuals are neither hazardous wastes nor hazardous substances.

Information gathered during the Mining Residuals Pile investigation indicated that the Mining Residuals Pile material was primarily iron hydroxide, with a low moisture content (measured at about 25 to 30 percent, as compared to an approximate field capacity of 50 to 60 percent), and a (disturbed) density ranging between 1.0 and 1.25 tons per cubic yard. Although the mining residuals were not hazardous wastes, sample results revealed that PCBs were present in the Mining Residuals Pile at concentrations ranging from non-detect to 760 ppm.

VIII.2 OPERABLE UNIT 6: RESPONSE ACTION SUMMARY

Basis for Taking Action

Evaluations of PCB and radium contamination at the Millennium $TiCl_4$ Plant as described above led EPA to believe that it was a potential source of recontamination to the Brook.

From 1989 through 1997, as part of the RI/FS process for the Source Areas, the Fields Brook PRPs evaluated areas of potential contamination within the Fields Brook watershed to determine whether they were a source of past contamination or could cause future recontamination once the Brook cleanup is underway. The Millennium $TiCl_4$ Plant was determined as one of the sources of contamination or potential contamination to Fields Brook. Additional details about RI/FS for the Source Areas are discussed in Section VII.2 "Basis for Taking Action."

Response Actions

Remedial actions for the Millennium $TiCl_4$ Plant (OU6) were selected in the September 29, 1997 Source Control ROD and in the April 9, 1999 Site-Wide ESD. Although a RAO was not specifically called out in the Source Control ROD, the goal of the Source Control OU is to remediate source areas that have the potential to cause sediment contamination to Fields Brook and its tributaries, thereby preventing the recontamination of the areas that will be addressed by the Sediment OU1 and FWA OU4. Where ICs were required, those controls were intended to limit the future use of areas to ensure that contamination does not migrate to the Brook. A chronology of significant events is included in Appendix D.

The cleanup of the Millennium $TiCl_4$ Plant was developed to address contaminated soils and mining residual piles that were and could potentially be a source of PCBs and radionuclides to the Brook. The September 29, 1997 Source Control ROD required the following actions for the Millennium OU6:

1. Excavation of soil with PCB concentrations greater than or equal to 50 ppm.
2. Excavated soils to be disposed at either an on-site or off-site TSCA landfill.
3. Following completion of excavation activities, the excavated areas were to be backfilled with clean soil and graded to allow for adequate drainage.

4. Remaining surface soils included in the remedial response area were to be contained on-site with a 12-inch soil cover and an erosion control blanket and vegetated to reduce erosion. For traffic and work areas, a geotextile and 6 inches of gravel will be used.

When the RD for the cleanup of the Fields Brook sediment and the FWA soils was approximately 90% complete stage, the EPA received information regarding possible radionuclide contamination in the Ashtabula River and the Fields Brook watershed. EPA issued a "stop work" directive to Millennium (effective June 10, 1998) to halt work on the RD under the UAO pending investigation of radionuclide contamination. EPA evaluated the available data and Millennium conducted follow-up sampling. The results of the sampling identified unacceptable levels of radium at the Millennium TiCl4 facility and in FWA soils near the Millennium facility. EPA determined that radium should be added as a contaminant of concern for the cleanup of the Millennium facility and for the Fields Brook sediment and the FWA soils. Because of the presence of radium, specific components of the remedial action were modified to address soils and sediment that contain radium. The April 8, 1999 Site-Wide ESD made changes to the remedy for both Fields Brook and the Millennium TiCl4 property. The ESD required that soil and mining residuals be excavated from the Millennium TiCl4 property to meet an industrial radium cleanup level of 10 pCi/g above background for combined levels of radium-226 and radium-228.

Where ICs were required, those controls were intended to limit the future use of areas to ensure that contamination does not migrate to the Brook.

Status of Implementation

EPA issued a UAO (V-W-98-C-449) for the performance of the Millennium RD/RA on December 24, 1997. A modification to the UAO became effective February 13, 1998.

Millennium elected to exceed the requirements of the ROD and proposed the following:

1. Excavation of soil and mining residuals containing ≥3.1 ppm total PCBs within the Mining Residual Pile or outside the Facility Stormwater Collection Area (FSCA);
2. Excavation of soils containing ≥50 ppm total PCBs inside the FSCA;
3. Excavation of soils containing total radium ≥ 12 pCi/g. The 12 pCi/g is based on 10 pCi/g above background, which is estimated at 1 pCi/g Ra-226 background and 1 pCi/g Ra-228 background; and
4. Site restoration.

The RD and the RA work plan were approved on July 7, 1999.

Instead of waiting for use of the Fields Brook on-site landfill, Millennium had proposed using its own landfill, which is part of the Millennium complex of facilities within the Fields Brook watershed. EPA evaluated the landfill, consulted with Ohio EPA and Ohio Department of Health/Bureau of Radiation Protection, and made the determination that it met the definition of "on-site" and that the construction of the landfill was consistent with the requirements of TSCA. As such, EPA allowed for the disposal of remediation-related material from the Millennium Source Control cleanup.

The physical cleanup at the Millennium $TiCl_4$ property began in July of 1999. Approximately 700,000 cubic yards of PCB and radionuclide-contaminated soil was sent to the Millennium landfill for disposal. Because Millennium was exceeding the ROD-specified cleanup level for PCBs (implementing a 3.1

ppm cleanup instead of a 50 ppm cleanup for areas outside of the FSCA), Millennium utilized PCB field screening kits to supplement design estimates of the extent of contamination. This decision was based on the detection limit for the field screening kits and the presence of a clearly visible split between the underlying natural clays in the area and the soil/mining residual fill. PCB field screening results were periodically supplemented with lab verification samples to ensure that the field screening kits were providing results consistent with actual PCB concentrations.

The ROD cleanup requirements for the Millennium $TiCl_4$ Plant were based on the risk of recontamination of the Brook. The facility was not evaluated for a cleanup based on the current or projected use of the property. Millennium exceeded the ROD-required PCB and radium cleanups and expanded the cleanup to plant areas (within the FSCA) not deemed necessary under the ROD for the protection of Fields Brook.

Field work concluded in October 1999. Remedial Action excavation was officially completed with the approval of the Completion of Remedial Action Report on June 28, 2000. Additional work was later determined to be necessary and included:

1. **Completion of PCB Response Action under UAO V-W-08-C-833**

   In 2005, FBAG discovered pockets of DNAPL contamination in Fields Brook during its O&M sediment monitoring. During follow up excavation sampling in September 2007, liquid PCB product was discovered between the northern boundary of the fenced Millennium Plant 2 and the Fields Brook stream, in EU 8. Liquid PCBs and highly contaminated PCB soils were found during these excavation activities.

   On October 18, 2007, EPA issued a UAO to Millennium to address the PCB contamination.

   The closure data from the response action is presented in the "Final Report, Administrative Order V-W-08-C-883, Millennium Inorganic Chemicals TiCl4 Facility, Ashtabula, OH, November 2009". Some of the report's conclusions include:

   a) All soils were excavated in EU6 and EU8 with observed DNAPL or above PCB confidence removal goals (50 ppm). See Fig. 6-2 for excavation locations.
   b) A total of 24,644 tons of contaminated soils were shipped offsite for disposal in 1,146 truck shipments.
   c) Four groundwater interceptor trenches were installed between the Millennium operations area and Fields Brook. The trenches are periodically pumped out, treated, sampled, and then discharged to the Millennium process water ponds.

   On July 10, 2009, EPA issued a modification to the Fields Brook Statement of Work, that addressed the work completed by Millennium, and authorized the re-routing of Fields Brook in EU8 by FBAG. The Fields Brook re-routing project is discussed in the Section XI.2 for OUs 1 & 4 of this FYR Report, because it was carried out under the oversight of the FBAG.

   On May 18, 2010, EPA notified Millennium that it had completed all of its obligations under the UAO.

   The FBAG, reports the results of its required monitoring in the Brook (see Section XI for OUs 1 & 4 above). The results of the soil, sediment, and surface water data from 2015-2019 from the

grids in EU8 were not found to contain PCBs above the allowable residual level. EU8 is located directly north of the Millennium facility.

2. Groundwater Monitoring at Millennium Landfill

Significant quantities of PCB-contaminated soils were disposed of in Millennium's own industrial landfill, located approximately two miles east of its Plant 2 Site in Ashtabula. These soils were generated during the original cleanup of the plant in 1999, and during the more recent EU 8 removal action in 2007. The Site-Wide ESD issued in 1999 to address radionuclide contamination includes a requirement for 30 years of groundwater monitoring.

The landfill is under regulation by Ohio EPA. It operates as a RCRA Subtitle D landfill, pursuant to Ohio Administrative Code (OAC) 3745-29 (Permit & Operations), OAC 3745-30-08 (Ground Water Monitoring), and OAC 3745-37 (License). Under its current license, Ohio EPA requires annual monitoring for PCBs.

Monitoring of the landfill is discussed in the OM&M section below.

On December 10, 2015, Cristal made a request to discontinue the EPA requirement for quarterly PCB sampling at the Cristal Ashtabula Landfill. The requirements to sample were outlined in a letter from April 8, 1998 from EPA. Cristal has sampled the leachate, monthly, from May 1999 to December 2002 and monthly again starting January 2008 through March 2011. Cristal has sampled leachate quarterly in calendar years 2003-2007, and 2012-2015. In that time, PCBs have not been detected in the leachate. On December 22, 2015 EPA approved Cristal's request to discontinue quarterly sampling. Semiannual sampling for PCBs is expected to continue under terms of their Ohio EPA permit. Additionally, the portion of the landfill containing the PCB waste materials was capped in 2011 (As described in letter in November 16, 2011).

Institutional Controls

Table 7: 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 Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Soil and Groundwater	Yes	Yes	Survey Drawing Exhibit C of Covenant	A. Entire 28 acre plant property is restricted to commercial/ industrial use, and consumptive use of groundwater is prohibited. B.1.5 acre "Restricted Zone" is further restricted to prohibit any intrusive activity that might disturb PCB DNAPL or Fields Brook.	EC pursuant to Ohio UECA , recorded February 10, 2011, SDMS #421768

A map of the parcel with the recorded ICs is shown on Fig. 1-13. The plant property is outlined in yellow, and the Restricted Zone is shaded gray.

Status of Access Restrictions and ICs: ICs are non-engineered instruments, such as administrative and legal controls that help to minimize the potential for human exposure to contamination and that protect the integrity of the remedy. For source areas at the Fields Brook Site, the original Source Area ROD required ICs where hazardous substances, pollutants or contaminants will remain above levels that could re-contaminate the Brook above cleanup levels, and to maintain the integrity of the remedy.

On September 23, 2009, EPA issued an ESD changing the IC requirements for three of the Fields Brook Source Areas, including OU6. The current requirement, for deed restrictions to limit the future use of the Site and to protect the cover system and drainage controls, was replaced with the following:

1. Deed restrictions will be implemented to restrict future use of the plant property to industrial uses; and
2. Maps of areas which require restrictions will be developed as part of the IC Work Plan.

Millennium recorded an EC, pursuant to Ohio UECA, in February 2011. The EC in place restricts its entire plant property to industrial use and applied additional restrictions on intrusive activity in a zone immediately north of its plant boundary in the Fields Brook floodplain (roughly corresponding to the "Non-Traffic Area"), in the area of the PCB excavation into which Fields Brook was relocated. See Section VI.2 for OUs 1 & 4 of this FYR Report for a discussion of the EU8 Fields Brook relocation project.

The area of the plant within the FSCA had a CUG of 50 ppm PCB. Millennium met this goal, with most confirmation samples in the "December 2009 PCB Investigation Report" being non-detect, and a maximum detect of 6.1 ppm, and the average concentration would be well below the 3.1 ppm objective previously achieved outside the FSCA.

Current Compliance: Based on the FYR inspection, EPA is not aware of Site or media uses which are inconsistent with the stated objectives to be achieved by the ICs. The remedy appears to be functioning as intended.

IC Follow up Actions Needed: A LTS Plan for the Source Area OUs should be developed and implemented to ensure that the ICs are maintained, monitored and enforced at Source Area properties, so that the remedy continues to function as intended.

Long-Term Stewardship:

Since compliance with ICs is necessary to assure the protectiveness of the remedy, planning for LTS is required to ensure that the ICs are maintained, monitored and enforced at Source Area properties, so that the remedy continues to function as intended. LTS involves assuring effective procedures are in place to properly maintain, monitor and enforce the ICs. A LTS Plan (or revision to an OM&M Plan) should be completed to document LTS procedures. LTS procedures should describe at a minimum: (1) monitoring activities and schedules; (2) responsibilities for performing each task; (3) reporting requirements; and (4) a process for addressing any potential IC issues that may arise during the reporting period. The LTS Plan should include the LTS components as outlined in the ICIAP guidance titled "Institutional Controls: A Guide to Preparing Institutional Control Implementation and Assurance Plans at Contaminated Sites," OSWER 9200.0-77.

A report should be submitted regularly to EPA to demonstrate: that the Site was inspected to ensure no inconsistent uses have occurred; that ICs remain in place and are effective; and that any necessary

contingency actions have been executed. Results of IC reviews should be provided to EPA in an annual/biennial ICs report and with a certification that the ICs remain in-place and are effective. Finally, development of a communications plan and use of the State's one call system shall be explored (see notes related to North Sewer OU7).

Systems Operations/Operation & Maintenance

OM&M at the Millennium landfill, which includes groundwater monitoring for PCBs and radionuclides, is being performed in conjunction with Cristal Ashtabula Landfill's license requirements with the State of Ohio.

Through 2015, Cristal provided EPA with a summary of the quarterly leachate monitoring results on an annual basis. Leachate and groundwater monitoring results for PCBs and radium from the Millennium landfill over 2014-2015 show that the landfill is successfully containing the PCBs and radium as no concentrations above action levels have been seen. In August 2018, EPA inspected the section of the Cristal Landfill where contaminated soils were placed in 1999. The contaminated soils are now covered with approximately 50 ft of filter cake material, and approximately half of the area was permanently capped in 2011.

In 2007-2008, interceptor trenches were installed between the Plant operational, upland area and the floodplain to intercept any migration from potential sources of PCBs remaining onsite (for example, under process equipment that is effectively capped). The trenches were constructed to capture any free product migrating towards the Brook in sumps located in the center of each trench. The trenches span the length of the operational areas of the TiCl4 Plant in order to capture any material migrating from these areas (See discussion in Section VIII.2, Status of Implementation, Part 1.) The terms of the UAO do not require Cristal to provide EPA with monitoring information from these trenches, but data voluntarily provided in April 2014 through April 2019 show that groundwater in these trenches is currently non-detect for PCBs. Development and implementation of an OM&M Plan to support long term monitoring of the trenches would be beneficial to ensure that the source control activities implemented have and will continue to be effective in preventing migration of any PCBs into the interceptor trenches.

VIII.3 OPERABLE UNIT 6: 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.

Protectiveness Determinations/Statements from the 2014 FYR

Table 8: Protectiveness Determinations/Statements from the 2014 FYR

OU #	Protectiveness Determination	Protectiveness Statement
6	Protective	The remedy at the Millennium TiCl4 Plant Source Area (OU6) is protective of human health and the environment. The cleanup in non-plant areas exceeded ROD requirements by excavating to a stricter cleanup level and meets the remedial action objective of preventing recontamination of Fields Brook in excess of PCB and radium cleanup goals. An effective EC is in-place in the plant area and EU 8 where excavation of PCB and DNAPL contaminated soils occurred, but contamination remains above levels appropriate for unrestricted use.

Status of Recommendations from the 2014 FYR

There were no issues nor recommendations affecting current nor future protectiveness of the remedy identified in the 2014 FYR.

VIII.4 OPERABLE UNIT 6: FYR PROCESS

Data Review

A list of technical reports and administrative records reviewed to support the remedy are included in Appendix A-Reference List. The data were analyzed, and the general observations include:

1. No soil samples taken in EU8 exceed applicable CRGs.
2. Surface water samples from EU8 indicate that the liner system is effectively protecting the Brook.
3. In 2007, interceptor trenches were installed between the Plant operational, upland area and the floodplain to intercept any migration from potential sources of PCBs remaining onsite (for example, under process equipment that is effectively capped). The trenches were constructed to capture any free product migrating towards the Brook in sumps located in the center of each trench. The trenches span the length of the operational areas of the TiCl4 Plant in order to capture any material migrating from these areas. Voluntarily monitoring by Cristal, outside of the ROD or UAO show that source control activities implemented appear to be effective in preventing the migration of any PCB's into the interceptor trenches from the Cristal property.

Site Inspection

The inspection of the Millennium/Cristal OU6 was conducted on 8/22/2018. In attendance were Jenny Davison, EPA; Regan Williams, Ohio EPA; and William Earle (EPA Contractor for SulTRAC). Mark

McIntyre, representing Millennium Group participated. The purpose of the inspection was to assess the protectiveness of the remedy. No formal interviews were conducted as part of the fourth FYR. The Site inspection included observations of the previous historical locations that were cleaned up under the remedy along the northern property line, the Brook (EU8) and the northern trench and sumps. See the Site Inspection Checklist (Appendix B, Section 3) and Photos for additional details (Appendix C). After the inspection, EPA followed up to request additional information regarding the status of the remedial actions. Cristal informed EPA that they have taken proactive measures to monitor the trenches along their northern property line. The trenches are sampled quarterly and analyzed by an external lab. All sample results for PCB have been non-detect since May 2014. All source control activities implemented appear to be effective in preventing the migration of PCBs into the interceptor trenches from the Cristal property.

VIII.5 OPERABLE UNIT 6: TECHNICAL ASSESSMENT

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

Question A Summary:

Yes. The remedy is functioning as intended by the decision documents. There is no data to indicate that the Millennium property is a current source of contamination to Fields Brook. The soil and sediment removal performed under the 2007 UAO was completed in accordance with established removal objectives for the site and meeting the CRGs. Effective ICs are in-place.

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

Question B Summary:

Yes. There have been no changes to the PCB or radium cleanup requirements for the facility. The RAOs for the Millennium $TiCl_4$ Plant Source Area OU6 are still valid.

The Source Control OU2 ROD was issued in 1997. The ROD and supporting risk assessment assumed a carcinogenic slope factor of 7.7 (mg/kg)/day for PCBs. A slope factor is a means of indicating the relevant potency of a cancer causing chemical. Since issuance of the Source Control OU2 ROD, the recommended slope factor for PCBs has been modified. On November 9, 1999, EPA issued updated regulations regarding PCB toxicity, recommending a range of dose response slopes. The new regulations changed the single-dose cancer potency factor of 7.7 (mg/kg)/day to a range from 0.07 (mg/kg)/day (lowest risk and persistence) to 2.0 (g/kg)/day (high risk and persistence). The slope factor used for the development of the Fields Brook cleanup standards is slightly more conservative than that currently used. No additional remedial actions are necessary based on the reevaluation of PCB toxicity.

On April 11, 2000, EPA issued Directive 9200.4-35P, "Remediation Goals for Radioactively Contaminated CERCLA Sites Using the Benchmark Dose Cleanup Criteria in 10 CFR Part 40 Appendix A, I, Criterion 6(6)." This guidance recommends the cumulative evaluation of radionuclides to ensure that the residual concentration of radionuclides does not exceed the radium standard identified in 40 CFR 1912.12 (OSWER Directive 9200.4-25). EPA has evaluated the types and concentrations of the radionuclides that were present at the Site and has determined that radium-226 and radium-228 were appropriately identified as the primary radionuclide contaminants of concern. Any thorium contamination would have been co-located with the radium, and thus sufficiently addressed at the time

of cleanup. The EPA has found that the radionuclide cleanup standards implemented at the Site remain protective.

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

No. No other information has come to light that would cause the Agency to question the protectiveness of the remedy.

VIII.6 OPERABLE UNIT 6: ISSUES/RECOMMENDATIONS

Issues/Recommendations				
OU(s) without Issues/Recommendations Identified in the FYR:				
None				
Issues and Recommendations Identified in the FYR:				
OU(s): OU6	**Issue Category: Operations and Maintenance**			
	Issue: There is inadequate monitoring of the interceptor trenches for potential recontamination of Fields Brook.			
	Recommendation: Develop and implement an OM&M Plan to monitor and respond to any collected material in the interceptor trenches so that is appropriately removed for treatment and disposal, and to prevent recontamination of the Brook.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	5/22/2022
Issues and Recommendations Identified in the FYR:				
OU(s): 6	**Issue Category: Institutional Controls**			
	Issue: Procedures are not in place to ensure LTS of ICs at the Site.			
	Recommendation: Develop and implement a LTS Plan for monitoring and tracking compliance with existing ICs, communicating with EPA, and providing an annual certification to EPA that the ICs remain in place and are effective.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	5/23/2022

VIII.7 OPERABLE UNIT 6: PROTECTIVENESS STATEMENT

Protectiveness Statement(s)	
Operable Unit:	*Protectiveness Determination:*
OU6	Short-term Protective
Protectiveness Statement:	
The remedy at the Millennium TiCl4 Plant Source Area (OU6) currently protects human health and the environment. The cleanup in non-plant areas exceeded ROD requirements by excavating to a stricter cleanup level and meets the remedial action objective of preventing recontamination of Fields Brook in excess of PCB and radium CUGs. An effective IC is in-place in the plant area and on EU8 where excavation of PCB and DNAPL contaminated soils occurred to prevent recontamination of the Brook. However, in order for the remedy to be protective in the long-term, the following actions need to be taken to ensure protectiveness: develop and implement an OM&M Plan to monitor and respond to any collected material in the interceptor trenches so that is appropriately removed for treatment and disposal, and to prevent recontamination of the Brook; and develop and implement a LTS Plan for monitoring and tracking compliance with existing ICs, communicating with EPA, and providing an annual certification to EPA that the ICs remain in place and are effective.	

IX. OPERABLE UNIT 7: NORTH SEWERS SOURCE AREA

IX.1 OPERABLE UNIT 7: INTRODUCTION

OU Summary

The purpose of this FYR is to determine if the remedy selected to address the contamination at the North Sewers Source Area (OU7) of the Fields Brook Superfund Site remains protective. The remedy, which only addressed potential sources of recontamination to Fields Brook included the closure, grouting and replacement of three storm and industrial outfall process sewers that contained sediment with elevated levels of PCBs and other organic constituents. The cleanup of the North Sewers was initiated in September 2000 and completed in October of 2000. EPA issued a letter on May 14, 2001, approving the completion of RA and the submittal of the Remedial Action Report.

Background, Land and Resource Use

The North Sewers are located in the northwest portion of the industrialized area near Fields Brook (top half of Fig. 7-1). Three sewers were identified as part of OU7:

· Combined Sewer - The RI identified this sewer, commonly referred to as the North Sewer, as a 48-in diameter reinforced concrete combined storm and facility outfall sewer. The sewer was later found to be 42 inches in diameter. The sewer is approximately 2,400 ft in length and runs along the west side of State Road, north of Fields Brook. The sewer was partially blocked in certain parts by debris which includes bricks, wood, sediment, and pieces of concrete. The North Sewer accepted surface and facility outfall water, which at several locations included plant surface water run-off, process water and sanitary effluent. On-site treatment of sanitary waste

was handled by all facilities that discharged to the sewer. No untreated process and sanitary effluent water entered the combined sewer system. The combined sewer collected outfall water from three facilities (the former Occidental Chemical facility, RMI Sodium, and Detrex) through three outfalls located at East 6th Street and State Road.

- Storm Sewer - The RI identified a 5-in. vitrified clay storm water sewer that is approximately 250 ft in length. It runs from the southwest corner of the intersection of State Road and East 6th Street, south to join the north end of the combined sewer on the west side of State Road, north of Fields Brook. This sewer was later determined to have a 6-in. diameter. This sewer line collected storm water from the RMI Sodium property and discharged into a manhole located at the former Occidental Chemical outfall.

- Detrex Outfall Sewer - This sewer connected the Detrex facility with the combined sewer. A portion of the sewer was constructed of polyvinyl chloride (PVC) and was relatively free of sediment. This PVC sewer section discharged to a manhole that contains an older section of sewer line that crosses under State Road to connect to the combined sewer. This sewer transferred water from the Detrex water treatment system to the combined sewer.

History of Contamination

The Source Control RI found that sediment in these storm and outfall process facility sewers were a source of potential recontamination to Fields Brook.

- Combined Sewer - Sediment samples from the combined sewer had concentrations of benzo(a)pyrene and hexachlorobenzene that ranged from 1.9 ppm to 11 ppm and 13 ppm to 5,800 ppm, respectively.

- Storm Sewer - A sediment sample from this storm sewer had a 5.4 ppm concentration of benzo(a)pyrene.

- Detrex Facility Outfall Sewer - A sediment sample was collected within a manhole on the east side of State Road in the northwest corner of the Detrex property. This manhole is between the Detrex facility sewer and the combined sewer that eventually discharges to Fields Brook on the west side of State Road. The sediment sample was collected from the bottom of the manhole where the sediment accumulates. This sediment had concentrations of 1,1,2,2-tetrachloroethane, 1,1,-dichloroethene, tetrachloroethene, benzo(a)pyrene, hexachlorobenzene, hexachlorobutadiene, hexachloroethane, heptachlor and gamma-BHC (Lindane).

IX.2 OPERABLE UNIT 7: RESPONSE ACTION SUMMARY

Basis for Taking Action

Evaluations of contamination at the North Sewers as described above led EPA to believe that they were a potential source of recontamination to the Brook.

From 1989 through 1997, as part of the RI/FS process for the Source Areas, the Fields Brook PRPs evaluated areas of potential contamination within the Fields Brook watershed to determine whether they

were a source of past contamination or could cause future recontamination once the Brook cleanup is underway. The North Sewers were determined as one of the sources of contamination or potential contamination to Fields Brook. Additional details about RI/FS for the Source Areas are discussed in Section VII.2 "Basis for Taking Action."

Response Actions

Remedial actions for the North Sewers OU7 were selected in the September 29, 1997 Source Control ROD. Although a RAO was not specifically called out in the Source Control ROD, the goal of the Source Control OU is to remediate source areas that have the potential to cause sediment contamination to Fields Brook and its tributaries, thereby preventing the recontamination of the areas that will be addressed by the Sediment OU1 and FWA OU4. The selected remedy for the North Sewer source control area required the cleaning of the sewers. If the sewers could not be cost-effectively cleaned, sewer sections would be fully grouted to contain sediment and debris within the pipe. Where ICs were required, those controls were intended to limit the future use of areas to ensure that contamination does not migrate to the Brook. Specifically, the remedy included the following activities and was implemented by the North Sewer Source Area Group. A chronology of significant events is included in Appendix D.

1. Cleaning of Sewer Lines and Catch Basins

For portions of the sewer that could be cleaned, the remedy required the removal of sediment and debris from inside the sewer lines and the associated catch basins to reduce the potential of recontamination of the Fields Brook sediments in excess of CUGs. Sediment removal would be accomplished by cleaning the inside of the sewer using manual and mechanical techniques to remove sediment, followed by rinsing. Selection of the equipment to be used was to be based on the size and conditions of the sewer lines at the time of work activities. The equipment selected would be capable of removing sediments, dirt, grease, rocks, and other foreign materials. Mechanically powered cleaning equipment consists of belt-operated buckets and a power rodding machine that are powerful enough to remove sediments and large debris from the sewer lines. Rinsing equipment would include a high velocity gun for washing and scouring sewer walls and floors.

2. Sediment Containment

Sewer sections that could not be cost-effectively cleaned were to be filled with grout to contain contaminated sediment and debris. The sediments in this sewer segment would be contained by filling the sewer pipe with a cement grout to restrict flow in the sewer and prevent migration of sediments into Fields Brook. The sewer segment would be plugged at both ends before grouting proceeds. Lean cement grout or fly ash grout would be used to grout the inner space of the sewer. Grouting would be accomplished from both ends and at several locations along the sewer pipe. Grout holes would be drilled at the crest of the sewer pipe through the overburden. Grout pipes would be inserted through the grout holes to pump the grout. Vents would be installed to allow air and water in the sewer to escape as it is replaced with the grout material. Sections of the existing sewer line that were to be grouted were to be abandoned and replaced with a new sewer diversion line.

3. Institutional Controls

ICs were to be implemented to control excavation into sewers that have been sealed to contain contaminants and to define handling and disposal requirements for such sewers.

Status of Implementation

EPA issued a UAO (V-W-98-C-446) for the performance of the North Sewer Sewers RD/RA on December 24, 1997. A modification to the UAO became effective February 18, 1998.

The PRPs evaluated the possibility of cleaning and restoring the existing sewers. However, because of the depth and condition of the sewers and the large amount of utility lines running near the sewers, the PRPs determined that it was more practical to close the sewers and build new sewer lines. The Source Control ROD accepted either approach. The RD for the abandonment work was approved on June 1, 2000. Based upon discussions held during the RD process, it was agreed that grouting to a minimum depth of 6 inches would sufficiently fixate the accumulated sediment. This would be done in conjunction with plugging the end of the combined sewer and all connections and constructing replacement sewer lines.

Prior to the abandonment and closure of the North Sewer, each facility completed rerouting of stormwater and wastewater that formerly discharged into the North Sewer. Each facility individually rerouted their NPDES outfalls in the summer of 2000. The proposed design of each of these rerouted outfalls was reviewed and approved by the Ohio EPA Division of Surface Water prior to construction. Because the construction of replacement storm sewers was not within the scope of the RA, EPA did not oversee the design and construction of the new sewer lines.

The abandonment of the North Sewers was completed during September and October of 2000, with the Completion of Remedial Action report approved on March 27, 2001.

The former Detrex outfall was abandoned on Detrex property when the new outfall was installed. The old line was not grouted, but a large section was cut and removed to allow for the installation of the slurry wall on the Detrex property. Connections to a former RMI outfall and a former Occidental Chemical outfall were accessible through manholes and closed by brick and mortar. The 6-in. storm sewer was plugged with a commercial expansion plug. The 6-in. storm sewer was located in a common manhole with the former Occidental Chemical outfall. After the brick and mortar closure of the Occidental Chemical and RMI outfalls had cured, concrete was poured into the manholes to a level corresponding with the ground surface.

In addition to the closure of connections for sewers entering the North Sewer, the North Sewer outfall to Field Brook was also closed. As part of the remedial action, a wooden form was constructed around the North Sewer outfall at Fields Brook and the pipe was filled with concrete, forming a plug five feet in length.

Within the North Sewer itself, lean concrete grout was poured into the sewer through vertical access shafts. At each shaft enough grout was poured in to achieve a depth of 6 inches, sufficient to immobilize sediment within the sewer. In addition to the grouting, concrete was poured at three access shaft locations to ensure adequate sewer closure.

Some additional contaminated soil removal occurred near the former outfall of the North Sewers when Ashtabula County replaced the State Road Bridge over Fields Brook in 2010. Environmental oversight was provided by FBAG and Ohio EPA to ensure that disposal requirements were met and that the bridge construction did not re-contaminate the Brook.

No active remedial activities have taken place on OU7 since the last FYR. Detrex continued to monitor a DNAPL/groundwater collection sump installed beneath the south end of the North Sewer easement in 2018. This sump is monitored under Detrex OM&M program. No DNAPL or significant VOC releases have been observed in the sump.

Institutional Controls

Table 9: 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 Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Soil and Grouted Pipe	Yes	Yes	2400' Sewer Easement	Public shall be notified and no construction or other activity should be undertaken which would disrupt, disturb, interfere or otherwise breach pipe.	Affidavit of Facts Related to Title to Real Property, 10/25/04

A map of the Exhibit referenced in the recorded Affidavit of Facts, showing the North Sewers location and adjacent property owners is shown on Figure 7-2.

Status of Access Restrictions and ICs: For source areas at the Fields Brook Site, ICs are required where hazardous substances, pollutants or contaminants could re-contaminate the Brook above cleanup levels, and to maintain the integrity of the remedy. ICs are required at the North Sewer line portion of the North Sewers OU7 because contaminated sediment is contained within the sewer. On November 30, 2004 a notice was provided to EPA that transmitted an Affidavit of Facts (also called a "deed notice") that was recorded in October 2004, on three parcels overlying the North Sewer. The Affidavit states that "the public be notified of such work and made aware that no construction or other activity should be undertaken which would disrupt, disturb, interfere with or otherwise breach such grouted and sealed sewer pipe."

Considering the relatively low concentration of contaminants that are present within the grouted sediment, EPA determined that the deed notices provide sufficient protectiveness for the maintenance of the implemented remedy. The deed notice to control excavation into the North Sewer and disturbance of the grouted material appears to be effective. However, in December 2018, a Utility company contacted EPA regarding a proposed installation of a gas main that appears to run along the right of way along the entire length of the North Sewer. Following the conversation, it was determined that information on the restrictions would not be available in the Public Utilities Commission of Ohio (PUCO) inquiry. PUCO stated if they got a request for work in the area they would call the Ashtabula County Environmental

Services Department (ACESD). Ashtabula County does not have records of this abandoned sewer as it was privately owned.

Current Compliance: Based on the FYR inspection, EPA is not aware of Site or media uses which are inconsistent with the stated objectives to be achieved by the ICs. The remedy appears to be functioning as intended.

IC Follow up Actions Needed: The ICs were recorded in 2004, prior to Ohio promulgating the UECA. A review regarding recording this information on specific parcels (specifically parcel three in the Affidavit of Facts which does not have an address or parcel ID number) should be completed to determine if it covers the entire Northern Sewer. In addition, the effectiveness of the 2004 Affidavit should be re-evaluated to ensure long-term protectiveness. A LTS Plan should be developed and implemented to ensure that the ICs are maintained, monitored and enforced at Source Area properties, including the North Sewer OU7, so that the remedy continues to function as intended.

Long Term Stewardship: Since compliance with ICs is necessary to assure the protectiveness of the remedy, planning for LTS is required to ensure that the ICs are maintained, monitored and enforced so that the remedy continues to function as intended. Long-term stewardship involves assuring effective procedures are in place to properly maintain, monitor and enforce the ICs as well as remedy components. A LTS Plan should be developed and implemented to include procedures to ensure LTS such as regular inspection of the engineering controls and access controls at the Site and review of the ICs for the Site. The plan should also include a requirement for certification to EPA that ICs are in place and effective. Finally, development of a communications plan and use of the State's one call system should be explored.

Systems Operations/Operation & Maintenance

The North Sewers have been abandoned and no further monitoring or maintenance is required. The sewers were grouted to prevent future use, the ends of the sewer and connections were capped, and replacement sewers were constructed.

IX.3. OPERABLE UNIT 7: 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.

Protectiveness Determinations/Statements from the 2014 FYR

Table 10: Protectiveness Determinations/Statements from the 2014 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1	Protective	The remedy for the North Sewers Source Area (OU7) is protective of human health and the environment. The sewers have been closed and grouted and are no longer in use, and there is no mechanism for any sediment within the sewers to move to the Fields Brook since it has been rendered immobile. ICs are in place to prevent activities that would disrupt or disturb the grouted and sealed sewers.

Status of Recommendations from the 2014 FYR

There were no issues nor recommendations affecting current nor future protectiveness of the remedy identified in the 2014 FYR.

IX. 4 OPERABLE UNIT 7: FYR PROCESS

Data Review

Since there is no monitoring of environmental media, there was no data to review during the FYR period.

Site Inspection

The inspection of the North Sewer Source Area OU7 was conducted on 8/21/2018. In attendance were Jenny Davison, EPA; and William Earle (EPA Contractor for SulTRAC). The purpose of the inspection was to assess the protectiveness of the remedy. No formal interviews were conducted as part of the fourth FYR. A visual observation of the land along the right-of-way overlying the abandoned sewer for OU7 showed that there did not appear to be any recent construction along areas along State Road where the current North Sewer is located. Due to the remedy being an abandoned underground sewer, EPA did not take photos or interview owners of the properties overlying the abandoned North Sewer as part of this FYR.

IX.5 OPERABLE UNIT 7: TECHNICAL ASSESSMENT

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

Question A Summary:
Yes. The abandonment of the sewers has addressed concerns about accumulated sediment moving from the sewers to the Brook. Since the North Sewers have been closed and grouted, historical sediment and debris accumulated in the sewers can no longer flow into Fields Brook. ICs in the form of a deed notice are in place to prevent disturbance of the grouted sediment within the combined sewer and appear to be effective. A review of the effectiveness of the 2004 Affidavit of Facts deed notice (pursuant to Ohio's UECA) and a LTS Plan should be developed and implemented to ensure the ICs are effective, maintained and monitored.

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

Question B Summary:
Yes. The RAOs for the North Sewers Source Area is still valid. The goal of the cleanup was to eliminate sources of possible recontamination to Fields Brook. Issues related to cleanup standards are not relevant to this cleanup, because historical sediment within the North Sewer has been immobilized.

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

No. No other information has come to light that would cause the Agency to question the protectiveness of the remedy.

IX.6 OPERABLE UNIT 7: ISSUES/RECOMMENDATIONS

Issues/Recommendations				
OU(s) without Issues/Recommendations Identified in the FYR:				
None				
Issues and Recommendations Identified in the FYR:				
OU(s): 7	**Issue Category: Institutional Controls**			
	Issue: Procedures are not in place to ensure LTS of ICs at the Site.			
	Recommendation: Develop and implement a LTS Plan for monitoring and tracking compliance with existing ICs, communicating with EPA, and providing an annual certification to EPA that the ICs remain in place and are effective.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	5/23/2022
OU(s): 7	**Issue Category: Institutional Controls**			
	Issue: The deed notice was recorded in 2004, prior to Ohio promulgating the UECA.			
	Recommendation: Evaluate the effectiveness of the current ICs.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	5/23/2022

IX.7 OPERABLE UNIT 7: PROTECTIVENESS STATEMENT

Protectiveness Statement(s)	
Operable Unit:	*Protectiveness Determination:*
OU7	Short-term Protective
Protectiveness Statement:	
The remedy for the North Sewers Source Area (OU7) currently protects human health and the environment. The sewers have been closed and grouted and are no longer in use, and there is no mechanism for any sediment within the sewers to move to the Fields Brook since it has been rendered immobile. ICs are in place to prevent activities that would disrupt or disturb the grouted and sealed sewers. However, in order for the remedy to be protective in the long-term, the following actions need to be taken to ensure protectiveness: evaluate the effectiveness of the current ICs; and develop and implement a LTS Plan for monitoring and tracking compliance with existing ICs, communicating with EPA, and providing an annual certification to EPA that the ICs remain in place and are effective.	

X. OPERABLE UNIT 8: ACME SCRAP IRON AND METALS AND SOUTH SEWERS SOURCE AREA

X.1 OPERABLE UNIT 8: INTRODUCTION

OU Summary

The purpose of this FYR is to determine if the remedy selected to address the contamination at the Acme Scrap Iron and Metal and South Sewers Source Area (OU8) of the Fields Brook Superfund Site remains protective. The remedy, which only addressed potential sources of recontamination to Fields Brook required the excavation of PCB-contaminated soil and the cleaning of the sewers, with long-term monitoring to ensure that residual PCB-contaminated soil and sediment does not move into Fields Brook in excess of CUGs. The scope of the cleanup was limited to actions necessary to protect Fields Brook from recontamination.

The Acme OU8 property remedial action included the cleaning of the property's storm sewers, commonly known as the South Sewers, to remove accumulated sediment that could adversely impact Fields Brook. The storm sewer from the Acme OU8 property still empties into Fields Brook and sediment that accumulated in the discharge pipe was with a temporary weir and analyzed for PCBs. Since not all eroded soils were collected in the storm sewer system, samples were also collected from a drainage ditch on site. Monitoring commenced in 2001. The frequency of sampling was initially every six months. After three sampling events, monitoring was reduced to yearly. The historical monitoring of sediment from stormwater runoff demonstrated that the risk of recontamination was abated. No additional sediment or surface water monitoring was required by EPA after 2006.

Background Land and Resource Use

Physical Characteristics

The Acme Scrap portion of OU8 is located in the southwest portion of the industrialized area near Fields Brook (Fig. 8-1). Structures at the Site include former manufacturing plant buildings, loading and unloading areas, drum storage areas, and an oil retention lagoon.

The South Sewer portion of OU8 consists of a 36 to 48-inch diameter sewer east of State Road that runs between the Acme facility and Fields Brook. A 30-inch outfall sewer connects the former oil retention pond on the Acme property to the catch basin at the corner of the intersection of State and Middle Roads. See bottom half of Fig. 7-1.

Land and Resource Use

The Site is currently vacant but was previously a scrap recycling facility. The Site was owned by the U.S. Government in the late 1940s and was later sold to National Carbide Corporation. Specific industrial activities by the U.S. Government and National Carbide are not known. However, the Acme Site was operated as a calcium carbide manufacturing plant from 1943 until 1952. The facility was then vacant until 1974, when Acme purchased the property and used it as a recycling facility. The property was purchased in December 2001 by Lakeside Industrial Park and Railyard, Inc. (Lakeside). During the 2014 FYR, Lakeside evaluated possible industrial development options for the remainder of the property, which includes the response area.

History of Contamination

In the past, Acme dismantled and recycled transformers to recover copper, aluminum, and steel for resale as scrap metal. On several occasions, the cutting operation used to dismantle the transformers would set the residual oil on fire. Oil containing PCBs may have been released into the environment from the transformers during this process. A preliminary assessment of the Acme facility in 1985 identified the chemicals of interest to include PCBs and several metals, including aluminum, arsenic, copper, iron, lead, mercury and zinc.

X.2. OPERABLE UNIT 8: RESPONSE ACTION SUMMARY

Basis for Taking Action

Evaluations of PCB concentrations in the storm sewer system at the Acme property and in the surface soils led EPA to believe that Acme was a potential source of recontamination to the Brook.

From 1989 through 1997, as part of the RI/FS process for the Source Areas, the Fields Brook PRPs evaluated areas of potential contamination within the Fields Brook watershed to determine whether they were a source of past contamination or could cause future recontamination once the Brook cleanup is underway. The Acme property was determined as one of the sources of contamination or potential contamination to Fields Brook. Additional details about RI/FS for the Source Areas are discussed in Section VII.2 “Basis for Taking Action.”

Response Actions

Remedial actions required for the Acme Scrap Iron and Metal property and the associated South Sewers were selected in the 1997 Source Control ROD. EPA issued a UAO (V-W-98-C-451) for the performance of the Acme Scrap and South Sewers RD/RA on December 29, 1997. A modification to the UAO became effective February 18, 1998 (letter dated February 20, 1998). Although a RAO was not specifically called out in the Source Control ROD, the goal of the Source Control OU is to remediate source areas that have the potential to cause sediment contamination to Fields Brook and its tributaries, thereby preventing the recontamination of the areas that will be addressed by the Sediment OU1 and FWA OU4. A chronology of significant events is included in Appendix D.

Acme Scrap Iron Property: The selected remedy for the Acme property included the excavation of soil with PCB concentrations greater than or equal to 50 ppm. The ROD called for the excavated soil to be either disposed of at the on-site landfill or at an off-site landfill, whichever was more cost-effective. More specifically, the selected remedy included the following components:

1. Clear Scrap, Debris and Vegetation / Remove Physical Hazards

   In order to implement the remedial action, scrap, debris and vegetation were to be cleared in response and work areas. Physical hazards (i.e., unstable building sections) that could threaten worker safety also had to be addressed prior to implementation of the remedial action.

2. Excavation of Soils with Total PCB Concentrations ≥ 50 ppm

   The ROD required excavation of soils with total PCB concentrations greater than or equal to 50 ppm. Based on existing data, it appeared that limiting excavations to a depth of approximately 1 foot would remove all TSCA-regulated soil. However, the remedy required removal of all TSCA-regulated soils (≥ 50 ppm PCBs), regardless of depth. Therefore, if areas of additional contamination were to have been identified, the excavation depth would have been adjusted accordingly. The ROD specified that additional soil samples were to be collected during the RD phase to further delineate the design remedial response area and ensure that the PCB contamination is not present on other areas of the Acme property.

   Upon excavation, the soil was to be placed in lined roll-off containers or dump trucks for transportation to either the on-site landfill or to an off-site landfill. Verification sampling could be required to ensure removal of TSCA-regulated soils. Following completion of excavation activities, the excavated areas were to be backfilled with clean soil and graded to allow for adequate drainage. Any disturbed areas not receiving an erosion control cover were to be graded and seeded, as necessary.

3. Refinement of Area to Be Covered

   As part of the RD, soil loss calculations were to be reviewed to finalize the area to be covered. The cover areas have been developed based on current operations and include the proposed excavation area since it is located within the cover interior. The areas could be altered during RD if assumptions on future operations were revised and/or the RD included consolidation.

4. Construction of Cover, Surface Drainage Controls

   For the cover areas, the erosion control cover materials consisted of a 12-inch thick layer of clean soil, an erosion control blanket and would be vegetated to reduce the potential for erosion. For anticipated future traffic areas, a 6-in. gravel layer underlain by geotextile was used instead of the soil.

5. Institutional Controls

   Specifically, the 2009 ESD stated that ICs were required to prevent recontamination of Fields Brook, limit land use to industrial use, and to provide EPA access.

South Sewers: The South Sewers discharge into Fields Brook and potentially discharged run-off with contaminated soils and sediment. There was concern that such accumulated material could move into the Brook and lead to exceedances of sediment and soil CUGs. The Source Control ROD identified the following actions to eliminate the risk of recontamination of Fields Brook from the South Sewers:

1. Removal of sediment and debris from inside the sewer lines and the associated catch basin.
2. For any portions of sewers that were blocked and difficult to clean, these sections were to be closed off, and the sediment within the sewers contained. The sediments in these sewer segments was to be contained by filling the sewer pipe with cement grout to restrict flow in the sewer and prevent migration of sediments into Fields Brook.
3. For areas where sewers were to be closed-off, replacement sewers were to be constructed to connect the remaining sections of the sewers that have been cleaned.
4. Specifically, the ESD stated that ICs were required to prevent recontamination of Fields Brook, limit land use to industrial use, and to provide EPA access.

Status of Implementation

Acme Scrap Iron and Metal

The cleanup requirements at the Acme Scrap property were based on erosion of Acme soils through the storm sewer system to Fields Brook. Therefore, the cleanup standard was determined based on an evaluation of anticipated erosion from the property. Pre-design studies concluded that soils with contamination equal to or greater than 50 ppm would need to be removed to ensure that erosion would not lead to an exceedance of the PCB CUG at the Brook. Design studies also found that with the removal of soils with 50 ppm or greater PCBs, no cover would be required to ensure erosion would not exceed the cleanup standard at the Brook.

As part of the cleanup design, supplemental sampling was performed to clearly delineate PCB contamination areas so that verification sampling would not be necessary. EPA approved the RD on April 17, 2000 and the Remedial Action Work Plan on August 30, 2000. Construction commenced on September 11, 2000 and was completed on September 26, 2000. Approximately 2,085 cubic yards of PCB-contaminated soil was excavated and disposed in the Fields Brook on-site landfill. EPA issued a letter on March 17, 2003, approving the completion of the RA and the submittal of the Remedial Action Report.

South Sewers

As part of the RD for the South Sewers (which was included as part of the Acme Scrap RD, the PRPs for the South Sewers made a video inspection of the sewers and determined that the sewers could be effectively cleaned. Because of the limited amount of sediment within the sewers, it was agreed that a follow-up video inspection would not be required. EPA approved the RD on August 30, 2000. Each length of sewer line was cleaned a minimum of two times. Approximately 12,000 gallons of wash water was collected and sent to the Fields Brook water treatment system for treatment prior to discharge to Fields Brook. Collected sediment was transported to the Fields Brook landfill for disposal. The cleaning of the sewers was performed in September 2000. EPA issued a letter on March 17, 2003, approving the completion of the RA and accepting the report documenting the work performed at the site.

Institutional Controls

Table 12: 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 Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Soils	Yes	Yes	As presented in Recorded Covenant SDMS #357785	Limited to industrial use, EPA provided unrestricted access.	EC pursuant to UECA, recorded on March 9, 2010

A map of the parcel with the recorded IC is shown on Figure 8-2.

Status of Access Restrictions and ICs: For source areas at the Fields Brook Site, ICs are required where hazardous substances, pollutants or contaminants will remain above levels that could re-contaminate the Brook above cleanup levels, and to help ensure long-term protectiveness of the remedy. In 2009, an ESD was issued that clarified that intent of the IC objectives in the 1997 ROD. Specifically, the ESD stated that ICs were required for the Acme Scrap and South Sewers OU8 to prevent recontamination of Fields Brook, limit land use to industrial use, and to provide EPA access. An EC pursuant to Ohio's UECA was recorded on March 9, 2010 for the Lakeside Industrial Park and Railyard, Inc. property (former Acme Scrap property). A copy of the location of the ICs is included in the Deed. Paragraph 6 of the EC states that "This Environmental Covenant shall be binding upon the Owner and all assigns and successors in interest, including any Transferee, and shall run with the land, pursuant to ORC § 5301.85, subject to amendment or termination as set forth herein. The term "Transferee", as used in this Environmental Covenant, shall mean any future owner of any interest in the Property or any portion thereof, including, but not limited to, owners of an interest in fee simple, mortgagees, easement holders, and/or lessees."

A recent pull of the Parcel pins shows that that the parcel on Lakeside Industrial Park & Rail Yard, Inc. where the EC was recorded has been split into two parcels. It is recommended to conduct a title search to determine when properties were transferred, who the current owners are and whether the current owners are aware of the EC requirements. EPA was not notified in accordance with Paragraph 11 "Notice of Conveyance" when these properties were transferred.

Current Compliance: Based on the FYR inspection, while EPA is not aware of Site or media uses which are inconsistent with the stated objectives to be achieved by the ICs, a recent pull of the Parcel pins shows that that the parcel on Lakeside Industrial Park & Rail Yard, Inc. where the EC was recorded has been split into two parcels. EPA was not notified in accordance with Paragraph 11 "Notice of Conveyance" when these properties were transferred.

IC Follow up Actions Needed: A recent pull of the Parcel pins show that that the parcel on Lakeside Industrial Park & Rail Yard, Inc. where the EC was recorded has been split into two parcels. It is recommended to: conduct a title search to determine when properties were transferred; determine parcel owners via a title search; and ensure the current owners are aware of the EC requirements. EPA was not notified in accordance with Paragraph 11 "Notice of Conveyance" when these properties were transferred. It is also recommended to evaluate the existing ICs and determine whether additional ICs are needed. In addition, LTS Plan for the Source Area OUs should be developed and implemented to ensure that the ICs are maintained, monitored and enforced at Source Area properties, so that the remedy continues to function as intended.

Long-Term Stewardship: Since compliance with ICs is necessary to assure the protectiveness of the remedy, planning for LTS is required to ensure that the ICs are maintained, monitored and enforced so that the remedy continues to function as intended. LTS involves assuring effective procedures are in place to properly maintain, monitor and enforce the ICs. A LTS Plan should be developed and implemented to include procedures to ensure LTS such as regular inspection of the engineering controls and access controls at the Site and review of the ICs for the Site. The plan should also include a requirement for certification to EPA that ICs are in place and effective. Finally, development of a communications plan and use of the State's one call system shall be explored.

Systems Operations/Operation & Maintenance

Acme Property

From 2001-2006, post removal sediment monitoring was required to ensure that the Field Brook was protected from recontamination from the upland Acme OU8. Sediment from three locations were collected biannually from the fall of 2001 through 2003, and then collected annually 2004 through 2006. The results of the sampling demonstrated that residual PCB contamination from the Acme property was not moving off-site at concentrations that could lead to an exceedance of the PCB CUG in Fields Brook (February 1, 2007 Letter, Table page 2 summarizing results). The post removal OM&M Plan only required sampling through 2005, and after a review of the data in the final OM&M monitoring report (dated February 1, 2007), EPA determined the monitoring of sediment from the stormwater run-off demonstrated that the risk of recontamination had been abated. The 2009 FYR further documented that no further sediment sampling was required, and no additional OM&M was necessary, other than to assure that ICs remain in place.

South Sewers

The South Sewers were fully cleaned and remain in use. Because the storm sewer outfall at Fields Brook was one of the three monitoring points discussed above, the post removal OM&M for the South Sewers was addressed as part of the overall Acme facility OM&M. Since the storm sewers had been cleaned, the O&MM monitoring was for evaluating recontamination of the sewers from the Acme property. As described in the previous section monitoring showed that after the cleanup, the Acme Scrap Source Area

was not causing PCB CUG exceedances in Fields Brook. Based on a review of the data additional no additional O&M sampling is necessary (see Data Review).

X.3 OPERABLE UNIT 8: 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.

Protectiveness Determinations/Statements from the 2014 FYR

Table 12: Protectiveness Determinations/Statements from the 2014 FYR

OU #	Protectiveness Determination	Protectiveness Statement
8	Protective	The remedy for the Acme Scrap Iron and Metals and South Sewers Source Area (OU8) is protective of human health and the environment because it is functioning as designed. Monitoring demonstrates that the risk of recontamination of the Fields Brook has been abated. An Environmental Covenant was recorded with Ashtabula County on March 9, 2010 and will be regularly evaluated for protectiveness in future FYRs.

Status of Recommendations from the 2014 FYR

There were no issues nor recommendations affecting current nor future protectiveness of the remedy identified in the 2014 FYR.

X.4 OPERABLE UNIT 8: FYR PROCESS

Data Review

As discussed previously, environmental monitoring has not been required since 2006 and there was no data to review for this FYR period.

Site Inspection

EPA attempted to contact representatives of Lakeside Industrial and the listed owner on the title however, were unable to reach any representatives prior to the August 2018 FYR Site visit. EPA drove to the property entrance road on 8/20/2018, 8/21/2018, and 8/22/2018 to see if a contact was onsite, but did not observe anyone working on the property. Based on observations from the driveway, the Site was still used as an industrial property and scrap yard. Many of the buildings were in poor condition and the roof had collapsed on parts of the building (Appendix C). Due to the integrity of the buildings onsite, EPA did not walk around. Photos of the property, as seen from the driveway are included in Appendix C. A checklist was not completed for OU 8, however general observations are included in the Site photographs.

X.5 OPERABLE UNIT 8: TECHNICAL ASSESSMENT

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

Question A Summary:
Yes. Previous monitoring data collected confirms that the soils eroding from the Acme property (through the storm sewer system to the outfall at Fields Brook and in the drainage ditch at the northwest corner of the property) would not cause an exceedance of the PCB CUG in Fields Brook. With the elimination of the former retention pond at the South Sewer inlet, any potential risks to Fields Brook are even further reduced. An EC was recorded for the Lakeside Industrial Park and Railyard, Inc. property (former Acme Scrap property) in 2010, however, EPA was not notified in accordance with Paragraph 11 "Notice of Conveyance" when these properties were transferred within the past five years. To ensure long-term protection for the Acme Scrap and South Sewers OU 8, a title search is required to locate the current property owners; an evaluation of the existing ICs and determine whether additional ICs are needed; and a LTS plan for monitoring and tracking compliance with existing ICs needs to take place.

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

Yes. There has been no change to the PCB cleanup requirement for Fields Brook. The RAOs for the Acme Scrap Iron and Metals and South Sewers Source Area are still valid.

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

No. No other information has come to light that would cause the Agency to question the protectiveness of the remedy.

X.6 OPERABLE UNIT 8: ISSUES/RECOMMENDATIONS

Issues/Recommendations				
OU(s) without Issues/Recommendations Identified in the FYR:				
None				
Issues and Recommendations Identified in the FYR:				
OU(s): 8	**Issue Category: Institutional Controls**			
	Issue: Procedures are not in place to ensure LTS ICs at the Site.			
	Recommendation: Develop and implement a LTS Plan for monitoring and tracking compliance with existing ICs, communicating with EPA, and providing an annual certification to EPA that the ICs remain in place and are effective.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	5/23/2022

Issues and Recommendations Identified in the FYR:				
OU(s): 8	**Issue Category: Institutional Controls**			
	Issue: A recent review of the parcel information shows that the Lakeside Industrial Park & Rail Yard, Inc. property (the property with the recorded EC) has been split into two parcels. EPA was not notified in accordance with the EC's Paragraph 11, "Notice of Conveyance" when these properties were transferred.			
	Recommendation: Conduct a title search to identify parcel owners and ensure the owners are aware of the EC requirements.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	5/23/2022

X.7 OPERABLE UNIT 8: PROTECTIVENESS STATEMENT

Protectiveness Statement(s)	
Operable Unit:	*Protectiveness Determination:*
OU8	Short-term Protective

Protectiveness Statement:

The remedy for the Acme Scrap Iron and Metals and South Sewers Source Area (OU8) currently protects human health and the environment because it is functioning as designed. Monitoring demonstrates that the risk of recontamination of the Fields Brook has been abated. An EC was recorded with Ashtabula County on March 9, 2010 and will be regularly evaluated for protectiveness in future FYRs. However, in order for the remedy to be protective in the long-term, the following actions need to be taken to ensure protectiveness: conduct a title search to identify parcel owners and ensure the owners are aware of the EC requirements; and develop and implement a LTS Plan for monitoring and tracking compliance with existing ICs, communicating with EPA, and providing an annual certification to EPA that the ICs remain in place and are effective.

Table 1-1
Sediment Clean Up Goals

	Sediment Clean Up Goals (CUG)		Sediment Confidence Removal Goals (CRG)							
	Residential	**Industrial / Occupational**	**EU-1**	**EU2**	**EU3**	**EU4**	**EU5**	**EU6**	**EU7**	**EU8**
Chemical	**µg/kg**	**µg/kg**								
1,1-dichloroethene	17,000	40,000								
trans-1,2-sichloroethene	87,433,000	170,333,000								
chloroform	1,672,000	3,909,000								
1,1,1-trichloroethane	393,451,000	766,500,000								
benzene	352,000	822,000								
benzidine	40	100								
tetrachloroethene	196,000	459,000					392,000			
trichloroethene	927,000	2,168,000					1,854,000			
toluene	874,335,000	1,000,000,000								
1,1,2-trichloroethane	179,000	418,000								
chlorobenzene	87,433,000	170,333,000								
ethylbenzene	437,167,000	851,667,000								
1,1,2,2-tetrachloroethane	51,000	119,000					102,000			
1,2,4-trichlorobenzene	43,717,000	85,167,000								
1,2-dichlorobenzene	393,451,000	766,500,000								
1,4-dichlorobenzene	425,000	994,000								
methylene chloride	1,360,000	3,180,000								
vinyl chloride	5,400	13,000								
Phenols	1,000,000,000	1,000,000,000								
2-chlorophenol	21,858,000	42,583,000								
acenaphthene, acenaphthalene	262,300,000	511,000,000								
hexachloroethane	729,000	1,703,000								
nitrobenzene	2,186,000	4,258,000								
isophorone	10,737,000	25,102,000								
naphthalene	174,897,000	340,667,000								
diethyl phthalate	1,000,000,000	1,000,000,000								
dimethyl phthalate	437,167,000	851,667,000								
fluorene	174,867,000	340,667,000								
n-nitrosdiphenylamine	2,081,750	4,867,000								
hexachlorobenzene	6,380	15,000		NA	39,000	40,000	39,000	45,000		
Hexachlorobutadiene	131,000	306,000								
Anthracene	1,000,000,000	1,000,000,000								
di-n-butyl phthalate	437,167,000	851,667,000								
fluoranthene	174,867,000	340,667,000								
pyrene	1,000,000,000	1,000,000,000								
bis(2-ethylhexyl)phthalate	729,000	1,703,000								
benzo(a)anthracene	13,970	33,000								
chrysene	139,730	327,000								
di-n-octyl phthalate	87,443,000	170,333,000								
benzo(b)fluoranthene	13,970	33,000								
nenzo(k)fluoranthene	13,970	33,000								
benao(a)pyrene	1,400	3,300								
indeno(1,2,3-cd)pyrene	14,000	33,000								
dibenzo(a,h)anthracene	1,400	3,300								
PCBs (total)	1.3	3.1	6,000	6,000	4,700	9,200		9,200		
Inorganics	**units are mg/kg (ppm)**									
antimony	1749	3407								
arsenic	5.8	14								
beryllium	2.4	5.5								
cadmium	2,186	4,258								
chromium - Cr6	21,858	42,583								
Chromium - Cr3	1,000,000	1,000,000								
copper	161,752	315,117								
nickel	87,433	170,333								
thallium	262	511								
zinc	847,335	1,000,000								
lead	500	500								
selenium	21,858	42,583								
mercury	1312	2555								
cyanide	87,433	170,333								
radium -226, radium 228 (combined)	5 pCi/g	10 pCi/g								

Notes:

Units are as shown.

CUGs which were calculated to exceed 100% are capped at 100%.

Sources:

CUGs - ESD-Sediment OU - August 1997

CRGs - Various reports from FBAG and Detrex.

Table 1-2
Soil Clean Up Goals

	Soil Clean Up Goals (CUGs)						Soil Confidence Removal Goals (CRGs							
	Residential			Industrial / Occupational			Exposure Unit							
Chemical	**Cancer risk**	**Non-cancer**	**controlling**	**Cancer risk**	**Non-cancer**	**controlling**	**EU-1**	**EU2**	**EU3**	**EU4**	**EU5**	**EU6**	**EU7**	**EU8**
acenaphthene		65,000,000	65,000,000		460,000,000	460,000,000								
acetone		97,000,000	97,000,000		710,000,000	710,000,000								
anthracene		300,000,000	300,000,000		2,100,000,000	*1,000,000,000*								
beta-BHC	900		900	7,500		7,500								
gamma-BHC (Lindane)	1,300	200,000	1,300	10,300	1,400,000	10,300								
bis(2-ethylhexyl)phthalate	43,500	5,400,000	43,500	349,000	35,000,000	349,000								
2-butanone		580,000,000	580,000,000		4,300,000,000	*1,000,000,000*								
butylbenzylphthalate		96,000,000	96,000,000		820,000,000	820,000,000								
carbazole	75,700		75,700	605,200		605,200								
carbon disulfide		97,000,000	97,000,000		710,000,000	710,000,000								
chlorobenzene		19,000,000	19,000,000		140,000,000	140,000,000								
chloroform	411,600	9,700,000	411,600	3,274,100	71,000,000	3,274,100								
4,4'-DDE	6,300		6,300	50,500		50,500								
4,4'-DDT	6,300	330,000	6,300	50,500	2,400,000	50,500								
dibenzofuran		4,300	4,300		31,000,000	31,000,000								
1,2-dichlorobenzene		44,000,000	44,000,000		390,000,000	390,000,000								
1,3-dichlorobenzene		44,000,000	44,000,000		390,000,000	390,000,000								
1,4-dichlorobenzene	63,100		63,100	504,400		504,400								
1,1-dichloroethane		97,000,000	97,000,000		710,000,000	710,000,000								
1,1-dichloroethene	4,200	8,800,000	4,200	33,300	64,000,000	33,300								
trans-1,2-dichloroethene		19,000,000	19,000,000		140,000,000	140,000,000								
diethyl phthalate		380,000,000	380,000,000		3,300,000,000	*1,000,000,000*								
dimethyl phthalate		4,900,000,000	*1,000,000*		42,000,000,000	*1,000,000,000*								
di-n-butyl phthalate		48,000,000	48,000,000		410,000,000	410,000,000								
endrin ketone		230,000	230,000		1,800,000	1,800,000								
fluoranthene		40,000,000	40,000,000		280,000,000	280,000,000								
fluorene		43,000,000	43,000,000		310,000,000	310,000,000								
hexachlorobenzene	800	370,000	800	6,700	3,100,000	6,700		80,000	80,000	200,000	39,000	200,000		
hexachlorobutadiene	19,400	990,000	19,400	155,200	8,600,000	155,200								
hexachloroethane	108,100	490,000	108,100	864,600	4,300,000	864,600								
methylene chloride	333,600	58,000,000	333,600	2,654,100	430,000,000	2,654,100								
4-methylphenol		2,500,000	2,500,000		22,000,000	22,000,000								
naphthalene		20,000,000	20,000,000		170,000,000	170,000,000								
PCBs	300		300	2,500		2,500		6,000	6000	50,000		50,000		
pyrene		31,000,000	31,000,000		210,000,000	210,000,000								
benzo(a)anthracene	3,300		3,300	26,500		26,500								
benzo(b)fluoranthene	3,300		3,300	26,500		26,500								
benzo(a)pyrene	300		300	2,600		2,600								
chrysene	333,000		333,000	2,649,800		2,649,800								
dibenz(a,h,)anthracene	300		300	2,600		2,600								
indeno (1,2,3-cd)pyrene	3,300		3,300	26,500		26,500								
1,1,2,2-tetrachloroethane	11,700		11,700	93,400		93,400					102,000			
tetrachlorethene	52,700	11,000,000	52,700	418,800	76,000,000	418,800					392,000			
1,1,1-trichloroethane		88,000,000	88,000,000		640,000,000	640,000,000								
1,1,2-trichloroethane	42,400	3,800,000	42,400	337,500	27,000,000	337,500								
toluene		190,000,000	190,000,000		1,400,000	1,400,000								
1,2,4-trichlorobenzene		4,700,000	4,700,000		40,000,000	40,000,000								
trichloroethene	267,800	7,500,000	267,800	2,125,800	50,000,000	2,125,800					1,854,000			
xylenes		1,900,000,000	*1,000,000,000*		14,000,000,000	*1,000,000,000*								
vinyl chloride	1,300		1,300	10,500		10,500								
	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg								
arsenic	2,600	590	590	20,800	3,900,000	20,800								
barium		86,000,000	86,000,000		560,000,000	560,000,000								
beryllium	500		500	4,000	31,000,000	4,000								
cadmium		1,200,000	1,200,000		7,900,000	7,900,000								
chromium-III		1,200,000,000	*1,000,000,000*		7,900,000,000	*1,000,000,000*								
chromium=VI		6,200,000	6,200,000		41,000,000	41,000,000								
copper		47,000,000	47,000,000		310,000,000	310,000,000								
cyanide		26,000,000	26,000,000		170,000,000	170,000,000								
manganese		160,000,000	160,000,000		1,100,000,000	1,000,000,000								
mercury (inorganic)		380,000	380,000		2,500,000	2,500,000								
nickel		23,000,000	23,000,000		150,000,000	150,000,000								
selenium		6,400,000	6,400,000		42,000,000	42,000,000								
silver		11,000,000	11,000,000		42,000,000	42,000,000								
thallium		100,000	100,000		6,800,000	6,800,000								
vanadium		8,900,000	8,900,000		59,000,000	59,000,000								
Zinc		380,000,000	380,000,000		2,500,000,000	*1,000,000,000*								

Notes:

Units are as indicated.

The controlling is the more conservative (lower) of the cancer and non-cancer value.

For the purposes of this table, the controlling values are capped at 100% concentration. If capped, the controlling value is in italics.

Sources:

The CUGs are from the wetland / floodplain ROD.

The CRGs are from various reports by FBAG and Detrex.

Table 1-3. Fish Advisory Consumption for Fields Brook Site
(Source: 2018 Ohio Sport Fish Consumption Advisory located online at https://epa.ohio.gov/portals/35/fishadvisory/fishadvisory_pamphlet.pdf)

Body of Water	Area Under Advisory	Species	Meal Frequency	Contaminant
Statewide-All waters		Yellow perch, sunfish (e.g. blue gill, green, longear, redear)	One/week	N/A
		All fish not specified in the table	One/week	N/A
		Flat head catfish 23" and over, northern pike 23" and over, steelhead trout from Lake Erie and its tributaries	One/month	N/A
Lake Erie Tributaries	All waters (Ashtabula, Cuyahoga, Erie, Lake, Lorain, Lucas, Ottawa, Sandusky counties)	Steelhead Trout	One/month	PCBs
Ashtabula River	U.S. Route 20 (Prospect Road) to mouth (Lake Erie) (Ashtabula County)	Common Carp, Freshwater Drum	One/month	PCBs

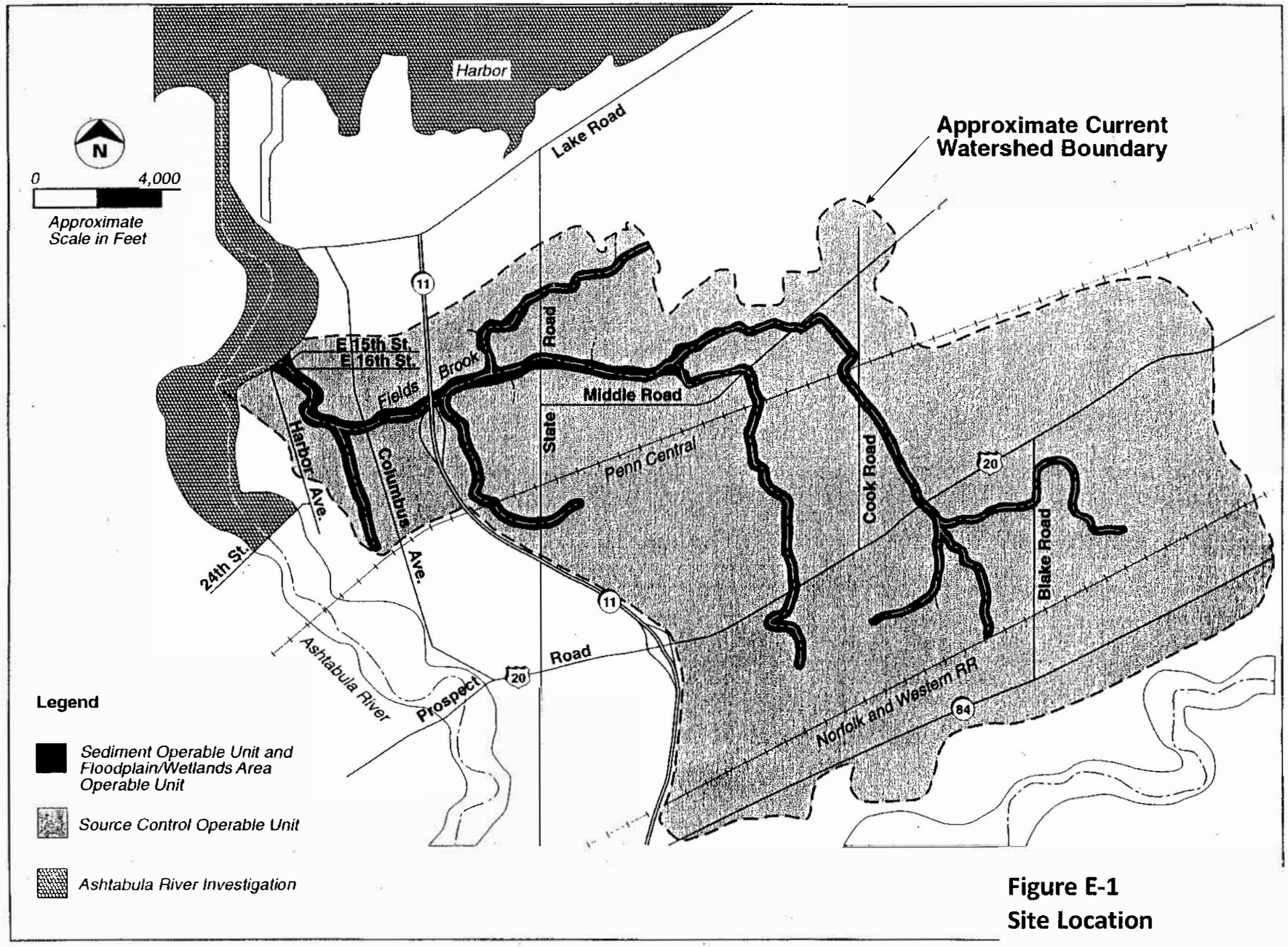


Figure E-1
Site Location

Ashtabula County Watersheds

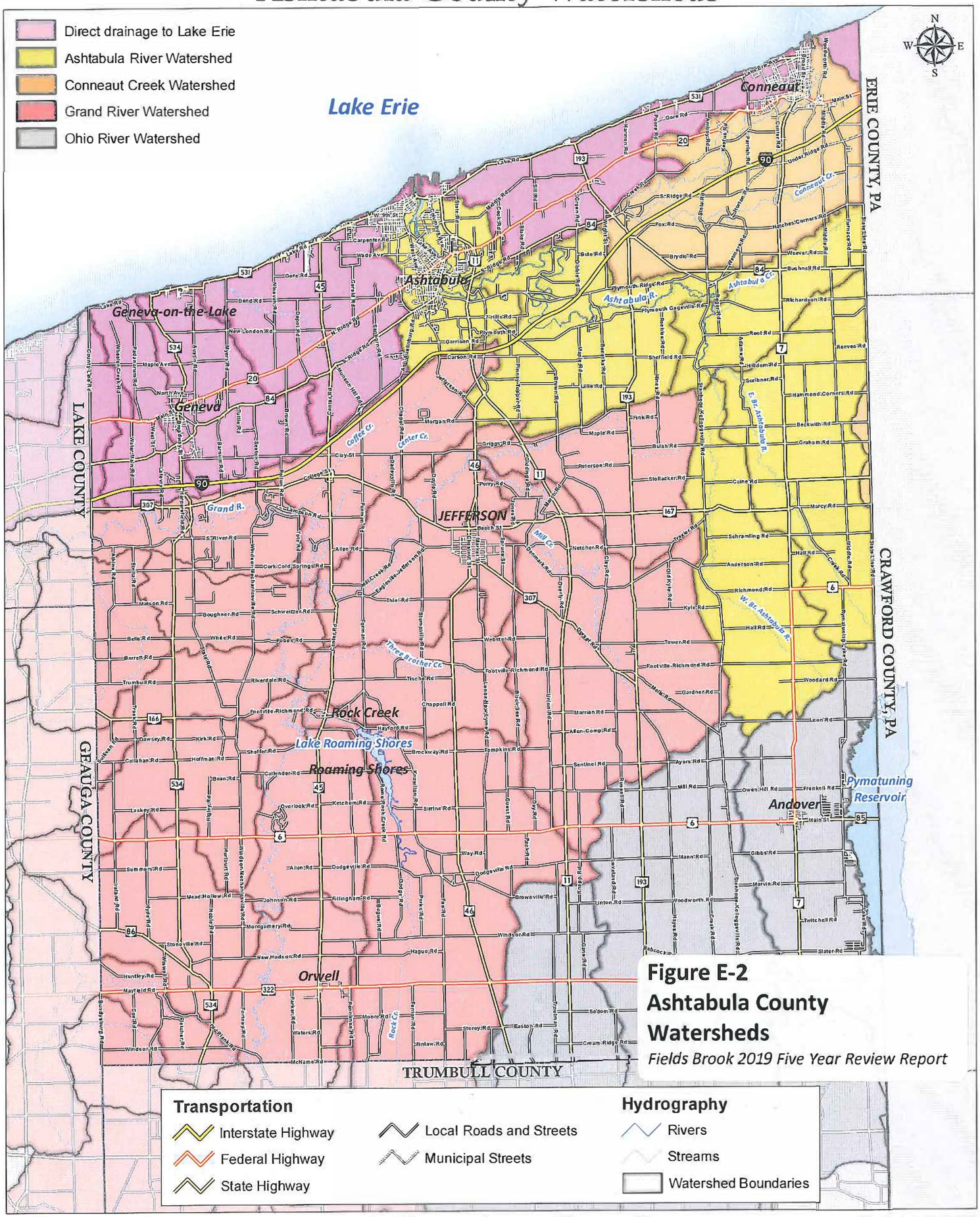
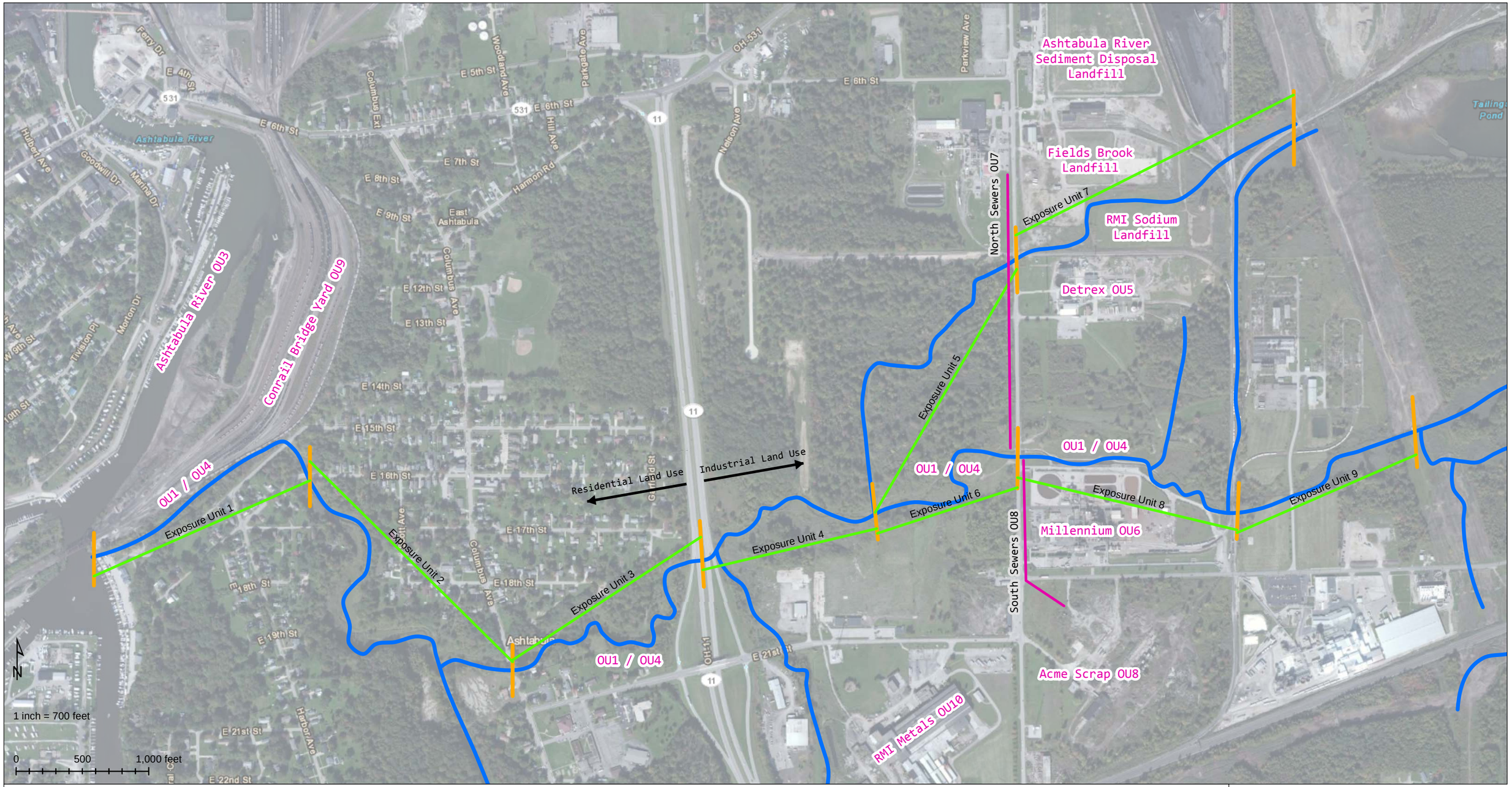


Figure E-2
Ashtabula County Watersheds
Fields Brook 2019 Five Year Review Report

County Boundaries and Transportation, ODOT, 2007
Watershed Boundaries - USDOA, NRCS, 1999

0 1.25 2.5 5 7.5 10
Miles

Map Created: May 9, 2012
Created by: Ohio Department of Natural Resources
Office of Coastal Management



Exposure Unit

Exposure Unit Division

Fields Brook

Notes:
OU1 = Sediment
OU4 = Floodplain / Wetland Area Soil

Imagery Source: Esri

document path: D:\projects\Fieldsbrook\Fields Brook 20140404.mxd author: aschubert

FIELDS BROOK
ASHTABULA COUNTY, OHIO

DETREX ESD

FIGURE E-3

EXPOSURE AND OPERABLE UNITS

EPA REGION 5 RAC 2 | REVISION 0 | APRIL 2014

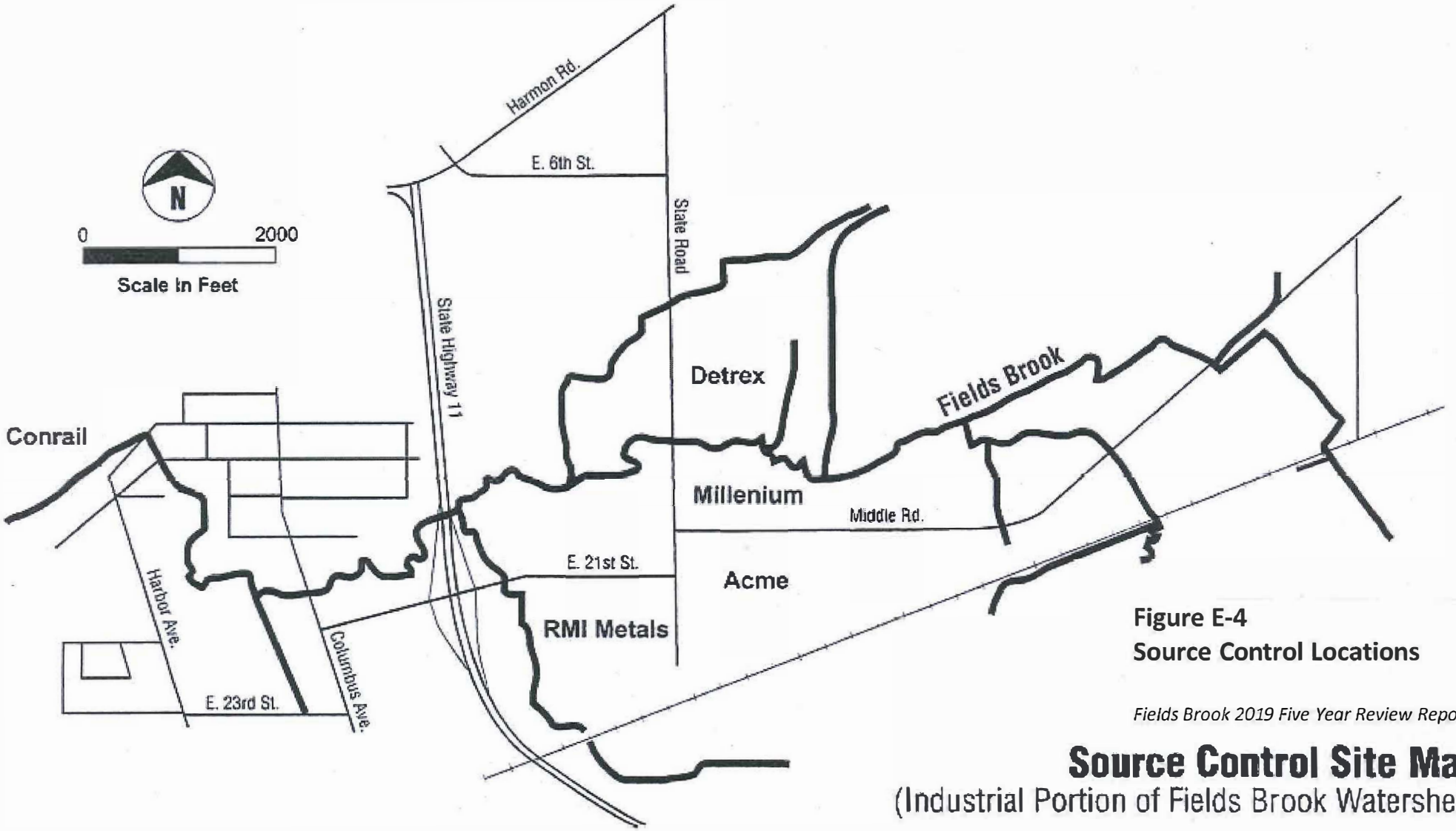


Figure E-4
Source Control Locations

Fields Brook 2019 Five Year Review Report

Source Control Site Map

(Industrial Portion of Fields Brook Watershed)

Boy swept up in sewer saved by firefighters

MADISON, Wis. (AP) — An 11-year-old boy sucked into a flooded Wisconsin storm sewer was saved when an eagle-eyed firefighter saw the boy's fingers pop through an opening in a manhole cover.

The astonishing rescue Tuesday evening came as storms pounded the southern half of the state and southeastern Minnesota.

The Calumet County Sheriff's Office said the boy was playing with friends in a flooded drainage ditch after the rains passed around 6 p.m. in the Village of Harrison. He disappeared under the water and didn't surface.

A dive team, sheriff's deputies and volunteer firefighters responded. Deputy Fire Chief Wesley Pompa said that when they arrived they found a bystander trying to hold onto the boy but he was sucked into a culvert that led to the storm sewer.

Pompa said the water was rushing so quickly it would have sucked a full-grown man into the culvert.

The rescuers could do nothing except try to determine where the flow might take the boy. Pompa called the village road superintendent, Bob Kesler, to the scene to help map out the sewers.

Pompa and Kesler were standing on top of a manhole cover about 30 feet (9 meters) away from the ditch when Pompa saw the boy's fingers pop through an opening in the cover. The boy had found an air pocket just beneath the manhole cover and was hanging onto a ladder leading up to the manhole.

The firefighters wrenched the cover open. Pompa and Kesler lifted the boy to safety.

"He was hollering and talking to us and he was able to reach up for us," Pompa said.

CHARGES: Garcia accused of sexually assaulting five juveniles

FROM PAGE A1

County, "suggested" other children had been assaulted, according to a statement from Ashtabula County Sheriff William Johnson.

The sheriff's office, along with the FBI and the Ohio attorney general's office, launched an investigation that "uncovered multiple people who reported being sexually assaulted by Garcia as juveniles, mostly in his capacity as the owner and operator of a local catering business," according to Johnson's statement.

Four additional accusers have since come forward since the initial contact in June, officials said. Four of the five were employed at Garcia's business, according to the attorney general's statement.

Investigators believe there could be more victims who have not come forward, Johnson said. Persons with information can contact the sheriff's office at 576-1446, he said.

"We do have concerns that there could be additional victims who have not yet been identified, and we urge anyone with information pertinent to the investigation to come forward," DeWine said.

Garcia has retained the services of the DiCaudo, Pitchford and Yoder law firm in Akron, according to court records. Attorney Reid Yoder, in a statement issued Wednesday afternoon, said Garcia is being targeted for his sexual orientation.

"Mr. Garcia has been unfairly and unjustly targeted because he is a homosexual by overzealous law enforcement who have mischaracterized his actions from over 20 years ago," according to Yoder's statement.

"This indictment is an extreme example of police and prosecutors grossly overcharging a person based on their sexual orientation in an attempt to gain media headlines.

"Phil Garcia has been an upstanding member of the Conneaut community for over 60 years. He has devoted his life to serving others through his catering business and acting as a referee in the local school athletic departments. The unfathomable and utterly false allegations raised by a few individuals for personal gain have caused irreparable harm to Mr. Garcia's good name and character. Mr. Garcia intends to fight these charges zealously and looks forward to his day in court where the actual truth will be disclosed."

Conneaut City Manager James Hockaday issued a statement Wednesday morning on behalf of the city's residents, employees and elected officials who are "stunned and shocked" by the indictment.

"Conneaut is a good community and a good place to work and raise a family, and any act of sexual abuse is not tolerated," Hockaday said in the statement. "The city condemns any act of sexual abuse against anyone at any time, particularly minors. We are deeply concerned for the victims of sexual abuse and that their rights, as well as the rights of those who are accused, are protected.

"These indictments are only the beginning of a lengthy legal procedure our country has steadfastly followed for more than 200 years, and further public comment is not appropriate until such time as this matter is resolved according to the law," he said.

Section 2-10 of Conneaut's municipal charter, which deals with vacancies on council, indicates a seat can be considered vacant if a member is convicted of a crime involving "moral turpitude." A seat is also vacated if a member misses every meeting for three straight months without being formally excused by council.

Council determines by resolution if a member "does not possess the qualifications set forth (in the charter)."

Conneaut City Council President Deborah Newcomb said she has asked Hockaday and Law Director Kyle Smith for a review of procedures and rules of council as it pertains to the situation.

While noting "the justice system has to run its course," council also has a job to do, Newcomb said Wednesday.

"It's important we have a quorum (at meetings)," she said. "We must make sure we can do the business of the city."

Garcia's political career began in November 2007 when he first ran for Ward 2 council. He lost to incumbent Charles Lewis by 33 votes. In 2011, Garcia ran when Lewis decided not to seek a second term, and beat opponent Michael Bambarger.

He was unopposed in elections that followed in 2013, 2015 and 2017.

In his statement, Johnson emphasized Garcia's role as council member is not an issue.

"The investigation, to date, has not revealed any inappropriate actions by Garcia in that capacity," Johnson said.

Garcia, a 1973 graduate of Conneaut High School, is a long-time scholastic sports referee, and has officiated events at the local and state tournament level.

He is a member of the Ohio High School Athletic Association's Officials Hall of Fame class of 2014 and the Ashtabula County Basketball Foundation Hall of Fame class of 2014. He was also presented a special award for his years as a referee by the CHS Hall of Fame committee in 2015.

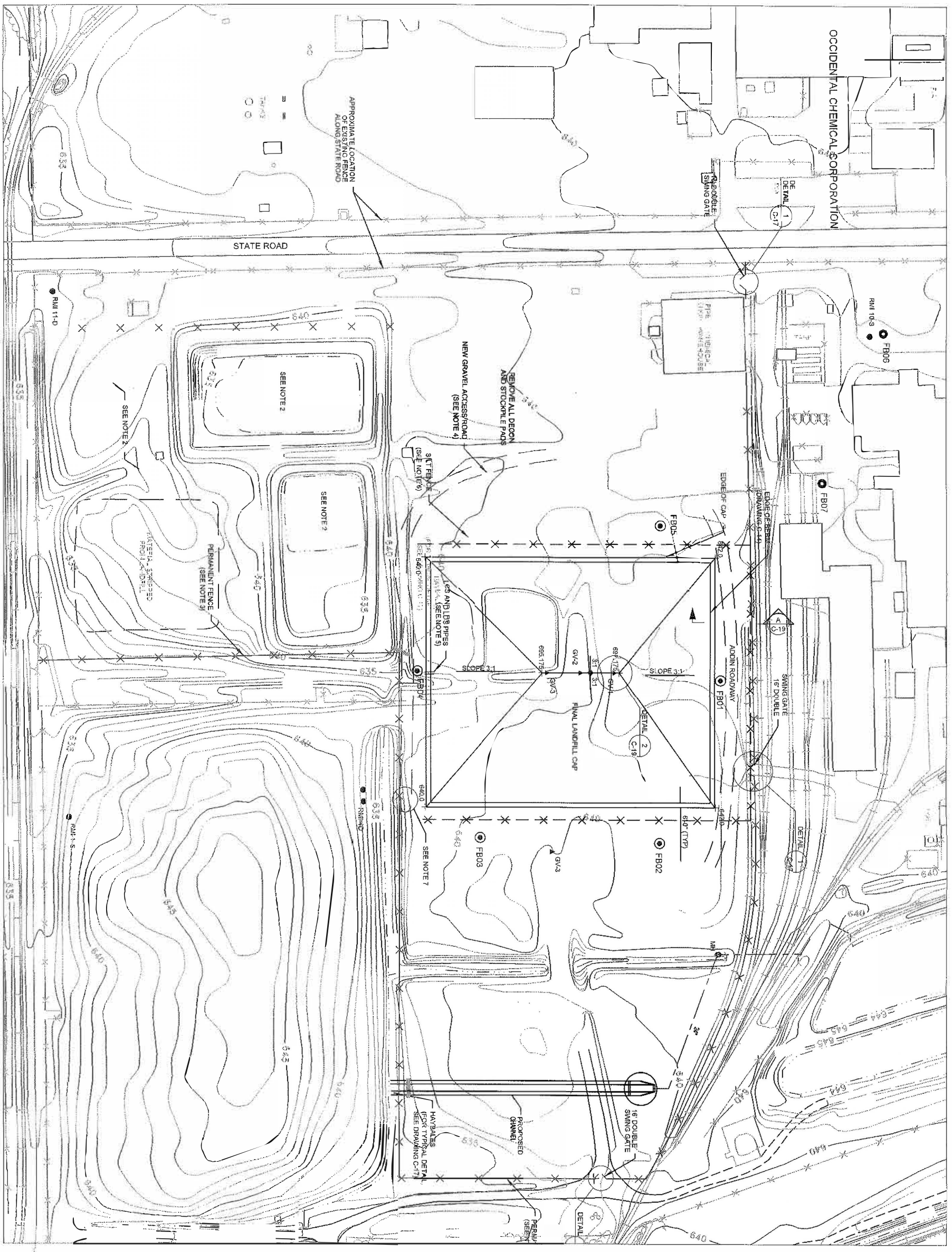
On Wednesday, the Ashtabula County Basketball Foundation issued a statement on its Facebook page saying they were "shocked and saddened" to hear of the charges facing Garcia, who servers as a board member.

"The ACBF abhors child abuse and sexual assaults, especially those involving minors. Keeping in mind that Mr. Garcia is innocent until proven guilty, in order to maintain the integrity of the Foundation, it is imperative that we request Mr. Garcia take a formal leave of absence until the criminal proceedings have concluded."

Garica is the son of legendary Conneaut coach Andrew Garcia, whose name adorns Conneaut High School's gymnasium. The Garcia family also has its name on the school's soccer field.

'This indictment is an extreme example of police and prosecutors grossly overcharging a person based on their sexual orientation in an attempt to gain media headlines. ... Mr. Garcia intends to fight these charges zealously and looks forward to his day in court where the actual truth will be disclosed.'

Reid Yoder
Phil Garcia's attorney



Drawing Status	Date	Initials

Proj. Mgr.	Reviewed	Date

Source Reference:
CRA Remedial Action Plan

Fields Brook Superfund Site
Ashtabula, Ohio

O & M, Inc.

450 Montbrook Lane
Knoxville, TN 37919

Figure 1-1
Fields Brook Superfund Site Map

EU1 Soil
No Soil CRGs Calculated

EU2 Soil	
Hexachlorobenzene	80,000
PCBs	6,000

EU3 Soil	
Hexachlorobenzene	80,000
PCBs	6000

EU4 Soil	
Hexachlorobenzene	200,000
PCBs	50,000

EU5 Sediment	
1,1,2,2-Tetrachloroethane	102,000
Hexachlorobenzene	39,000
PCBs	6,400
Tetrachloroethene	392,000
Trichloroethene	1,854,000

EU7 Soil
No Soil CRGs Calculated

EU7 Sediment	
1,1,2,2-Tetrachloroethane	238,000
Arsenic	53,000
Hexachlorobenzene	1,500,000
Tetrachloroethene	918,000
Trichloroethene	4,366,000

EU6 Soil	
Hexachlorobenzene	200,000
PCBs	50,000

EU6 Sediment	
1,1,2,2-Tetrachloroethane	102,000
Hexachlorobenzene	45,000
PCBs (Total)	7,000
Tetrachloroethene	392,000
Trichloroethene	1,854,000
Vinyl chloride	10,800

EU8 Soil	
Hexachlorobenzene	200,000
PCBs	50,000

EU8 Sediment	
1,1,2,2-Tetrachloroethane	238,000
Hexachlorobenzene	1,500,000
PCBs (Total)	42,000
Tetrachloroethene	918,000
Trichloroethene	4,366,000

EU1 Sediment	
PCBs (Total)	6,800

EU2 Sediment
See Note

EU3 Sediment	
Hexachlorobenzene	39,000
PCBs (Total)	4,700

EU4 Sediment	
Hexachlorobenzene	40,000
PCBs (Total)	9,200

0 500 1,000 feet

1 inch = 700 feet

N

Exposure Unit 1
Exposure Unit 2
Exposure Unit 3
Exposure Unit 4
Exposure Unit 5
Exposure Unit 6
Exposure Unit 7
Exposure Unit 8
Exposure Unit 9

Exposure unit

Exposure unit division

Fields Brook

Notes:
CRG = Confidence Removal Goal
EU = Exposure Unit
Units: µg/kg

Imagery Source: Esri

Note: As part of the original clean up, all sediment from EU2 was to be excavated.

FIELDS BROOK
ASHTABULA COUNTY, OHIO

DETREX ESD

FIGURE 1-2
CONFIDENCE REMOVAL GOALS (CRG) BY EXPOSURE UNIT

EPA REGION 5 RAC 2 | REVISION 1 | APRIL 2019

Draft

Privileged and Confidential
Prepared at Request of Counsel

N

EU1-SD105

EU1-SD106

EU1-SS101

EU1-SS102
27.0 mg/kg

Fields Brook

EU1-SD104

EU1-SD103

EU1-SD102

EU1-SD101

EU1

Ashtabula River

LEGEND

- Previous Sediment Sample Location
- Previous Soil Sample Location
- 2005 Excavation Area
- 100-Year Flood Elevation
- Proposed Excavation Area - Dimensions provided in Table 1

0 60 120

Feet

File Path: G:\Projects\206035 Fields Brook\Graphics\1106\206035_106_01_EU1.mxd

GRADIENT

EU1 - Proposed Excavation Areas

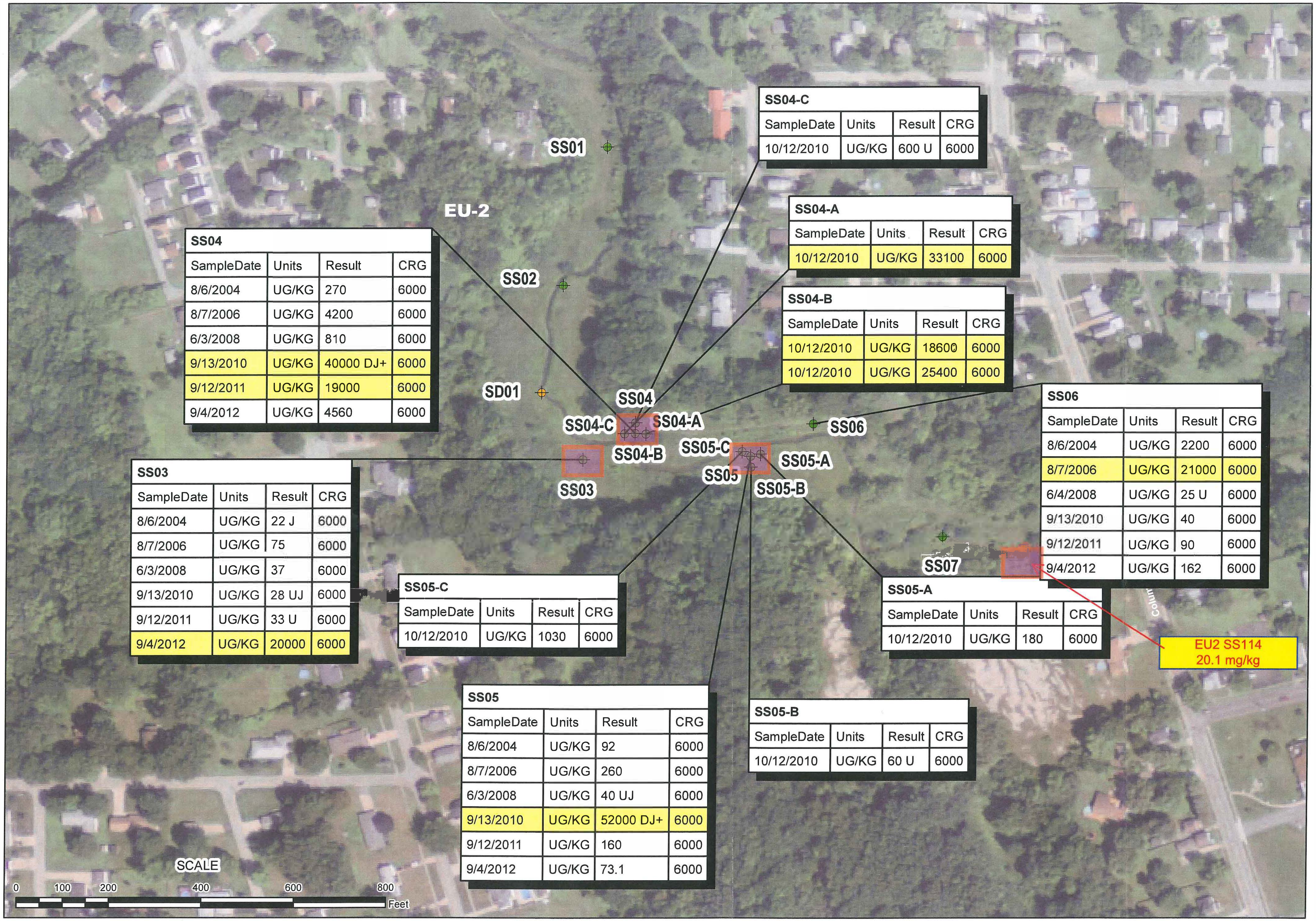
Fields Brook Superfund Site - Ashtabula, Ohio

FIGURE 1-3

Date: 2/7/2013

Figure 1-4
EU2 Proposed Excavation Areas

Fields Brook Superfund Site
Ashtabula, Ohio



SS04

SampleDate	Units	Result	CRG
8/6/2004	UG/KG	270	6000
8/7/2006	UG/KG	4200	6000
6/3/2008	UG/KG	810	6000
9/13/2010	UG/KG	40000 DJ+	6000
9/12/2011	UG/KG	19000	6000
9/4/2012	UG/KG	4560	6000

SS04-C

SampleDate	Units	Result	CRG
10/12/2010	UG/KG	600 U	6000

SS04-A

SampleDate	Units	Result	CRG
10/12/2010	UG/KG	33100	6000

SS04-B

SampleDate	Units	Result	CRG
10/12/2010	UG/KG	18600	6000
10/12/2010	UG/KG	25400	6000

SS03

SampleDate	Units	Result	CRG
8/6/2004	UG/KG	22 J	6000
8/7/2006	UG/KG	75	6000
6/3/2008	UG/KG	37	6000
9/13/2010	UG/KG	28 UJ	6000
9/12/2011	UG/KG	33 U	6000
9/4/2012	UG/KG	20000	6000

SS06

SampleDate	Units	Result	CRG
8/6/2004	UG/KG	2200	6000
8/7/2006	UG/KG	21000	6000
6/4/2008	UG/KG	25 U	6000
9/13/2010	UG/KG	40	6000
9/12/2011	UG/KG	90	6000
9/4/2012	UG/KG	162	6000

SS05-C

SampleDate	Units	Result	CRG
10/12/2010	UG/KG	1030	6000

SS05-A

SampleDate	Units	Result	CRG
10/12/2010	UG/KG	180	6000

SS05

SampleDate	Units	Result	CRG
8/6/2004	UG/KG	92	6000
8/7/2006	UG/KG	260	6000
6/3/2008	UG/KG	40 UJ	6000
9/13/2010	UG/KG	52000 DJ+	6000
9/12/2011	UG/KG	160	6000
9/4/2012	UG/KG	73.1	6000

SS05-B

SampleDate	Units	Result	CRG
10/12/2010	UG/KG	60 U	6000

Description:

Map adapted from 2011 imagery.

Sample Location Source; "field notes 2011_2.pdf"

Map Legend:

- Sediment Sample
- Soil Sample
- Result Exceeds CRG
- Proposed Excavation Area - Dimensions provided in Table 1

Spatial Projection:

N

Coordinate System: OH State Plane North
FIPS Zone: 3401
Units: US Survey Feet
Datum: NAD83

Plot Info:

File: EU2_Arochlor1248_2010-12
Project No.: 3075F
Plot Date: 22 January, 2013
Arc Operator: EI
Reviewed by: HG

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Figure 1-5
EU3 Proposed Excavation Areas

Fields Brook Superfund Site
Ashtabula, Ohio

Description:

Map adapted from 2011 imagery.

Sample Location Source; "field notes 2011_2.pdf"

SD04			
SampleDate	Units	Result	CRG
8/9/2004	UG/KG	1300	4700
8/7/2006	UG/KG	540	4700
6/3/2008	UG/KG	3500	4700
9/13/2010	UG/KG	5000 J+	4700
9/12/2011	UG/KG	6300	4700
9/4/2012	UG/KG	5340	4700

SD04-A			
SampleDate	Units	Result	CRG
10/12/2010	UG/KG	2120	4700

SD04-B			
SampleDate	Units	Result	CRG
10/12/2010	UG/KG	2920	4700

HWY 11

EU-4

EU-3

SS11

SD04-A

SD04

SD04-B

SD03

SS10

SS08

SS09

SD02

Columbus Avenue

SCALE

0 100 200 400 600 Feet

Map Legend:

- Sediment Sample
- Soil Sample
- Result Exceeds CRG
- Proposed Excavation Area - Dimensions provided in Table 1

Spatial Projection:

N

Coordinate System:
OH State Plane North
FIPS Zone: 3401
Units: US Survey Feet
Datum: NAD83

Plot Info:

File: EU3_Arochlor1248_2010-12
Project No.: 3075F
Plot Date: 22 January, 2013
Arc Operator: EI
Reviewed by: HG

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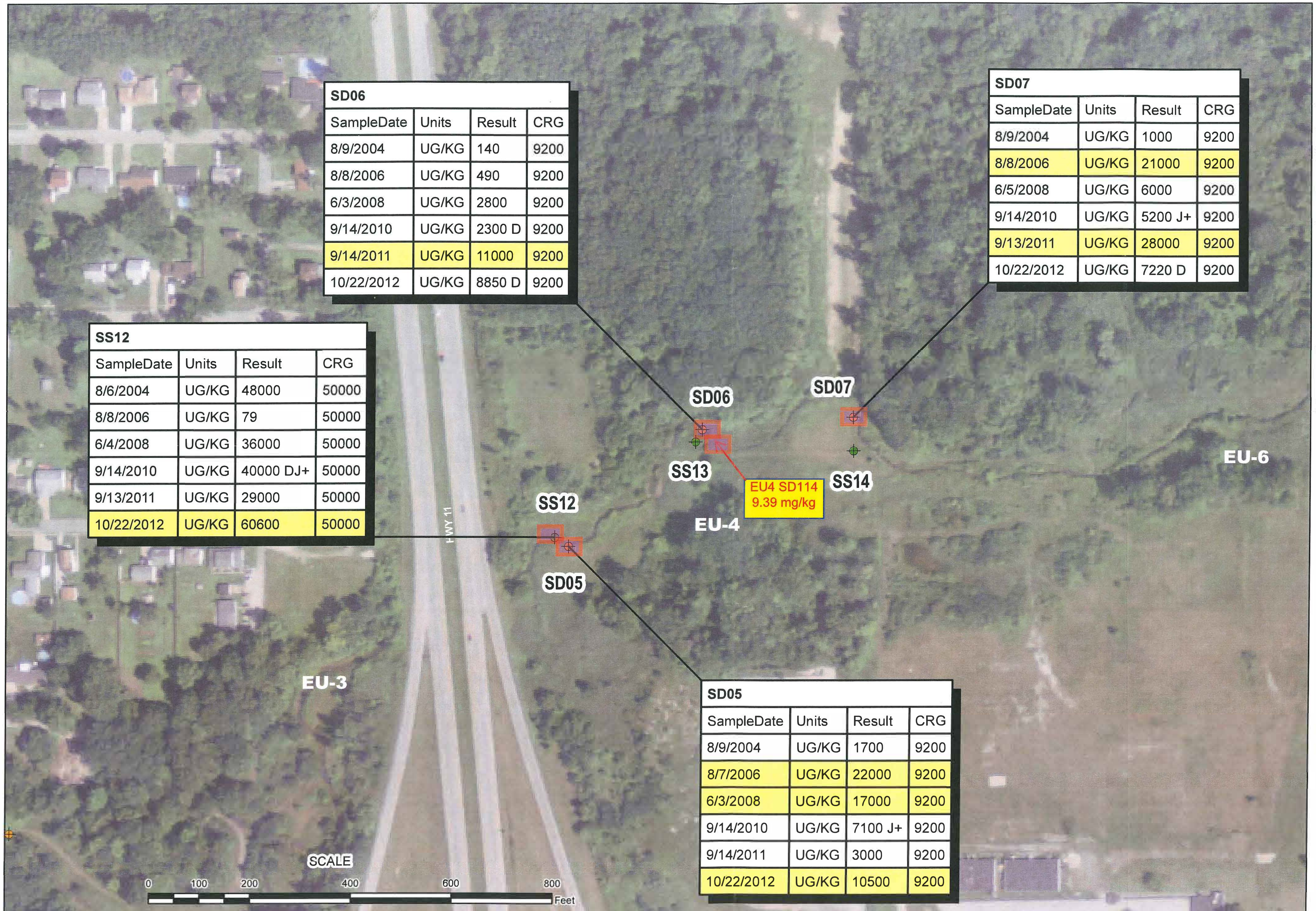
K:\Projects\WNUH\US\MXD\3075F-Fieldsbrook\DataAnalysis\MXDs



SD06

SampleDate	Units	Result	CRG
8/9/2004	UG/KG	140	9200
8/8/2006	UG/KG	490	9200
6/3/2008	UG/KG	2800	9200
9/14/2010	UG/KG	2300 D	9200
9/14/2011	UG/KG	11000	9200
10/22/2012	UG/KG	8850 D	9200

SD07

SampleDate	Units	Result	CRG
8/9/2004	UG/KG	1000	9200
8/8/2006	UG/KG	21000	9200
6/5/2008	UG/KG	6000	9200
9/14/2010	UG/KG	5200 J+	9200
9/13/2011	UG/KG	28000	9200
10/22/2012	UG/KG	7220 D	9200

SS12

SampleDate	Units	Result	CRG
8/6/2004	UG/KG	48000	50000
8/8/2006	UG/KG	79	50000
6/4/2008	UG/KG	36000	50000
9/14/2010	UG/KG	40000 DJ+	50000
9/13/2011	UG/KG	29000	50000
10/22/2012	UG/KG	60600	50000

SD05

SampleDate	Units	Result	CRG
8/9/2004	UG/KG	1700	9200
8/7/2006	UG/KG	22000	9200
6/3/2008	UG/KG	17000	9200
9/14/2010	UG/KG	7100 J+	9200
9/14/2011	UG/KG	3000	9200
10/22/2012	UG/KG	10500	9200

Figure 1-6
EU4 Proposed Excavation Areas

Fields Brook Superfund Site
Ashtabula, Ohio

Description:

Map adapted from 2011 imagery.

Sample Location Source; "field notes 2011_2.pdf"

Map Legend:

- Sediment Sample
- Soil Sample
- Result Exceeds CRG
- Proposed Excavation Area - Dimensions provided in Table 1

Spatial Projection:

N

Coordinate System: OH State Plane North
FIPS Zone: 3401
Units: US Survey Feet
Datum: NAD83

Plot Info:

File: EU4_Arochlor1248_2010-12
Project No.: 3075F
Plot Date: 22 January, 2013
Arc Operator: EI
Reviewed by: HG

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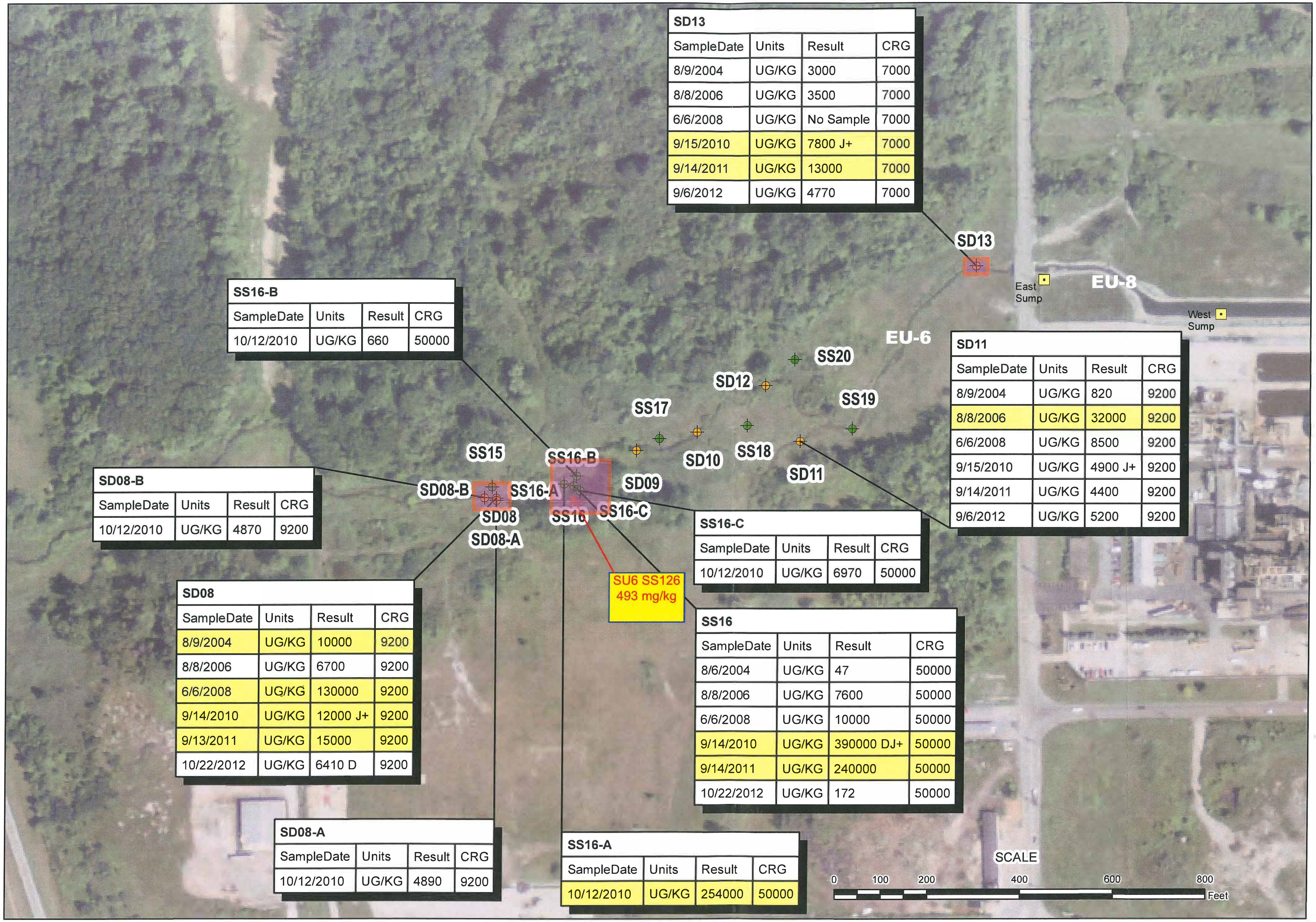


SD13

SampleDate	Units	Result	CRG
8/9/2004	UG/KG	3000	7000
8/8/2006	UG/KG	3500	7000
6/6/2008	UG/KG	No Sample	7000
9/15/2010	UG/KG	7800 J+	7000
9/14/2011	UG/KG	13000	7000
9/6/2012	UG/KG	4770	7000

SS16-B

SampleDate	Units	Result	CRG
10/12/2010	UG/KG	660	50000

SD11

SampleDate	Units	Result	CRG
8/9/2004	UG/KG	820	9200
8/8/2006	UG/KG	32000	9200
6/6/2008	UG/KG	8500	9200
9/15/2010	UG/KG	4900 J+	9200
9/14/2011	UG/KG	4400	9200
9/6/2012	UG/KG	5200	9200

SD08-B

SampleDate	Units	Result	CRG
10/12/2010	UG/KG	4870	9200

SS16-C

SampleDate	Units	Result	CRG
10/12/2010	UG/KG	6970	50000

SD08

SampleDate	Units	Result	CRG
8/9/2004	UG/KG	10000	9200
8/8/2006	UG/KG	6700	9200
6/6/2008	UG/KG	130000	9200
9/14/2010	UG/KG	12000 J+	9200
9/13/2011	UG/KG	15000	9200
10/22/2012	UG/KG	6410 D	9200

SS16

SampleDate	Units	Result	CRG
8/6/2004	UG/KG	47	50000
8/8/2006	UG/KG	7600	50000
6/6/2008	UG/KG	10000	50000
9/14/2010	UG/KG	390000 DJ+	50000
9/14/2011	UG/KG	240000	50000
10/22/2012	UG/KG	172	50000

SD08-A

SampleDate	Units	Result	CRG
10/12/2010	UG/KG	4890	9200

SS16-A

SampleDate	Units	Result	CRG
10/12/2010	UG/KG	254000	50000

Figure 1-7
EU6 Proposed Sample Locations

Fields Brook Superfund Site
Ashtabula, Ohio

Description:

Map adapted from 2011 imagery.

Sample Location Source; "field notes 2011_2.pdf"

Map Legend:

- Sediment Sample
- Soil Sample
- DNAPL Sump
- Result Exceeds CRG
- Proposed Excavation Area - Dimensions provided in Table 1

Spatial Projection:

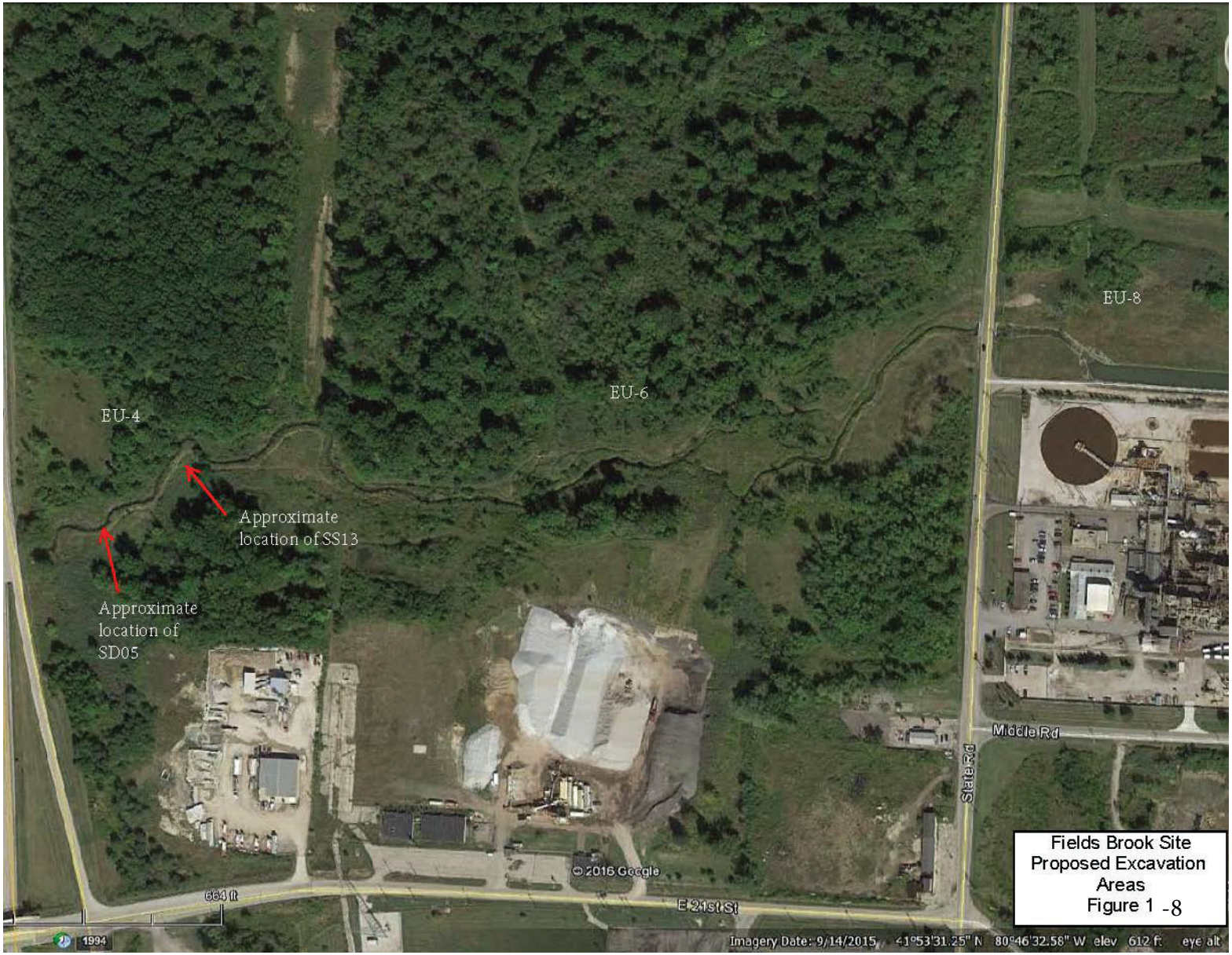
N

Coordinate System: OH State Plane North
FIPS Zone: 3401
Units: US Survey Feet
Datum: NAD83

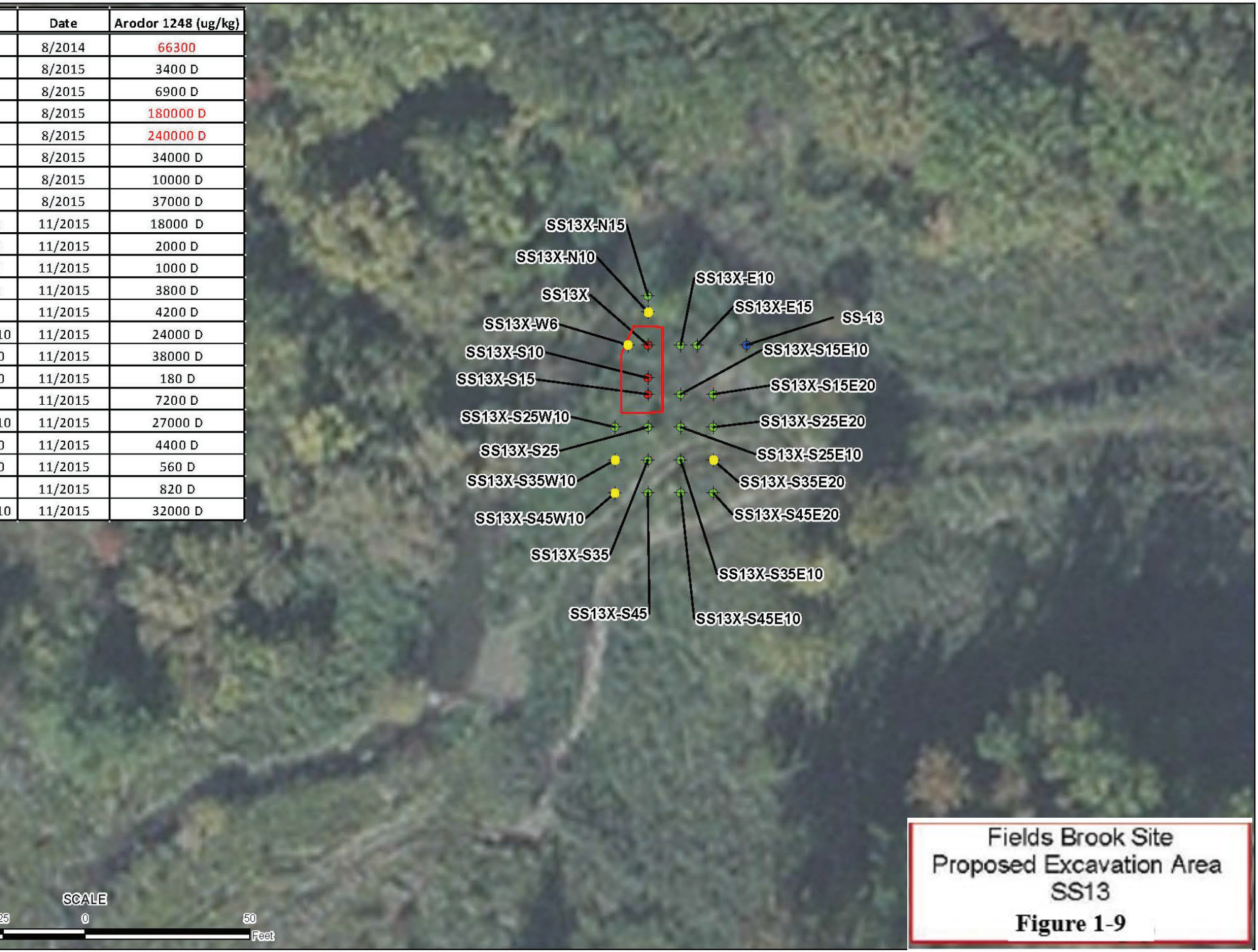
Plot Info:

File: EU6_Arochlor1248_2010-12
Project No.: 3075F
Plot Date: 22 January, 2013
Arc Operator: EI
Reviewed by: HG

ddms
www.ddmsinc.com


EU-8
EU-6
EU-4
Approximate location of SS13
Approximate location of SD05
Middle Rd
State Rd
© 2016 Google
E 21st St
664 ft
1994
Imagery Date: 9/14/2015 41°53'31.25" N 80°46'32.58" W elev 612 ft eye alt
Fields Brook Site
Proposed Excavation Areas
Figure 1 -8

	Date	Arodor 1248 (ug/kg)
	8/2014	66300
	8/2015	3400 D
	8/2015	6900 D
	8/2015	180000 D
	8/2015	240000 D
	8/2015	34000 D
	8/2015	10000 D
	8/2015	37000 D
	11/2015	18000 D
	11/2015	2000 D
	11/2015	1000 D
	11/2015	3800 D
	11/2015	4200 D
10	11/2015	24000 D
0	11/2015	38000 D
0	11/2015	180 D
	11/2015	7200 D
10	11/2015	27000 D
0	11/2015	4400 D
0	11/2015	560 D
	11/2015	820 D
10	11/2015	32000 D



Fields Brook Site
Proposed Excavation Area
SS13

Figure 1-9

SS13
Resu
Augu
2015

Fields
Ashta

Notes:

Imager

The CF
Remov
Exceed

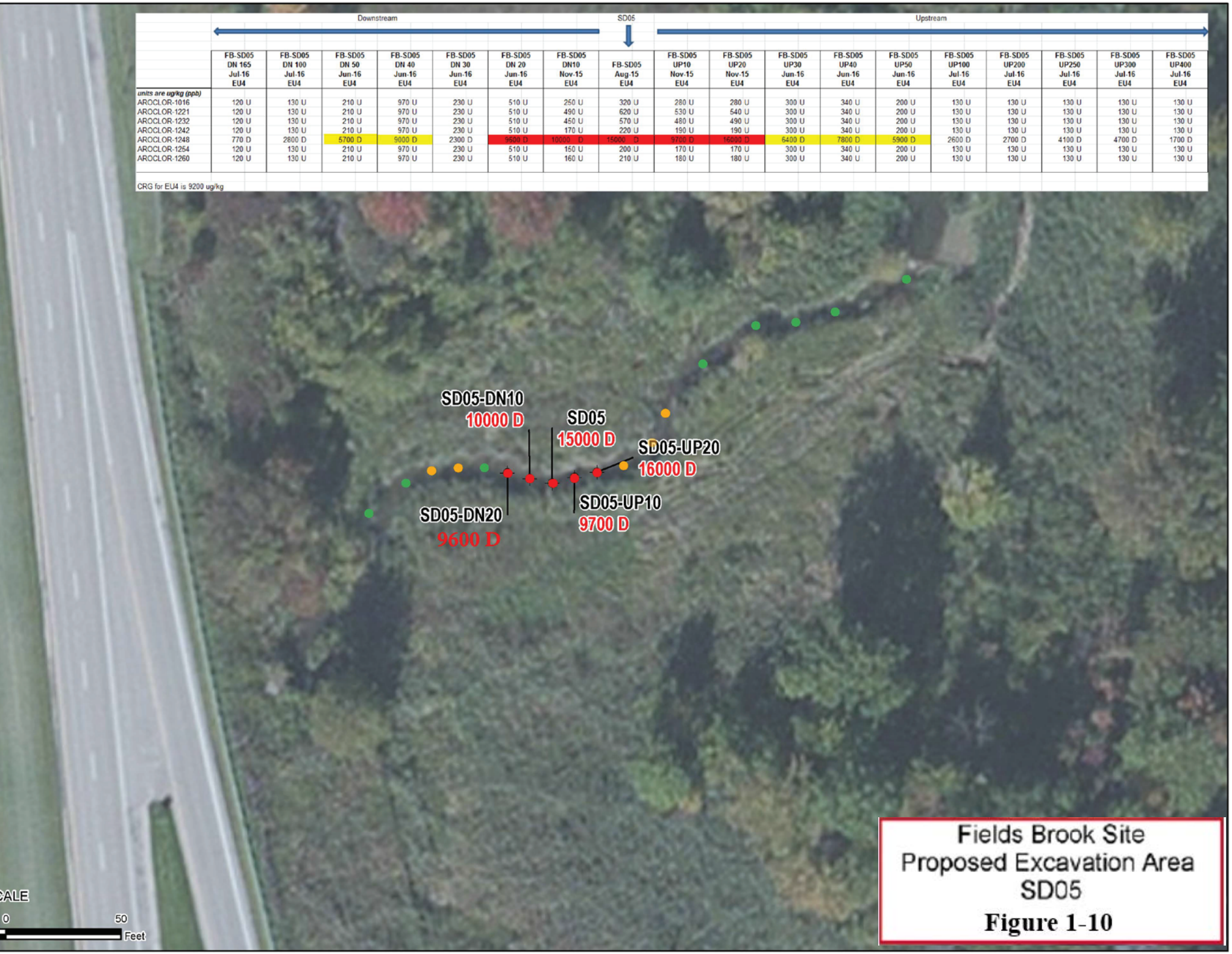
Map Le

Spatial

Downstream | SD05 | Upstream

	FB-SD05 DN 165 Jul-16 EU4	FB-SD05 DN 100 Jul-16 EU4	FB-SD05 DN 50 Jun-16 EU4	FB-SD05 DN 40 Jun-16 EU4	FB-SD05 DN 30 Jun-16 EU4	FB-SD05 DN 20 Jun-16 EU4	FB-SD05 DN10 Nov-15 EU4	FB-SD05 Aug-15 EU4	FB-SD05 UP10 Nov-15 EU4	FB-SD05 UP20 Nov-15 EU4	FB-SD05 UP30 Jun-16 EU4	FB-SD05 UP40 Jun-16 EU4	FB-SD05 UP50 Jun-16 EU4	FB-SD05 UP100 Jul-16 EU4	FB-SD05 UP200 Jul-16 EU4	FB-SD05 UP250 Jul-16 EU4	FB-SD05 UP300 Jul-16 EU4	FB-SD05 UP400 Jul-16 EU4
units are ug/kg (ppb)																		
AROCLOR-1016	120 U	130 U	210 U	970 U	230 U	510 U	250 U	320 U	280 U	280 U	300 U	340 U	200 U	130 U	130 U	130 U	130 U	130 U
AROCLOR-1221	120 U	130 U	210 U	970 U	230 U	510 U	490 U	620 U	530 U	540 U	300 U	340 U	200 U	130 U	130 U	130 U	130 U	130 U
AROCLOR-1232	120 U	130 U	210 U	970 U	230 U	510 U	450 U	570 U	480 U	490 U	300 U	340 U	200 U	130 U	130 U	130 U	130 U	130 U
AROCLOR-1242	120 U	130 U	210 U	970 U	230 U	510 U	170 U	220 U	190 U	190 U	300 U	340 U	200 U	130 U	130 U	130 U	130 U	130 U
AROCLOR-1248	770 D	2800 D	5700 D	9000 D	2300 D	9600 D	10000 D	15000 D	9700 D	16000 D	6400 D	7800 D	5900 D	2600 D	2700 D	4100 D	4700 D	1700 D
AROCLOR-1254	120 U	130 U	210 U	970 U	230 U	510 U	150 U	200 U	170 U	170 U	300 U	340 U	200 U	130 U	130 U	130 U	130 U	130 U
AROCLOR-1260	120 U	130 U	210 U	970 U	230 U	510 U	160 U	210 U	180 U	180 U	300 U	340 U	200 U	130 U	130 U	130 U	130 U	130 U

CRG for EU4 is 9200 ug/kg



Fields Brook Site
Proposed Excavation Area
SD05

Figure 1-10

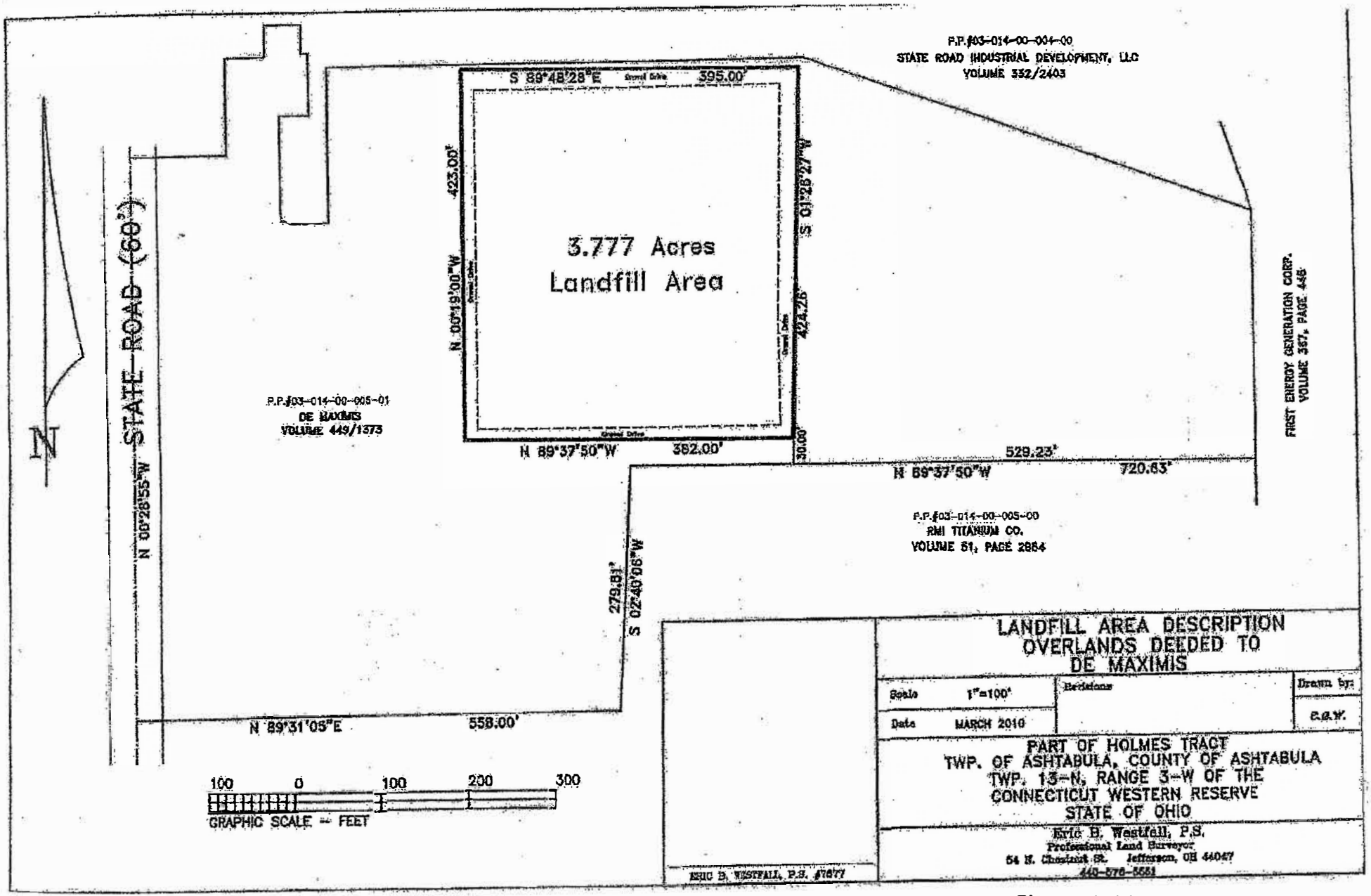


Figure 1-11
Fields Brook Landfill
IC Map
Fields Brook 2019 Five Year Review Report

'4667 -4)

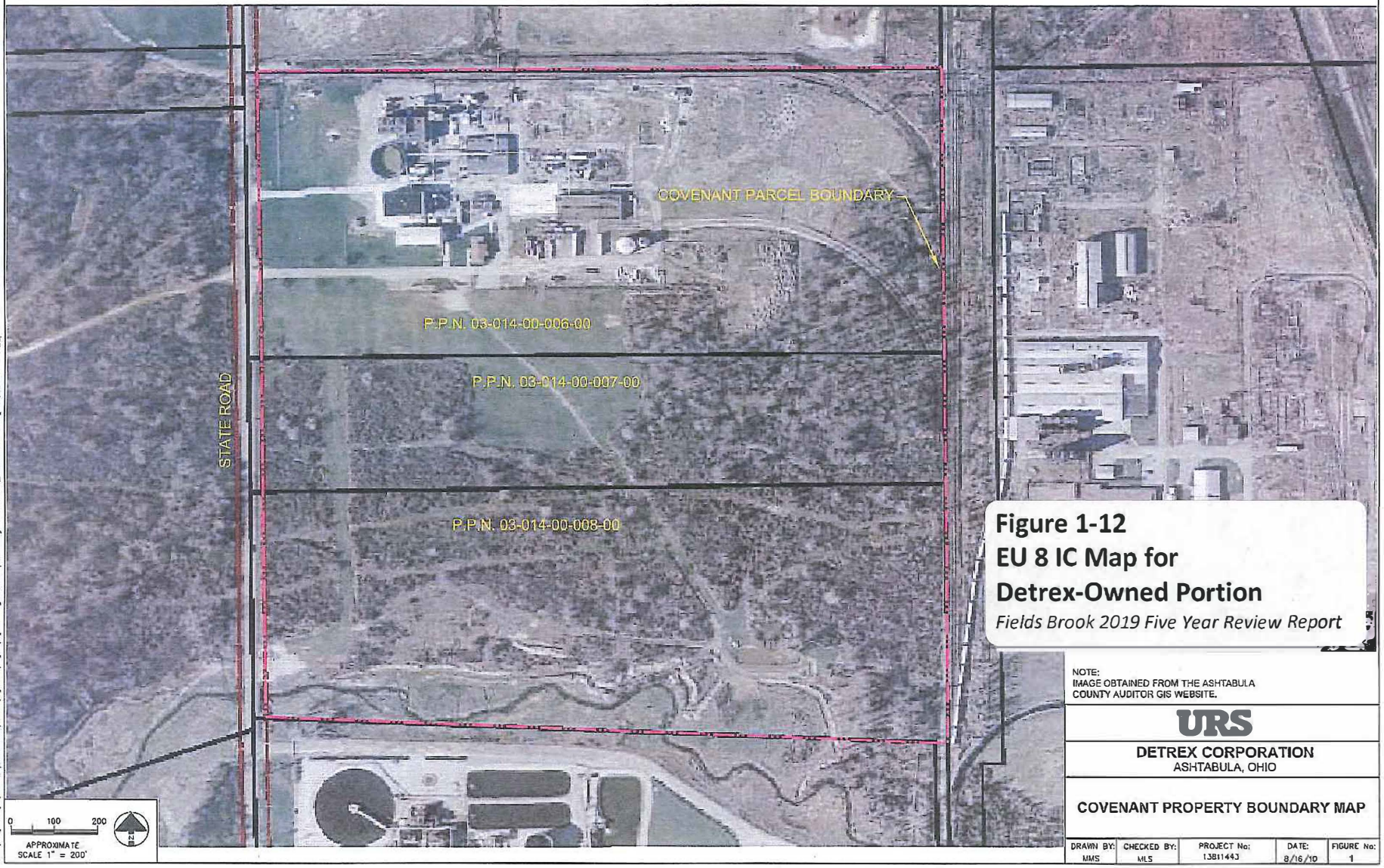


Figure 1-12
EU 8 IC Map for
Detrex-Owned Portion
Fields Brook 2019 Five Year Review Report

NOTE:
IMAGE OBTAINED FROM THE ASHTABULA COUNTY AUDITOR GIS WEBSITE.

URS

DETREX CORPORATION
ASHTABULA, OHIO

COVENANT PROPERTY BOUNDARY MAP

DRAWN BY:	CHECKED BY:	PROJECT No:	DATE:	FIGURE No:
MMS	MLS	13811443	8/16/10	1

K:\Projects\P\Detrex\13811443\DWGs\Figures\Legal\Fig-1-Legal Description.dwg User:nate_marchiak Aug 16, 2010 - 4:22pm

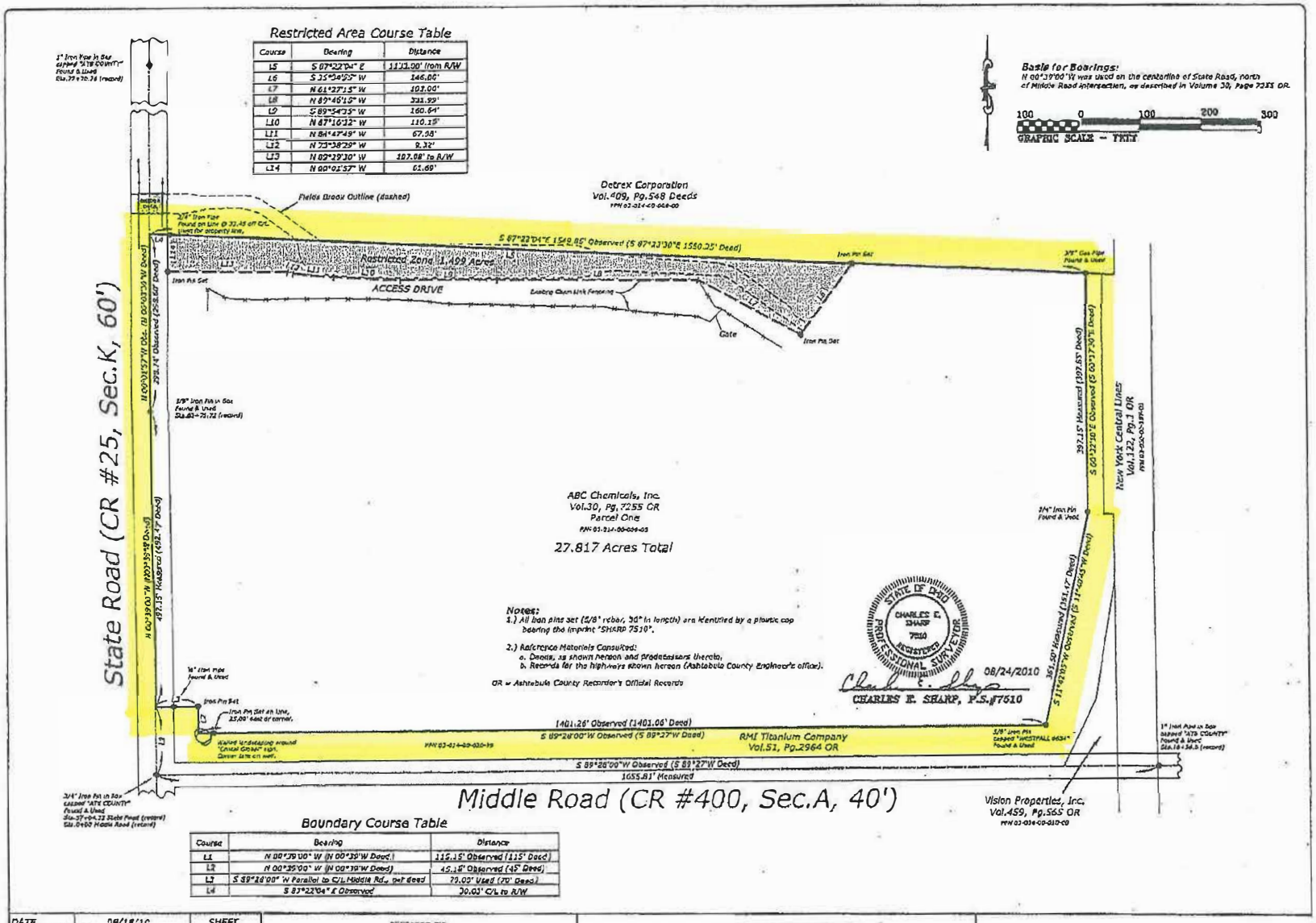
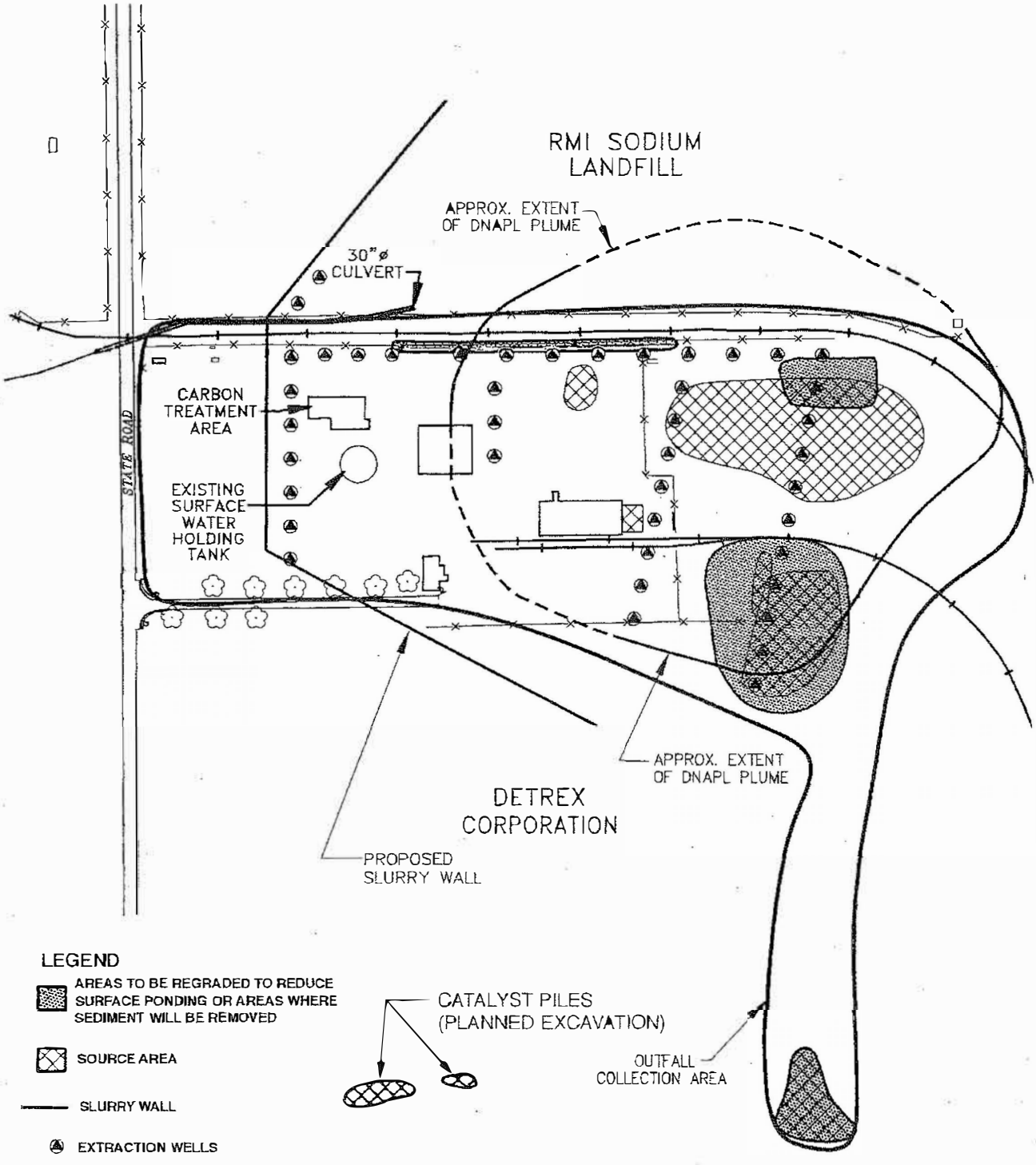


Figure 1-13
EU 8 IC Map for Millennium-Owned Portion

Fields Brook 2019 Five Year Review Report



DETREX Site Map

Figure 5-1
Detrex Facility Site Map
From 1997 ROD
Fields Brook 2019 Five Year Review Report

LEGEND

- RECOVERY WELL
- MONITORING WELL
- PIEZOMETER
- PASSIVE DNAPL RECOVERY POINT OR MONITORING POINT WITH NO DNAPL OBSERVED SINCE INITIATION OF ESD
- PASSIVE DNAPL RECOVERY POINT OR MONITORING POINT WITH NO DNAPL OBSERVED IN CURRENT MONTH
- PASSIVE DNAPL RECOVERY POINT OR MONITORING POINT WITH 0.01 TO 1.00 FOOT OF DNAPL THICKNESS OBSERVED SINCE INITIATION OF ESD
- PASSIVE DNAPL RECOVERY POINT OR MONITORING POINT WITH 1 FOOT OR GREATER DNAPL THICKNESS OBSERVED SINCE INITIATION OF ESD
- 142 - 1-INCH PERIMETER DNAPL RECOVERY POINTS MEASURED ANNUALLY (JULY 2-3, 2018 - NO DNAPL OBSERVED)

NOTE:
RECOVERY POINT LOCATIONS ARE APPROXIMATE. FIELD CONDITIONS DETERMINED ACTUAL PLACEMENT

0 75 150
SCALE 1" = 150'

EHS Support™

FIGURE 5-2
JANUARY 2019 DNAPL OCCURRENCES AND PERIMETER DNAPL RECOVERY POINTS

DETREX CORPORATION
ASHTABULA, OHIO

DRAWN BY:	AMH	DATE DRAWN:	02/17/19
REVIEWED BY:	MLS	DATE REVIEWED:	02/17/19
SCALE:	1" = 150'	PLOT DATE:	02/17/19
PROJECT NO.:	C02426		

C:\Users\Mick.Osburn.EHS\Documents\Drawings\Detrex\OMM Plan Figures\EHS Revised Figures\Figure 1 - January 2019 DNAPL Recovery Points.dwg

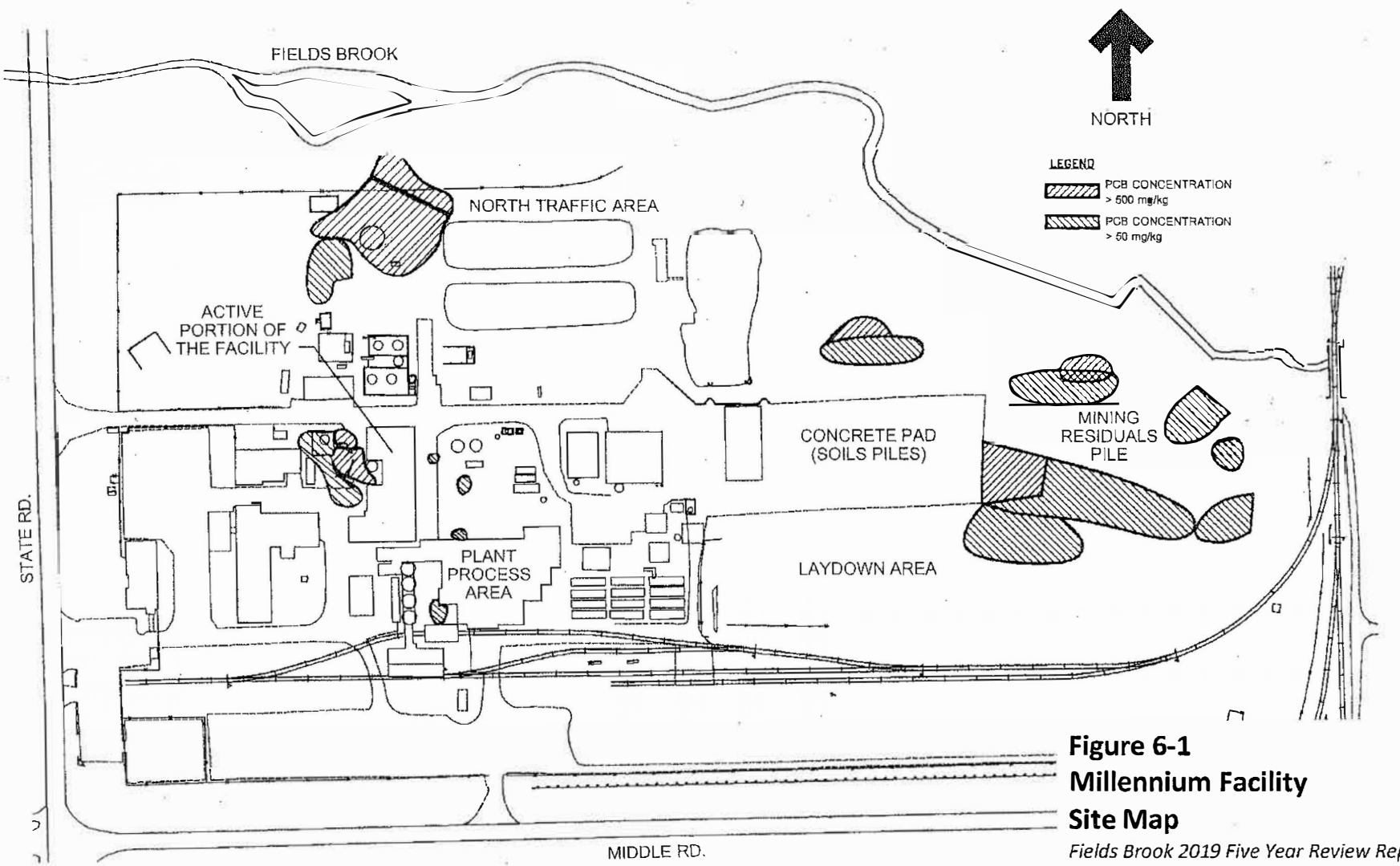
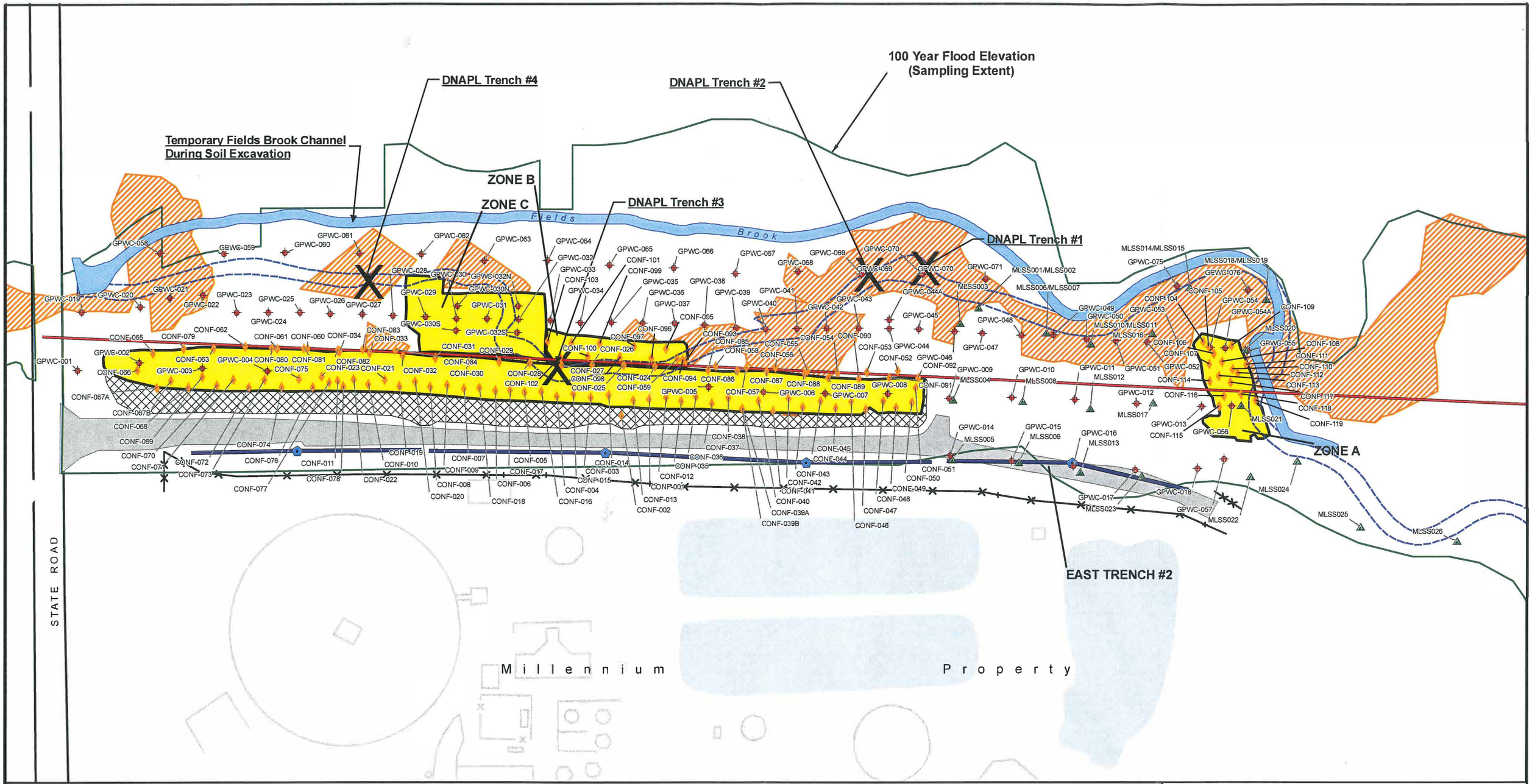


Figure 6-1
Millennium Facility Site Map
Fields Brook 2019 Five Year Review Report



LEGEND

- Confirmation Sample Location
- GeoProbe Sample Location
- MLSS Sample Location
- Sump Location
- Millennium Fence
- Trench Location
- Millennium Property Line
- Millennium Ponds
- Asphalt/Gravel Drive
- 2001 DNAPL Removal Limits
- Temporary Fields Brook Channel during soil excavations
- Former Fields Brook Channel
- Southern Wall of Excavation
- Excavation Floor
- X — Excavation Location of DNAPL trenching August 2007 and pooled DNAPL in 2005
- Zone B and C intersection with Excavation Trench

N

0 25 50 100 150 200 Feet

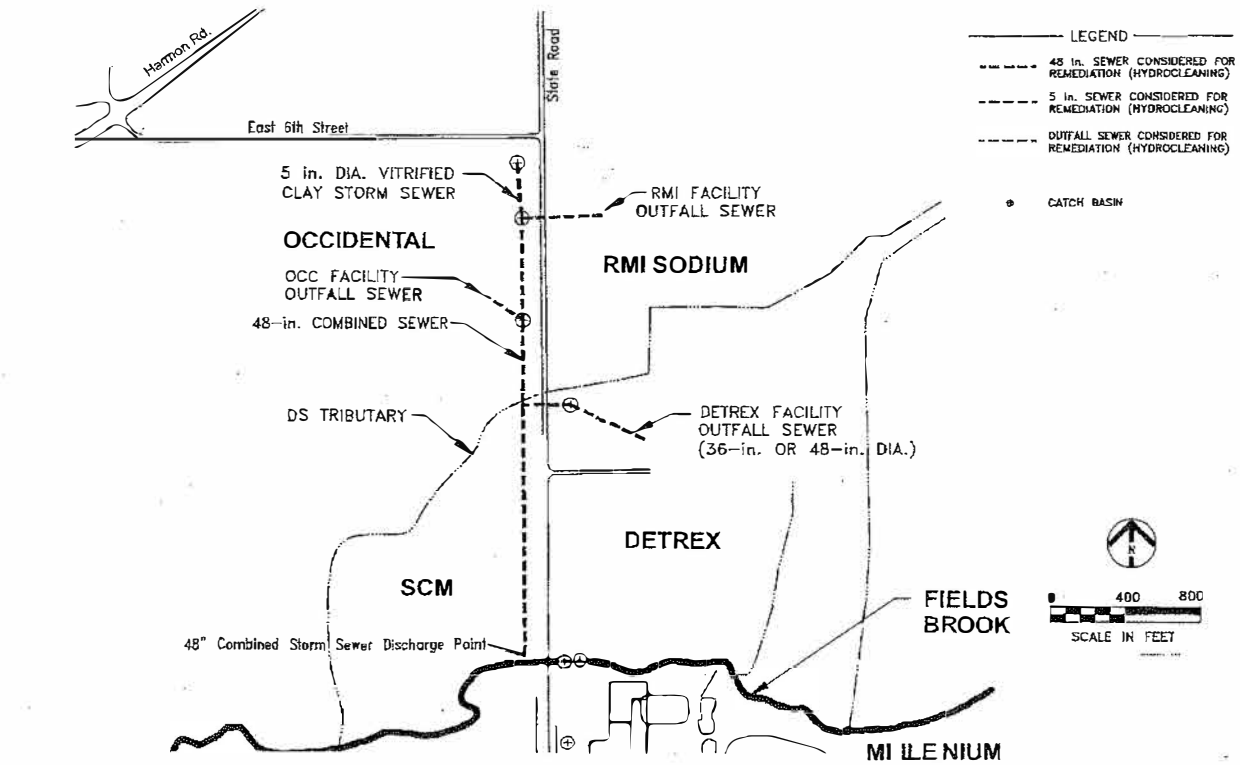
de maximis, inc.

de maximis Data ddms Management Solutions, Inc.

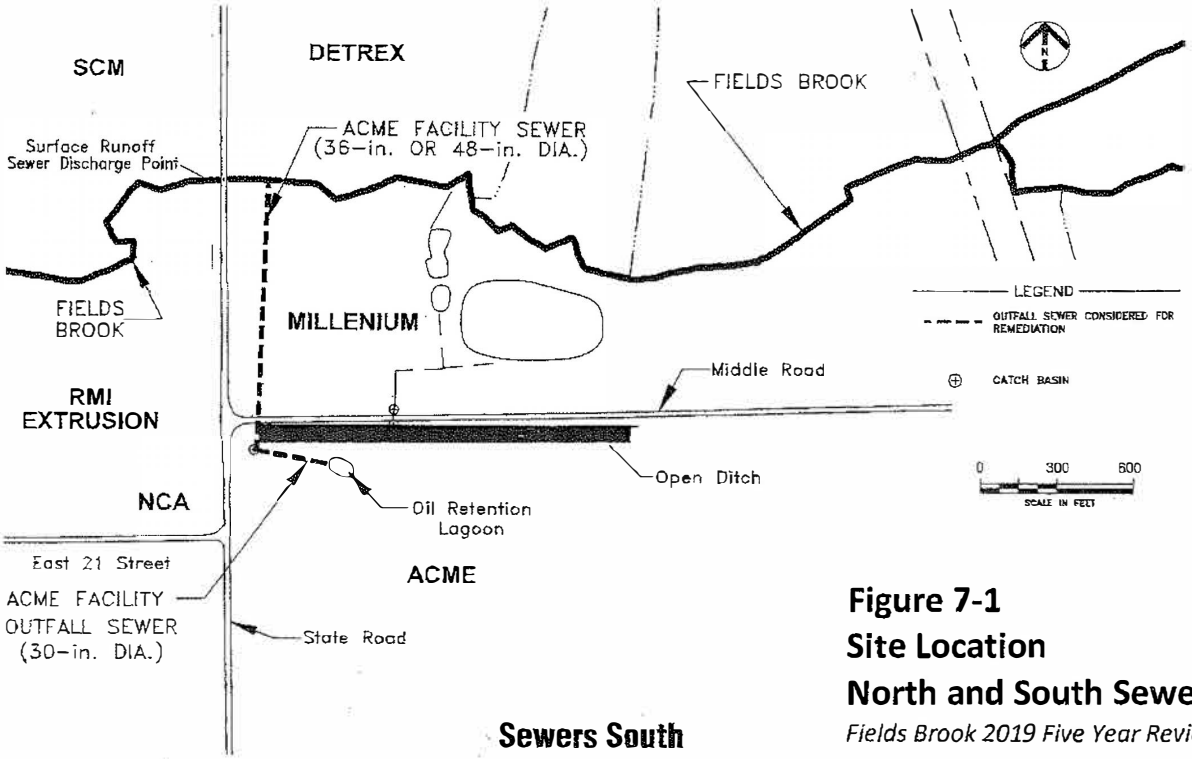
FIGURE 6-2
Soil Excavations and Soil Sampling Locations

Millennium Inorganic Chemical Co. Site - Ashtabula, Ohio

Mapping By: CMC	Checked By:	ddms Project #: 1547-3206
Version: 24 Sept 2009	Date: 24 Sept 2009	File: 090924_millennium_figure2_EU8_11x17.mxd



Sewers North



Sewers South

Figure 7-1
Site Location
North and South Sewers
Fields Brook 2019 Five Year Review Report

Sewers North and South Site Maps

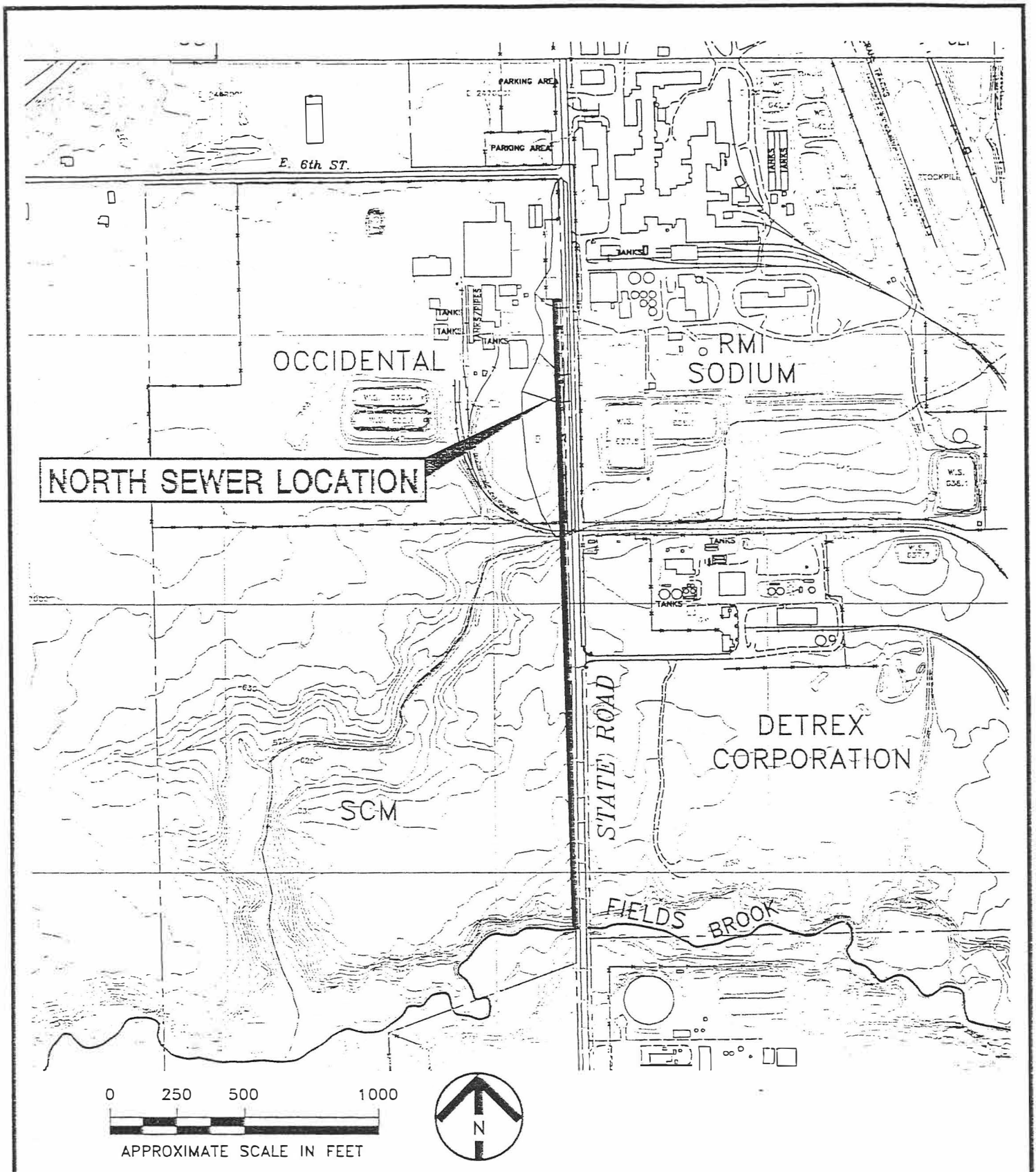
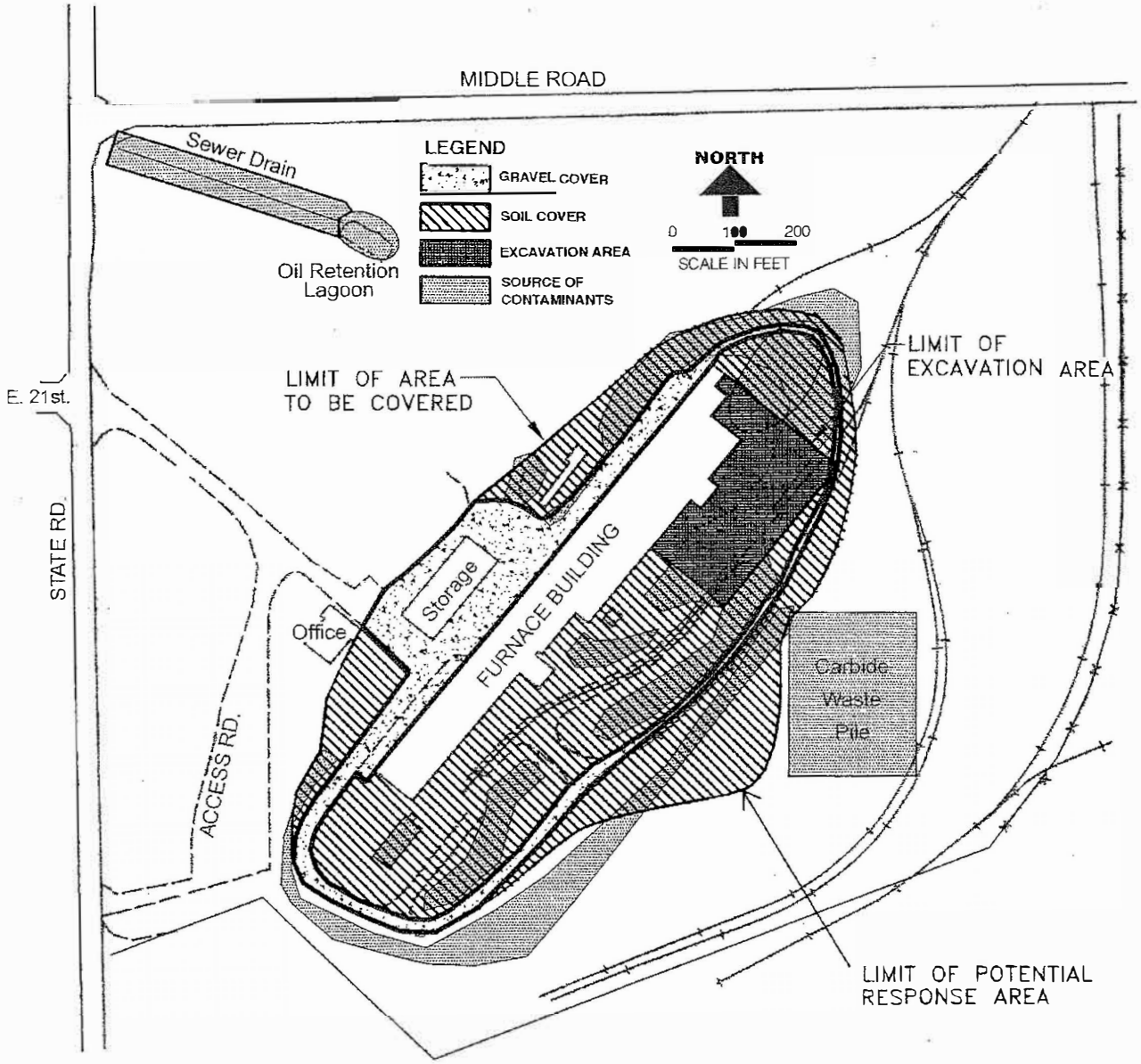


Figure 7-2 SITE MAP

NORTH SEWER REMEDIAL ACTION ACTIVITIES

DRAWN BY: TBC	CHECKED BY: KMA	PROJECT NUMBER: 38-8E06013	DATE: 9/27/00	FIGURE NO: 1



Acme Scrap Iron & Metal Company Site Map

Figure 8-1
Acme Iron & Metal
Site Map
Fields Brook 2019 Five Year Review Report

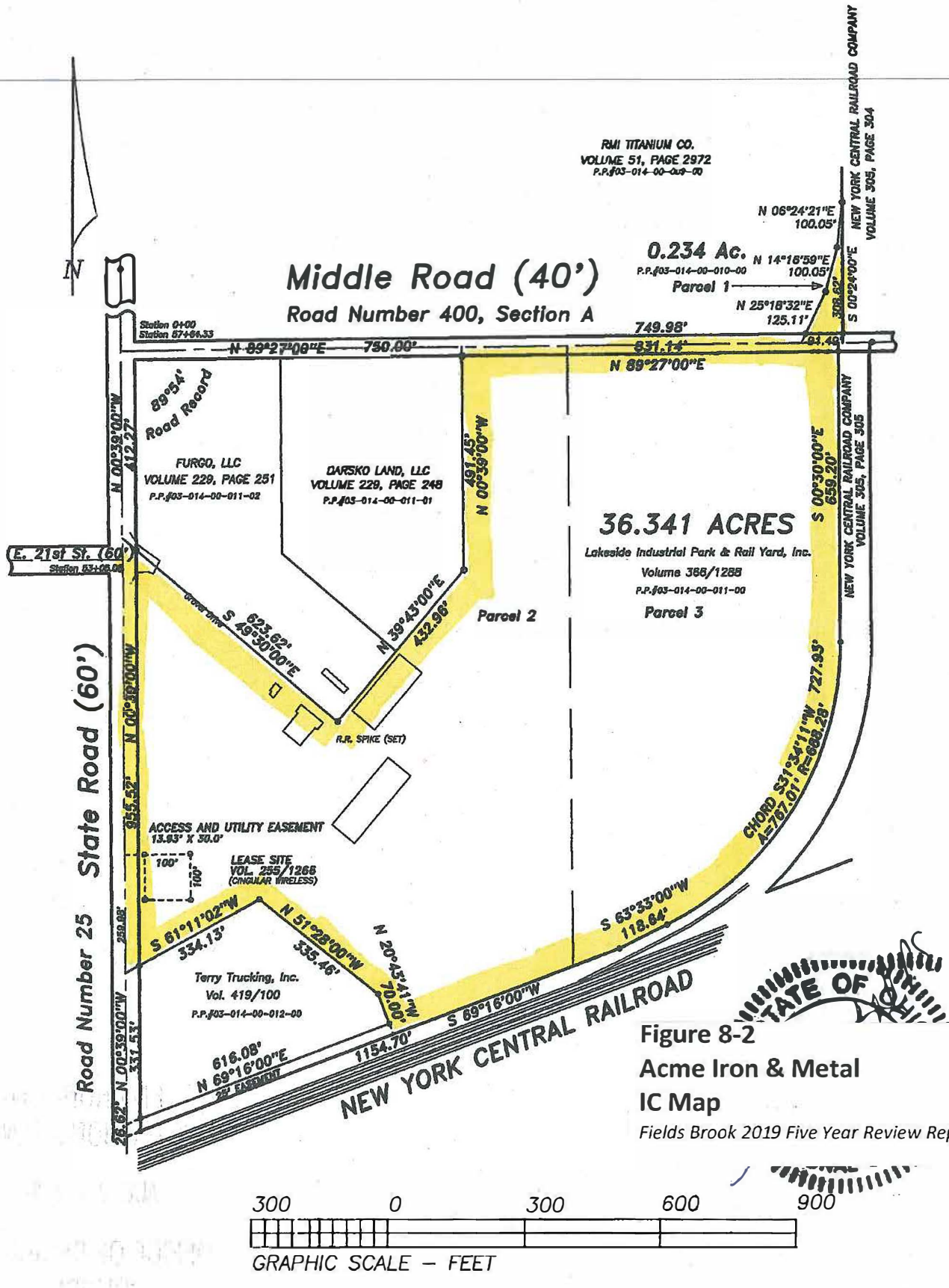


Figure 8-2
Acme Iron & Metal
IC Map
Fields Brook 2019 Five Year Review Report

APPENDIX A- REFERENCES

Date	Title of Document	SDMS
Document Review for Fields Brooks Sitewide		
6/7/2004	First Five-Year Review	218688
6/2/2009	Second Five-Year Review	330312
4/8/1999	Site-Wide Explanation of Significant Differences	95179
5/23/2014	Third Five-Year Review	461766
Data Review for Fields Brooks Sediment and Floodplain Soils (OU1& OU4)		
2/10/2010	Final Project Construction Completion Report, Fields Brook Relocation & EU 8 Floodplain Restoration, de maximis, inc.	939489
7/11/2012	Remediation Construction Completion Report for 2009-2011 DNAPL in DS Tributary	910594
8/29/2013	Excavation of Soils and Sediments Work Plan, de maximis, inc.	911070
6/1/2014	Site Monitoring Report Groundwater Sampling Performed April 2014	504595
9/10/2014	Relocation & Floodplain Restoration Final Completion Report/Construction Completion Report	559854/ 939428
11/1/2014	Soil, Sediment, and Surface Water Sampling, Performed Aug and Oct 2014	559841
12/1/2014	Site Monitoring Report Groundwater Sampling Performed October 2014	559842
2/25/2015	Discussion Points	939436
5/28/2015	EPA Response Letter to Discussion Points and ITRC Sampling	939442
6/19/2015	Site Monitoring Report Groundwater Sampling Performed April 2015	559844
11/1/2015	Soil, Sediment, and Surface Water Sampling, Performed Aug 2015	939513
12/3/2015	Site Monitoring Report Groundwater Sampling Performed October 2015	559845
5/1/2016	Supplemental sampling in EU4	939460
8/31/2016	Workplan, Excavation of Soils and Sediments for EU4	939465
11/23/2016	Fields Brook Superfund Site, Excavation of Soils and Sediments Final Completion Report (dated November 28, 2016)	946427
12/1/2016	Site Monitoring Report Groundwater Sampling Performed November 2016	939514
5/1/2017	Site Monitoring Report Groundwater Sampling Performed April 2017	939516
11/21/2016	Soil, Sediment, and Surface Water Sampling, Performed Aug 2016	559843
12/1/2017	Soil, Sediment, and Surface Water Sampling, Performed Aug 2017	946425
6/19/2018	Quality Assurance Project Plan Revision 4	941824
8/6/2018	Site Monitoring Report Groundwater Sampling Performed May 2018 -FYR Event	946424
3/15/2019	Soil, Sediment, and Surface Water Sampling, Performed Aug 2018	946574
Document Review for Fields Brooks Sediment and Floodplain Soils OU1 and OU4		
9/30/1986	Record of Decision for the Sediment Operable Unit	91201
6/30/1997	Record of Decision for the Floodplain/Wetland Operable Unit	119128
8/15/1997	ESD for the Sediment Operable Unit	91698
9/29/1997	Record of Decision for the Source Control Operable Unit of the Fields Brook Superfund Site	91944

Document Review for Fields Brooks Sediment and Floodplain Soils OU1 and OU4 (cont.)		
12/17/1997	Unilateral Administrative Order for the performance of the RD/RA for the Sediment and Floodplain /Wetland Operable Units (OU1/OU4) (V-W-98-C-449)	499254
7/7/1999	Consent Decree entered for Performance of Remedial Design and Remedial Action for OU1 / OU4 (Case No. 5:89CV1866)	141408
8/1/2000	Final Remedial Action Work Plan	257606
8/17/2001	ESD to address DNAPL-Impacted Soils and Sediment	150306
5/4/2004	Post-Closure Operations, Maintenance and Monitoring (OM&M) Plan for the Sediment and Floodplain/Wetland Operable Units, de maximis, inc.,	946428
10/18/2007	Unilateral Administrative Order issued to Millennium	281598
7/10/2009	Modification to CD	939490
10/6/2009	Environmental Covenant, Detrex Property	353273
7/27/2010	Environmental Covenant, Fields Brook Landfill	384258
2/10/2012	Environmental Covenant, Millennium Property	421768
Detrex (OU5) Document Review		
9/29/1997	Record of Decision for the Source Control Operable Unit of the Fields Brook Superfund Site,	91944
12/24/1997	Unilateral Administrative Order for the performance of the Detrex Corporation RD/RA (V-W-98-C-450)	143973
2/17/1998	Amendment to Unilateral Administrative Order for the performance of the Detrex Corporation RD/RA (V-W-98-C-450)	496533
7/10/2009	Modification to CD	939490
10/6/2009	Environmental Covenant	353273
1/15/2014	ESD for Fields Brook Superfund Site, Detrex Corp. Source Area (OU5)	461558
Detrex (OU5) Technical Report and Data Review		
5/4/2010	Draft Sediment and DNAPL Delineation Report, URS, Inc.	910409
8/2/2011	Additional Excavation of DS Tributary Work Plan, URS, Inc.,	467819
8/9/2011	Letter Report, DS Tributary Monitoring Results, Gradient Corp., .	911000
7/11/2012	Report for Additional Excavation of DS Tributary & State Rd Culvert Restoration	910594
4/8/2014	Draft DNAPL Recovery Point Installation Work Plan	559849
5/1/2014	EPA Approval of Draft DNAPL Recovery Point Installation Work Plan	939429
6/23/2014	Request for Schedule Modification DNAPL Recovery Point Installation Work Plan	939419
6/26/2014	EPA approval of Request for Schedule Modification DNAPL Recovery Point Installation Work Plan	939434
7/30/2015	Request for Perimeter DNAPL Recovery Point Installation	939448
7/31/2015	EPA Approval Letter DNAPL Recovery Point Installation	939441
12/1/16	"Submittal of Draft Passive DNAPL Collection System Completion Report	939463
1/25/2017	Revised Request for ESD DNAPL Monitoring Modification	942656
6/5/2017	Final Passive DNAPL Collection System Completion Report	934353
6/22/2017	EPA Approval Letter Final Passive DNAPL Collection System Completion Report	934352

Detrex (OU5) Technical Report and Data Review(cont.)		
1/22/2018	Request for ESD DNAPL Monitoring Modification	942657
3/21/2018	EPA approved DNAPL Monitoring Frequency Schedule	942658
2014-2018	Monthly Technical Status Reports for Detrex Source Area (June 2014 and January 2018)	946738
	Draft Operations, Maintenance, and Monitoring (OM&M) Plan for the Detrex Source Control Area on November 29, 2017 and a revised version on October 29, 2018	DRAFT NOT IN SDMS
Millennium (OU6) Document Review		
9/29/1997	Record of Decision for the Source Control Operable Unit of the Fields Brook Superfund Site,	91944
12/24/1997	EPA issued a Unilateral Administrative Order for the performance of the Millennium RD/RA (V-W-98-C-449)	143970
2/11/1998	EPA Letter with UAO Modification (2/18/1998?)	242253
4/8/1998	Letter: U.S. EPA Conditions For Use Of The Millennium Industrial Waste Landfill for Disposal Of PCB-Contaminated Soils From The Millennium Source Control Area	142398
6/16/1999	Approval Letter to Waste Stream Modification, Millennium Ashtabula Plant II Landfill, Letter from Kimberly Reese, Solid & Infectious Waste Division, Ohio EPA	142405
7/7/1999	EPA Memo-Approval of RD and RA Workplan	142204
12/24/1999	EPA issued a Unilateral Administrative Order for the performance of the Millennium RD/RA (V-W-98-C-449)	143970
5/1/2000	Millennium Remedial Action Report	942676
6/28/2000	EPA Approval of RA Report-Millennium OU	239727
10/18/2007	Unilateral Administrative Order issued to Millennium No. V-W-08-C-883	281598
7/10/2009	Modification to 1999 CD Statement of Work	939490
9/23/09	Explanation of Significant Difference (OU6, OU8, OU9)	352346
11/1/09	Final Report, Millennium Inorganic Chemicals TiCl4 Facility, Ashtabula, Ohio, Administrative Order V-W-08-C-883	397675
2/10/10	Completion Report	939489
5/18/2010	EPA Closes out UAO No. V-W-08-C-883	365852
11/16/2011	Cristal Letter Regarding Landfill Leachate Analysis	559859
2/10/2012	Environmental Covenant, Millennium Property	421768
8/29/2013	Excavation of Soils and Sediments Work Plan, de maximis, inc.	911070
3/7/2014	Cristal Ashtabula Landfill Sampling Report	939430
12/10/2015	Cristal requested to discontinue PCB monitoring at the Cristal Ashtabula Landfill	559862
12/22/2015	EPA Approved Request to Discontinue Sampling at the Cristal Ashtabula Landfill	939458
2014-2016	Cristal Ashtabula Landfill Quarterly Leachate Analysis for 2014-2016	559861, 559862

North Sewer (OU7) Document Review		
9/29/1997	Record of Decision for the Source Control Operable Unit of the Fields Brook Superfund Site	91944
12/24/1997	EPA issued a Unilateral Administrative Order for the performance of the North Sewers RD/RA (V-W-98-C-446	143972
2/18/1998	Amendment-EPA issued a Unilateral Administrative Order for the performance of the North Sewers RD/RA (V-W-98-C-446)	239910
1/11/2000	Final 100% design of North Sewer Source Area	142673
10/3/2000	Remedial Action workplan, North Sewer Source Area	142630
1/31/2001	Remedial Action Report, North Sewer Source Area	496564
3/27/2001	EPA letter with approval of Remedial Action and no monitoring required	239815
11/30/2004	Letter sent to EPA for Recoded Institutional Controls Recorded with Ashtabula County on October 25, 2004	504699
1/15/2014	ESD for Fields Brook Superfund Site, Detrex Corp. Source Area (OU5)	461558
Acme Scrap Iron (OU8) Document Review		
9/29/1997	Record of Decision for the Source Control Operable Unit of the Fields Brook Superfund Site,	91944
12/29/97	Unilateral Administrative Order (V-W-98-C-451)	143976
2/18/98	Amendment to Unilateral Administrative Order (V-W-98-C-451)	496534
2/20/98	Memo on UAO Amendment	240023
7/1/98	Remedial Design Work Plan-Map with PCBs (PCB Sampling Locations)	142642
12/28/2000	Remedial Action Construction Quality Assurance Report	323730
2/13/01	Completion of Remedial Action Report	504544
2/20/01	Operations, Maintenance, and Monitoring Plan	504680
3/17/03	Unilateral Administrative Order (V-W-98-C-451) Close out letter	239758
9/1/06	Results of Post-Remedial Action OM&M Sampling	323737
2/1/07	Acme Post Remedial Action O&M Sampling	361496
9/23/09	ESD (OU6, OU8, OU9)	352346
3/9/10	Environmental Covenant, Acme Property	357785

APPENDIX B

FIELDS BROOK NPL SITE

FIVE-YEAR REVIEW

INSPECTION CHECKLISTS

Section 1. SEDIMENT AND FLOODPLAIN/WETLANDS (OU1 & OU4)

Section 2. DETREX CORPORATION SOURCE AREA (OU5)

Section 3. MILLENNIUM TICL4 PLANT SOURCE AREA (OU6)

Appendix B: Section 1
Fields Brook Sediment (OU1) & Floodplains/Wetlands (OU4) Site Inspection Checklist

I. SITE INFORMATION	
Site name: **Fields Brook NPL Site-Sediment (OU1) and Floodplains/Wetland Area (OU4)**	**Date of inspection:** **8/21/2018**
Location and Region: **Ashtabula, OH**	**EPA ID:** **OHD980614572**
Agency, office, or company leading the FYR: US EPA	**Weather/temperature:** 76 degrees and scattered showers (AM) and sunny in the afternoon

Remedy Includes: (Check all that apply)

☒ Landfill cover/containment	☐ Monitored natural attenuation
☒ Access controls	☒ Groundwater Monitoring (of landfill leachate)
☒ Institutional controls	☐ Vertical barrier walls
☐ Groundwater pump and treatment	☐ Other: Click or tap here to enter text.
☒ Surface water collection and treatment	

Attachments:

☐ Inspection team roster attached Regan Williams, Ohio EPA Valerie Rule, de maximis, inc., Jenny Davison, USEPA William Earle, SulTRAC (EPA Contractor)	☒ Site map attached (See FYR

Appendix B: Section 1
Fields Brook Sediment (OU1) & Floodplains/Wetlands (OU4) Site Inspection Checklist

II. 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: Logs were available in the warehouse adjacent to the landfill.

2. Groundwater Monitoring Records

☒ Readily available ☐ Up to date ☐ N/A

Remarks: This information is provided to EPA in monthly reports

3. Leachate Extraction Records

☒ Readily available ☐ Up to date ☐ N/A

Remarks: This information is summarized in monthly reports provided to EPA

4. Daily Access/Security Logs

☒ Readily available ☒ Up to date ☐ N/A

Remarks: EPA was asked to sign in upon arrival—other names were listed in the log book so it appears to be used.

III. O&M COSTS

1. O&M Organization

☐ PRP in-house ☒ Contractor for PRP

Remarks: FBAG conducts O&M on behalf of PRPs

IV. ACCESS AND INSTITUTIONAL CONTROLS

☒ Applicable ☐ N/A

1. Fencing Damaged ☒ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: Gates were on the perimeter of the on-Site landfill that was used to dispose of wastes. See Appendix C. Photo 2.

2. Other Access Restrictions ☒ Location shown on site map ☒ Gates secured

Remarks: See Figure 1-1 of of FYR Report.

3. Institutional Controls (ICs)

A. 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)	Self-monitoring.		
Frequency	Click or tap here to enter text.		
Responsible party/agency	FBAG		
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:

Signs were not posted on the perimeter of the landfill.

B. Adequacy ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

Remarks: **ICs required are appropriate, however an ICIAP and LTS a recommended (see FYR)**

4. General

A. Vandalism/Trespassing ☐ Location shown on site map ☐ No vandalism evident

Remarks: When found, vandalism is addressed as soon as possible.

B. Land use changes on site ☒ N/A

Remarks: Click or tap here to enter text.

C. Land use changes off site ☒ N/A

Remarks: Click or tap here to enter text.

V. LANDFILL COVERS

1. Landfill Surface	☒ Applicable	☐ N/A
A. Settlement (Low Spots)	☐ Location Shown on Site Map	☒ Settlement Not Evident
B. Cracks	☐ Location Shown on Site Map	☒ Cracking Not Evident
C. Erosion	☐ Location Shown on Site Map	☒ Erosion Not Evident
D. Holes	☐ Location Shown on Site Map	☒ Holes Not Evident
E. Vegetative Cover	☒ Grass	☐ Cover Properly Established
	☐ Tress/Shrubs (indicate size and locations on a diagram	☒ No Signs of Stress
F. Bulges	☐ Location Shown on Site Map	☒ Bulges Not Evident
G. Wet Areas/Water Damage	☒ Wet Areas/Water Damage Not Evident	
H. Slope Instability	☐ Location Shown on Site Map	☒ Slope Instability Not Evident
I. Erosion	☐ Location Shown on Site Map	☒ Erosion Not Evident

J. Excessive Vegetative Growth	☐ Location Shown on Site Map	☒ Excessive Growth Not Evident	
2. Cover Penetrations	☒ Applicable	☐ N/A	
A. Gas Vents	☐ Active	☒ Passive	
☐ Properly secured/locked	☒ Functioning	☐ Routinely sampled	
☒ Good condition	☐ Evidence of leakage at penetration		
B. Monitoring Wells			
☒ Properly secured/locked	☒ Functioning	☒ Routinely sampled	
☒ Good condition	☐ Evidence of leakage at penetration		

VI. OVERALL OBSERVATIONS

1. 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.).

1. Photos of the Site inspection are presented in Appendix C (Photos 1-13), with observations noted in the captions.
2. The inspection was targeted to those elements of the Brook and source area remedies that were pertinent to completing the FYR.
3. ICs and access controls were observed; no signs were observed on the landfill. No other inconsistencies were noted with CERCLA decision documents or ECs that are on record for the site.
4. No on-site OM&M documents, costs or Site records were reviewed during the inspection. This information is regularly provided to EPA in monthly reports and was reviewed at the office.
5. Landfill covers appear to be well maintained
   Engineered elements of the remedies, e.g. EU 8Brook Realignment Structure, groundwater and DNAPL interception trenches, monitoring wells, are generally functioning as currently required.

2. 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.

Some minor issues are discussed in the FYR and will be resolved in upcoming revisions to OM&M Plans.

Appendix B: Section 2
Detrex (OU5) Site Inspection Checklist

I. SITE INFORMATION	
Site name: **Detrex Corporation (OU5)**	**Date of inspection:** **8/20/2018**
Location and Region: **1100 State Road,** **Ashtabula, OH, 44004**	**EPA ID:** **OHD980614572**
Agency, office, or company leading the FYR: US EPA	**Weather/temperature:** 76 degrees and overcast

Remedy Includes: (Check all that apply)

☐ Landfill cover/containment	☐ Monitored natural attenuation
☒ Access controls	☒ DNAPL Groundwater containment
☒ Institutional controls	☒ Vertical barrier walls
☒ Groundwater pump and treatment	☐ Other: Click or tap here to enter text.
☒ Surface water collection and treatment	

Attachments:

☒ Inspection team roster listed below	☒ Site map attached (see FYR Figure 5-2)

Inspection Team
Jenny Davison, USEPA
William Earle, SulTRAC (EPA Contractor)
Tom Doll, Detrex
Marty Schmidt, Detrex

Appendix B: Section 2
Detrex (OU5) Site Inspection Checklist

II. INTERVIEWS (Check all that apply)
1. **O&M Site Manager** **Thomas Doll, Plant Manager, 8/20/2018** Interviewed: ☒ at site ☐ at office ☐ by phone Phone Number: N/A Problems, suggestions: ☐ Report attached **Interview answers in checklist**
2. **O&M Staff** **Marty Schmidt, Plant Manager, 8/20/2018** Interviewed: ☒ at site ☐ at office ☐ by phone Phone Number: N/A Problems, suggestions: ☐ Report attached **Interview answers in checklist**

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: **Due to the recent change in remedy the O &M Plan was in draft form at the time of the Site Visit**			
2. Site-Specific Health and Safety Plan		☒ Readily available	
☐ Contingency Plan/Emergency Response Plan		☐ Readily available	
Remarks: Stored Electronically (Tom Steib) but not reviewed by EPA.			
3. O&M and OSHA Training Records			
	☐ Readily available	☒ Up to date	☐ N/A
Remarks: Mr. Schmidt and Mr. Doll conformed their training was up to date.			
4. Groundwater Monitoring Records			
	☒ Readily available	☒ Up to date	☐ N/A
Remarks: The records are up to date and submitted to EPA monthly			
5. Daily Access/Security Logs			
	☒ Readily available	☐ Up to date	☐ N/A
Remarks: Observed the records at check-in to the Site			
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

Remarks: Marty Schmidt, Tom Doll and Tom Steib participate in O&M activities. Monthly reports are sent to EPA on the progress of the DNAPL collection.

2. O&M Cost Records

☒Readily available ☐ Up to date ☐ Funding mechanism/agreement in place

Original O&M cost estimate The O&M staff at Detrex is full time to keep track of the wells. The gaging and DNAPL extraction records are in the monthly report sent to EPA. When DNAPL is sent off site, it goes to Ross Incinerator in Grafton, IN or Akron, OH.

V. ACCESS AND INSTITUTIONAL CONTROLS

☒ Applicable ☐ N/A

1. Fencing Damaged ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks: No damage was observed.

2. Other Access Restrictions ☐ Location shown on site map ☒ Gates secured

Remarks: Click or tap here to enter text.

3. Institutional Controls (ICs)

C. 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) Self -Reporting

Click or tap here to enter text.

D. Adequacy ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

Remarks: **Appear to be adequate. LTS recommended (see FYR)**

4. General

A. Vandalism/Trespassing ☐ Location shown on site map ☒ No vandalism evident

Remarks: Click or tap here to enter text.

B. Land use changes on site ☒ N/A

Remarks: No land use changes since last FYR. The facility is still operating.

Appendix B: Section 2
Detrex (OU5) Site Inspection Checklist

C. Land use changes off site ☒ N/A

Remarks: No land use changes. The facility is still operating

VI. VERTICAL BARRIER WALLS

☒ Applicable	☐ N/A

1. Settlement ☒ Location Shown on Site Map ☐ Settlement Not Evident

Remarks: See Appendix C-Photo 22.

VII. DNAPL COLLECTION & GROUNDWATER/SURFACE WATER REMEDIES

☒ Applicable	☐ N/A

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

A. Pumps, Wellhead Plumbing, and Electrical ☐ N/A

☒ Good Condition ☐ All Required Wells Properly Operating ☐ Needs Maintenance

Remarks: Appendix C

B. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances

☒ Good Condition ☐ Needs Maintenance

Remarks: Wells were properly secured, in good condition and functioning as intended based on visual observations (Appendix C Photos 20-22 and review of the monthly monitoring reports submitted by Detrex (SDMS 946738

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

A. Collection Structures, Pumps, and Electrical

☒ Good Condition ☐ Needs Maintenance

Remarks: See Photos 20-22 in Appendix C.

B. Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances

☒ Good Condition ☐ Needs Maintenance

Remarks: See Photos 20-22 in Appendix C.

3. Treatment System ☐ Applicable ☐ N/A

A. Treatment Train (Check components that apply)

☒ Good Condition ☐ Needs Maintenance

☒ Sampling ports properly marked and functional

☐ Sampling/maintenance log displayed and up to date

☒ Equipment properly identified

Remarks: Mobile DNPAL Recovery Unit, Pump, water and DNAPL collection tank appeared to be operating and functioning secured, in good condition and functioning as intended based on visual observations (Appendix C Photos 19 and review of the monthly monitoring reports submitted by Detrex (SDMS 946738)

B. Tanks, Vaults, Storage Vessels ☐ N/A

☐ Proper Secondary Containment ☒ Good Condition ☐ Needs Maintenance

Remarks: Tanks on-site for treatment were in good condition. See Appendix C Photo 19

C. Treatment Building(s)

☐ N/A ☒ Good condition (esp. roof and doorways)

☐ Needs repair ☒ Chemicals and equipment properly stored

Remarks Treatment trailer was in condition and equipment and chemicals were properly stored. See Appendix C Photo 19

D. Monitoring Wells (DNAPL Passive collection remedy) ☐ N/A

☒ Properly secured/locked ☒ Functioning

☒ Routinely sampled ☐ All required wells located

☒ Good condition ☐ Needs Maintenance

Remarks Passive collection wells were properly secured, in good condition and functioning as intended based on visual observations (Appendix C Photos 20-22 and review of the monthly monitoring reports submitted by Detrex (SDMS 946738)

VIII. OVERALL OBSERVATIONS

Adequacy of O&M

Currently the Detrex passive collection system is operating and functional. Detrex submitted a draft Operations, Maintenance, and Monitoring Report. Sampling of the Detrex outfall, which assesses the performance of the on-site water treatment system, is addressed by monitoring required under Detrex's NPDES permit. Detrex provides copies of its monthly status reports to EPA.

Appendix B: Section 3
Millennium (OU6) Site Inspection Checklist

I. SITE INFORMATION	
Site name: **Fields Brook NPL Site-Millennium (OU6)**	**Date of inspection:** **8/22/2018**
Location and Region: **Ashtabula, Ohio**	**EPA ID:** **OHD980614572**
Agency, office, or company leading the FYR: US EPA	**Weather/temperature:** Overcast, 70s

Remedy Includes: (Check all that apply)

☒ Landfill cover/containment	☐ Monitored natural attenuation
☒ Access controls	☐ Groundwater containment
☒ Institutional controls	☐ Vertical barrier walls
☐ Groundwater pump and treatment	☒ Other: Interceptor Trench on northern property line.
☐ Surface water collection and treatment	

Attachments:

☐ Inspection team Jenny Davison, USEPA William Earle, SulTRAC (EPA Contractor) Regan Williams, Ohio EPA Mark McIntyre, Cristal	☒ Site map attached (FYR Figure 6-1)

Appendix B: Section 3
Millennium (OU6) Site Inspection Checklist

II. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)			
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: Click or tap here to enter text.			
Remarks: On-site NPDES Permit and landfill permits were available.			

III. ACCESS AND INSTITUTIONAL CONTROLS			
	☒ Applicable	☐ N/A	
1. Fencing Damaged	☐ Location shown on site map	☒ Gates secured	☐ N/A
2. Perimeter Ditches/Off-Site Discharge	☒ Applicable	☐ N/A	
A. Discharge Structure	☒ Functioning	☐ N/A	

IV. OVERALL OBSERVATIONS

Implementation of the Remedy

The Site inspection included observations of the previous historical locations that were cleaned up under the remedy along the northern property line, the Brook (EU8) and the northern trench and sumps. See the Site Photos for additional details (Appendix C). After the inspection, EPA followed up to request additional information regarding the status of the remedial actions. Cristal informed EPA that they have taken proactive measures to monitor the trenches along their northern property line. The trenches are sampled quarterly and analyzed by an external lab. All sample results for PCB have been non-detect since May 2014. All source control activities implemented appear to be effective in preventing the migration of any PCB's into the interceptor trenches from the Cristal property.

Excavated soils and mining residuals were sent to Millennium's existing, permitted solid waste industrial landfill located within the Fields Brook watershed. The portion of the landfill containing the PCB waste materials was capped in 2011. Millennium's OM&M responsibilities for its landfill were and are defined by the permit issued by Ohio EPA, with the only addition being the expansion of the monitoring parameters to include PCBs and radionuclides.

The landfill is under regulation by Ohio EPA. It operates as a RCRA Subtitle D landfill, pursuant to Ohio Administrative Code (OAC) 3745-29 (Permit & Operations), OAC 3745-30-08 (Ground Water Monitoring), and OAC 3745-37 (License). Under its current license, Ohio EPA requires annual monitoring for PCBs.

Appendix C
Ashtabula River NPL Site
Five Year Review Inspection

August 21-22, 2018

by Jenny Davison, RPM

(Photos 1-18)

Photo 1
Date: 8/21/2019
Time: 9:30am
Description: Fields Brook Land Fill. As part of the inspection we observed the integrity of the cap.

Photo 2
Date: 8/21/2019
Time: 9:42 am
Description: Entrance to Ashtabula Landfill (note this is not the Fields Brook Landfill-however was observed as waste from OU3 was disposed of in this landfill. Entrance was marked with signage alerting that “Hazardous Substances Within this Area”

Photo 3
Date: 8/21/2019
Time: 10:39 am
Description: Fields Brook OU 1& 4--- Exposure Unit 5. Photo of DS Tributary (facing State Road)

Photo 4
Date: 8/21/2019
Time: 10:39 am
Description: Fields Brook OU 1& 4--- Exposure Unit 5. Photo of DS Tributary Sump (south Side of EU Tributary)

Photo 5
Date: 8/21/2019
Time: 10:48 am
Description: Fields Brook OU 1& 4--- Exposure Unit 6 (Observed from State Road facing west)

Photo 6
Date: 8/21/2019
Time: 10:49 am
Description: Fields Brook OU 1& 4--- Exposure Unit 8 (Facing east on State Road. Cristal is to the South)

Photo 7
Date: 8/21/2019
Time: 11:07 am
Description: Fields Brook OU 1& 4--- Exposure Unit 6 (Facing east on Highway 11)

Photo 8
Date: 8/21/2019
Time: 11:15 am
Description: Fields Brook OU 1& 4--- Exposure Unit 4 (Facing west on Highway 11)

Photo 9
Date: 8/21/2019
Time: 11:20 am
Description: Fields Brook OU 1& 4--- Exposure Unit 7 (Facing east on Columbia Avenue Bridge)

Photo 10
Date: 8/21/2019
Time: 11:33 am
Description: Fields Brook OU 1& 4--- Exposure Unit 3 (Facing east)

Photo 11
Date: 8/21/2019
Time: 11:50 am
Description: Fields Brook, OU 1& 4--- Exposure Unit 2 (On 15th Street, facing east)

Photo 12
Date: 8/21/2019
Time: 11:56 am
Description: Fields Brook, OU 1& 4--- Exposure Unit 1 (Fields Brook tributary, prior to the confluence of the Ashtabula River)

Photo 13
Date: 8/21/2019
Time: 11:56 am
Description: Description: Ashtabula River Turning Basin

Photo 14
Date: 8/21/2019
Time: 2:54 pm
Description: Property that includes Acme Scrap Irons and Metals (OU8), dilapidated buildings at the end of the driveway. The area around the building appears to be the area where RD/RA excavations may have taken place.

Photo 15
Date: 8/21/2019
Time: 2:56 pm
Description: Property that includes Acme Scrap Irons and Metals (OU8), dilapidated buildings, silos and empty area at the end of the driveway. The area around the building appears to be the area where RD/RA excavations may have taken place.

Photo 16
Date: 8/21/2019
Time: 3:18 pm
Description: OU3-Ashtabula River work being completed by GLNPO.

Photo 17
Date: 8/21/2019
Time: 3:18 pm
Description: OU3- Ashtabula River (Work being completed by GLNPO)

Photo 18
Date: 8/22/2019
Time: 10:54 am
Description: Sump along trench of EU8. Fences and security measures were in place.

Photos of Detrex
(Photos 19-22)
by Marty Schmidt (Detrex)
August 20, 2018

Photo 19
Date: 8/20/2019
Description: Mobile DNPAL Recovery Unit, Pump, water and DNAPL collection tank

Photo 20
Date: 8/20/2019
Description: Perimeter wells monitoring wells , down gradient of Site

Photo 21
Date: 8/20/2019
Description: Passive DNAPL recovery well at Detrex facility.

Photo 22
Date: 8/20/2019
Description: Slurry wall on west perimeter of Site

APPENDIX D – Site Chronology for all OUs

SEDIMENT AND FLOODPLAIN/WETLANDS OU1 & OU4 SITE CHRONOLOGY

Event	Date
Site is finalized on the National Priorities List (NPL)	September 8, 1983
Sediment RI Report Completed	March 1985
Sediment FS Completed	July 1986
Record of Decision for the Fields Brook Sediment (OU1)	September 30, 1986
Source Control RI Completed	May 1997
Source Control FS Completed	June 1997
Record of Decision for the Floodplain / Wetland (OU4)	June 30, 1997
Explanation of Significant Differences (ESD) – Sediment (OU1)	August 15, 1997
Record of Decision for Source Control (OU2 originally, OUs 5-10 now)	September 29, 1997
EPA issued a Unilateral Administrative Order for the performance of the RD/RA for the Sediment and Floodplain / Wetland Operable Units (OU1 / OU4) (V-W-98-C-449)	December 17, 1997
EPA issues Unilateral Administrative Orders for the performance of RD/RA at the Source Control Operable Unit. OU2 broken into OUs 5 through 10.	December 1997
Site-Wide ESD Modifying the Decisions for the Sediment, Floodplain/Wetland and Source Control OUs (addition of radionuclide cleanup requirements)	April 8, 1999
Consent Decree lodged for Performance of Remedial Design and Remedial Action for OU1 / OU4	May 14, 1999
Consent Decree entered for Performance of Remedial Design and Remedial Action for OU1 / OU4	July 7, 1999
PRP Contractor Mobilization at the Site	April 28, 2000
Start Landfill Excavation	May 25, 2000
EPA approves landfill design / Start of landfill construction	July 2000
Start Liner Installation	July 20, 2000
EPA approves Remedial Design / Commencement of Remedial Action	August 9, 2000
Complete Landfill	September 6, 2000
Begin Excavation in OU1 / OU4	September 22, 2000
Encounter DNAPL / Commence Shutdown	October 16, 2000
DNAPL Investigation	Oct. 2000 – Mar. 2001
Re-commence excavation activities in OU1 / OU4	May 7, 2001
ESDs to address the presence of DNAPL-impacted soil and sediment.	August 17, 2001

Appendix D

Event	Date
Begin Thermal Treatment with Soil Pure, Inc.	October 19, 2001
Thermal treatment resumed with ESMI of New York – commence trial runs to prepare for performance demonstration	June 17, 2002
Thermal treatment shutdown pending approval of performance demonstration plans and scheduling of trial burn	Aug. 2 – Sept. 29, 2002
Performance Demonstration Performed	October 8 – 10, 2002
Site Mitigation - Placement of Plantings	Oct. 2002 – Mar. 2003
Complete Sediment and Soil Excavation	December 17, 2002
Thermal treatment completed	December 20, 2002
Demobilization	Dec. 2002 – Feb. 2003
Conditional Approval of Final Construction Report	September 30, 2003
EPA Approval of Quality Assurance Project Plan for OM&M	March 19, 2004
EPA Approval of OM&M Work Plan	May 4, 2004
First FYR Completed	June 7, 2004
PCBs & Chlorinated Solvent DNAPL found in the Brook during OM&M sampling	May 14, 2005
PRPs Mobilize to Excavate Soil & Sediment Pockets with PCB and Chlorinated Solvent DNAPL	August 20, 2007
PRPs discover oily DNAPL – Determined to be Therminol (Arochlor 1248)	August 29, 2007
EPA issued Unilateral Administrative Order to Millennium to address potential for release of PCB contaminants	October 18, 2007
Millennium installs interceptor trench and commences soil/sediment excavation	Winter 2007/2008
Fields Brook Action Group submits proposal for relocating and isolating Fields Brook as part of a Focused Feasibility Study	February 2, 2009
Second FYR Completed	June 2, 2009
Modification to Statement of Work for the Fields Brook Superfund Site United States of America v. GenCorp, Inc., et al. Case No. 5:89CV1866	July 10, 2009
FBAG submits Final Construction Completion Report, Fields Brook Relocation & EU 8Floodplain Restoration	February 10, 2010
EPA approves repairs to the EU 8Fields Brook Relocation Structure	November 30, 2011
URS and Detrex complete remediation report for 2009-2011 DNAPL excavation work in DS tributary (EU5)	June 11, 2012

Event	Date
FBAG submits *Excavation of Soils and Sediments Work Plan* to address isolated areas of contamination found during O&M sampling in EU 2 through EU 6.	August 29, 2013
EPA Approves *Excavation of Soils and Sediments Work Plan*	December 5, 2013
Third FYR Completed	May 23, 2014
Excavation of Soils and Sediments in EU1, EU2, EU 3, EU 4, and EU 6. FBAG submit a Completion Report submitted ot EPA on September 10, 2014.	June 12-26, 2014
Excavation of Soils and Sediments in EU4	October 3 – November 7, 2016
FBAG submits Fields Brook Superfund Site, Excavation of Soils and Sediments Final Completion Report	November 23, 2016
Quality Assurance Project Plan Revision 4, to update sampling procedures under the OM&M plans, dated June 19, 2018 was reviewed and approved by EPA	June 27, 2018

DETREX CORPORATION SOURCE AREA (OU5) SITE CHRONOLOGY

Event	Date
Detrex facility constructed	1947
EPA initiated negotiations for the performance of a Source Control RI/FS.	1986
EPA issued a Unilateral Administrative Order for performance of a Source Control RI/FS	1989
Fields Brook PRPs investigated possible source control areas.	1992 – 1995
EPA approved the PRPs' Source Control RI	May 1997
EPA approved the PRPs' Source Control FS	June 1997
EPA issued the Source Control ROD, which addressed six individual source control areas, including Detrex Corporation.	September 29, 1997
EPA issued a Unilateral Administrative Order for the performance of the Detrex Corporation RD/RA (V-W-98-C-450) and Amendment 2/17/1998 (496533)	December 1997

Appendix D

Event	Date
EPA issued an Amendment to Unilateral Administrative Order for the performance of the Detrex Corporation RD/RA (V-W-98-C-450) Note-UAO SOW provided on Feb 26, 1998	February 17, 1998
EPA approval of Phase I (slurry wall & earth work) RD	May 22, 2000
EPA approval of Phase I Remedial Action (RA) Work Plan	August 30, 2000
Earth work, including construction of slurry wall	August 2000 - July 2001
EPA approval of Phase II (DNAPL Recovery) RD	October 4, 2001
EPA approval of Phase II RA Work Plan	December 6, 2001
Construction of DNAPL extraction system	Summer 2002
DNAPL extraction commenced	October 2002
EPA completes First FYR	June 7, 2004
PCBs & Chlorinated Solvent DNAPL found in the Brook during OM&M sampling	May 14, 2005
Detrex investigates southern portion of property for evidence of DNAPL movement towards Fields Brook	August 2005
Detrex installs interceptor trenches north of Fields Brook and south of the plant and former lagoon area	Winter 2006/2007
EPA observes DNAPL at North Sewer outfall	December 5, 2006
Detrex completes borings and test trenches along North Sewer to investigate possible migration of DNAPL. Excavation of North Sewer outfall area and installation of sump	December 2006
Detrex installs additional extraction wells (with alternative design)	September 2007 – February 2008
Additional chlorinated solvent DNAPL pockets found in the Brook during Millennium removal action	October 2007 – October 2008
Detrex submits revised draft work plans for investigation of DS Tributary and expansion of DNAPL extraction system	June 2008
State Road bridge reconstruction and identification of additional chlorinated DNAPL at North Sewer outfall location	December 2008 – February 2009

Appendix D

Event	Date
Detrex conducts additional investigation with soil borings along western edge of facility and in State Road north of the bridge	January 2009
EPA completes Second FYR	June 2, 2009
Detrex performs limited sediment removal in DS Tributary immediately west of State Road	November 2009
Detrex completes "Sediment/DNAPL Delineation Report"	May 4, 2010
Detrex performs additional sediment removal in DS Tributary and restoration of box culvert under State Road	October – December 2011
Detrex submits "Report for Additional Excavation of DS Tributary and State Road Culvert Restoration"	July 11, 2012
EPA Issues "ESD" to modify the extraction well remedy at Detrex.	January 15, 2014
EPA approved a DNAPL Recovery Point Installation Work Plan	May 1, 2014
EPA completes Third FYR	May 23, 2014
DNPAL System Phase I, Phase II, III wells installed	June-Aug 2015
EPA approved "Final Passive DNAPL Collection System Completion Report"	June 14, 2017
EPA approved DNAPL Monitoring Frequency Schedule	March 21, 2018

MILLENNIUM TICL4 PLANT SOURCE AREA (OU6) SITE CHRONOLOGY

Event	Date
$TiCl_4$ Plant constructed by Stauffer Chemical Company and began operations	1956
National Distillers and Chemicals bought and operated $TiCl_4$ Plant	1959
Cabot Titania purchased and began its operation of the $TiCl_4$ Plant	1963
$TiCl_4$ Plant leased to Gulf and Western Industries, Inc.	1972
Gulf and Western purchased the $TiCl_4$ Plant	1975
SCM purchased the $TiCl_4$ Plant	1983
EPA initiated negotiations for the performance of a Source Control RI/FS.	1986
EPA issued a Unilateral Administrative Order for performance of a Source Control RI/FS	1989
Fields Brook PRPs investigated possible source control areas.	1992 – 1995
SCM changed its name to Millennium Inorganic Chemicals, Inc.	1997
EPA approved the PRPs' Source Control RI	May 1997
EPA approved the PRPs' Source Control FS	June 1997
EPA issued the Source Control ROD, which addressed 6 individual source control areas, including the Millennium $TiCl_4$ Plant	September 29, 1997
EPA issued a Unilateral Administrative Order for the performance of the Millennium RD/RA (V-W-98-C-449)	December 24, 1997
Letter and Amendment to 1997 UAO (V-W-98-C-449)	Feb 11, 1998
Effective date of EPA "stop work" directive issued to Millennium to allow evaluation of project direction pending investigation of radionuclide contamination	June 10, 1998
EPA issued site-wide ESD to address radionuclide contamination at Millennium and in Fields Brook	April 8, 1999

Appendix D

Event	Date
EPA approved the Remedial Design and the Remedial Action Work Plan for the Millennium $TiCl_4$ Plant Operable Unit	July 7, 1999
Commencement of soil and mining residual excavation	July 26, 1999
Completion of excavation	October 15, 1999
EPA approved the Completion of Remedial Action Report	June 28, 2000
EPA approves reduction in PCB and radium monitoring frequency for leachate at the Millennium landfill. Leachate monitoring was reduced from monthly to quarterly.	February 4, 2003
EPA completes FYR	June 7, 2004
Lyondell Chemicals acquires the facility	2004
Fields Brook PRPs Mobilize to excavate pockets of PCB contamination and DNAPL from Fields Brook	August 20, 2007
Fields Brook PRPs discover oily DNAPL – Determined to be Therminol (Aroclor 1248)	August 29, 2007
EPA issued Unilateral Administrative Order to Millennium to address potential for release of contaminants (response work commenced under verbal order) (V-W-08-C-883)	October 18, 2007
Millennium installs interceptor trenches on the northern portion of its property as a protective measure to ensure that any DNAPL within the facility cannot move to Fields Brook	November – December 2007
Millennium collects soil borings from facility perimeter and from potential DNAPL source areas within its facility	April 2008
EPA completes Second FYR	June 2, 2009
Consent Decree Modified by EPA to incorporate relocation of Fields Brook in EU 8through the PCB-contaminated soil excavation area	July 10, 2009
ESD for OU6, OU8, and OU9	September 23, 2009
Final Report approved by EPA for soil and sediment investigation, and removal work considered complete pursuant to UAO	May 18, 2010
Millennium Inorganic Chemical changes name to Cristal USA	October 12, 2012
Most Recent Sampling report submitted to EPA for Cristal Ashtabula Landfill	March 7, 2014
Third FYR	May 23, 2014
EPA approved Cristal's request to discontinue quarterly sampling at the Cristal Ashtabula Landfill	December 22, 2015

NORTH SEWERS SOURCE AREA (OU7) SITE CHRONOLOGY

Event	Date
EPA initiated negotiations for the performance of a Source Control RI/FS.	1986
EPA issued a Unilateral Administrative Order for performance of a Source Control RI/FS	1989
Fields Brook PRPs investigated possible source control areas.	1992 – 1995
EPA approved the PRPs' Source Control RI	May 1997
EPA approved the PRPs' Source Control FS	June 1997
EPA issued the Source Control ROD, which addressed 6 individual source control areas, including the North Sewers	September 29, 1997
EPA issued a Unilateral Administrative Order for the performance of the North Sewers RD/RA (V-W-98-C-446)	December 24, 1997
Amendment-EPA issued a Unilateral Administrative Order for the performance of the North Sewers RD/RA (V-W-98-C-446)	February 18, 1998
Approval of Remedial Design for North Sewers	June 1, 2000
Abandonment of Sewer Lines	September – October, 2000
EPA approves Completion of Remedial Action Report (dated January 31, 2001)—no monitoring is required	March 27, 2001
EPA completes First FYR	June 7, 2004
Institutional Controls Recorded with Ashtabula County (Letter sent to EPA on November 30, 2004)	October 25, 2004
EPA completes Second FYR	June 2, 2009
EPA completes Third FYR	May 23, 2014

ACME SCRAP IRON AND METALS AND SOUTH SEWERS SOURCE AREA (OU8)
SITE CHRONOLOGY

Event	Date
Acme Scrap property owned by U.S. government	Late 1940s
Site operated as a calcium carbide manufacturing facility	1943 – 1952
Site was vacant	1952 – 1974
Acme purchased the property	1974
EPA initiated negotiations for the performance of a Source Control RI/FS	1986
EPA issued a Unilateral Administrative Order for performance of a Source Control RI/FS	1989
Fields Brook PRPs investigate possible source control areas	1992 - 1995
EPA approved the PRPs' Source Control RI	May 1997
EPA approved the PRPs' Source Control FS	June 1997
EPA issued the Source Control ROD, which addressed 6 individual source control areas, including Acme Scrap and the South Sewers	September 29, 1997
EPA issued a Unilateral Administrative Order (V-W-98-C-451) for the performance of the Acme Scrap and South Sewers RD/RA	December 29, 1997
EPA issued a Unilateral Administrative Order (V-W-98-C-451) for the performance of the Acme Scrap and South Sewers RD/RA Amendment	February 18, 1998
EPA approved the Remedial Design for the Acme Scrap and South Sewers operable units	August 30, 2000
Performance of the Remedial Action	September 2000
Completion of Remedial Action Repot	February 13, 2001
Operations, Maintenance, and Monitoring Plan for Acme Scrap and Metal	Feb 20, 2001
Acme Scrap property purchased by Lakeside Industrial Park and Railyard, Inc.	December 2001
EPA approved the 12/28/2000 Remedial Action Construction Quality Assurance Report for Acme Scrap and South Sewers	March 17, 2003
EPA completes First FYR	June 7, 2004
Routine monitoring of sediment from stormwater runoff	September 2001 – September 2006

Appendix D

Event	Date
EPA completes Second FYR	June 2, 2009
ESD OU6, OU8, and OU9	September 23, 2009
Institutional Controls Recorded	March 9, 2010
Third FYR	May 23, 2014