HDR APTIM
a Joint Venture

Final Remedial Investigation Report

Fulton Avenue Superfund Site - Operable Unit 2

Nassau County, New York

EPA Task Order No. 68HE0222F0037

EPA Contract No. 68HE0318D0009

December 3, 2024

Contents

Tables iv

Figures v

Appendices vi

Acronyms vii

Executive Summary 1

1 Introduction 1-1
- **1.1 Site Description** 1-1
- **1.2 Potential TCE Sources** 1-3
  - **1.2.1 Garden City Park Industrial Area** 1-3
  - **1.2.2 Zoe Chemical** 1-3
  - **1.2.3 40 & 50 Roselle** 1-3
  - **1.2.4 Albertson** 1-4
  - **1.2.5 Jackson Steel** 1-4
  - **1.2.6 Manfred Schulte** 1-4
- **1.3 Report Organization** 1-4

2 Remedial Investigation 2-1
- **2.1 Phase 1 - Baseline Sampling: May 2011 – November 2011** 2-1
  - **2.1.1 Monitoring Well Assessment** 2-1
  - **2.1.2 Groundwater Sampling and Analysis** 2-1
  - **2.1.3 Investigation Derived Waste (IDW)** 2-2
- **2.2 Phase 2: June 2012 – November 2013** 2-2
  - **2.2.1 Direct Push Technology and Groundwater Sampling** 2-2
  - **2.2.2 Monitoring Well Assessment** 2-3
  - **2.2.3 Groundwater Sampling and Analysis** 2-3
  - **2.2.4 Investigation Derived Waste (IDW)** 2-3
- **2.3 Phase 3: February 2014 – August 2015** 2-4
  - **2.3.1 Groundwater Sampling and Analysis** 2-4
  - **2.3.2 Soil Sampling and Analysis** 2-5
  - **2.3.3 Soil Gas Sampling** 2-5
  - **2.3.4 Monitoring Well Reconnaissance** 2-5
  - **2.3.5 Transducer Study** 2-5
  - **2.3.6 Monitoring Well Survey** 2-6
  - **2.3.7 Investigation Derived Waste** 2-6
- **2.4 Phase 4: September 2015 – September 2016** 2-6
  - **2.4.1 VPB Borings with Soil and Groundwater Sampling** 2-6
  - **2.4.2 Monitoring Well Installation and Development** 2-7
  - **2.4.3 Groundwater Sampling** 2-8
  - **2.4.4 Investigation Derived Waste** 2-8
- **2.5 Phase 5: July 2019 – March 2020** 2-9
  - **2.5.1 Groundwater Sampling** 2-9
    - **2.5.1.1 Monitoring Well Reconnaissance** 2-9
    - **2.5.1.2 Synoptic Water Level Measurements** 2-9
    - **2.5.1.3 Groundwater Sampling and Analysis** 2-9
  - **2.5.2 Subslab and Soil Gas Sampling** 2-10
  - **2.5.3 Transducer Study** 2-11
  - **2.5.4 Monitoring Well Survey** 2-11

2.5.5 Investigative Derived Waste (IDW) 2-11
2.6 Data Validation 2-12
3 Physical Characteristics 3-1
3.1 Demographics 3-1
3.2 Land Use 3-1
3.3 Meteorology 3-1
3.4 Topography 3-1
3.5 Soils 3-2
3.6 Geology 3-2
3.7 Hydrogeology 3-3
3.7.1 Regional Hydrogeology 3-3
3.7.2 Local Hydrogeology 3-3
3.7.3 Municipal Water Supply Wells 3-4
3.7.4 Recharge Areas 3-4
3.8 Surface Water 3-5
3.9 Ecological Characterization 3-6
4 Nature and Extent of Contamination 4-1
4.1 Applicable and Relevant and Appropriate Requirements and To Be Considered Criteria 4-1
4.1.1 Groundwater 4-1
4.1.2 Soil 4-2
4.1.3 Soil Vapor, Indoor and Outdoor Air 4-2
4.2 Phase 1 through 4 Analytical Results 4-2
4.3 Phase 5 Groundwater Analytical Results 4-3
4.3.1 Volatile Organic Compounds 4-3
4.3.1.1 Compound Specific Isotope Analysis 4-4
4.3.1.2 OU2 TCE-Dominant Groundwater Contamination 4-5
4.3.1.2.1 Round 1 4-8
4.3.1.2.2 Round 2 4-8
4.3.1.2.3 TCE Trends 4-8
4.3.2 Metals 4-9
4.3.3 Organic Acids 4-10
4.4 Groundwater Geochemical Conditions and Biodegradation Indicator Parameters 4-10
4.4.1 Sulfate 4-11
4.4.2 Iron and Manganese 4-11
4.4.3 Nitrate and Nitrite 4-12
4.4.4 Alkalinity 4-12
4.4.5 Organic Carbon 4-12
4.4.6 BOD 4-12
4.4.7 COD 4-12
4.4.8 Chloride 4-13
5 Contamination Fate and Transport 5-1
5.1 Introduction 5-1
5.2 Contaminant Transport and Attenuation Mechanisms 5-2
5.2.1 Advection 5-3
5.2.2 Dispersion 5-3
5.2.2.1 Mechanical Dispersion 5-4
5.2.2.2 Molecular Diffusion 5-5

5.2.3 **Sorption** ... 5-6
5.2.4 **Transformation Processes** ... 5-7
5.2.4.1 **Anaerobic Reductive Dechlorination** ... 5-8
5.2.4.2 **Abiotic Degradation of Chlorinated Ethenes** ... 5-9
5.2.5 **Facilitated Transport** ... 5-9
5.2.6 **Volatilization** ... 5-9
5.2.7 **Dilution** ... 5-10
5.3 **Fate and Transport of TCE and PCE in OU2** ... 5-10
6 **Conceptual Site Model** ... 6-1
6.1 **Introduction and Site History** ... 6-1
6.2 **Source Investigation** ... 6-1
6.3 **Hydrogeology** ... 6-2
6.4 **Nature and Extent of Contamination** ... 6-3
6.5 **Fate and Transport** ... 6-4
7 **Summary of Human Health Risk Assessment** ... 7-1
7.1 **Human Health Risk Assessment** ... 7-1
7.1.1 **Introduction** ... 7-1
7.1.2 **Exposure Assessment** ... 7-2
7.1.3 **Risk Characterization and Conclusions** ... 7-2
8 **Summary and Conclusions** ... 8-1
9 **References** ... 9-3

Tables

2-1 Field Activity Summary
2-2 Sample Summary – Phase 1 Baseline Groundwater Sampling
2-3 Sample Summary – Phase 2 DPT and Groundwater Screening & Groundwater Sampling
2-4 Sample Summary – Phase 3 Groundwater, Soil Vapor, and Soil Sampling
2-5 Sample Summary – Phase 4 Vertical Profile Groundwater Screening and Soil Sampling
2-6 Synoptic Groundwater Elevation and Monitoring Well Construction - 2019
2-7 Sample Summary – Phase 5 Groundwater & Soil Gas Sampling
4-1 Potential Delineation Criteria (PDC) - Groundwater Screening
4-2 Groundwater Analytical Results - Phase 5 - VOCs
4-3 Groundwater Analytical Results - Phase 5 - Metals
4-4 Groundwater Analytical Results - Phase 5 - Organic Acids
4-5 Groundwater Analytical Results - Phase 5 - Biodegradation Indicator Parameters
4-6 Groundwater Analytical Results - Phase 5 - Statistical Summary
4-7 Fulton Avenue OU2 Plume Rationale
4-8 Phase 5 - Groundwater Geochemical Conditions Data

Figures

1-1 Site Location Map
1-2 Sites of Interest
2-1 Baseline Monitoring Well Sampling Locations – July 2011
2-2 Phase 2 DPT and Groundwater Screening Sampling Locations – July 2012 – August 2013
2-3 Phase 2 Monitoring Well and Public Water Supply Well Groundwater Sampling Locations – May – November 2013
2-4 Phase 3 Groundwater Sampling Locations – February 2014 - August 2015
2-5 Phase 3 Zoe Chemical Soil and Vapor Sampling Locations – December 2014 – February 2015
2-6 Phase 3 Transducer Study Monitoring Wells – April 2014
2-7 Phase 4 Vertical Profile Boring and Monitoring Well Locations - December 2015 - January 2016
2-8 Phase 5 Groundwater Sampling Locations – August & December 2019
2-9 Phase 5 Soil Vapor Sampling Locations – October 2019 & March 2020
2-10 Phase 5 Transducer Study Monitoring Wells – September 2019
3-1 Land Use and Land Cover
3-2 Precipitation Chart – January 2019 through February 2021
3-3 Surface Soils
3-4 Plan View and Cross Section Geology
3-5 Regional Potentiometric Surface of the Magothy Aquifer
3-6 Piezometric Surface – Upper Glacial Aquifer – August 27, 2019
3-7 Piezometric Surface – Upper Glacial Aquifer – December 3, 2019
3-8a Piezometric Surface – Shallow Magothy – August 27, 2019
3-8b Piezometric Surface – Deep Magothy – August 27, 2019
3-9a Piezometric Surface –Shallow Magothy – December 3, 2019
3-9b Piezometric Surface – Deep Magothy – December 3, 2019
3-10 Nearby Public Water Supply Wells
3-11 Public Water Supply Well Concentration VOC N-03881
3-12 Public Water Supply Well Concentration VOC N-07058
3-13 Public Water Supply Well Concentration VOC N-08339
3-14 Public Water Supply Well Concentration VOC N-07649
3-15 Public Water Supply Well Concentration VOC N-07650
3-16 Public Water Supply Well Concentration VOC N-03603
3-17 Public Water Supply Well Concentration VOC N-03604
3-18 Nassau County Department of Health Source Water Assessment Program (SWAP) Maps
3-19 Surface Water and Recharge Locations
4-1 Phase 5 Groundwater PDC Exceedances
4-2 Phase 5 Total Ethene Pie Charts- August/September 2019
4-3 Phase 5 Total Ethene Pie Charts- December 2019
4-4 Vertical Distribution of Contaminants
4-5 PCE & TCE in Groundwater in Monitoring Well MW-20C -2001-2020
4-6 PCE & TCE in Groundwater in Monitoring Well MW-23C -2001-2020
4-7 PCE & TCE in Groundwater in Monitoring Well MW-25A -2001-2020
4-8 PCE & TCE in Groundwater in Monitoring Well MW-26F -2001-2020
4-9 PCE & TCE in Groundwater in Monitoring Well MW-26G -2001-2020
4-10 PCE & TCE in Groundwater in Monitoring Well N-11171 -2001-2020
4-11 PCE & TCE in Groundwater in Public Supply Well N-03881 -2001-2020
6-1 Conceptual Site Model

Appendices

Appendix A	Well Assessment Forms
Appendix B	Groundwater Sampling Logs
Appendix C	Investigation Derived Waste Characterization and Disposal Documents
Appendix D	Soil Boring Logs
Appendix E	Soil Vapor and Soil Gas Sampling Logs
Appendix F	Transducer Studies
Appendix G	Monitoring Well Survey Data
Appendix H	DSB-02RS Monitoring Well Construction Log
Appendix I	DSB-02RS Monitoring Well Development Log
Appendix J	Data Evaluation Report
Appendix K	Discussion of Analytical Results - Phases 1-4
Appendix L	CSIA Data
Appendix M	MNA Assessment
Appendix N	Human Health Risk Assessment Report

Acronyms

1,1,1-TCA	1,1,1-trichloroethane
1,1,2-TCA	1,1,2-trichloroethane
1,1-DCA	1,1-dichloroethane
1,1-DCE	1,1-dichloroethene
1,2-DCA	1,2-dichloroethane
1,2-DCE	1,2-dichloroethene
AARCO	AARCO Environmental Services Inc.
ADT	Aquifer Drilling and Testing of Mineola, NY
ALS	ALS Laboratory
APTIM	APTIM Federal Services LLC
ARARs	Applicable, Relevant and Appropriate Requirements
ASTs	above ground storage tanks
bgs	below ground surface
BOD	biological oxygen demand
CA	chloroethane
Cascade	Cascade Drilling, L.P.
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CHM	Chemtech Consulting Group
cis-1,2-DCE	cis-1,2-dichloroethene
CLP	Contract Laboratory Program
COC	Contaminants of Concern
COD	chemical oxygen demand
COPC	contaminant of potential concern
CSIA	Compound specific isotope analysis
CSM	Conceptual Site Model
CVOC	chlorinated volatile organic compound
DCE	dichloroethene (cis-1,2-dichloroethene, trans-1,2-dichloroethene, and 1,1-dichloroethene)
DER	Data Evaluation Report
DES	Design and Engineering Services contract
DHE	*Dehalococcoides Ethenogens*
DI	deionized water
DNAPL	dense non-aqueous phase liquid
DO	dissolved oxygen
DOC	dissolved organic carbon
EDS	Environment Data Services, Inc.
ELCR	Excess Lifetime Cancer Risk
EPA	United States Environmental Protection Agency
ERT/SERAS	Environmental Response Team's Scientific, Engineering, Response & Analytical Services
FB	field blank sample
FD	field duplicate sample
FeS	Iron sulfide

ft/d	Feet per day
ft/ft	Feet per foot
FUSRAP	Formerly Utilized Site Remedial Action Program
GCPIA	Garden City Park Industrial Area
HASP	Health and Safety Plan
HDR	Henningson, Durham and Richardson Architecture and Engineering, P.C., in association with HDR Engineering, Inc.
HDR-APTIM	HDR Environmental, Operations and Construction, Inc. & APTIM Federal Services LLC Joint Venture
HDR EOC	HDR Environmental, Operations and Construction, Inc.
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
IDW	Investigation-Derived Waste
IHWDS	Inactive Hazardous Waste Disposal Site Program
IRA	Interim Remedial Action
IRT	Innovative Recycling Technologies, Inc.
JV	joint venture
LSASD	Laboratory Services and Applied Sciences Divisions
mg/L	milligrams per liter
MNA	Monitored Natural Attenuation
mS/cm	millisiemens per centimeter
MS/MSD	Matrix Spike/Matrix Spike Duplicate
msl	mean sea level
mV	millivolts
NAPL	non-aqueous phase liquid
NAVD88	North American Vertical Datum of 1998
NCDHPW	Nassau County Department of Health and Public Works
NCDOH	Nassau County Department of Health
NYSDOH	New York State Department of Health
NOAA	National Oceanic and Atmospheric Administration
NPL	National Priorities List
NTU	nephelometric turbidity units
NYSDEC	New York State Department of Environmental Conservation
ORP	oxidation-reduction potential
OU	Operable Unit
OU1	Operable Unit 1
OU2	Operable Unit 2
Ppb	parts per billion
PCE	tetrachloroethene
PDC	Potential Delineation Criteria
PID	Photoionization Detector
POGW	Protection of Groundwater
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan

RAC	Remedial Action Contract
RAGS	Risk Assessment Guidance for Superfund
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RSL	Regional Screening Level
RTK	Real-time kinematic
SDS	Sonic Drilling Services
SCO	Soil Cleanup Objective
SOP	Standard Operating Procedure
SOW	Statement of Work
SU	standard units
SWAP	Source Water Assessment Program
TAL	Target Analyte List
TBC	To Be Considered
TCE	trichloroethene
TCL	Target Compound List
TDS	total dissolved solids
TKN	Total Kjeldahl Nitrogen
TOC	total organic carbon
TOGS	New York State Department of Environmental Conservation Division of Water Technical and Operational Guidance Series
TSS	total suspended solids
UGA	Upper Glacial Aquifer
USACE	United States Army Corps of Engineers
USCB	United States Census Bureau
USCD	United States Climate Data
USCS	Unified Soil Classification System
USDA	United States Department of Agriculture
USFW	United States Fish & Wildlife Service
USGS	United States Geological Survey
UST	underground storage tank
UUSCO	Unrestricted Use Soil Cleanup Objective
VC	vinyl chloride
VOC	volatile organic compound
VPB	vertical profile boring
WAWNC	Water Authority of Western Nassau County
WP	Work Plan
µg/kg	micrograms per kilogram
µg/L	micrograms per liter

This page is intentionally left blank.

Executive Summary

This Remedial Investigation (RI) report was prepared for the Environmental Protection Agency (EPA) by HDR-APTIM LLC (HDR-APTIM) to present the findings of the RI for Operable Unit 2 (OU2) of the Fulton Avenue Superfund Site located in Nassau County, New York. The Remedial Investigation/Feasibility Study (RI/FS) for OU2 was performed under two contracts. The RI/FS was started in October 2009 under Work Assignment Number 016-RICO-02LN under the Remedial Action Contract (RAC) 2 Contract Number EP-W-09-009 by Henningson, Durham, and Richardson Architecture and Engineering, P.C. in association with HDR Engineering, Inc. (HDR). Data collection activities were completed in five phases from 2011 to 2020 in accordance with the approved Work Plan, RAC Statement of Work (SOW), Quality Assurance Project Plan (QAPP), and Health and Safety Plan (HASP). This RI includes data collected under the December 2009 SOW; the 2010 Work Plan with revisions December 2013, May 2015, and April 2019 (HDR, 2010b); and the September 2010 EPA-approved QAPP with revisions August 2012, December 2014, June 2016, and August 2019 (HDR, 2010a).

The RI/FS was continued by HDR-APTIM under Task Order Number 68HE0222F0037 of the EPA DES Contract No. 68HE0318D0009 issued July 2022. HDR-APTIM is a joint venture (JV) of HDR Environmental, Operations, and Construction, Inc. (HDR EOC) and APTIM Federal Services LLC (APTIM). No field data were collected under this current Task Order. The SOW, including the assembly and evaluation of field data collected under the RAC Work Assignment for the preparation of the RI Report, was completed in accordance with the Guidance for Conducting Remedial Investigation/Feasibility Studies under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (EPA, 1988).

The Fulton Avenue Superfund Site (Site) includes groundwater contamination within the Villages of Garden City, Garden City Park, and New Hyde Park, in the Towns of Hempstead and North Hempstead, Nassau County, NY, and is currently divided into two Operable Units (OUs) (**Figure 1-1**). Operable Unit 1 (OU1) is a discrete portion of contaminated groundwater containing tetrachloroethene (PCE) (PCE-dominant) and degradation compounds at and downgradient from 150 Fulton Avenue within the Garden City Park Industrial Area (GCPIA). Operable Unit 2 (OU2), the subject of this report, includes the contaminated groundwater containing mainly trichloroethene (TCE) (TCE-dominant) located immediately west of, and comingling with, OU1. OU2 extends approximately 2,500 feet west from the western edge of OU1 and extends 5,300 feet from its northern extent to its southern limit (**Figure 1-1**).

Groundwater contamination in this area was discovered in the 1980s when the Nassau County Department of Health and Public Works (NCDHPW) conducted an investigation to find the source of volatile organic compounds (VOCs) impacting public water supply wells downgradient of GCPIA (**Figure 1-2**). In 1993, following additional investigation, the New York State Department of Environmental Conservation (NYSDEC) added the 150 Fulton Avenue site to the registry of Inactive Hazardous Waste Disposal Sites (IHWDS). In 1998, the EPA placed the Site on the National Priorities List (NPL) under CERCLA. During the completion of the 2005 OU1 RI, TCE (not associated with the PCE in OU1) was shown to be comingling with and west of the OU1 PCE-dominant groundwater contamination. The EPA concluded that this was “not from the same source as the PCE and a separate investigation should be conducted into the TCE-dominant portion of the plume (EPA, 2015a). The source of TCE in OU2 had not been identified at this time.

Numerous known hazardous waste sites (GCPIA, Zoe Chemical, 40 & 50 Roselle, Albertson, Jackson Steel, and Manfred Schulte) were investigated during the OU2 RI to identify the source of TCE-dominant groundwater contamination (**Figure 1-2**). Data collected as part of the OU2 RI and supporting historical documents show PCE was the main contaminant of concern released at the Manfred Schulte and Albertson sites. Therefore, these two sites are not likely the source of OU2 TCE-dominant groundwater contamination. Data collected as part of the OU2 RI and supporting historical documents show TCE was potentially released at GCPIA, 40 & 50 Roselle, Zoe Chemical, and Jackson Steel; however, 40 & 50 Roselle, Zoe Chemical, and Jackson Steel are cross-gradient to groundwater flow relative to the TCE-dominant groundwater contamination. Furthermore, these sites are not within the recharge area of Garden City Well 9 (N-03881), a public water supply well located within the OU2 plume (**Figure 3-18**). Therefore, even though they have a documented history of using TCE, they are not likely the source of OU2 TCE-dominant groundwater contamination.

OU2 is underlain by glacial outwash deposits, the Magothy Formation, and the Raritan Formation. Glacial outwash deposits are composed of stratified, fine to coarse sand and gravel. The contact between the top of the Magothy Formation and the base of the outwash deposits is at or near sea level in OU2 (Smolensky, et al., 1989). The Magothy is composed of fine to medium sand with discontinuous lenses of coarse sand, sandy clay, silt, and clay. The lower 50 feet typically contains gravel. The Raritan Formation comprises an upper clay member, referred to as the Raritan Clay, and a lower sand member known as the Lloyd Sand. The Raritan Clay member ranges between 100 and 300 feet in thickness. The Lloyd Sand member ranges between 200 to 400 feet thick in OU2. The base of the Lloyd is in direct contact with the bedrock surface at an approximate depth of 1,000 feet below ground surface (ft bgs) or -900 feet mean sea level (msl) (**Figure 3-4**).

Saturated portions of the glacial outwash (Upper Glacial Aquifer) and Magothy Formation (Magothy Aquifer) comprise a single, unconfined water bearing unit and are the focus of this groundwater investigation. Groundwater in OU2 flows initially to the southwest, trending more to the south with groundwater movement through OU2 under a horizontal hydraulic gradient ranging from 0.0008 to 0.0020 feet per foot (ft/ft). Vertical hydraulic gradients were observed to be downward (negative), -0.0126 to -0.0009 ft/ft, with a median gradient of -0.0039 ft/ft. Published literature indicates that the hydraulic conductivity of fine to medium sands in the Magothy Formation in Nassau County, based on aquifer tests of permeable portions of the aquifer, ranges from 27 to 150 feet per day (ft/day) with an average of approximately 67 ft/day (Isbister, 1966). Local impacts on the horizontal and vertical gradients and groundwater flow direction may result from the operation of municipal water supply wells within or adjacent to OU2. These wells include three Garden City wells, two Water Authority of Western Nassau County (WAWNC) wells, and two Franklin Square wells within a mile radius of OU2 (**Figure 3-10**).

The results from two rounds of groundwater samples collected from 29 monitoring wells and 19 water supply wells were compared to Potential Delineation Criteria (PDC), which were derived from state and federal cleanup guidance, as discussed in section 4.1. These results show chlorinated VOCs (CVOCs), non-chlorinated VOCs, and metals were present above the PDC (**Figure 4-1**). Multiple lines of evidence were used to distinguish OU2 TCE-dominant groundwater contamination from TCE that may be coming from other sources or from the biotic or abiotic degradation of PCE in OU1. These multiple lines of evidence include:

- Regional groundwater flow (i.e., whether TCE detected in a groundwater sample spatially related to OU2 TCE based on groundwater flow) (**Figure 3-5**),

- Municipal water supply well recharge areas (i.e., whether TCE detected in groundwater was located within or near the N-03881 recharge area) (**Figure 3-18**), and
- The chemical characteristics of the VOCs in groundwater samples (i.e., whether TCE was the dominant or parent CVOC) (**Figures 4-2 & 4-3**).

Considering the multiple lines of evidence, six monitoring wells and one municipal water supply well have been determined to contain TCE-dominant groundwater contamination. These wells are monitoring wells MW-20C, MW-23C, MW25A, MW-26F, MW-26G, and N-11171 and the water supply well Garden City 9 (N-03881) (**Figure 4-4**).

Groundwater sampling results show contamination within OU2 consists primarily of the chlorinated ethene TCE, with lower concentrations of PCE. Trace concentrations of benzene, were also detected. However, based on an evaluation of the location, depth, frequency, and magnitude of these detections, only TCE and PCE are considered potentially site-related. Benzene was found sporadically at levels below the PDC during the two comprehensive rounds of groundwater sampling. Iron and manganese were also detected above the PDC but are naturally occurring in the Magothy Aquifer and can be solubilized by changing geochemical conditions (Brown, 1995).

The TCE concentration in groundwater collected from wells within the OU2 plume in the most recent phase of sampling ranged from 0.37 µg/L to 79 µg/L. TCE within the OU2 plume will continue to migrate with groundwater flow initially to the southwest and then trend to the south. Groundwater sampling results show the OU2 TCE-dominant groundwater contamination extends over an area that is more than 2,500 feet wide and up to 5,300 feet long in the direction of groundwater flow. Similar concentrations of TCE and PCE indicate some evidence of comingling between the OU1 PCE-dominant groundwater contamination and OU2 TCE-dominant groundwater contamination at monitoring wells MW-25A and N-11171 on the eastern side of the OU2 plume near Edgemere Road at the western edge of the Garden City Country Club.

The Human Health Risk Assessment (HHRA) screening resulted in five Contaminants of Potential Concern (COPCs) (TCE, PCE, benzene, iron, and manganese) with potential for Excess Lifetime Cancer Risk (ELCR) exceeding the target risk range of 1E-06 to 1E-04 and noncancer Hazard Quotient (HQ) greater than 0.1 based on monitoring well sampling result data from wells identified to be physically within the OU2 plume. These COPCs were further evaluated in the HHRA. The evaluation of potential cancer risks and noncancer hazards to future workers and future residents exposed to groundwater identified TCE, iron, and manganese as the primary risk drivers; however, iron and manganese are not considered to be site-related and were not retained as chemicals of concern for OU2.

1 Introduction

This RI report was prepared for the EPA by HDR-APTIM to present the findings of the OU2 investigation for the Fulton Avenue Superfund Site located in Nassau County, New York, as shown on **Figure 1-1**. The purpose of the RI/FS is to investigate the nature and extent of TCE-dominant groundwater contamination, evaluate risks to human health, and identify and evaluate remedial alternatives in support of a Record of Decision (ROD) for Fulton Avenue OU2.

The RI/FS for OU2 were performed under two contracts. The RI/FS was started in 2009 under Work Assignment Number 016-RICO-02LN under the RAC 2 Contract Number EP-W-09-009 by HDR. Data collection activities were completed in multiple phases from 2011 to 2020 in accordance with the approved Work Plan, RAC SOW, QAPP, and HASP. This RI includes data collected under the December 2009 SOW, the 2010 Work Plan with revisions (December 2013, May 2015, and April 2019) (HDR 2010b), and the September 2010 (revised August 2012, December 2014, June 2016, and August 2019) EPA-approved QAPPs (HDR 2010a).

The RI/FS was continued by HDR-APTIM under Task Order Number 68HE0222F0037 of the EPA DES Contract No. 68HE0318D0009 issued July 2022. HDR-APTIM LLC is a JV of HDR EOC and APTIM. No field data were collected under this Task Order. The SOW including the assembly and evaluation of field data collected under the RAC Work Assignment for the preparation of the RI Report was completed in accordance with the Guidance for Conducting Remedial Investigation/Feasibility Studies under the Comprehensive Environmental Response, Compensation, and Liability Act (EPA, 1988).

1.1 Site Description

The Site is located primarily in the Village of Garden City, but also includes groundwater contamination within the Villages of Garden City Park and New Hyde Park in the Towns of Hempstead and North Hempstead, Nassau County, New York (**Figure 1-1**). The Site has been divided into two OUs:

- OU1 includes a 0.8-acre property at 150 Fulton Avenue, Garden City Park, Nassau County located within the GCPIA. OU1 includes all locations impacted by contamination released at the 150 Fulton Ave Property, and all other contamination impacting the groundwater and indoor air in the vicinity of the Fulton Property (EPA, 2015a). In 1986, the NCDHPW investigated the source of VOC groundwater contamination impacting public water supply wells located downgradient of GCPIA. As a result of the investigation, 150 Fulton Avenue was identified as a potential source. In response, the NYSDEC added the 150 Fulton Avenue site to the registry of IHWDS. In 1998, the EPA placed the Site on the NPL under CERCLA. During an environmental investigation completed from 1998 to 2001, a drywell at 150 Fulton Avenue was found to be a source of PCE groundwater contamination. Tenants of the property from 1965-1974 included a fabric cutting mill which dry cleaned fabric using PCE (EPA, 2015a). As a result, the 0.8-acre property and associated groundwater contamination were designated the Fulton Avenue Superfund Site OU1. After the completion of a RI/FS, the EPA issued a ROD for OU1 in 2007 (EPA, 2007). A 2015 ROD amendment presents an amended Interim Remedial Action (IRA) for OU1.

- OU2 includes TCE-dominant groundwater contamination that was shown to be comingling and west of, but not associated with, the OU1 PCE-dominant plume. Prior to the 2007 OU1 ROD, groundwater samples were collected from 20 monitoring wells in OU1. A review of these data showed monitoring wells cross-gradient to OU1 contained TCE-dominant trends. The EPA concluded that this was “not from the same source as the PCE” and that a separate investigation should be conducted to investigate the TCE-dominant portion of the plume (EPA, 2015a). OU2 was defined as the TCE-dominant portion of the plume west of the PCE-dominant plume defined as OU1. The source of TCE in OU2 has not been identified.

The OUs are shown in **Figure 1-1.**

- Operable Unit 1 (groundwater downgradient of 150 Fulton Avenue): OU1 extends from 150 Fulton Avenue approximately 6,500 - 7,000 feet to the south and west of 150 Fulton Avenue. OU1 comprises the PCE-dominant portion of the comingled groundwater contamination extending southwest and south from 150 Fulton Avenue.
- Operable Unit 2 (groundwater up- and cross-gradient of 150 Fulton Avenue): OU2 is located to the west of the PCE-dominant OU1 plume, extending approximately 2,500 feet west from the western edge of the OU1 plume, and 5,300 feet from its northern extent to its southern limit. OU2 comprises the TCE-dominant portion of the comingled groundwater contamination.

This RI report refers to PCE-dominant and TCE-dominant groundwater contamination. The TCE-dominant groundwater contamination is the result of a potential release of TCE (used as an industrial solvent) to the environment. In the TCE-dominant groundwater contamination, the TCE has the highest concentration relative to PCE and cis-1,2-dichloroethene (cis-1,2-DCE). If PCE is present in groundwater samples, the PCE concentration will be lower than TCE, as it is present likely as a contaminant of the TCE industrial solvent. Cis-1,2-DCE could be detected at lower concentrations than TCE as this compound is potentially present in groundwater from the biotic degradation of TCE. The Magothy Aquifer is generally an aerobic aquifer, and TCE biotically degrades most readily under anerobic conditions. More favorable anerobic conditions may be present locally, resulting in a limited amount of biotic degradation of TCE in groundwater that produces low concentrations of cis-1,2-DCE relative to the TCE concentration.

The PCE-dominant groundwater contamination is the result of a potential release of PCE to the environment. In this case, PCE will always be detected at the highest concentration relative to the concentration of TCE and cis-1,2-DCE. TCE and cis-1,2-DCE could be detected at lower concentrations than PCE as these compounds are potentially present in groundwater from the biotic degradation of PCE. Since the Magothy Aquifer is generally an aerobic aquifer with only local anerobic conditions, and PCE also biotically degrades most readily under anerobic conditions, there will be a limited amount of biotic degradation of PCE in groundwater. This results in low concentrations of TCE and cis-1,2-DCE relative to the PCE concentration except where the PCE and TCE plumes comingle.

It is important to keep these concepts in mind so that the TCE that is the result of biotic degradation of the PCE source in OU1 can be differentiated from the TCE source that was likely released to the environment in OU2.

1.2 Potential TCE Sources

The source of the OU2 TCE had not been identified prior to the RI/FS, as noted in Section 1.1. As part of the effort to investigate potential sources of the OU2 TCE, several nearby contaminated waste sites were reviewed, as shown in **Figure 1-2**. Below is a brief summary of each site. Section 4 of this report presents the results of groundwater, soil, soil vapor, and indoor and outdoor air samples collected at each site that were used to evaluate their potential association to the OU2 TCE.

1.2.1 Garden City Park Industrial Area

GCPIA is an approximately 65-acre area of industrial properties along Fulton Avenue in Garden City Park, Town of North Hempstead. It is bounded to the north by Park Avenue between Herricks Road and Armstrong Road, and Broadway Avenue between Armstrong Road and County Court House Road; to the east by Herricks Road; to the south by the Long Island Railroad; and to the west by Nassau Boulevard and County Court House Road (NYSDEC, 1999a).

150 Fulton Avenue, which is included in GCPIA, was occupied by a series of textile operations from 1965 through 1976, all of which used PCE as part of dry-cleaning operations (EPA, 2015a; NYSDEC, 1999a). Since 1998, the 150 Fulton Avenue property has been occupied by an office supply company. Other businesses within the GCPIA include several automotive body shops, building materials contractors and suppliers, and other warehousing operations.

1.2.2 Zoe Chemical

From 1962 to 1992, Zoe Chemical, located at 1801 Falmouth Avenue in New Hyde Park, blended and packaged cleaning products. The company used on-site cesspools to dispose of liquid industrial waste until approximately 1987 when they were connected to municipal sewer. In 2011, the NYSDEC found elevated levels of 1,1,1-trichloroethane (1,1,1-TCA) immediately downgradient of the former Zoe Chemical site.

A 2014 Site Characterization conducted by Seaboard Estates, Inc., reported TCE (up to 198 µg/L) in groundwater exceeding the NYSDEC Technical and Operational Guidance Series (TOGS) standard and detected TCE (up to 2,850 µg/kg) in on-site soil exceeding the NYSDEC Part 375 Unrestricted Soil Cleanup Objectives (SCOs). TCE (up to 88,800 µg/kg) was also detected in storm drain soils at the site, below the NYSDEC Part 375 Commercial SCO (CA Rich, 2014). In the 2022 NYSDEC ROD for Zoe Chemical, TCE is listed as a contaminant of concern.

1.2.3 40 & 50 Roselle

40 & 50 Roselle in Mineola, New York are adjacent industrial warehouse properties identified in 2007 as the location of a potential IHWDS. The combined building was constructed in 1955 and has been home to a series of industrial and commercial companies throughout its history.

40 Roselle was occupied by Garden Photoengraving Co., Inc. from 1955 until 1977. The photoengraving business likely used various chemicals, potentially including solvents such as PCE and TCE. The investigation into 40 Roselle has been split into on-site contamination (OU1) and an offsite CVOC groundwater plume (OU2). Groundwater sample results for TCE in the OU1 RI/FS ranged up to 1,000 µg/L and in the OU2 RI/FS up to 400 µg/L from an on-site monitoring well. The

delineated groundwater plume extends off the property approximately 2,200 feet southwest in the direction of groundwater flow (CDM Smith, 2017), with the westernmost terminus of the delineated plume approximately one mile northeast of the 150 Fulton Avenue property.

50 Roselle was occupied by Poper Aluminum, a metal door and window manufacturer, from the early 1960s until 1970. A knitting mill operated on the property from the 1980s until around the year 2000. Subsequently, Lewis Oil Company began to use the property for delivery truck repairs. The 50 Roselle property is recorded as having had three above ground storage tanks (ASTs) and one underground storage tank (UST). One of the ASTs stored waste oil while the other two stored other unknown chemicals. The UST was removed from the parking lot west of the building in May 2008. No evidence of petroleum contamination was observed during its removal. PCE was detected in bottom soil samples at 0.001-0.002 mg/Kg, none exceeding NYSDEC Residential SCOs (Camp Dresser & McKee, 2009).

1.2.4 Albertson

VOC contamination, particularly PCE, was detected in groundwater at five public water supply wells in the Albertson Water District between 1996 and 2002. Aeration treatment systems were installed at the five wells (HDR, 2011). Albertson is located approximately 4 miles north-northeast of OU2.

1.2.5 Jackson Steel

Jackson Steel was a “roll form metal shapes” manufacturing facility located at 435 First Street in Mineola from 1977 or earlier to 1991. The facility used degreasers as part of the manufacturing process, including PCE, TCE, and 1,1,1-TCA. Industrial degreasers were reportedly detected in groundwater samples collected downgradient of the dry wells (Weston,1999).

1.2.6 Manfred Schulte

The Manfred Schulte IHWDS Site Number 130047, is an inactive dry-cleaning facility located at 405 Jericho Turnpike in the Village of New Hyde Park, Nassau County. The 0.3-acre site is on the north side of Jericho Turnpike, approximately 100 feet east of Hillside Boulevard. Located on the property is a two-story building that was previously occupied by a dry-cleaning operation called T&S Cleaners.

During the 1980s, PCE was reportedly stored in two 1,000-gallon tanks located in the basement of the building. The primary source of contamination was a drywell located in a paved alleyway next to the building (NYSDEC, 2000).

1.3 Report Organization

This RI report is organized into nine sections:

Section 1 – Introduction provides a general description of the Site, and descriptions of potential TCE source areas.

Section 2 – Remedial Investigation describes the methods and procedures for activities conducted as part of the RI, including the investigation of groundwater.

Section 3 – Physical Characteristics describes surface features, land use, topography, climate, geology, soils, surface water hydrology, hydrogeology, and ecological resources.

Section 4 – Nature and Extent of Contamination presents the nature and extent of contaminants of potential concern (COPCs) in groundwater, surface water, and sediment.

Section 5 – Contaminant Fate and Transport provides information on fate and transport for COPCs and a description of transport and mechanisms of migration.

Section 6 – Conceptual Site Model presents an element-based conceptual site model.

Section 7 – Summary of Human Health Risk Assessment (HHRA) presents a summary of the HHRA which includes a data evaluation, exposure and toxicity assessments, risk characterization, uncertainty analysis, and conclusions.

Section 8 – Summary and Conclusions presents summaries of the nature and extent of contamination, contaminant fate and transport, conclusions, and recommendations.

Section 9 – References lists the reference documents used in preparation of this RI report.

2 Remedial Investigation

This section describes the methods and procedures used to collect environmental samples and other field data. Environmental samples were collected from 2011 through 2020 in five phases over the course of the investigation. **Table 2-1** provides a chronological summary of the field activities.

2.1 Phase 1 - Baseline Sampling: May 2011 – November 2011

Phase 1 activities focused on collecting baseline groundwater data from existing monitoring wells that were historically sampled during previous investigations. Phase I activities were conducted in accordance with the EPA-approved Work Plan dated December 2009 (HDR, 2010b) and the EPA-approved QAPP dated September 17, 2010 (HDR, 2010a). The following summarizes the data collected during Phase 1 field activities:

2.1.1 Monitoring Well Assessment

HDR and GRB Environmental Services, Inc. of New York, NY conducted a monitoring well assessment from May 17, 2011 to May 25, 2011 to locate and assess the physical condition of 46 monitoring wells. A second round of well reconnaissance was completed October 31 through November 3, 2011. The depth to water and total depth of each well were also measured. **Appendix A** provides a summary of the condition of each monitoring well on the EPA's Well Assessment Form.

2.1.2 Groundwater Sampling and Analysis

Groundwater samples were collected from the 19 monitoring wells (**Figure 2-1**). Groundwater sampling was conducted between July 6, 2011, and July 13, 2011, in accordance with the approved QAPP and EPA's Low Stress/Low Flow protocol (SOP-17, HDR, 2010a).

A stainless steel Grundfos positive displacement pump with dedicated Teflon™-lined polyethylene tubing was used to purge groundwater from the monitoring wells. Groundwater from each monitoring well was pumped through a Horiba U-52 water quality meter. The Horiba U-52 water quality meters measured dissolved oxygen, pH, specific conductance, turbidity, oxidation reduction potential, and temperature. Water levels readings were recorded during purging of each well. Groundwater samples were collected after stabilization of field parameters. Groundwater sampling logs are provided as **Appendix B**.

Stainless steel equipment used to sample the monitoring wells was decontaminated between sample locations by running a detergent and water solution through the pump followed by tap water and a deionized water rinse. Disposable items, such as bladders and tubing, were changed between wells.

Groundwater samples were analyzed for Target Compound List (TCL) VOCs. Groundwater samples from one monitoring well, FULRW-1 KOEPPEL, were analyzed for TCL VOCs, TCL pesticides, and organophosphorus and were submitted to EPA Region 2's Environmental Response Team's Scientific, Engineering, Response & Analytical Services contract (ERT/SERAS) laboratory in Edison, New

Jersey. A summary of groundwater samples collected during the sampling events is provided in **Table 2-2**.

2.1.3 Investigation Derived Waste (IDW)

IDW generated during the field activities were:

- Monitoring well purge water; and
- Decontamination fluids containing wash/rinse water and decontamination chemicals.

The IDW was staged at a fenced, gated, and locked area at 288 New Hyde Park Road, Franklin Square, NY. Metro Environmental of Lindenhurst, NY was subcontracted to provide IDW disposal services and drum drop off. Samples were collected from the drums and submitted for waste characterization laboratory analysis on July 14, 2011. The liquid IDW was characterized as non-hazardous. Non-hazardous liquid waste IDW was transported by American Environmental Assessment Corp (USEPA ID #: NYR000044412) for offsite disposal to Chemical Pollution Control facility in Bayshore, New York (USEPA ID #: NYD082785429) November 1, 2011. Waste characterization profile and disposal manifests for the Phase 1 RI activities are provided as **Appendix C**.

2.2 Phase 2: June 2012 – November 2013

Phase 2 activities included groundwater and public water supply sampling as well as Direct Push Technology and groundwater screening samples. These groundwater screening samples targeted potential upgradient sources of OU2. Phase 2 activities were completed in accordance with the EPA-approved Work Plan dated December 2009 (HDR 2010b) and the EPA-approved QAPP dated September 17, 2010 (HDR 2010a). The following summarizes the specific RI tasks conducted during Phase 2 field activities:

2.2.1 Direct Push Technology and Groundwater Sampling

A total of 115 groundwater screening samples were collected from 43 borings in three mobilizations: July through August 2012, November 2012 through January 2013, and August 2013, by Aquifer Drilling and Testing (ADT) of Mineola, NY. Direct push drilling technology was used to advance the borings until refusal was encountered, which ranged from 40 to 100 ft bgs. Groundwater samples were collected with a direct-push sampler supported by a Geoprobe 6620 DT rig. Multiple groundwater samples were collected from each soil boring location targeting zones within approximately ten feet of the water table and every twenty feet below the water table until refusal. An HDR field geologist observed and directed the drilling operations. A list of groundwater screening samples is provided on **Table 2-3**. Groundwater screening sample locations were surveyed using a GPS and shown on **Figure 2-2**. Soil boring logs are provided as **Appendix D**.

ADT obtained street opening permits from Nassau County. NewYork811 (One Call) was notified for utility companies to mark-out the location of their utility lines prior to starting drilling activities. A private utility contractor, Diversified Geophysics, Inc., sub-contracted by ADT, performed subsurface utility location/clearance to confirm the absence of subsurface utilities at the drilling locations. The first 5 feet were hand-dug at each soil boring location using an air knife and hand auger to confirm there were no subsurface utilities.

2.2.2 Monitoring Well Assessment

A well assessment was completed in March and May 2013, on 57 monitoring wells belonging to Nassau County and selected sites around OU2. The well assessment included locating and assessing the physical condition of each monitoring well. The depth to water and total depth of each well were also measured. **Appendix A** provides a summary of the condition of each monitoring well on the EPA's Well Assessment Form.

2.2.3 Groundwater Sampling and Analysis

HDR collected groundwater samples from 13 monitoring wells and 10 public supply wells (**Figure 2-3**) in July 2012, May 2013, and November 2013, in accordance with the approved QAPP and EPA's Low Stress/Low Flow protocol (SOP-17N, & HDR, 2010a). These samples were analyzed for TCL VOCs, compound specific isotope analysis (CSIA), iron, total manganese, and monitored natural attenuation (MNA) parameters - alkalinity, chloride, nitrate, sulfate, and methane.

A stainless steel Grundfos positive displacement pump with Teflon™-lined polyethylene tubing was used to pump groundwater from the monitoring wells. Groundwater from each monitoring well was pumped through a Horiba U-52 water quality meter flow through cell. The Horiba U-52 water quality meter measured dissolved oxygen, pH, specific conductance, turbidity, salinity, oxidation reduction potential, total dissolved solids, and temperature. The water level in each monitoring well was measured using an electronic water level meter. Groundwater samples were collected after stabilization of field parameters. Groundwater sampling logs are provided as **Appendix B**. The non-dedicated equipment used to sample the monitoring wells were decontaminated between sample locations by running a detergent and water solution through the pump followed by tap water and a deionized water rinse. For the public supply wells, groundwater samples were collected from a spigot on the well.

The VOCs and CSIA samples were submitted to Zymax Forensics in Escondido, CA. The metals and MNA parameter samples were submitted to EPA Region 2's ERT/SERAS laboratory in Edison, New Jersey. A summary of groundwater samples collected during the sampling events is provided in **Table 2-3**.

2.2.4 Investigation Derived Waste (IDW)

IDW generated during the Phase 2 field activities were:

- Purge water from groundwater screening sampling;
- Residual drilling fluids from groundwater screening sampling;
- Monitoring well purge water; and
- Decontamination fluids containing wash/rinse water and decontamination chemicals.

The IDW was staged at a fenced, gated, and locked yard at 288 New Hyde Park Road, Franklin Square, NY. AARCO Environmental Services Inc. (AARCO) (USEPA ID #: NYR000107326) of Lindenhurst, NY was subcontracted by HDR to provide IDW characterization and disposal services for the Phase 2 RI. AARCO sampled the contents of the drums on August 10, 2012, December 14, 2012, and June 6, 2013. All IDW was characterized as non-hazardous. Non-hazardous liquid waste IDW was transported by AARCO on January 9, 2013, and June 28, 2013, for offsite disposal to Triumvirate Environmental (USEPA ID #: NYD077444263) in Queens, NY. Waste characterization profile and disposal manifests are provided as **Appendix C**.

2.3 Phase 3: February 2014 – August 2015

Phase 3 activities included groundwater and public water supply sampling at existing NYSDEC superfund sites with VOC contamination for targeted potential sources of OU2 through CVOC data and CSIA fingerprinting. Phase 3 activities were completed in accordance with the EPA-approved Work Plan dated December 2009 (HDR 2010b) and the EPA-approved QAPP dated September 17, 2010 (HDR 2010a). The following summarizes the specific RI tasks conducted during Phase 3 field activities:

2.3.1 Groundwater Sampling and Analysis

Four rounds of groundwater samples were collected from 9 monitoring wells and 17 public supply wells (**Figure 2-4**) surrounding OU2. Round 1 groundwater samples were collected from 10 public supply wells between February 6 and 19, 2014. Round 2 groundwater samples were collected from 4 existing monitoring wells and 12 public water supply wells between July 14 through 25, 2014. Round 3 included 1 groundwater sample from a monitoring well at the Zoe Chemical site on December 13, 2014. The fourth and final round of Phase 3 samples included groundwater from 4 monitoring wells from the 40 & 50 Roselle site on August 5, 2015 and 6 public water supply wells on August 6, 2015. Groundwater sampling was conducted in accordance with the approved QAPP and EPA's Low Stress/Low Flow protocol (SOP-17, & HDR, 2010a).

A stainless steel Geotech bladder pump and dedicated Teflon™-lined polyethylene tubing was used to pump groundwater from each of the monitoring wells. Groundwater from each monitoring well was pumped through a Horiba U-52 water quality meter flow-through cell. The Horiba U-52 water quality meter measured dissolved oxygen, pH, specific conductance, turbidity, salinity, oxidation reduction potential, total dissolved solids, and temperature. The water level in each monitoring well was measured using an electronic water level meter. Groundwater samples were collected after stabilization of field parameters. Groundwater sampling logs are provided as **Appendix B**.

Stainless steel non-dedicated equipment used to sample the monitoring wells were decontaminated between sample locations by running a detergent and water solution through the pump followed by tap water and a deionized water rinse. Disposable items, such as bladders and tubing, were changed between wells. For the public supply wells, groundwater samples were collected from a spigot on the well.

2.3.2 Soil Sampling and Analysis

These samples were analyzed for TCL VOCs, CSIA, iron, total manganese, and MNA parameters: alkalinity, chloride, nitrate, sulfate, and methane. The VOC, metals, and MNA parameters were submitted to the ERT/SERAS contract laboratory in Edison, NJ and through the contract laboratory program (CLP) to Mitkem in Wakefield, MA. The CSIA samples were submitted to Zymax Forensics/Pace/Microseeps (Pace) in Pittsburgh, PA, who also analyzed for VOCs as part of their CSIA analysis. A summary of groundwater samples collected during these sampling events is provided in **Table 2-4**.

During the NYSDEC Zoe Chemical RI led by CA Rich, HDR collected one composite sample from the onsite cesspools (CP) location HDRCP1, on January 28, 2015. HDR was onsite for the removal of the cesspools on February 20, 2015, and collected split samples from inside Cesspool A (CP1) at 4.5 ft bgs, inside Cesspool B (CP2) at 5.5 ft bgs, and below Cesspool B (CP3) at 12 ft bgs (**Figure 2-5**). These samples were sent to Zymax Forensics/Pace in Pittsburgh, PA for CSIA and VOC analysis.

2.3.3 Soil Gas Sampling

Five air samples were collected during the NYSDEC Zoe Chemical RI investigation on December 13, 2014, including 1 indoor air, 1 outdoor air, 1 soil gas, and 2 subslab soil vapor samples, as shown on **Figure 2-5**. A sampling port for the soil gas sample was installed by ADT; the soil gas location was cleared to 5 feet, then a point was pushed to 8 ft bgs using a Geoprobe®.

Two sampling ports for the subslab soil vapor samples were hand-drilled by HDR. The subslab soil vapor samples were collected using stainless 6-liter summa canisters and 4-hour regulator. Prior to sample collection, PID reading was measured at each sampling port, sample port was purged using a personal sampling pump, and a leak check was conducted using helium gas and an MGD 2002 Multi-Gas Leak Locator. Subslab soil vapor samples were analyzed for VOCs (TO-15) and CSIA for fingerprinting. Soil gas and soil vapor sampling logs are provided as **Appendix E**.

2.3.4 Monitoring Well Reconnaissance

A monitoring well condition assessment of 35 wells belonging to Nassau County was completed from April 1, 2014 to April 3, 2014. The well assessment included locating and assessing the physical condition of each monitoring well for the purposes of transducer study. The depth to water and total depth of each well were also measured. **Appendix A** provides a summary of the condition of each monitoring well on the EPA's Well Assessment Form.

2.3.5 Transducer Study

On April 21, 2014, to April 24, 2014, HDR installed submersible in-situ Level Troll 700 pressure transducers with integrated data loggers in 30 monitoring wells to measure and record seasonal water level fluctuations at the site. The transducers were programmed to measure and record water levels at 15-minute intervals over the course of the study. The locations of these wells are shown on **Figure 2-6**.

HDR downloaded the transducer data on a periodic basis to ensure quality control by manually verifying groundwater levels via a reading from the top of the inner casing at a fixed point using an electronic interface probe as a data quality assurance measure. Water levels were manually measured periodically in each monitoring well and used to confirm the transducers were accurately measuring water levels. These manual water level measurements were also used to account for and correct for potential sensor drift during the six-month study period. The transducers were retrieved from the monitoring wells in October 2014.

Once completed, all measurements gathered during the transducer study were compiled and analyzed. Transducer installation and periodic groundwater level measurement sheets are provided as **Appendix F**.

2.3.6 Monitoring Well Survey

On April 28 and 29, 2014, a location and elevation survey were conducted of existing Nassau County monitoring wells, and monitoring wells associated with other Sites during the Phase 2 OU2 field activities. Location and elevation surveying was conducted using an RTK GPS unit. The survey consisted of measuring the elevations of the ground surface, top of the outer casing, top of the inner casing (measuring point for groundwater levels), and the horizontal coordinates of each well. The coordinates and elevation data were tabulated. **Appendix G** provide details of the monitoring well survey.

2.3.7 Investigation Derived Waste

IDW generated during the Phase 3 field activities were:

- Monitoring well purge water; and
- Decontamination fluids containing wash/rinse water and decontamination chemicals.

The IDW was staged at a fenced, gated, and locked yard at 288 New Hyde Park Road, Franklin Square, NY. AARCO was subcontracted by HDR to provide IDW characterization and disposal services for the Phase 3 RI. All IDW was characterized as non-hazardous. Non-hazardous liquid waste IDW was transported by AARCO on July 31, 2014, for offsite disposal at AWWT (USEPA ID #: NYD1100018860730) in Farmingdale, NY. Waste characterization profile and disposal manifests are provided as **Appendix C**.

2.4 Phase 4: September 2015 – September 2016

Phase 4 included installation and sampling of 3 vertical profile borings (VPB), construction of 1 monitoring well, and 2 groundwater samples of nearby public water supply wells to target contamination in deeper zones of the Magothy Aquifer. Field activities were completed in accordance with the EPA-approved Work Plan dated December 2009 (HDR 2010b) and the EPA-approved QAPP dated September 17, 2010 (HDR 2010a). The following summarizes the specific RI tasks conducted during Phase 4 field activities:

2.4.1 VPB Borings with Soil and Groundwater Sampling

Three deep VPB borings (DSB01, DSB02, and DSB03) were installed between October 6, 2015, and February 11, 2016 to collect soil and groundwater samples for assessing contaminant distribution with depth, and to determine screen intervals of proposed monitoring wells (**Figure 2-7**). Site restoration for all drilling locations was completed on April 26, 2016.

A private utility contractor, Delta Geophysics, Inc. subcontracted to HDR, performed subsurface utility location/clearance to confirm the absence of subsurface utilities at each drilling location on October 2, 2016. A street opening permit was filed with Nassau County. NewYork811 (One Call) was notified for utility companies to mark out the location of utility lines prior to the start of drilling activities. The first 5 feet were hand-dug at each VPB location using an air knife and hand auger to confirm there were no subsurface utilities.

Sonic Drilling Services (SDS)/Cascade of Dundee, OH drilled VPBs using a VeraSonic 300/20 Roto-Sonic drill rig. VPBs were drilled to a depth similar to the depths of nearby public water supply wells screened in the deeper portion of the Magothy Aquifer, or until a positive detection of VOCs via field screening, up to a maximum of 500 ft bgs. Groundwater samples were collected using a sampler that was pushed five feet past the sonic casing to collect undisturbed grab samples. Soil samples were collected directly from the Sonic cores using an EnCore sampler for VOC analysis and glass jars for metals, MNA, and sieve analysis. All samples were screened using Color-Tec prior to lab submission. Samples from these deeper soil borings include:

- DSB01: 15 soil samples were collected at 20-ft intervals. No VOCs were detected by the Photo Ionization Detector (PID) or the Color-Tec field screening in the soil samples. Therefore, no soil samples were collected for VOC analysis. One groundwater sample was collected at 456 ft bgs and analyzed for VOCs. Borehole termination depth was 458 ft bgs.
- DSB02/DSB02RS: 25 soil samples were collected at 20-ft intervals. The highest PID reading was 5.7 parts per billion (ppb) with a confirmatory Color-Tec result between 10 and 20 ppb at 383 ft bgs. Due to the low PID and Color-Tec readings, no groundwater samples were collected. Borehole termination depth was 418 ft bgs.
- DSB03: 18 soil samples were collected at 20-ft intervals and were screened with both a PID and the Color-Tec field screening methodology. VOCs were not detected by the PID or Color-Tec. Therefore, no groundwater samples were collected for VOC analysis. Borehole termination depth was 498 ft bgs.

The VOC samples were sent to ALS Laboratory (ALS) in Salt Lake City, UT; iron and manganese were submitted to Chemtech Consulting Group (CHM) in Mountainside, NJ; sieve analysis to Test America; CSIA to Pace; and natural attenuation parameters (methane, alkalinity, chloride, nitrate, sulfate, iron, and manganese) to EPA ERT/SERAS Laboratory in Edison, NJ. A summary of groundwater samples collected during these sampling events is provided in **Table 2-5**.

The borings were logged by a geologist. Soil samples were collected and analyzed for grain size, geochemical parameters, and TCL VOCs. Boring logs are provided in **Appendix D**.

2.4.2 Monitoring Well Installation and Development

One monitoring well, DSB02RS, was installed to a depth of 368 ft bgs as part of the VPB drilling activities from December 9 to 14, 2015. Monitoring Well DSB02RS was constructed with 10-ft long 0.01-inch diameter (10-slot) stainless steel screen (from 372-382 ft bgs) with a 2-foot sump and 4-inch diameter black steel casing to reach land surface.

Silica sand, No. 1, was placed, via the tremie method, around the screen from the bottom of the annular space to five feet above the top of the well screen. Three feet of silica sand, No. 00, was placed on top of the silica No. 1 sand. A 10-foot bentonite seal was placed above the filter pack to create a seal and to prevent grout from penetrating the sand pack. Cement bentonite (90%/10%) grout was placed from the top of the bentonite seal to within four feet of ground surface via the tremie method. The well was finished at the surface using a 12-inch diameter flush-mount manhole. The manhole was set in a 3-ft x 3-ft x 1-ft deep concrete pad. A monitoring well construction log is provided as **Appendix H**.

Monitoring well DSB02RS was developed by pumping groundwater via the air lift method to remove fine-grained material from the well, sand pack, and surrounding formation. The well was also developed using a Grundfos pump stainless steel submersible pump. The monitoring well was developed for three hours, until the pH, specific conductance, and temperature stabilized within 10 percent and the turbidity was less than 50 Nephelometric Turbidity Units (NTUs). A total of 2,160 gallons of water was removed. The well development log for DSB02RS is provided in **Appendix I**.

2.4.3 Groundwater Sampling

A stainless steel Geotech portable bladder pump and dedicated Teflon™-lined polyethylene tubing was used to pump groundwater from each monitoring well. Groundwater from each monitoring well was pumped through a Horiba U-52 water quality meter with flow-through cell. The Horiba U-52 water quality meter measured dissolved oxygen, pH, specific conductance, turbidity, salinity, oxidation reduction potential, total dissolved solids, and temperature. The water level in each monitoring well was measured using an electronic water level meter. Groundwater samples were collected after stabilization of field parameters. Groundwater sampling logs are provided as **Appendix B**. A summary of the groundwater sample DSB-02RS is provided in **Table 2-5**.

2.4.4 Investigation Derived Waste

IDW generated during the Phase 4 field activities were:

- Soil cuttings from VPB drilling;
- Residual drilling fluids;
- Monitoring well development and purge water; and
- Decontamination fluids containing wash/rinse water and decontamination chemicals.

The IDW was staged at a fenced, gated, and locked yard at a Nassau County-owned property located at 277 Denton Avenue, New Hyde Park, NY. HDR subcontracted AARCO to provide IDW characterization and disposal services for the Phase 4 RI field activities. AARCO sampled the contents of the soil roll-offs and frac tank to characterize the IDW, all of which was characterized as non-hazardous on November 30, 2015, and February 26, 2016. Non-hazardous solid waste IDW was transported by AARCO for offsite disposal to Clean Earth of North Jersey in Kearny, New Jersey. Non-hazardous liquid waste IDW was transported by AARCO for offsite disposal to Clear Water of New York, Inc. in Staten Island, NY (USEPA ID #: EXEMPT). Waste characterization profile and disposal manifests are provided as **Appendix C**.

2.5 Phase 5: July 2019 – March 2020

Phase 5 included sampling of groundwater in monitoring and public water supply wells that previously had TCE concentrations exceeding criteria. These locations had been historically sampled by HDR over the course of the RI, and were collected in this comprehensive round, in the summer and winter of 2019. Two rounds of soil gas samples were also collected in GCPIA proximal to OU1 source area and sampled for VOCs and CSIA. Phase 5 activities were completed in accordance with the EPA-approved Work Plan dated December 2009 (HDR 2010b) and the EPA-approved QAPP dated September 17, 2010 (HDR 2010a). The following summarizes the specific RI tasks conducted during Phase 2 field activities:

2.5.1 Groundwater Sampling

2.5.1.1 Monitoring Well Reconnaissance

A monitoring well condition assessment was completed on 47 wells used for the Phase 5 from July 16 to 17, 2019. A representative from Nassau County Department of Public Works provided access to monitoring wells located within the Garden City Bird Sanctuary and the stormwater retention basins. The well assessment included locating and assessing the physical condition of each monitoring well. The depth to water and total depth of each well were also measured. **Appendix A** provides a summary of the condition of each monitoring well on the EPA Well Assessment Form.

2.5.1.2 Synoptic Water Level Measurements

Two rounds of synoptic water level measurements were completed during Phase 5. The first round of 44 monitoring wells was conducted on August 27, 2019. The second round of 45 monitoring wells was conducted on December 3, 2019. The water level in each well was measured by removing the well cap, monitoring headspace with a calibrated PID, and lowering the water level probe into the well until the audible alarm sounded. Depth to water was measured from a surveyed mark on the inner casing of the wells. The depth to groundwater was measured to the nearest 0.01 foot from the top of the inner well casing. The PID reading and water level measurement were noted on the field form along with the well ID, date, and time. **Table 2-6** provides a summary of details of water level measurements together with monitoring well construction.

2.5.1.3 Groundwater Sampling and Analysis

Two rounds of groundwater samples were collected from 29 monitoring wells and 17 public supply wells (**Figure 2-8**). Round one groundwater sampling was conducted from August 28 through September 9, 2019. A total of 46 groundwater samples were collected from 29 monitoring wells and 17 public supply wells. Round two groundwater sampling was conducted from December 4 through December 13, 2019. A total of 45 groundwater samples were collected from 28 monitoring wells and 17 public supply wells. Both rounds of sampling were conducted in accordance with the approved QAPP and EPA's Low Stress/Low Flow protocol (HDR 2010a).

A stainless steel Geotech bladder pump and dedicated Teflon-lined polyethylene tubing was used to pump groundwater from each of the monitoring wells. Groundwater from each monitoring well was pumped through a Horiba U-52 water quality meter flow-through cell. The Horiba U-52 water quality meter measured dissolved oxygen, pH, specific conductance, turbidity, salinity, oxidation reduction potential, total dissolved solids, and temperature. The water level in each monitoring well was monitored using an electronic water level meter. Groundwater samples were collected after stabilization of field parameters. Groundwater sampling logs are provided as **Appendix B**.

Stainless steel non-dedicated equipment used to sample the monitoring wells were decontaminated between sample locations by running a detergent and water solution through the pump followed by tap water and a deionized water rinse. Disposable items, such as bladders and tubing, were changed between wells. For the public supply wells, groundwater samples were collected from a spigot on the well.

The groundwater samples were analyzed for:

- CSIA by Microbial Insights;
- VOCs by CHM;
- VOCs and Iron/Manganese by Shealy Environmental Inc.;
- MNA parameters: alkalinity, ammonia, chloride, biological oxygen demand (BOD), chemical oxygen demand (COD), volatile fatty acids, nitrite, nitrate + nitrite, orthophosphate, sodium, sulfate, total Kjeldahl nitrogen (TKN), and total organic carbon (TOC) by ALS; and
- MNA parameters and Iron/Manganese by ERT/SERAS.

A summary of groundwater samples collected during these sampling events is provided in **Table 2-7**.

2.5.2 Subslab and Soil Gas Sampling

Two rounds of soil gas samples were collected from commercial properties near the Site within the GCPIA. 10 subslab soil vapor samples were collected in round 1 from October 22 through October 25, 2019 (**Figure 2-9**). 15 indoor air, 4 outdoor air, and 20 subslab soil vapor samples were collected in round 2 from March 12 through March 20, 2020. Soil gas samples were collected from the following commercial properties:

- 180 Atlantic Avenue
- 194 Atlantic Avenue
- 197 Atlantic Avenue
- 118 Fulton Avenue
- 150 Fulton Avenue
- 200 Fulton Avenue
- 270 Park Avenue
- 40 Roselle Avenue

The soil gas samples were collected using stainless 6-liter summa canisters and 4-hour regulator with breakthrough tubes. Prior to sample collection, PID reading was measured at each sampling port, sample port was purged using a personal sampling pump, and a leak check conducted using helium gas and a MGD 2002 Multi-Gas Leak Locator. Soil gas samples were analyzed for VOCs (TO-15) at ALS in October 2019 and Alpha in March 2020, and CSIA was analyzed at Microbial Insights for both rounds. Soil gas sampling logs are provided as **Appendix E**. A summary of soil vapor samples collected during these sampling events is provided in **Table 2-7**.

2.5.3 Transducer Study

HDR installed submersible in-situ Level Troll 700 pressure transducers with integrated data loggers from September 19, 2019, to December 5, 2019 in 20 monitoring wells to measure and record seasonal water level fluctuations at the site. The transducers were programmed to measure and record water levels at five-minute intervals over the course of the study. 8 transducers were installed in monitoring wells screened in the Upper Glacial Aquifer (UGA) and 12 in monitoring wells screened in the Magothy Aquifer. The locations of these wells are shown on **Figure 2-10**.

HDR downloaded the transducer data on a biweekly basis. Manual groundwater levels from the top of the inner casing at a fixed point using an electronic interface probe were taken at the same time as a data quality assurance measure. These manual water level measurements were also used to account for and correct for potential sensor drift during the three-month study period.

Once completed, all measurements gathered during the transducer study were compiled and analyzed. Transducer installation and periodic groundwater level measurement sheets are provided as **Appendix F**.

2.5.4 Monitoring Well Survey

HDR conducted a location and elevation survey for these monitoring wells where no previous elevation data had been collected on March 13, 2020. The survey consisted of using a GPS real-time kinematic (RTK) unit to measure the elevations of the ground surface, top of outer casing; top of inner casing (measuring point for groundwater levels) and measuring the horizontal coordinates of each well. Well coordinates and elevation data were tabulated with the well locations and are provided in **Appendix G.**

2.5.5 Investigative Derived Waste (IDW)

IDW generated during Phase 5 RI field activities were:

- Purge water from monitoring well sampling; and
- Decontamination fluids containing wash/rinse water and decontamination chemicals.

Liquid IDW generated during field activities, including monitoring well sampling, and equipment decontamination was collected in 55-gallon steel drums, labeled, transported and placed in secondary containment at the IDW staging area. Innovative Recycling Technologies, Inc. (IRT), of Lindenhurst, NY was subcontracted by HDR to provide IDW characterization and disposal services for the Phase 5 RI field activities. IRT sampled the contents of the drums for the Round 1 groundwater sampling on September 10, 2019, to characterize the IDW. Non-hazardous IDW (liquid waste) from Round 1 groundwater sampling was shipped on October 3, 2019, for offsite disposal at Republic Environmental Systems, LLC. in Hartfield, PA (USEPA ID #: PAD085690592). Liquid IDW from Round 2 groundwater sampling was transported for offsite disposal on December 31, 2019. Waste characterization profile and disposal manifests are provided as **Appendix C**.

2.6 Data Validation

Data validation for CLP and Laboratory Services and Applied Sciences Divisions (LSASD) data was performed by EPA Region 2 data validators. Data analyzed by subcontracted laboratories were validated by either Environmental Data Services, Inc. (EDS), an independent validator, or an internal senior chemist within HDR. The results of the data validation are discussed in more detail in the Quality Control Summary Reports contained in the Data Validation Report. The Data Evaluation Report is included as **Appendix J.**

3 Physical Characteristics

This section describes the physical characteristics of OU2. Included in this section are demography, meteorology, topography, geology, hydrogeology, surface water hydrology, and ecological characterization.

3.1 Demographics

OU2 is within the villages of Garden City, Garden City Park, and New Hyde Park. According to the United States Census Bureau (USCB), the population of Garden City in 2020 was 23,272 people. The ethnic makeup of the village was 87.6 percent White alone, 6.1 percent Hispanic or Latino, and 0.7 percent Black or African American alone. Other ethnicities included 5.7 percent Asian alone and 4.6 percent two or more races (USCB, 2023).

As reported by the 2020 US Census, Garden City Park had a total population of 7,985 people with a population density of 8,041.3 people per square mile. The racial makeup of the area was 36.6 percent White alone, 48.6 percent Asian alone, and 11.4 percent Hispanic or Latino. Other ethnicities included 1.5 percent Black or African American and 4.7 percent two or more races (USCB, 2023).

As reported by the 2020 US Census, New Hyde Park had a total population of 10,257 people. The racial makeup of the area was 51.4 percent White alone, 28.5 percent Asian alone, 19.1 Hispanic or Latino, and 7.4 percent two or more races (USCB, 2023).

3.2 Land Use

Land use in the area of the OU2 plume is primarily residential with a small area of commercial land use in the northern area of OU2. Regional land use in and around the Site is shown in **Figure 3-1.**

3.3 Meteorology

Based on US climate data from the National Oceanic and Atmospheric Administration (NOAA), and US Climate Data (USCD) for Garden City, New York, climatic conditions in the Fulton Avenue area are generally temperate with average annual temperatures ranging from a low of 46 degrees to a high of 63 degrees Fahrenheit. Average annual precipitation is 46.57 inches (USCD, 2023). Monthly averages range from a low of just over three inches for the month of February to a high of just over 4.75 inches for the month of July. Based on observations from NOAA at JFK International Airport Station in Queens, NY, located approximately 5 miles southwest of the Site, prevailing wind direction is west-southwesterly with an average windspeed of 15 miles per hour. **Figure 3-2** presents precipitation data recorded at the JFK International Airport Station (NOAA, 2022).

3.4 Topography

OU2 lies in the Atlantic Coastal plain physiographic province of Long Island, New York. Based on the USGS Lynbrook Quadrangle 7.5-minute topographic map, ground surface topography is relatively flat lying and ranges in elevation between 75 and 100 feet (NAVD88). The ground surface generally slopes to the southwest at a grade of less than 1 percent (USGS, 2023).

3.5 Soils

According to the United States Department of Agriculture (USDA) Natural Resources Conservation Service Web Soil Survey (USDA, 2022), soils in OU2 primarily consist of Urban land-Hempstead complex and Urban land-Riverhead complex, 0 to 3 percent slopes, with smaller areas of Urban land-Montauk complex, 3 to 8 percent slopes, Hempstead silt loam, and Urban land (**Figure 3-3**). The soils formed in thin, loamy mantles over stratified sand and gravel, with slopes ranging from 0 to 3 percent.

3.6 Geology

The geology of Nassau County, New York can generally be described as a thickening wedge of unconsolidated sediment overlying bedrock, which extends from Long Island Sound to the Atlantic Ocean. Bedrock consists of Precambrian, crystalline, igneous and metamorphic rock, including granite, schist, and gneiss. The bedrock surface dips from north to south at a grade of approximately 50 feet per mile. Bedrock outcrops on the northern shore of Long Island Sound and reaches depths of -1,500 feet msl or more at the southern shore of Nassau County. The surface is approximately -900 feet msl in OU2, or approximately 1,000 ft bgs.

Bedrock is overlain by a sequence of upper Cretaceous age unconsolidated sedimentary deposits, of the Raritan and Magothy Formations, and Pleistocene age glacial outwash deposits. Local deposits of fill material and Recent age alluvium are also present in stream flood plains, and current and former marshland.

The Raritan Formation lies directly on the bedrock surface. The Raritan Formation consists of the basal Lloyd Sand Member and an Upper Clay Member, which is often referred to as the Raritan Clay. The Lloyd Sand Member range is approximately 300 feet thick and is composed of fine to coarse sand, gravel, discontinuous beds of sandy clay and thin beds of lignite. The Raritan Clay Member is approximately 200 feet thick and is composed of gray, white, red, and purple clay that is locally silty or sandy. Lignite and pyrite are also present.

The Magothy Formation lies unconformably above the Raritan Formation and is approximately 400 feet thick. The Magothy is composed of fine to medium sand with discontinuous lenses of coarse sand, sandy clay, silt, and clay. The lower 50 to 100 feet typically contains gravel. Lignite and pyrite are also present. Literature (Smolensky, et al., 1989) indicates that the contact between the base of the Magothy Formation and the top of the Raritan Clay is at or near -400 ft msl in the OU2 study area.

Magothy sediment is primarily composed of quartz, lignite, and muscovite, with 2-3 percent heavy minerals (Perlmutter and Geraghty, 1963). OU2 is located south of the terminal moraine where redox conditions are reportedly oxic in the sandy sequences and potentially anoxic in the clay sequences. Pyrite and lignite are typically association with clay deposits in this area (Brown, et al, 2000).

Surficial geologic deposits consist of Pleistocene glacial outwash. The outwash deposits range in thickness from 30 to 100 feet and are composed of stratified, fine to coarse sand and gravel. Mineralogy of the outwash deposits is similar to that of the Magothy but with more variation in the heavy mineral fraction (Brown, et al., 2000). A plan view geologic map and geologic cross section is provided as **Figure 3-4**.

3.7 Hydrogeology

3.7.1 Regional Hydrogeology

Regional groundwater recharge occurs most prominently along the moraine north of OU2 which serves as not only a deep recharge zone but also as a groundwater divide. Although the moraine area is the most important regional recharge feature, groundwater recharge takes place across most of the land surface of Long Island. In general, groundwater moves away from the recharge area along the central spine of the island toward the coastal areas. The regional groundwater flow direction in the Magothy Aquifer can be inferred from the 2016 potentiometric surface map provided by the United States Geological Survey (USGS) (Como et al, 2018). Based on the potentiometric surface of the Magothy Aquifer, the groundwater flow direction at and downgradient of OU2 is to the southwest trending more to the south as groundwater flows through OU2 (**Figure 3-5**).

Groundwater in the shallow portions of the Magothy Aquifer in the vicinity of OU2 occurs as an unconfined aquifer. However, lenses of silt and clay that overlap with depth result in a vertical anisotropy ranging from approximately 36:1 to 120:1, cause a confining effect with depth (Isbister, 1966 and Reilly et al., 1983). The storativity of the Magothy ranges from water table conditions (0.25) to confined conditions (0.0006) depending on the location and depth (Reilly et al., 1983). Hydraulic conductivity estimates for the regional Magothy Formation, based on aquifer tests of permeable portions of the aquifer, range from approximately 27 ft/d to 150 ft/d with an average of approximately 67 ft/d (Isbister, 1966). Variations in the horizontal and vertical hydraulic conductivity can occur locally due to the presence of lower or higher permeability materials such as silts, clays, or gravels. More recent studies report average values of hydraulic conductivity for the Magothy Formation to be in the range of 35 to 90 ft/d (Cartwright, 2002; Misut and Feldman, 1996; Smolensky and Feldman, 1995). The horizontal hydraulic gradient in shallow portions of the Magothy can range from 0.0001 to 0.001 feet per foot; however, the hydraulic gradient can be affected by hydraulic stresses such as local municipal pumping and recharge basins (Busciolano et al, 1998).

The Nassau/Suffolk Aquifer, which includes the Upper Glacial, Magothy, and Lloyd aquifers, was designated as a Sole Source Aquifer by the EPA in 1978. The Nassau/Suffolk Aquifer is considered the sole source of drinking water in Nassau County.

3.7.2 Local Hydrogeology

Two synoptic rounds of water level measurements were completed in August and December of 2019 during the comprehensive groundwater sampling event. The average depth to water was approximately 38 ft bgs (**Table 2-6**). Groundwater flow maps were created using data from the 2019 synoptic rounds for the piezometric surface of the UGA and the Magothy Aquifer **(Figures 3-6 to 3-9**). The groundwater flow direction, based on these maps, is predominantly in a southwestern direction. The flow direction transitions to a predominantly southern direction within the southern portion of OU2. Horizontal hydraulic gradients in the Upper Glacial/Magothy ranged from 0.0008 to 0.0020 feet/foot across OU2 during both August and December 2019. These results were compared to the April-May 2016 USGS potentiometric-surface altitude mapping (Como et al, 2018). There is very good correlation between the data sets and horizontal groundwater flow direction. The unique groundwater flow patterns on these figures are the result of water levels measured in monitoring wells close to water supply wells that were pumping at the time the water levels were measured.

Vertical hydraulic gradients were also calculated from using 2019 synoptic water level data. In August 2019, vertical gradients ranged from -0.0126 to -0.0009 with a median gradient of -0.0049 (**Appendix F**). In December 2019, vertical gradients ranged from -0.0106 to -0.0007 with a median gradient of -0.0029. Negative vertical gradients (i.e., decreasing groundwater potentiometric head with depth) are expected within OU2 given the proximity to the Long Island groundwater divide and area of aquifer recharge (USGS, 1999). Pumping in the lower Magothy would enhance this effect.

3.7.3 Municipal Water Supply Wells

A municipal water supply well search was completed to locate municipal water supply wells within a one-mile radius of OU2. The results (**Figure 3-10**) show seven water supply wells within a one-mile radius of the center of OU2. These include:

Well ID	Water District	Well Name	Total Depth (ft bgs)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)
N-03881	Garden City	Well 9	466	426	468
N-07058	Garden City	Well 13	440	380	440
N-08339	Garden City	Well 14	360	308	358
N-07649	WAWNC	Well 57	205	165	205
N-07650	WAWNC	Well 57A	440	400	440
N-03603	Franklin Sq.	Well 1	498	443	493
N-03604	Franklin Sq.	Well 2	495	436	495

Groundwater analytical data from these wells show the presence of PCE, TCE and cis-1,2-DCE at concentrations above either the NYSDOH or Federal Drinking Water Standards. The historical concentrations of PCE, TCE, and cis-1,2-DCE in these wells are shown on **Figures 3-11 - 3-17.**

Review of these data indicate that Garden City Well 9 (N-03881) exhibits TCE concentrations greater than PCE, which is consistent with the TCE-dominant groundwater associated with OU2. Garden City Wells 13 and 14 exhibit PCE concentrations greater than TCE, which is consistent with the PCE-dominant groundwater associated with OU1. WAWNC Wells 57 and 57a are located further to the west and exhibit a different contaminant distribution, which potentially indicates a different source. Franklin Sq. wells 1 and 2 are located south of Garden City Well 9 and although TCE concentrations are greater than PCE concentrations, the wells exhibit much lower VOC concentrations. Groundwater flow based on both regional (**Figure 3-5**) and local (**Figures 3-6 to 3-9**) contour mapping in the Magothy aquifer indicate that these wells are not located directly downgradient of Garden City Well 9.

3.7.4 Recharge Areas

Water quality at a municipal water supply well is a function of the quality of the groundwater it captures. In an unconfined aquifer such as this, groundwater quality is directly impacted by recharge from the ground surface that percolates downward to the water table and is then captured by the municipal well. In order to assess the aerial extent of the recharge areas, or source water areas, captured by municipal wells in Nassau County, the Nassau County Department of Health (NCDOH) implemented the Source Water Assessment Program (SWAP) for the State of New York. Groundwater modeling was used to define the aerial extent of the groundwater table that supplies, or provides source water, to each of the municipal drinking water wells throughout Nassau County. The municipal water supply well source water areas in the vicinity of OU2 are shown on **Figure 3-18**.

As shown on **Figure 3-18**, these source water areas vary in both size and shape, driven in part by:

- the lateral distance between water supply wells – the closer the water supply wells are to each other, the narrower and more elongated the source water area;

- the longitudinal distance between water supply wells along a similar flow path or from the hydraulic divide at the terminal moraine north of OU2 – the closer the water supply well is to an upgradient well or to the hydraulic divide, the less elongated and wider the source water area; and

- the pumping rate of the water supply well – the greater the pumping rate of the water supply well, the larger the source water area.

The location of each municipal water supply well and the corresponding modeled source water area were used to better understand the groundwater movement in the area of OU2, and potential source areas of the TCE-dominant groundwater contamination. TCE detected in a groundwater sample collected from a monitoring well and within a municipal well recharge area has a potential to be from a source area within the corresponding municipal water supply well recharge area. For example, the source of TCE and PCE detected in monitoring well MW-20C (that is located within the modeled recharge area of Municipal Well N-03881) is likely within the N-03881 modeled recharge area. Whereas the source of PCE and TCE detected in monitoring well MW-21D (that is located within the modeled recharge area of Municipal Well N-07058/N-08339) is likely within the N-07058/N-08339 modeled recharge area (150 Fulton Avenue). It is unlikely that TCE detected in one recharge area would cross over to another recharge area.

It is important to note that not all of the groundwater hydraulically captured by municipal wells is from the footprint of the source water areas identified on **Figure 3-18**. While the source water areas may represent the major extent of a well's capture zone, a well hydraulically captures groundwater from a 3-dimensional volume of the aquifer that extends a small distance downgradient of the well and may extend into vertical portions of the aquifer that are slightly beyond the limits of the source water area. The source water areas represent the intersection of this 3-dimensional capture zone with the water table.

3.8 Surface Water

There are no natural surface water bodies including rivers or creeks within a one-mile radius of the OU2 plume. There is a stormwater retention basin (i.e., recharge basin) located on Tanners Pond Road in OU2. The retention basin is ephemeral and only holds water after rain events. It is anticipated that it could have a temporary impact on both horizontal and vertical groundwater flow in the immediate area of the basin (**Figure 3-19**). Additionally, there is a wetland area identified by the National Wetlands Inventory within the OU2 plume in the Garden City Country Club.

Groundwater in OU2 does not discharge to surface water. There are numerous rivers approximately 2 miles to the south of OU2.

3.9 Ecological Characterization

The NYSDEC Environmental Resource Mapper (NYSDEC, 2022) lists the Tanners Pond Road recharge basins and Garden City Country Club lakes as freshwater wetlands. The U.S. Fish & Wildlife Service's Information for Planning and Consultation (USFW, 2022) website list four endangered species, but no critical habitats within OU2. Threatened species listed are birds – piping plover (Charadrius melodus), and red knot (Calidris canutus rufa). The monarch butterfly (Danaus plexippus) is listed as a candidate for the threatened species list. The flowering plant, sandplain gerardia (Agalinis acuta), is listed as endangered. The area is listed as habitat for Bald & Golden Eagles, as well as 19 other migrating birds.

4 Nature and Extent of Contamination

This section describes the nature and extent of chemical constituents detected in soil, soil gas, and groundwater. The sampling and analytical methods are discussed in detail in Section 2. Applicable or Relevant and Appropriate Requirements (ARARs) and To Be Considered (TBCs) criteria, advisories, and guidance, are presented in Section 4.1. Analytical results for Phases 1 through 4 are discussed in 4.2. Analytical results for Phase 5 are discussed in Section 4.3. Groundwater geochemical conditions, based on Phase 5 sampling are discussed in Section 4.4.

4.1 Applicable and Relevant and Appropriate Requirements and To Be Considered Criteria

Section 121 (d) of the CERCLA states that remedial actions must attain a degree of cleanup of hazardous substances, pollutants, and contaminants which will assure protection of human health and the environment. Section 121 (d)(2)(A) provides that the cleanup must meet certain standards, requirements, criteria, and limitations derived from specified Federal environmental laws. This section also provides that the cleanup must meet certain standards, requirements, criteria, and limitations derived from State or territory environmental or facility siting laws if these are more stringent than the Federal standards or criteria, if these State or territory standards come from an approved, delegated program and have been identified by the State in a timely manner.

To determine whether a standard, requirement, criterion, or limitation is to be met, EPA must first determine whether that standard, requirement, criterion, or limitation is legally applicable to the hazardous substance or pollutant or contaminant of concern or is relevant and appropriate under the circumstances of the release, or threatened release, at the site. A standard, requirement, criterion, or limitation that is legally applicable or has been determined by EPA to be relevant and appropriate for a particular cleanup is referred to as an Applicable, Relative and Appropriate Requirement or “ARAR”.

In addition to ARARs, EPA and the State or territory may, as appropriate, identify other Federal, State, or territory advisories, criteria, guidance, or proposed but non-promulgated standards to be considered in developing the remedy for a particular site. Although not sources of potential ARARs, because they are neither promulgated nor enforceable, the information in these sources is “to be considered” or “TBC” in developing a protective site remedy. The chemical specific, action specific, and location specific ARARs and TBCs will be developed and provided in the FS.

Chemical-specific ARARs and TBCs were identified for purposes comparing analytical data and delineating the nature and extent of contamination. **Table 4-1** lists the potential chemical-specific ARARs and TBCs by matrix and lists the PDC for each compound/analyte.

4.1.1 Groundwater

Potential groundwater ARARs include:

- EPA National Primary Drinking Water Regulation Maximum Contaminant Levels (EPA, 2009a)

- New York State Water Quality Standards for taste-, color-, and odor-producing, toxic and other deleterious substances, 6 CRR-NY 703.5 (NYSDEC, 2021)
- Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (NYSDEC Division of Water TOGS 1.1.1)
- New York State Department of Health Drinking Water Quality Standards, 10 NYCRR 5.1 (NYSDOH, 2021)

TBC criteria, advisories, or guidance were not identified for OU2 groundwater.

PDC have been selected for the purpose of identifying Contaminants of Potential Concern (COPCs) and delineating the nature and extent of COPCs in groundwater. PDC for OU2 groundwater are the lower of the potential groundwater ARARs for each chemical. PDC are listed on **Table 4-1**. EPA will select the final cleanup standards for OU2 in the ROD.

4.1.2 Soil

Potential Soil ARARs include:

- NYSDEC Unrestricted Use Soil Cleanup Objectives (UUSCOs) (NYSDEC 375-6.8(a)); and
- NYSDEC SCOs for the Protection of Groundwater (POGW SCOs) (NYSDEC 375-6.8(b)).

PDC have been identified by selecting the most conservative ARAR for the purpose of delineating the nature and extent of contaminants in soil. PDC for OU2 soil are the lowest of the relevant potential ARARs. Data tables comparing soil analytical data to PDC and a discussion of those results are provided in **Appendix K**.

4.1.3 Soil Vapor, Indoor and Outdoor Air

There were no potential ARARs identified for soil vapor, indoor air, or outdoor air. The following TBC criteria were used to establish PDC.

- EPA Regional Screening Levels (RSLs) Resident Air Non-Carcinogenic, THQ=1 (EPA, 2023)

Consistent with EPA's Technical Guidance for Assessing and Mitigating the Vapor Intrusion Pathway (EPA, 2015c) an attenuation factor of 33 from sub-slab to indoor air was applied. The resulting product is the soil vapor PDC. Data tables comparing soil analytical data to PDC and a discussion of those results are provided in **Appendix K**.

4.2 Phase 1 through 4 Analytical Results

Analytical results from Phases 1 through 4 were compared to the PDC. Groundwater sampling locations exceeding the PDC in all previous phases were resampled in Phase 5 to produce a comprehensive and more recent set of data. Further discussion of results from prior phases is provided in **Appendix K**.

4.3 Phase 5 Groundwater Analytical Results

Two rounds of groundwater samples were conducted in August-September 2019 and December 2019 as part of Phase 5. The distribution of wells covers an area much larger than OU2 to get a full perspective of the contamination and possibly identify OU2 source(s). Twenty-nine monitoring wells and 17 municipal water supply wells were sampled in the first round. Twenty-eight monitoring wells (MW-4 ZOE was not sampled during the second round) and 17 municipal water supply wells were sampled during the second round. Municipal water supply wells N-03881 and N-06745 were sampled only in the first round and N-03732 and N-14146 were sampled only in the second round due to access. Groundwater samples were analyzed for VOC, metals (iron, manganese, and sodium), organic acids, and biodegradation indicator parameters.

Groundwater analytical results are presented in data tables provided as **Tables 4-2 through 4-5**. Statistical summary tables providing the frequency of detections, frequency of exceedances, and the minimum/maximum concentrations is provided as **Table 4-6**. **Figure 4-1** display the exceedances of various compounds above their respective PDC in map view.

4.3.1 Volatile Organic Compounds

VOCs were detected in 29 of 46 wells in Round 1. VOCs were detected in 26 of 45 samples in Round 2. Seven VOCs (PCE, TCE, cis-1,2-DCE, 1,1,1-TCA, 1,1-dichloroethene, 1,1-dichloroethane, and xylene) were detected above the PDC in Round 1. Nine VOCs (PCE, TCE, cis-1,2-DCE, 1,1,1-TCA, 1,1-dichloroethene, 1,1-dichloroethane, isopropyl benzene, ethylbenzene, and xylene) were detected above the PDC in Round 2. The VOCs were detected in wells screened between the depths of 10 feet and 518 feet below the ground surface. A comparison of VOC data to the PDC is provided on **Table 4-2** and shown on **Figure 4-1**.

Below is a summary of the VOCs with the most PDC exceedances in groundwater and the range in concentrations detected. The distribution of these concentrations is provided in **Figure 4-1**.

- TCE
  - Round 1 TCE was detected above the PDC in 22 of 46 samples.
    - Sample results in the event ranged from 0.17 to 590 µg/L with a maximum µg/Lat MW-03 ROS, a median of 4.2 µg/L, and an average of 69.0 µg/L.
    - Sample results within OU2 ranged from 0.37 to 79 µg/L with a maximum at N-03881, a median of 23 µg/L, and an average of 25 µg/L.
  - Round 2 TCE was detected above the PDC in 20 of the 45 samples.
    - Sample results in the event ranged from 0.056 to 830 µg/L with a maximum µg/Lat MW-03 ROS, a median of 4.3 µg/L, and an average of 71.0 µg/L.
    - Sample results within OU2 ranged from 2.4 to 27 µg/L with a maximum at MW-25A, a median of 15 µg/L, and an average of 16 µg/L.
- PCE
  - Round 1 PCE was detected above the PDC in 25 of 46 samples.

  - Sample results in the event ranged from 0.12 to 910 µg/L with a maximum µg/Lat N-10330, a median of 6.7 µg/L, and an average of 98.5 µg/L.
  - Sample results within OU2 ranged from 0.52 to 42 µg/L with a maximum at N-03881, a median of 7.9 µg/L, and an average of 14 µg/L.
- Round 2 PCE was detected above the PDC in 22 of the 45 samples.
  - Sample results in the event ranged from 0.066 to 320 µg/L with a maximum µg/Lat N-07058, a median of 4.4 µg/L, and an average of 69.2 µg/L.
  - Sample results within OU2 ranged from 1.1 to 22 µg/L with a maximum at MW-25A, a median of 5.5 µg/L, and an average of 7.9 µg/L.

- cis-1,2-DCE
  - Round 1 DCE was detected above the PDC in 7 of 46 samples.
    - Sample results in the event ranged from 0.14 to 210 µg/L with a maximum µg/Lat MW-03 ROS, a median of non-detect at 0.5 µg/L, and an average of 48.6 µg/L.
    - Sample results within OU2 ranged from 0.36 to 5.6 µg/L with a maximum at MW-26F, a median of 0.5 µg/L, and an average of 1.6 µg/L.
  - Round 2 DCE was detected above the PDC in 8 of the 45 samples.
    - Sample results in the event ranged from 0.09 to 710 µg/L with a maximum µg/Lat N-10330, a median of non-detect at 0.5 µg/L, and an average of 137.25 µg/L.
    - Sample results within OU2 ranged from 0.27 to 3.8 µg/L with a maximum at MW-26F, a median of 0.34 µg/L, and an average of 1.1 µg/L.
- Four compounds (1,1,1-TCA, 1,1-dichloroethene, 1,1-dichloroethane, and xylene) were detected above the PDC each in a single sample in Round 1.
- Five compounds (1,1,1-trichloroethane, 1,1-dichloroethene, 1,1-dichloroethane, ethylbenzene and xylene) were detected above the PDC each in a single sample in Round 2.
- One compound (isopropyl benzene) was detected above the PDC in two samples in Round 2.

4.3.1.1 Compound Specific Isotope Analysis

CSIA is a diagnostic tool that can be used to differentiate sources of VOCs. It can also help identify transformation reactions associated with isotopic fractionation, such as reductive dechlorination of PCE to TCE and other daughter products.

CSIA data are reported as the difference (δ) between the ratios of two stable isotopes of a single element in a molecular compound in a reference sample vs. a collected sample. For example, $\delta^{13}C$ represents the difference in ratios of carbon isotopes C_{12} and C_{13} between the reference standard and the collected sample, in parts per thousand (‰). When high enough concentrations of TCE and PCE are present, CSIA is conducted in “3-D”, indicating it was performed on all three elements, carbon, chlorine, and hydrogen, comprising both TCE and PCE. A 3-D CSIA result provides better resolution of data for discriminating between potential source areas; however, it requires a large amount of product (i.e. high concentrations of TCE or PCE). The alternative to 3-D analysis is to perform 2-D (only carbon and chlorine) or even 1-D (only carbon) on a larger number of samples at lower concentrations; however this approach provides a lower resolution for source analysis.

Groundwater and soil gas samples were collected from 2013 to 2020 and, based on the range of concentrations, analyzed using CSIA. The TCE CSIA results from 2013 to 2015 were plotted in dual isotope plots to correlate isotopic signatures in sampled wells and infer potential sources from the plotted data. These data identified 4 to 5 potential sources, including a potential comingling of two sources (**Appendix L – Figure 1**). Some groundwater sampling locations that were sampled more than once from 2013-2015 had CSIA values that indicated different source areas between sampling rounds. This suggests a general level of uncertainty between the datasets as the results were not reproducible. Thus, the 2013 to 2015 data were generally inconclusive and were not used for source area determination.

A more widespread, comprehensive round of sampling was undertaken from 2019-2020. Isotopic source groupings from the 2013-2015 rounds of sampling were not reproducible in the 2019-2020 comprehensive round (**Appendix L – Figure 2**). This may be due to several factors, including significant pumping effects of the nearby public water supply wells. Based on the full set of data, reasonable and defensible conclusions on the identification of the source cannot be drawn from the CSIA data.

4.3.1.2 OU2 TCE-Dominant Groundwater Contamination

Analytical results from the 5 phases of RI groundwater sampling indicate that TCE-dominant groundwater contamination is present in an area roughly 5,400 feet long north to south, extending from the area between Nassau Terminal Road and the Long Island Railroad line in the north, to an area between Farmount Blvd. and Dartmouth Street to the south. The width of the TCE-dominant area is roughly 2,500 feet, extending from the area between Adam Street and New Hyde Park Road to the west, to the western border of OU1 between Tanners Pond Road and Lee Road to the east. The southeastern portion of the plume extends approximately 500 feet east into the northwestern portion of the Garden City Country Club. The vertical extent of TCE-dominant groundwater contamination ranges between the depths of 250 to 450 feet at the northern edge of the plume and between the depths of 350 to over 500 feet at the southern edge of the plume.

The TCE concentrations range from below the maximum contaminant level (5 µg/L) to 180 µg/L with an average concentration of 44.8 µg/L in Round 1 and 33.5 µg/L in Round 2 groundwater samples as described below.

Multiple lines of evidence were used to identify the extent of TCE-dominant groundwater contamination in OU2. These lines of evidence include the following:

1. Groundwater with a TCE to PCE ratio greater than 1,
2. Groundwater located along a similar horizontal and vertical flow path,
3. Groundwater within common municipal well source water/recharge areas.

These lines of evidence are discussed in detail below:

<u>TCE to PCE Ratio Greater than 1</u>

Chlorinated solvents including PCE and TCE are widespread in Nassau County and in the Garden City area. TCE is often used as an industrial solvent that can be released to the environment, potentially causing groundwater contamination. However, TCE can also be present in groundwater as a result of biotic and abiotic degradation of PCE that was released to the environment. Therefore, it is important to distinguish TCE that was released to the environment from TCE that is present due to the degradation of PCE.

The Magothy Aquifer is an aerobic aquifer. Since PCE biotically degrades very slowly to TCE under aerobic conditions, when PCE is released into the Magothy Aquifer, the ratio of TCE to PCE is typically low. Additionally, the abiotic transformation of PCE to TCE is largely controlled by the presence of minerals such as manganese. The Magothy Aquifer contains low concentrations of manganese, resulting in a very slow rate of abiotic transformation of PCE to TCE.

The limited biotic and abiotic transformation of PCE to TCE results in low TCE concentrations (where present) relative to PCE concentrations. Therefore, samples where TCE was detected in concentrations less than PCE concentrations are considered part of OU1. Samples where TCE was detected in concentrations higher than PCE concentrations are considered part of OU2. Thus, the ratios of TCE to PCE are greater than 1 in the OU2 plume, while the ratios of TCE to PCE are less than 1 in the OU1 plume.

The total ethene molar mass was calculated for all wells included in the 2019 comprehensive groundwater sampling. Pie charts showing the distribution of molar ratios of total ethenes by well are shown on **Figures 4-2 and 4-3**. In the area of the OU1 plume, molar ratios are predominately PCE, whereas in the area of the OU2 plume, molar ratios are predominately TCE for both comprehensive rounds.

Similar Groundwater Flow Path

TCE has potentially been released to the environment in numerous locations in the Garden City and Nassau County area. Groundwater samples were collected from a 20 square mile area as part of the OU2 RI. Therefore, it is important to distinguish TCE that could be spatially related to the OU2 TCE from TCE that is more likely associated with a separate source area.

This was accomplished using the direction of groundwater flow shown on potentiometric surface maps drawn as part of this RI (**Figures 3-6 through 3-9**) and as defined by the USGS groundwater flow mapping (Como et al, 2018) shown on **Figure 3-5**. The USGS potentiometric surface maps were used as the primary basis to interpret whether or not samples containing TCE were likely related to each other and to a documented TCE release based on groundwater flow in the Magothy Aquifer. TCE in groundwater samples that are in close proximity to each other, and could be from a TCE release based on groundwater flow in the Magothy Aquifer, were considered part of OU2.

Common Source/Recharge Areas

This area of Nassau County contains a very high density of municipal water supply wells. The hydraulic capture zones and source water areas of these wells (**Figure 3-18**) were used to understand the potential spatial relationship between known TCE source areas and the groundwater samples containing TCE. TCE in groundwater samples that were collected within a common source water area are likely to be related to a contamination source within that source water area, whereas TCE in groundwater collected from different source water areas are not likely from the same contamination source. TCE in groundwater samples collected from the source water area for Garden City Well N-03881 have the potential to be related to each other and are likely from the same source area.

For example, MW-23C and MW-26G are both within the N-03603 source water area. Therefore, their TCE contamination is more likely to be from the same contamination source. Conversely, while MW-25A and MW-10MS are both TCE-dominant, they are not within the same source water area (N-03881); therefore, they are less likely to be from the same contamination source.

It is important to note that not all the groundwater hydraulically captured by municipal wells originate at the source water areas identified on **Figure 3-18**. The source water areas are areas where surface recharge enters the aquifer at the water table, flows to and is captured by the pumping municipal wells. The hydraulic capture zone of a well is a 3-dimensional volume of the aquifer that includes water captured from upgradient areas, vertical portions of the aquifer above and below the well screen and a limited portion of the aquifer down gradient of the well. The source water areas represent the intersection of the 3-dimensional capture zones with the water table.

The multiple lines of evidence approach was considered while reviewing the TCE and PCE concentration in groundwater collected from each well that was sampled as part of this RI. The rationale for including or excluding wells from OU2 is presented in **Table 4-7**. Considering the multiple lines of evidence, six monitoring wells and one municipal water supply well have been determined to fall within the OU2 TCE-dominant plume. The OU2 TCE-dominant groundwater contamination is shown on **Figure 4-4** and listed below:

- Monitoring Wells
    - MW-20C
    - MW-23C
    - MW-25A
    - MW-26F
    - MW-26G
    - N-11171
- Municipal Water Supply Well
    - Garden City Well 9 (N-03881)

The OU2 area is on the order of 2,500 feet in width by 5,400 feet in length. The wells listed above are screened between the depths of 215 feet and 466 feet bgs. There is not sufficient well density to provide a detailed vertical distribution of TCE-dominant groundwater. However, data indicate that TCE exceeds the PDC only in deep wells with screen depths ranging from 345 feet to 466 feet bgs. Historical data from clustered well location MW-20A/MW-20B/MW-20C supports this distribution. TCE only exceeded the PDH at the deep well MW-20C, screened from 400 feet to 410 feet bgs. TCE was not detected in MW-20A (140 to 150 ft bgs) or MW-20B (244 to 254 ft bgs). In general, data indicate that the TCE-dominant groundwater in OU2 is migrating primarily in the deeper portion of the Magothy aquifer at depths between 300 feet and 500 feet bgs.

4.3.1.2.1 Round 1

TCE and PCE were detected in all 7 OU2 wells sampled in Round 1. The TCE concentration ranges from 0.37 µg/L to 79 µg/L with an average concentration of 24.6 µg/L. TCE exceeds the PDC in only 5 of the 7 groundwater samples. The PCE concentration ranges from 0.52 µg/L to 42 µg/L with an average concentration of 13.7 µg/L. PCE exceeds the PDC in only 4 of the 7 groundwater samples. cis-1.2-DCE was detected in 4 of the 7 OU2 wells sampled in Round 1. The cis-1,2-DCE concentration ranges from 0.36 µg/L to 5.6 µg/L with an average concentration of 2.4 µg/L. cis-1,2-DCE exceeds the PDC in only 1 of the 8 groundwater samples.

4.3.1.2.2 Round 2

TCE and PCE were detected in all 7 OU2 wells sampled in Round 2. The TCE concentration ranges from 2.4 µg/L to 27 µg/L with an average concentration of 16.5 µg/L. TCE exceeds the PDC in 6 of the 7 groundwater samples. The PCE concentration ranges from 1.1 µg/L to 22 µg/L with an average concentration of 7.9 µg/L. PCE exceeds the PDC in 4 of the 7 groundwater samples. cis-1.2-DCE was detected in 6 of the 7 OU2 wells sampled in Round 1. The cis-1,2-DCE concentration ranges from 0.27 µg/L to 3.8 µg/L with an average concentration of 1.2 µg/L. cis-1,2-DCE exceeds the PDC in none of the 7 groundwater samples.

These data show the TCE-dominant groundwater contamination is a relatively diffuse low concentration plume as shown by the average TCE concentration of 24.6 µg/L (Round 1) and 16.5 µg/L (Round 2). These data are shown in **Table 4-2** and shown on **Figure 4-4**.

4.3.1.2.3 TCE Trends

Numerous groundwater samples have been collected from the OU2 monitoring wells from 2001 through 2019. Older data were also available for some of the water supply wells. Concentrations of TCE and PCE were plotted against time to show concentration trends over the 18-year period (**Figures 4-5 through 4-11**). TCE trends are further discussed in the Natural Attenuation Memorandum in **Appendix M**.

Seven core wells, MW-20C, MW-23C, MW-25A, MW-26F, MW-26G, N-03881, and N-11171, were evaluated. The evaluation indicated the following:

- Decreasing trends were found at four wells: MW-23C, MW-25A, MW-26G, and N-11171.
    - All of these wells are located on the eastern edge of OU2.
    - Concentrations at MW-23C ranged from a high of 290 µg/L in 2005 to less than 10 µg/L.
    - Concentrations at MW-25A ranged a high of 96 µg/L in 2001 to 19.3 µg/L.
    - MW-26G concentrations generally ranged from a high of 96 µg/L to 4.2 µg/L. More recent samples in 2019 and 2020 ranged from 10 to 25 µg/L.
    - Well N-11171 showed an overall reducing trend from the high concentrations detected in the 1990’s (**Appendix M)**. A high concentration of 261 µg/L was detected in 1992. However, since 2001 the trend has leveled off and concentrations have

ranged from less than 1 µg/L to 14 µg/L. The most recent sample in 2019 detected 13 µg/L.

- Increasing trends were found at three wells: MW-20C, MW-26F, and N-03881.
  - Well MW-20C concentrations were generally below 10 µg/L and showed only a slightly increasing trend.
  - Well MW-26F concentrations generally ranged from 32.8 µg/L to 1 µg/L. More recent samples in 2019 and 2020 ranged between 15 and 18 µg/L.
  - Well N-03881 concentrations ranged from 155 µg/L to approximately 68 µg/L and show a slow rate of increase.

A concentration trend plot was also constructed for MW-24A, which exhibited TCE-dominant groundwater. Samples indicated that this well encounters groundwater with a wider range of contaminants and stronger increasing trend in TCE concentrations. Because of the differences in the nature of contaminants and the location of the well further to the west of the other TCE-dominant wells, MW-24A appears to be impacted by a different TCE source and is not considered to be part of OU2.

4.3.2 Metals

Iron, manganese, and sodium were detected throughout the areas that were investigated and the data are presented on **Table 4-3**. Total iron concentrations ranged from not detected at 20 µg/L to 405,000 µg/L and manganese concentrations ranged from not detected at 1 µg/L to 8560 µg/L. The wide ranges in concentration are likely a result of variable geochemical conditions in the aquifer. Iron and manganese are naturally occurring in the Magothy Formation and can be solubilized by changing geochemical conditions (Brown, 1995). Oxidation-Reduction Potential (ORP) measurements at the time of sampling indicated that redox conditions are in the iron and manganese reducing range and support the mobilization of these naturally occurring metals. Background concentrations of iron and manganese for the area investigated could not be found. However, USGS Open-File Report 87-0742 indicates that iron and manganese in the upper Glacial and Magothy aquifers in Nassau and Suffolk counties from natural sources exceed drinking water standards. In addition, USGS WRI Report 90-4182 provides data from observation wells in the Bethpage-Hicksville-Levittown area that shows a wide range of dissolve iron concentrations from 0 to 41 mg/L and manganese concentrations from less than 0.05 to 18 mg/L. These ranges in concentration are consistent with those found in the OU2 RI.

Sodium concentrations ranged from 7280 µg/L to 117,000 µg/L. Sodium is commonly found in groundwater on Long Island resulting from urban runoff and stormwater recharge to the aquifer system. USGS WRI Report 90-4182 indicates that sodium concentrations in observation wells in the Bethpage-Hicksville-Levittown area range from 4 to 135 mg/L. This range is also consistent with what was found in the OU2 RI.

Iron, manganese, and sodium are not site-related contaminants in that they were not released to groundwater from the same source as the CVOCs. However, the presence of iron and manganese at elevated levels is most likely related to the effects of the organic contaminants that define OU2. Oxygen is typically the first electron acceptor used in biotic degradation. Even limited biotic degradation of PCE and TCE will consume oxygen, resulting in a change to anerobic redox conditions within the aquifer. Under these anerobic conditions, less soluble forms of iron and manganese naturally present in the aquifer matrix are reduced to more soluble forms, resulting in elevated concentrations in groundwater.

4.3.3 Organic Acids

Organic acid analysis was conducted as part of the Phase 5 sampling program and the data is presented on **Table 4-4**. Acetic acid was detected in one OU2 well, MW-26F, at a concentration of 2.1 mg/L. The presence of acetic acid at isolated wells may indicate a limited amount of localized abiotic degradation of TCA, however this high concentration suggests there may be an unknown source of acetic acid.

4.4 Groundwater Geochemical Conditions and Biodegradation Indicator Parameters

Hydrogeochemical conditions within the UGA and Magothy Aquifer were characterized by a combination of direct field measurements and laboratory analysis. Field measurements were made regularly during the purging process for monitoring well sampling and final conditions, measured just prior to sample collection, are reported in **Table 4-8**. This table presents results for the August-September 2019 and December 2019 sampling events. Laboratory analysis was performed for a series of geochemical parameters to characterize conditions that support or inhibit microbial degradation of chlorinated solvents through the process of reductive dichlorination and are reported in **Table 4-5**.

The general geochemical parameters measured in the field are temperature, pH, specific conductance, dissolved oxygen (DO), ORP, and turbidity. Across the entire area sampled temperatures ranged from 11 to 22 degrees Celsius (°C), or 52 to 72 degrees Fahrenheit (°F), which is typical for groundwater in this area. Temperatures in OU2 results were consistent with the wider area and ranged from 11 to 17 °C, or 52 to 63 °F. Biological activity will typically take place in aquifers with a range in temperature of 10 to 35 °C, or 50 to 95 °F.

Values for pH ranged from 4.67 to 11.38 standard units (SU) overall and from 5.91 to 11.37 SU in OU2. Typical values for pH in these aquifers are in the slightly acidic range: 5.8 to 6.1 SU (Nemickas, *et al.*, 1989). Values in the basic range were generally recorded in wells greater than 350 feet in depth: MW-20C, MW-23C, and MW-26F. Basic pH values generally correlated with reducing conditions as indicated by low or negative ORP values.

ORP measurements ranged from -256 to 374 millivolts (mV), indicating that redox conditions in the aquifers ranged from reducing to oxidizing. In OU2 the ORP measurements were more indicative of reducing conditions with values ranging from -256 to 76 mV. There was general agreement between ORP and DO where low or negative ORP results corresponded with DO values less than 1 mg/L in OU2 for the fall 2019 event. However, the December 2019 event did not demonstrate that same agreement, which may be the result of lower temperatures impacting the DO sensor in the field.

In general, deeper wells with screen depths greater than 200 feet showed oxygen depleted or reducing conditions. ORP values less than -100 mV are typically required to promote reductive dechlorination; however, the reductive pathway is still possible at potentials less than 50 mV (EPA, 1998). Although there was some variability between the sampling rounds, these reducing conditions were generally present at OU2 wells MW-20C and MW-26F. All but one OU2 well had ORP values less than 50 mV. Other wells sampled with strong reducing conditions include: DSB-02RS, MW-03-ROS, MW-21C, MW-24A, and MW-26F.

Specific conductance measurements ranged from 0.016 to 0.764 millisiemens per centimeter (mS/cm) and within the OU2 wells from 0.174 to 0.758 mS/cm. This range is consistent with literature values reported for the area (Buxton, *et al.*, 1981).

DO levels indicated that conditions within the aquifers range from oxygen depleted to oxygenated approaching saturation. DO levels must be below 0.5 mg/L for anerobic microbes to function and drive the process of reductive dichlorination; the primary mechanism for degradation of chlorinated solvents in groundwater (EPA, 1998). DO levels were below 1 mg/L in 25 of the 55 monitoring wells sampled over the two rounds. In the August-September 2019 round DO levels were less than 0.5 mg/L for all OU2 wells, but in the December round the results were higher, ranging from 0.55 to 4.39 mg/L.

Turbidity levels were generally below 50 NTU. Several wells had elevated turbidity measurements for both events: DSB-02RS, MW-8D, MW-10D, MW-24A, and MW-25A.

The following parameters were analyzed by the laboratory.

4.4.1 Sulfate

Sulfate concentrations across the two comprehensive groundwater sampling events ranged from non-detect at 1.0 mg/L to 38 mg/L, and within the OU2 wells from 5.1 mg/L to 32 mg/L. Sulfate may be used as an electron acceptor for anaerobic biodegradation after oxygen and nitrate have been depleted. Concentrations of sulfate greater than 20 mg/L may cause competitive exclusion for dichlorination (EPA, 1998). Five of the seven Round 1 samples and four of the seven Round 2 samples of OU2 wells had sulfate results greater than 20 mg/L.

4.4.2 Iron and Manganese

Although separate analyses for dissolved-phase iron and manganese were not performed, increased total concentrations of these metals can be indicative of their reduction to more soluble forms as a result of microbial degradation of organic chemicals.

Iron concentrations in OU2 wells ranged from 79 µg/L to 379,000 µg/L with the highest concentration at MW-23C (**Table 4-3**). Manganese concentrations ranged from 1.5 µg/L to 2,170 µg/L in the OU2 wells.

Iron and manganese play roles in both biotic and abiotic degradation of CVOC. Oxidized forms of these metals are used as electron acceptors in the anerobic degradation process. Abiotic degradation is mediated by a number of reactive iron minerals, such as iron sulfides (e.g., pyrite), iron oxides (e.g., magnetite) and iron oxyhydroxide coatings (e.g., goethite, lepidocrocite) (EPA, 2009b). Mineralogical analysis was not performed on the formation samples. However, other studies have documented the presence of these reactive iron minerals in the UGA and Magothy Aquifer on Long Island (Faust, 1963, Brown, 1995, USGS, 1999). In addition to performing mineralogical characterization of these materials, the studies observed that localized zones of iron reducing and sulfate reducing conditions had developed within the aquifers in response to isolated deposits of lignite-rich silts and clays (USGS, 1999). These reactions can also increase the availability of iron present in the formation material for abiotic processes (EPA, 2009b, EPA, 2015b).

Ferrous iron (Fe^{2+}, Iron II) results ranged from 0.04 mg/L to 148 mg/L with a maximum concentration of 6.61 mg/L in the OU2 wells (**Table 4-3**). Iron III is an electronic acceptor for biological metabolism under anaerobic conditions and the Iron III is reduced to Iron II. Iron II concentrations greater than 1 mg/L indicate the reductive pathway is possible (EPA, 1998). Ferrous iron concentrations in the OU2 wells were typically under 1 mg/L and only one of those wells, N-11171, had two results above 1 mg/L (4.4 mg/L and 6.61 mg/L).

4.4.3 Nitrate and Nitrite

Nitrate + nitrite concentrations ranged from non-detect values at 0.05 mg/L to 6.8 mg/L in OU2 wells (**Table 4-5**). Nitrate may be used as an electron acceptor for anaerobic biodegradation in the absence of oxygen. For reductive dechlorination to occur, nitrate in the contaminated portion of the aquifer must be less than 1 mg/L (EPA, 1998). Nitrite is an intermediate compound in the denitrification process and its absence can serve as an indicator that nitrogen is being utilized in the biodegradation process (EPA, 1998).

Nitrate was evaluated through the nitrate + nitrite analysis. Nitrate + nitrite was detected in groundwater at concentrations greater than 1 mg/L in three of the OU2 wells (MW-25A, N-03881, and N-1171).

4.4.4 Alkalinity

Alkalinity levels ranged from 14 mg/L to 130 mg/L in the OU2 wells (**Table 4-5**). The average concentration of alkalinity in OU2 wells was 59.9 mg/L with concentrations exceeding 100 mg/L in monitoring wells MW-20C and MW-26F. Increased alkalinity can be an indicator of microbial activity in an aquifer. (EPA, 1998).

4.4.5 Organic Carbon

Total organic carbon (TOC) levels were detected between the concentrations of 1 mg/L and 6.1 in OU2 wells. Organic carbon serves as both a carbon and energy source for microbes that drive reductive dichlorination. TOC concentrations in groundwater, or dissolved organic carbon (DOC), greater than 20 mg/L are necessary to sustain biodegradation (EPA, 1998). TOC was not greater than or equal to 20 mg/L in any of the OU2 wells.

4.4.6 BOD

Biological oxygen demand levels were detected from 2.1 mg/L to 6.2 mg/L in OU2 wells. BOD is a general indicator of biological activity.

4.4.7 COD

Chemical oxygen demand was measured in one well (MW-20C) at a concentration of 30 mg/L during Round 2. COD was below the detection limit in the 6 remaining samples during Round 2 sampling and all samples during Round 1 sampling.

4.4.8 Chloride

Chloride was detected in OU2 wells at 18 mg/L to 75 mg/L. Chloride is released to groundwater during the biological degradation of CVOC and can be an indicator of biological activity when concentrations are elevated in comparison to background levels (EPA, 1998).

5 Fate and Transport

5.1 Introduction

The mobility and persistence of contaminants in the environment are significant factors in determining their environmental fate and transport characteristics. Contaminant fate and transport are also dependent on the chemical and physical characteristics of the site and environmental media in which the contaminant resides. Examples of chemical characteristics of the site/medium include pH of the soil and water, organic content of soil, ORP, and the presence of inorganics (e.g., carbonates, sulfates, iron). Examples of physical characteristics include geological and hydrological parameters (e.g., hydraulic conductivity, porosity, and hydraulic gradients), temperature, the presence of surface water bodies, buildings, ground cover, etc. Additionally, the presence or absence of oxygen and microbial organisms in the environmental medium could determine the persistence of certain contaminants, particularly organic contaminants. Although the degree of impact is uncertain, because of the capacity of some contaminants to move from one medium to another or to become degraded by one or more biotic and/or abiotic processes, the analysis of contaminant fate and transport can be used to assess the potential rate of migration and fate of contaminants.

Three organic compounds exceeded strict risk-based EPA regional screening levels, including PCE, TCE, and benzene. However, only PCE and TCE were present at levels exceeding NYSDEC TOGS groundwater quality standards. Benzene was only detected at trace levels below the TOGS limits of µg/L. Therefore, this discussion will focus on the chlorinated ethenes PCE and TCE that represent the primary contaminants found in groundwater at the Site.

<u>Trichloroethene</u>

TCE is an organic solvent primarily used to remove grease from metal parts, particularly in the automotive and metal machining industries. As a general solvent or as a component of solvent blends, TCE is used with adhesives, lubricants, paints, varnishes, paint strippers, pesticides, and cold metal cleaners. It can be found in many household products, including paint removers, adhesives, spot removers, and rug-cleaning fluids. It is also used in various chemical manufacturing processes. Historically, TCE was also used in foods, beverages (decaffeination of coffee), pet foods, medicine, pharmaceuticals, and cosmetics. TCE does not occur naturally in the environment.

Mobility and volatility of TCE is high with very weak sorption and an average solubility in groundwater of 1100 mg/L, soil sorption coefficient of 2.1 (log K_{oc}), Henry’s Law constant of 87, and specific gravity of 1.46. The half-life degradation rate of TCE in groundwater is estimated to be between 321 to 1653 days, based on aqueous aerobic biodegradation but may be considerably longer under certain conditions. Although TCE is not readily degraded in groundwater, some TCE may naturally degrade under anaerobic conditions. However, TCE may degrade into compounds that are toxic and more difficult to degrade than TCE, such as DCE and VC.

<u>Tetrachloroethene</u>

Tetrachloroethene or perchloroethene (PCE) is an organic solvent primarily associated with dry cleaning, textile operations, and metal degreasing activities. It was also widely used in the production of CFC-113 (Freon-113) and other fluorocarbons. PCE is also used in rubber coatings, solvent soaps, printing inks, adhesives and glues, sealants, polishes, lubricants, and pesticides. PCE is a manufactured chemical and does not occur naturally in the environment.

Mobility of PCE is moderate to high with weak sorption, high volatility, and an average solubility in groundwater of 150 mg/L, soil sorption coefficient of 2.42 (log K_{oc}), Henry's Law constant of 121, specific gravity of 1.62. The half-life degradation rate of PCE in groundwater is estimated to be between 360 to 720 days, based on aqueous aerobic biodegradation but may be considerably longer under certain conditions.

This section discusses the migration potential and probable environmental fate of the PCE and TCE in groundwater at OU2. First, contaminant transport and attenuation mechanisms and degradation or transformation mechanisms are discussed in a general context. The section concludes with a discussion of the site-specific characteristics and the potential fate and transport of PCE and TCE in OU2. The following discussion of fate, transport, and transformation of PCE and TCE is based on information provided in contaminant hydrogeology references (Fetter, 1993 and Payne, et al, 2008) and environmental chemistry references (Montgomery, 1990; Howard, 1991; Lucius, 1990; Tetra Tech Inc, 1998; and Verschuren, 1983). This information served as the basis for development of the Conceptual Site Model (CSM) presented in **Section 6**.

5.2 Contaminant Transport and Attenuation Mechanisms

Dissolved phase contaminant transport and attenuation in an aquifer can be described by a partial differential equation that includes terms for advection, dispersion, sorption, and degradation. Parameters for estimating advection, dispersion and sorption can typically be obtained by direct field measurement or consulting scientific literature. The degradation of organic contaminants can be approximated using first-order kinetics. In one dimension, the partial differential equation describing solute (i.e., CVOC) transport in the saturated zone with first order (biotic and abiotic) decay is given by:

$$\frac{\partial C}{\partial t} = \frac{D_L}{R}\frac{\partial^2 C}{\partial x^2} - \frac{V_x}{R}\frac{\partial C}{\partial x} - \frac{\lambda C}{R} \qquad \text{Equation 5-1}$$

Where:

C = concentration [M/L3]

t = time [T]

D_L = hydrodynamic dispersion [L2/T]

x = distance along flow path [L]

R = coefficient of retardation [dimensionless]

v_x = transport velocity in x direction [L/T]

λ = first-order decay rate [T-1]

This equation illustrates how the processes of advection, dispersion, sorption, and biotic and abiotic degradation are integrated to describe the fate and transport of solutes (i.e., CVOCs) in groundwater. The following sections describe the most significant reactions affecting the fate and transport of solutes (i.e., CVOCs) in groundwater.

5.2.1 Advection

Advection is the movement of dissolved or suspended chemicals by the displacement of the fluid (i.e., groundwater). Advection moves dissolved or suspended chemicals along, not across, groundwater flow paths. The linear groundwater velocity in the direction parallel to groundwater flow caused by advection is given by:

$$V_x = \frac{K}{\theta} \frac{dH}{dL} \qquad \text{Equation 5-2}$$

Where:

V_x = average linear velocity [L/T]

K = hydraulic conductivity [L/T]

θ = effective porosity [L^3/L^3]

dH/dL = hydraulic gradient [L/L]

Advection is the dominant transport process in the movement of chemicals in groundwater. Solute transport by advection can be described by the one-dimensional advective transport component of the advection-dispersion equation given by:

$$\frac{\partial C}{\partial t} = V_x \frac{\partial C}{\partial x} \qquad \text{Equation 5-3}$$

Where:

V_x = average linear velocity [L/T]

C = contaminant concentration [M/L^3]

t = time [T]

x = distance along flow path [L]

In some cases, this may be a fair approximation for simulating solute migration because advective transport is the main force behind contaminant migration. However, because of effects of dispersion, diffusion, sorption, and biodegradation, this equation generally must be combined with the other components of the advection-dispersion equation to obtain an accurate mathematical description of solute (i.e., CVOCs) transport.

5.2.2 Dispersion

Dispersion (also called hydrodynamic dispersion) is the spreading of solute molecules of dissolved chemicals over increasing volumes of water resulting from differences in groundwater velocity (magnitude and direction) between pores of varying size and shape. Dispersion decreases solute concentrations and results in the spreading of dissolved constituents both parallel and perpendicular to groundwater flow.

Two very different processes cause hydrodynamic dispersion: mechanical dispersion and molecular diffusion. Mechanical dispersion is the dominant mechanism causing hydrodynamic dispersion at normal groundwater velocities. At extremely low groundwater velocities, molecular diffusion can become the more dominant mechanism of hydrodynamic dispersion.

5.2.2.1 Mechanical Dispersion

Mechanical dispersion is mixing that occurs as a result of variations in velocity around a mean velocity of flow. With time, a given volume of solute will gradually become more dispersed as different portions of the mass are transported at the differing velocities. In general, the main cause of variations of both rate and direction of transport velocities is the heterogeneity of the aquifer. These heterogeneities are present at scales ranging from microscopic (e.g., pore to pore) to macroscopic (e.g., well to well) to megascopic (e.g., a regional aquifer system).

Three processes are responsible for mechanical dispersion on the microscopic scale. The first process is the variation in flow velocity through soil pores of various sizes. As groundwater flows through a porous medium, it flows more slowly through large pores than through smaller pores. The second cause of mechanical dispersion is tortuosity, or flow path length. As groundwater flows through a porous medium, some of the groundwater follows less tortuous (shorter) paths, while some of the groundwater takes more tortuous (longer) paths. The longer the flow path, the slower the average linear velocity of the groundwater and the dissolved contaminant. The final process causing mechanical dispersion is friction within an individual pore. Groundwater traveling close to the center of a pore experiences less friction than groundwater traveling next to a sand grain, and, therefore, moves faster. These processes cause some of the contaminated groundwater to move faster than the average linear velocity of the groundwater and some to move slower. This variation in average velocity of the solute causes dispersion of the contaminant.

Heterogeneity at the macroscopic and megascopic scales also creates variability in groundwater and solute velocities producing dispersion on a larger scale. Geologic features that contribute to dispersion at the macroscopic scale include stratification characteristics such as changing unit geometry; discontinuous facies and contrasting lithologies; and permeability characteristics such as non-uniform permeability, directional permeability, and trending permeability (Domenico and Schwartz, 1990). Even in aquifer material that appears to be homogeneous, relatively small changes in the fraction of fine sediment can change hydraulic conductivity characteristics enough to produce significant variations in fluid and solute velocities and introduce dispersion. Larger geological features will introduce dispersion at the megascopic scale. Structural features such as faults, dipping strata, folds, or contacts will create heterogeneity, as will stratigraphic features such as bedding or other depositional structures.

As a result of dispersion, the solute front travels at a rate that is faster than would be predicted based solely on the average linear velocity of the groundwater. The overall result of dispersion is spreading and mixing of the contaminant plume with uncontaminated groundwater. The component of hydrodynamic dispersion contributed by mechanical dispersion is given by the relationship:

$$Dx = \alpha x \, Vx \qquad \text{Equation 5-4}$$

Where:

Vx = average linear groundwater velocity [L/T]

αx = dispersivity [L]

Mechanical dispersion has two components, longitudinal dispersion, and transverse (both horizontal and vertical) dispersion. Longitudinal dispersion is the spreading of a solute in a direction parallel to the direction of groundwater flow. On the microscopic scale, longitudinal dispersion occurs because of velocity changes due to variations in pore size, friction in the pore throat, and tortuosity. Transverse dispersion is the spreading of a solute in directions perpendicular to the direction of groundwater flow. Transverse dispersion on the microscopic scale is caused by the tortuosity of the porous medium, which causes flow paths to branch out from the centerline of the contaminant plume.

5.2.2.2 Molecular Diffusion

Molecular diffusion includes the molecular scale spreading of solutes in aqueous phase. Low concentrations of solutes along the perimeter of a groundwater plume will often move in random motion into areas not previously containing solutes.

The molecular diffusion of a solute in groundwater described by Fick's Laws can be applied to the diffusive flux of a dissolved contaminant under steady-state conditions for the one-dimensional case is given by:

$$F = -D\frac{dC}{\partial x}$$ Equation 5-5

Where:

F = mass flux of solute per unit area of time [M/T]

D = diffusion coefficient (L2/T)

C = solute concentration (M/L3)

dC/dx = concentration gradient (M/L3/L)

As the concentration of solutes increase in a plume, all randomness is gone, and the solute (i.e., CVOCs) will move from high-concentration areas to low-concentration areas, following Fick's laws. For contaminants that are present as an immiscible phase (i.e., dense non-aqueous phase liquid (DNAPL)), dissolution processes are intertwined with diffusion processes. The driving force for diffusion of dissolved contaminant mass in aquifers is the concentration gradient that occurs throughout and along the perimeter of contaminated aquifers.

Diffusion can also occur in heterogeneous aquifers where high concentrations of solutes migrating through porous aquifer fractions encounter fine-grained silts and clays with pore water containing no or low concentrations of solutes. The concentration gradient in these circumstances can drive the solutes into the pore water in the fine-grained silt and clay layers. As solutes advance in more permeable layers of the aquifer, solute mass is continually transferred to the less permeable layers as a result of molecular diffusion due to the concentration gradient between the layers. After the source area has been remediated, the solute mass in the permeable portions of the aquifer decreases, sometimes called washout, to concentrations lower than the pore water in the silts and clays. In these circumstances, the solute will begin to diffuse from the silts and clays into the more permeable portions of the aquifer. This process is called "back-diffusion". Removal of mass due to back-diffusion takes longer than the time period for inward diffusion due to much lower concentration gradients in the reverse direction. In addition, continued inward diffusion toward the center of the silts and clays occurs until the mass is spread throughout the silt and clay. In this scenario, the impacted silt and clay becomes a secondary source of contamination to groundwater and can be the source of contaminant mass for decades to centuries. This type of molecular diffusion is not part of the advection-dispersion equation.

Mechanical dispersion and molecular diffusion can be given by the relationship:

$$\frac{\partial C}{\partial t} = D_x \frac{\partial^2 C}{\partial x^2} \qquad \text{Equation 5-6}$$

Where:

D_x = Mechanical Dispersion Coefficient [L2/T]

C = contaminant concentration [M/L^3]

t = time [T]

x = distance along flow path [L]

5.2.3 Sorption

Sorption, a general class of surface reactions, is the process by which dissolved substances in groundwater bind chemically and/or physically to the surface of aquifer material. Although sorption is reversible, its effect is to reduce a compound's mobility in groundwater and retard the compound's rate of migration in an aquifer. Sorption does not alter the total mass of a contaminant, but the associated reduction in mobility may lead to substantial reduction in risk to human and ecological health. The specific mechanisms of sorption for organic compounds may differ from that of inorganics. Ion exchange is one type of surface reaction in which the specific binding mechanism is the electrolytic attraction between the charged ion in solution and the charged surface of a particle, usually clay minerals or other oxides. Another mechanism by which dissolved cations bind with particles is isomorphous substitution, where a dissolved cation replaces another cation in the crystal lattice of clay minerals. Except under extreme conditions or during clay mineral formation, isomorphous substitution is not expected to be an important attenuation mechanism in most groundwater environments. Since the specific binding mechanism is not always explicitly known, the term sorption is generally applied to all forms of chemical and physical binding with aquifer material.

The sorption of dissolved organic compounds in water onto soils and aquifer materials may be described by a distribution coefficient that predicts that the amount of pollutant bound to the soil will increase linearly with the concentration in the aqueous phase. Many investigations have demonstrated that the distribution coefficient for sorption of a single organic contaminant onto a variety of soil materials can be related to the organic carbon content of the sorbent. This observation permits the definition of an organic carbon-water partitioning coefficient (K_{oc}) where f_{oc} is the weight fraction of organic carbon in the soil.

$$K_{oc} = K_d / f_{oc} \qquad \text{Equation 5-7}$$

Where:

K_{oc} = soil sorption coefficient normalized for total organic carbon content

K_d = distribution coefficient

f_{oc} = fraction total organic carbon (mg organic carbon/mg soil)

K_{oc} values for a range of different organic compounds have been shown to be related to their octanol-water partitioning coefficients (K_{ow}) and also to their aqueous solubility (Karickhoff, 1984).

An important implication of these results is that sorptive distribution coefficients of organic pollutants in water saturated aquifers may be predicted given knowledge of the organic carbon content of the soil (f_{oc}).

Sorption is factored into the advection-dispersion equation as a Retardation Factor (R) that can be given by the expression:

$$R = 1 + (rb/q)\, K_d \qquad \text{Equation 5-8}$$

Where:

R = coefficient of retardation [dimensionless]

ρ_b = bulk density of aquifer [M/L3]

θ = porosity [L3/L3]

K_d = distribution coefficient [L3/M]

Retardation is factored into each of the component equations in the advection-dispersion equation results in:

$$\frac{\partial C}{\partial t} = \frac{D_x}{R}\frac{\partial^2 C}{\partial x^2} - \frac{V_x}{R}\frac{\partial C}{\partial x} \qquad \text{Equation 5-9}$$

Where:

V_x = average linear velocity [L/T]

C = contaminant concentration [M/L^3]

t = time [T]

x = distance along flow path [L]

D_x = Mechanical Dispersion Coefficient [L2/T]

R = Retardation Factor

5.2.4 Transformation Processes

Contaminant transformation processes of chlorinated VOCs are either abiotic or biologically mediated. The most significant abiotic transformation processes for chlorinated ethenes typically occur in the presence of reduced minerals, such as iron sulfide (FeS). The following subsections review the major biotic and abiotic transformation mechanisms that may act upon chlorinated solvents.

Transformation processes (i.e., degradation) are represented by the final term in the advection-dispersion equation:

$$\lambda C \qquad \text{Equation 5-10}$$

Where:

C = contaminant concentration [M/L^3]

λ = first-order decay rate [T-1]

The mechanisms of CVOC biodegradation are described in detail in the "Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater" (USEPA, 1998) and in "Principles and Practices of Enhanced Anaerobic Bioremediation of Chlorinated Solvents" (AFCEE et al., 2004). The following sections provide a summary of the discussions in these documents.

Chlorinated solvents can be transformed, directly or indirectly, by three biological pathways. These pathways are as follows: anaerobic reductive dechlorination (use of a solvent as an electron acceptor), anaerobic oxidative bioremediation (use of a solvent as an electron donor), and cometabolism. One or all of these processes may be operating at a Site, although anaerobic reductive dechlorination and the use of chlorinated solvents as electron acceptors appears to be the most important biodegradation mechanism (EPA, 1998) and is discussed below.

5.2.4.1 Anaerobic Reductive Dechlorination

The most important process for the natural biodegradation of chlorinated solvents (chloroethenes) is reductive dechlorination. During this process, the bioremediation of chloroethenes can occur in anaerobic aquifer conditions when microorganisms produce H^2 as a natural byproduct of fermentation reactions, use the H^2 as an electron donor, and ultimately replace chlorine atoms in the oxidized chloroethene as a respiratory mechanism to derive metabolically useful energy (AFCEE, 2004). If groundwater contains enough organic electron donors and the appropriate strains of microorganisms (Dehalococcoides), this process can proceed until all of the chlorine atoms are removed and PCE is dechlorinated completely to TCE, DCE (primarily the cis-1,2-DCE isomer), VC, and finally to ethene, a harmless end-product.

Reductive dechlorination affects chlorinated compounds differently. PCE is the most susceptible (easiest) to reductive dechlorination because it is the most oxidized of the ethenes. Conversely, VC is the least susceptible (hardest) to reductive dechlorination because it is the least oxidized of the ethenes. In general, the rate of reductive dechlorination of chlorinated solvents has been observed to decrease as the degree of chlorination decreases. This rate decrease may explain the accumulation of VC and cis-1,2-DCE mass relative to PCE and TCE mass at some sites where reductive dechlorination is occurring.

Reductive dechlorination also can be affected by the ORP of the groundwater system. For example, dechlorination of PCE and TCE to DCE can proceed under mildly reducing conditions such as nitrate reduction or iron (III) reduction, while the transformation of DCE to VC or the transformation of VC to ethene requires more strongly reducing conditions. Reductive dechlorination also has been shown to preferentially produce specific daughter compounds. For example, during reductive dechlorination of PCE or TCE, all three isomers of DCE can theoretically be produced. However, it has been found that during reductive dechlorination, cis-1,2-DCE is a more common intermediate than trans-1,2-DCE, and 1,1-DCE is the least prevalent intermediate of the three DCE isomers.

The needs of bacteria can be simplified to three requirements: a carbon source that can be used to build biomass, an electron donor (such as hydrogen) for the energy needed to live and reproduce, and a terminal electron acceptor (for example, oxygen or chlorinated solvents) to receive the electrons the bacteria use for energy.

Current literature suggests that anaerobic reductive dechlorination of chlorinated ethenes is carried out by relatively few metabolic classifications of bacteria. These groups, which may behave very differently from one another, include methanogens, sulfate-reducing bacteria, and dechlorinating bacteria. The bacteria that can reduce PCE and TCE to cis-1,2-DCE appear to be ubiquitous in the subsurface environment. However, complete dechlorination of PCE or TCE to ethene by a single species has been demonstrated in the laboratory only for *Dehalococcoides Ethenogens (DHE)*. *DHEs* appear to be common, but not ubiquitous, in the environment.

5.2.4.2 Abiotic Degradation of Chlorinated Ethenes

Chlorinated ethenes, such as PCE and TCE, dissolved in groundwater may also be degraded abiotically through the process of reductive elimination. The ethenes react with iron sulfide minerals under iron and sulfate reducing conditions, producing dichloroacetylene, in the case of PCE, and chloroacetylene, in the case of TCE. Chlorine ions are further eliminated through the process of hydrogenolysis to produce acetylene and ultimately to ethene. Abiotic degradation of PCE and TCE can occur under natural conditions in an aquifer if the proper geochemical conditions exist, such as the presence of iron sulfide minerals and favorable redox and pH conditions. The presence of acetylenes provides evidence of these reactions taking place (He, Wilson and Wilken, 2015; Pivetz, *et al.*, 2013). An analysis of these geochemical conditions is provided in **Appendix M**, assessing the MNA parameters at the site.

5.2.5 Facilitated Transport

In certain cases, a compound may sorb to a colloid or other mobile solid within an aquifer. This is called facilitated transport. Facilitated transport occurs most often because organic and inorganic compounds sorb onto colloids. Colloids are defined as particles of less than 10 micrometers (μm) in diameter. Colloids may be organic or inorganic in composition. Organic colloids are further characterized as biocolloids such as bacteria or spores, macromolecules such as humic substances and organic fibers, and non-aqueous phase liquids (NAPL), such as oil droplets and surfactants. Inorganic colloids include clays, metal oxides, and inorganic precipitates which may or may not be naturally occurring. Facilitated transport is not considered to be a major factor in the fate and transport of solutes and is not represented in the advection dispersion equation.

5.2.6 Volatilization

Volatilization is the process by which mass of a certain compound is transferred from the aqueous phase to the gaseous phase. The aqueous phase may include an immiscible non-aqueous fraction, or a compound dissolved in groundwater. The factors that affect a compound’s volatilization include the vapor pressure, solubility, and molecular weight. The Henry’s Law constant, defined as the vapor pressure divided by the aqueous solubility, characterizes a compound’s tendency to volatilize. Compounds with a high Henry’s Law constant are more volatile. Volatilization and subsequent risk of vapor intrusion into structures is possible where groundwater contamination is at the water table.

Henry's Law states that the concentration of a contaminant in the gaseous phase is directly proportional to the compound's concentration in the liquid phase and is a constant characteristic of the compound. Stated mathematically, Henry's Law is given by (Lyman *et al.*, 1992):

$$C_a = HC_l \qquad \text{Equation 5-11}$$

Where:

H = Henry's Law Constant (atm m^3/mol)

C_a = concentration in air (atm)

C_l = concentration in water (mol/m^3)

Volatilization is not considered to be a major factor in the fate and transport of contaminants when a plume is migrating at depth below the water table and is not represented in the advection dispersion equation.

5.2.7 Dilution

Dilution of a solute from recharge of a water table aquifer has two effects on the natural attenuation of a dissolved contaminant plume. Water entering the system due to infiltration of precipitation or from a surface water body will contribute to dilution of a solute and potentially add electron-acceptors potentially altering geochemical processes and, in some cases, facilitate additional biodegradation. Evaluating the effects of recharge on the dilution of a solute is difficult because dispersivity, sorption and biodegradation are often not well-quantified, and separating out the effects of dilution is very difficult. The effects of the addition of electron acceptors may be qualitatively evaluated due to elevated electron acceptor concentrations or differing patterns in electron acceptor consumption or byproduct formation in the area of the recharge. Due to the primarily linear nature of groundwater flow, the major effects of dilution from infiltrating precipitation occur at or near the water table. Solutes migrating at depth do not readily mix with this recharge and the impact of dilution is minimal. Therefore, dilution is not considered to be a major factor in the fate and transport of dissolved phase contaminants and is not represented in the advection dispersion equation.

5.3 Fate and Transport of TCE and PCE in OU2

The primary contaminants in OU2 are TCE and PCE. These chlorinated solvents are present as solutes (i.e. dissolved phase) in groundwater. As such, horizontal and vertical migration within and beyond OU2 will be with the general flow of groundwater. Investigations also indicate that the plume is migrating at depth within the Magothy Aquifer in OU2.

Advection is the most dominant transport process in the movement of these compounds in groundwater. The direction of advective movement is controlled by the horizontal and vertical hydraulic gradients within the aquifer. Horizontal hydraulic gradients within OU2 were generally southwest in direction and vertical hydraulic gradients were generally downward.

The rate of horizontal advective movement in OU2 can be approximated using equation 5-2:

$$V_x = \frac{K}{\theta} \frac{dH}{dL}$$

Using:

Average linear velocity (V_x)

Average hydraulic conductivity (K) = 67 feet/day

Effective porosity (θ) = 0.25

Average hydraulic gradient (dH/dL) = 0.002 feet per foot

Based on these average values, the average linear or seepage velocity in OU2 is estimated to be approximately 0.5 feet/day. This value represents the net advective movement on a large or sitewide scale. Advective movement on a more local scale is much more complex. Local changes in the direction and magnitude of both horizontal and vertical gradients result from pumping at water supply wells and recharge at stormwater retention basins in OU2. Vertically upward gradients were observed in proximity to operating water supply wells, and up to three feet of increased hydraulic head was observed in proximity to stormwater recharge basins to during major precipitation events.

As discussed in section 3.5.2, the geologic deposits that make up the Magothy Aquifer in OU2 are heterogeneous. Sand deposits with variable percentages of silt, clay and gravel have different permeabilities. Solutes, such as PCE and TCE migrate at different rates through these materials, in response to the different permeabilities. As discussed in section 5.2.2, these variable rates of advection result in mechanical dispersion of the PCE and TCE. Effects of mechanical dispersion in OU2 are expected to be minimal in the longitudinal and lateral direction of groundwater flow.

Based on boring logs from the OU2 investigation, the presence of fine-grain silt and clay beds in the Magothy Aquifer appear to be limited and therefore, the effects of diffusion and back diffusion on the plume are expected to be limited. Given the predominantly permeable sandy material in the aquifer, the effects of hydrodynamic dispersion at OU2 are primarily from the mechanical dispersion process discussed above.

The advective movement of PCE and TCE can be slowed or retarded by sorption to organic matter in the aquifer. In general, these compounds have low affinities to adsorb to soil (PCE Log K_{oc} = 2.42; TCE Log K_{oc} = 2.10) (Montgomery 1990). The Magothy Aquifer generally has a low organic carbon content (f_{oc} less than or equal to 0.001) (ITRC, 2015). Under these conditions, the impact of retardation on the advective movement of PCE and TCE is expected to be limited. The retardation factors for PCE and TCE were estimated to be close to 1 using equation 5.8.

$$R = 1 + (rb/q)\ K_d$$

Where:

Coefficient of retardation (R)

Bulk density of aquifer (ρ_b) = 1.8 g/cc

Porosity (θ) = 0.3

Distribution coefficient ($K_d = K_{oc} \times f_{oc}$) = PCE - 0.0024, TCE - 0.0021

Based on these values, the retardation coefficients were calculated at 1.014 for PCE and 1.013 for TCE.

There is mixed evidence of biotic transformation of PCE and TCE in OU2. The aquifer is under mildly reducing conditions, based on ORP levels measured during well sampling indicating that favorable redox conditions are present. Although the OU2 area is both recharged locally and is close to the hydraulic divide that represents the main recharge zone for the aquifer on Long Island, contamination was found in deeper portions of the aquifer where oxygen can be consumed along the longer flow path by the widespread presence of organic solvent contamination.

Only trace levels of cis-1,2-DCE, a byproduct of the reductive dichlorination of TCE were detected. However, vinyl chloride was not detected indicating that degradation is incomplete. This may be a result of limiting geochemical conditions in the aquifer resulting in degradation of TCE to a limited degree.

Abiotic degradation may also be occurring as it appears that favorable redox conditions are present and soluble iron is present in the aquifer. However, neither analysis for acetylenes or iron speciation to identify the presence of reduced forms of iron (e.g. iron sulfides) was performed and it is not known if and to what degree abiotic degradation may be taking place.

As previously discussed, the presence of fine-grained silt and clay beds within the aquifer at OU2 is limited and the effects of diffusion and back diffusion are expected to be limited as well. Although CVOCs have a high Henry's Law Constant and would readily be transferred from the aqueous phase into the gaseous phase through volatilization, volatilization is not expected to be a factor in the fate and transport of TCE and PCE in OU2 as contamination appears to be deep within aquifer, not at or near the water table or unsaturated zone. For the same reason, dilution from recharging precipitation is not expected to be a major factor in the fate and transport of TCE and PCE in OU2.

6 Conceptual Site Model

The CSM synthesizes data acquired from historical research and site characterization. The CSM typically is presented as a summary or specific component of a RI report. The model is based on interpretive graphics, analyzed data, subsurface investigation logs, and other pertinent characterization information. The CSM is not a mathematical or computer model, although these may be used to assist in developing and testing the validity of the conceptual model or evaluating the restoration potential of the site. The CSM, like any other theory or hypothesis, is a dynamic tool that should be tested and refined throughout the life of the project. The model should evolve in stages as information is gathered during the various phases of site remediation. This iterative process allows data collection efforts to be designed so that key model hypotheses may be tested and revised to reflect new information. The CSM also serves as a foundation for evaluating the restoration potential of the site. The clarity of the CSM (and supporting information) is critical to the decision-making process. The Fulton Ave OU2 graphic CSM can be found in **Figure 6-1.**

6.1 Introduction and Site History

In 1986, the NCDHPW investigated the source of VOC groundwater contamination impacting public water supply wells located downgradient of GCPIA. 150 Fulton Avenue in Garden City Park was identified as a potential source. In response, the NYSDEC added the 150 Fulton Avenue site to the registry of IHWDS (NYSDEC). In 1998, the EPA placed the Site on the NPL under CERCLA. During an environmental investigation completed from 1998 to 2001, a drywell at 150 Fulton Avenue was found to be a source of PCE groundwater contamination. Tenants of the property from 1965-1974 included a fabric cutting mill operation which dry cleaned fabric using PCE. As a result, the 0.8-acre property at 150 Fulton Avenue and associated groundwater contamination were designated the Fulton Avenue Superfund Site Operable Unit 1 (EPA 2015a).

During the completion of the OU1 RI, TCE not associated with the PCE in OU1 was shown to be co-mingling and west of OU1 PCE groundwater contamination. Groundwater samples collected from monitoring wells during the OU1 RI showed TCE cross-gradient to OU1 PCE. The EPA concluded that this was “not from the same source as the PCE” and that a separate investigation should be conducted to investigate the TCE-dominant portion of the plume (EPA, 2015a). This contamination was initially investigated by NYSDEC and subsequently became OU2 of the Fulton Avenue Superfund Site. The source of TCE in OU2 had not been identified prior to the start of this RI.

6.2 Source Investigation

Numerous properties were investigated during the RI including:

- GCPIA
- Zoe Chemical
- 40 & 50 Roselle
- Albertson
- Jackson Steel
- Manfred Schulte

Manfred Schulte and Albertson reportedly released predominantly PCE, so these sites are not likely the source of OU2 TCE. Industries at GCPIA, 40 & 50 Roselle, Zoe Chemical, and Jackson Steel have histories of using TCE; however, 40 & 50 Roselle, Zoe Chemical, and Jackson Steel are not located within the recharge area of Garden City Well 9 (N-03881) and they are also cross-gradient (advective groundwater flow) to Garden City Well 9 (N-03881). Therefore, even though they have a history of using TCE, they are not likely the source of TCE detected in OU2. Given the horizontal and vertical extent of TCE is similar to PCE in OU1, the source of TCE in OU2 is potentially upgradient and west of GCPIA.

6.3 Hydrogeology

Geologic deposits in OU2 consist largely of fine to medium quartz sand with varying amounts of clay, silt, and gravel. Approximately the upper 50 feet of the subsurface consists of Pleistocene glacial outwash sands and gravels. The glacial sediments overlie approximately 500 feet of Cretaceous Magothy Formation silty sand deposits. The Magothy terminates at the surface of the Clay Member of the Raritan Formation at a depth of approximately 600 ft bgs. Magothy sands showed evidence of iron oxide or oxyhydroxide coatings and varying amounts of lignite were observed throughout much of the formation. During the field investigation, clay lenses were observed within the sand beds; however, they are discontinuous and are expected to have only localized effects on contaminant transport. Sand and gravel deposits in the UGA would result in higher rates of advective transport than silty sands of the Magothy Formation.

The water table in OU2 was observed at depths ranging from 0.51 to 71.23 ft bgs (**Table 2-6**). Groundwater generally flows initially to the southwest, trending more to the south with groundwater movement through OU2 under a horizontal hydraulic gradient ranging from 0.0008 to 0.0020 ft/ft. Vertical hydraulic gradients were observed to be -0.0126 to -00009 ft/ft with a median gradient of -0.0039 ft/ft. Published literature indicates that the hydraulic conductivity of fine to medium sands in the Magothy Formation in Nassau County, based on aquifer tests of permeable portions of the aquifer, ranges from 27 to 150 ft/day with an average of approximately 67 ft/day (Isbister, 1966).

Estimates of the average seepage velocity are on the order of 0.5 ft/day, using an average gradient of 0.002 ft/ft, an average hydraulic conductivity of 67 ft/day, and an effective porosity of 25 percent. At this velocity, groundwater could migrate about 200 feet per year.

The ambient flow of groundwater may be impacted by active municipal and industrial supply wells, and stormwater retention basins in the vicinity of OU2.

There are seven municipal water supply wells within a one-mile radius of the center of OU2.

Well ID	Water District	Well Name	Total Depth (ft bgs)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)
N-03881	Garden City	Well 9	466	426	468
N-07058	Garden City	Well 13	440	380	440
N-08339	Garden City	Well 14	360	308	358

Well ID	Water District	Well Name	Total Depth (ft bgs)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)
N-07649	WAWNC	Well 57	205	165	205
N-07650	WAWNC	Well 57A	440	400	440
N-03603	Franklin Sq.	Well 1	498	443	493
N-03604	Franklin Sq.	Well 2	495	436	495

These wells most likely impact the horizontal and vertical flow of groundwater. Groundwater samples collected from these wells show that Garden City Well 9 (N-03881) contains high concentrations of TCE with minor concentrations of PCE (**Figure 3-11**) while Garden City Wells 13 (N-07058) and 14 (N-08339) contain high concentrations of PCE with minor concentrations of TCE (**Figure 3-12 and 3-13**). These data support the interpretation that Garden City Well 9 (N-03881) is located within the OU2 TCE plume and has been impacted by the OU2 TCE while Garden City Wells 13 (N-07058) and 14 (N-08339) are located with the OU1 PCE plume and have been impacted by OU1 PCE.

The aquifer system is recharged locally from precipitation that infiltrates into the aquifer through pervious surfaces. The aquifer is also recharged by precipitation that is conveyed on impervious surfaces into stormwater retention ponds that ultimately allow the precipitation to infiltrate into the aquifer. Recharge from stormwater recharge basins has the potential to cause local mounding of the water table and increased downward movement of groundwater. These effects are expected to be limited to periods during and shortly after rain events and to the shallow portions of the aquifer system. Effects on deeper portions where the plume is migrating are expected to be minimal.

Because the OU2 plume is roughly 2 miles from the nearest natural surface water body and given its proximity to 7 municipal water supply wells within a 1-mile radius, OU2 TCE is likely primarily withdrawn from the aquifer by municipal water supply wells with some possibly migrating further south. Given the depth of the TCE, any TCE that is not withdrawn by municipal wells likely discharges to the Atlantic Ocean.

6.4 Nature and Extent of Contamination

Groundwater sampling during the RI shows that groundwater contamination within OU2 consists primarily of chlorinated ethenes (TCE and PCE). Trace concentrations of benzene were also detected. However, based on an evaluation of the location, depth, frequency, and magnitude of detections, only TCE and PCE are considered potentially site-related. Benzene was found sporadically at levels below PDC during the most recent round of sampling. Furthermore, benzene is a petroleum related compound not related to TCE and PCE.

Concentrations of chlorinated ethenes in Phase 5 in sampled wells within the OU2 plume ranged from non-detections to 79 µg/L in TCE in N-03881. TCE will continue to migrate with groundwater flow (**Figures 4-2 through 4-3**) to the southwest and south. Some of the metals detected in the RI are naturally occurring in the Magothy Formation (e.g., iron and manganese) and can be solubilized by changing geochemical conditions (Brown, 1995).

The data collected during this RI show that the OU2 TCE plume extends over an area more than 2,500 feet wide and potentially up to 5,300 feet long in the direction of groundwater flow. There is some evidence of comingling between the OU1 and OU2 plumes at monitoring wells MW-25A and N-11171 located along the eastern edge of the OU2 plume at Edgemere Road at the western edge of the Garden City Country Club. The concentrations of TCE and PCE in December 2019 are at similar concentrations in MW-25A (TCE at 22 µg/L and PCE at 27 µg/L) and N-11171 (TCE at 6.8 µg/L and PCE at 13 µg/L).

6.5 Fate and Transport

Advection is the dominant transport mechanism in the Magothy Aquifer. The average seepage velocity for the Magothy Aquifer was estimated to be approximately 0.5 ft/day. Although some retardation of the contaminants is expected, the low carbon content of Magothy sands would limit overall retardation of TCE. Therefore, longitudinal and transverse dispersion is expected to be limited. Based on the estimated seepage velocity, TCE could be moving at about 200 feet per year.

Clay lenses provide sites for forward and back diffusion driven by the concentration gradient. Forward diffusion (from conductive sands into clays) will tend to retard the forward movement of the leading edge of the plume. Back diffusion (from clays to sands) will tend to allow the back end of the plume to persist. The extent and frequency of clay lenses within the Magothy Formation are limited and it is expected that diffusion would only have a local impact on portions of the plume moving near clay lenses.

The presence of PCE, TCE, and 1,1,1-TCA metabolites (1,2-DCE, 1,1-DCA, and 1,1-DCE) indicate that TCE degradation is occurring to some limited degree within OU2, most likely by the process of reductive dechlorination. However, the lack of vinyl chloride detected in groundwater samples indicates that reductive dechlorination is not moving beyond 1,2-DCE on a wide scale. Geochemical characteristics indicate anaerobic conditions necessary for reductive dechlorination are not widespread, therefore reductive dechlorination of the plume will be limited. Anaerobic conditions favorable for microbial degradation of TCE may be present in isolated areas within silts and clays. Iron, manganese, sulfate, sulfide, nitrate, and nitrite concentrations present in the aquifer create conditions that may be favorable in isolated areas for abiotic degradation.

7 Summary of Human Health Risk Assessment

The risk assessment performed as part of the RI was limited to human health. An ecological risk assessment was not conducted because contaminated groundwater does not discharge to any surface water bodies within OU2. Since there are no groundwater discharges to surface water, exposure pathways are not complete, and ecological receptors are not exposed to contaminants from the Site.

7.1 Human Health Risk Assessment

The HHRA was conducted in accordance with the scope as described in the EPA DES SOW, EPA Risk Assessment Guidance for Superfund (RAGS) (EPA, 1989 and 1991) and other applicable guidance. In preparation for the HHRA, a Pathway Analysis Report (PAR) was previously submitted to EPA for approval of the potential exposure points and routes of exposure for each exposure pathway, parameters regarding human receptor characteristics and behavior (e.g., body weight, ingestion rate, and exposure frequency), and toxicity values (HDR-APTIM, 2023). The complete HHRA is presented in **Appendix N**.

Evaluation of potential cancer risks and noncancer hazards (resulting from the screening assessment) to future Site receptors from exposure to COPCs in groundwater indicated that there are several primary COPCs, consisting of VOCs (TCE, PCE, and benzene) and metals (iron and manganese) in groundwater. These COPCs were further evaluated in the risk assessment. The concentrations of TCE, manganese and iron in groundwater contribute to the overall hazard and risk estimates, and exposure to these COPCs may result in potential adverse health effects.

The potential exposure scenarios considered in the HHRA included drinking water ingestion and dermal contact for future Site workers and future Site residents, and inhalation of volatile organics in groundwater while showering for future Site residents. Vapor intrusion into indoor air was not evaluated as the available soil vapor samples were located in areas of OU1 that are not near the TCE-dominant plume (OU2). Therefore, the soil vapor samples are not considered to be representative of the soil vapor concentrations that might result from the TCE-dominant plume. In addition, the depth to contaminated groundwater exceeds 100 feet in all OU2 monitoring wells.

The baseline HHRA results indicate the potential for unacceptable excess lifetime cancer risk (ELCR) does not exceed the target risk range of $1x10^{-6}$ to $1x10^{-4}$ (one in a million to one in ten thousand); however, the noncancer hazard index (HI) exceeds unity (one), indicating there may be concern for potential noncancer effects mainly from TCE, iron, and manganese (**Appendix N**).

The total ELCR for a worker's exposure to COPCs in groundwater via tap water use from all pathways is $4.1x10^{-6}$ which is within the target risk range of $1x10^{-6}$ to $1x10^{-4}$ (one in a million to one in ten thousand). The ELCR for groundwater ingestion exposure is $4.1x10^{-6}$, with the primary contributor to risk being TCE. The ELCR for groundwater dermal exposure is $2.4x10^{-8}$ which is less than the target risk range of $1x10^{-6}$ to $1x10^{-4}$. The total noncancer HI is 2.9. The HI for groundwater ingestion is 2.9 and the primary contributor is Iron, with a HQ of 1.8. The HI for groundwater dermal exposure is 0.005.

The ELCRs for a resident's exposure to COPCs in groundwater via tap water is $2.5x10^{-5}$ from the ingestion pathway, $3.5x10^{-6}$ from the dermal pathway, and $8.1x10^{-8}$ from the inhalation pathway for a receptor total of $3.0x10^{-5}$. These values are within or less than the target risk range of $1x10^{-6}$ to $1x10^{-4}$. The groundwater ingestion pathway contributes the majority (about 83%) to the risk total; the primary contributor is TCE. The total noncancer HI is 18 for an adult and 22 for a child. The groundwater inhalation and ingestion pathways contribute the most to these HIs with adult HIs of 10 and 8, respectively, and child HIs of 8 and 13, respectively. TCE is the primary contributor for all pathways, but iron and manganese both have HIs greater than one for the ingestion pathway. While included in the HHRA, these parameters are not considered to be site-related; detections of iron and manganese do not appear to be associated with the OU2 TCE. Thus, iron and manganese were not retained as chemicals of concern.

8 Summary and Conclusions

The major conclusions of OU2 RI are outlined below:

- Numerous properties were investigated during the RI including:
    - GCPIA
    - Zoe Chemical
    - 40 & 50 Roselle
    - Albertson
    - Jackson Steel
    - Manfred Schulte
- Manfred Schulte and Albertson reportedly released PCE so these sites are not likely the source of OU2 TCE. Industrial businesses at GCPIA, 40 & 50 Roselle, Zoe Chemical, and Jackson Steel have historic predominant TCE releases, however, they are not located with the recharge area of Garden City Well 9 (N-03881) and are also cross-gradient (advective groundwater flow) to Garden City Well 9 (N-03881). Therefore, even though they have a history of using TCE, they are not likely the source of TCE detected in OU2. Given the horizontal and vertical extent of TCE in OU2 is similar but west of the PCE in OU1, the source of TCE in OU2 is potentially west of the OU1 PCE source in GCPIA.
- Groundwater flows initially to the southwest, trending more to the south with groundwater movement through OU2, under a horizontal hydraulic gradient ranging from 0.0008 to 0.0020 ft/ft. Vertical hydraulic gradients were observed to be downward (-0.0126 to -00009 with a median gradient of -0.0039). Published literature indicates that the hydraulic conductivity of fine to medium sands in the Magothy Formation in Nassau County ranges from 27 to 150 ft/day with an average of approximately 67 ft/day, based on aquifer tests (Isbister, 1966).
- Local impacts on the horizontal and vertical gradients and groundwater flow direction may result from the operation of municipal water supply wells within or adjacent to OU2. These wells include three Garden City wells, two WAWNC wells, and two Franklin Square wells within a one-mile radius of OU2.
- Two rounds of groundwater samples collected in 2019 from 29 monitoring wells and 17 water supply wells show CVOCs, non-chlorinated VOCs, and metals present in the OU2 plume above their PDC.
- Multiple lines of evidence were used to identify the extent of the TCE-dominant groundwater contamination in OU2. These lines of evidence include the following:
    - Distinguishing TCE that was released to the environment from TCE that is from the biotic or abiotic degradation of PCE.
    - Distinguishing TCE in OU2 from other potential sources of TCE using groundwater flow direction as defined by the USGS groundwater flow mapping (Como et al, 2018).
    - Distinguishing TCE in OU2 from other potential sources of TCE using the mapped recharge areas of municipal wells in the Garden City area as defined by the NCDOH SWAP.

- By incorporating these multiple lines of evidence, six monitoring wells (MW-20C, MW-23C, MW-25A, MW-26F, MW-26G and N-11171) and one municipal water supply well, Garden City Well 9 (N-03881), have been determined to contain TCE-dominant concentrations.
- Groundwater sampling during the RI shows that groundwater contamination within OU2 consists primarily of chlorinated ethenes (TCE and PCE). Trace concentrations of benzene were also detected. However, based on an evaluation of the location, depth, frequency, and magnitude of detections, only TCE and PCE are considered potentially site-related. The remaining compounds were found sporadically at levels below PDC during the most recent round of sampling. Furthermore, benzene is a petroleum related compound not associated with TCE and PCE.
- Concentrations of chlorinated ethenes in Phase 5 in sampled wells within the OU2 plume ranged from non-detections to 79 µg/L in TCE in N-03881. TCE will continue to migrate with groundwater flow (**Figures 4-2 through 4-3**) to the southwest and south. Some of the metals detected in the RI are naturally occurring in the Magothy Formation (e.g., iron and manganese) and can be solubilized by changing geochemical conditions (Brown, 1995).
- The data collected during this RI show that the TCE OU2 plume extends over an area more than 2,500 feet wide and potentially up to 5,300 feet long in the direction of groundwater flow. There is some evidence of comingling between the OU1 and OU2 plumes at monitoring wells MW-25A and N-11171 located at Edgemere Road on the western edge of the Garden City Country Club. The concentrations of TCE and PCE in December 2019 are at similar concentrations in MW-25A (TCE at 22 µg/L and PCE at 27 µg/L) and N-11171 (TCE at 6.8 µg/L and PCE at 13 µg/L).
- The presence of cis-1,2-DCE indicates that some unknown quantity of TCE has most likely been transformed through reductive dechlorination along the migration pathway. The lack of vinyl chloride indicates that reductive dechlorination is not moving beyond cis-1,2-DCE on a wide scale. Geochemical characteristics indicate that anaerobic conditions favorable for microbial degradation are present in isolated areas but are not widespread throughout OU2.
- The HHRA screening resulted in five COPCs (TCE, PCE, benzene, iron, and manganese) with potential for ELCR (exceeding the target risk range of 1E-06 to 1E-04) and noncancer HQ greater than 0.1 based on monitoring well sampling result data from wells identified to be physically within the OU2 plume. These COPCs were further evaluated in the HHRA. The evaluation of potential cancer risks and noncancer hazards to future workers and future residents exposed to groundwater identified TCE, iron, and manganese as the primary risk drivers; however, iron and manganese are not considered to be site-related and were not retained as chemicals of concern for OU2.

9 References

Air Force Center for Environmental Excellence (AFCEE), et al., 2004. Principles and Practices of Enhanced Anaerobic Bioremediation of Chlorinated Solvents. August. Available online: https://frtr.gov/costperformance/pdf/remediation/principles_and_practices_bioremediation.pdf

Brown, C. J., And M. A. Schoonen, 1995, Iron Reactions in the Magothy and Upper Glacial Aquifers of Suffolk County, Long Island, New York.

Brown, C.J., Rakovan, J. and Schoonen, M.A.A., 2000. Heavy Minerals and Sedimentary Organic Matter in Pleistocene and Cretaceous Sediments on Long Island, New York with Emphasis on Pyrite and Marcasite in the Magothy Aquifer. USGS Water-Resources Investigations Report 99-4216. Coram, New York, 2000.

Busciolano, R., Monti, J. Jr., and Chu, A., 1998, Water-table and Potentiometric-surface Altitudes of the Upper Glacial, Magothy, and Lloyd Aquifers on Long Island, New York, in March-April 1997, with a Summary of Hydrogeologic Conditions: U.S. Geological Survey Water-Resources Investigations Report 98-4019, 17 p.

Buxton, H.T., Soren, J., Posner, A. and Shernoff, P.K., 1981. Reconnaissance of the Ground-Water Resources of Kings and Queens Counties, New York. USGS Open-File Report 81-1186. Syosset, New York, 1981.

CA Rich Consultants Inc, 2014. Site Characterization Report Former Zoe Chemical 1801 Falmouth Ave New Hyde Park, NY NYSDEC Site # 130211. July 2014.

Camp Dresser & McKee, 2009. Final Site Characterization Report: 40 & 50 Roselle Street (Site No.: 1-30-174). July 2009.

Cartwright, R. A., 2002, History and Hydrologic Effects of Ground-water Use in Kings, Queens and Western Nassau Counties, Long Island, New York, 1800's through 1997: U.S. Geological Survey Water-Resources Investigations Report 01-4096, 79 p.

CDM Smith, 2017. Former Garden Photoengraving: Draft Remedial Investigation/Feasibility Study Report for OU-1. February 2017.

Como, M.D., Finkelstein, J.S., Rivera, S.L., Monti, J. and Busciolano, R., 2018. Water-Table and Potentiometric-Surface Altitudes in the Upper Glacial, Magothy and Lloyd Aquifers of Long Island, New York, April-May 2016. Scientific Investigations Map 3398. Coram, New York, 2018.

Domenico, P.A. and Schwartz, F.W.,1990. Physical and Chemical Hydrogeology. John Wiley and Sons, New York, 824.

EPA, 1988. Guidance for Conducting Remedial Investigation/Feasibility Studies under the Comprehensive Environmental Response, Compensation, and Liability Act. October.

EPA ,1989. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual, Part A. Interim Final. EPA/540/1-89/002. Dec. Available online: https://www.epa.gov/risk/risk-assessment-guidance-superfund-rags-part

EPA, 1991. Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions. April. Available online: https://www.epa.gov/risk/superfund-risk-assessment- human-health-topics

EPA, 1998. Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater, EPA/600/R-98/128.

EPA, 2007. Fulton Avenue Superfund Site Record of Decision. September 2007.

EPA, 2009a. National Primary Drinking Water Regulations, EPA 816-F-09-004. May.

EPA, 2009b. Identification and Characterization Methods for Reactive Minerals Responsible for Natural Attenuation of Chlorinated Organic Compounds in Groundwater. Dec.

EPA, 2015a. Record of Decision Amendment, Fulton Avenue Superfund Site, First Operable Unit. Nassau County, New York. September. https://semspub.epa.gov/work/02/372864.pdf

EPA, 2015b. Use of Monitored Natural Attenuation for Inorganic Contaminants in Groundwater at Superfund Sites, 9283.1-36. Aug.

EPA, 2015c. Technical Guidance for Assessing and Mitigating the Vapor Intrusion Pathway, OSWER 9200.2-154). June. https://www.epa.gov/sites/default/files/2015-09/documents/oswer-vapor-intrusion-technical-guide-final.pdf

EPA, 2023. Regional Screening Level Summary Table (TR=1E-6, HQ=1), November. https://semspub.epa.gov/work/HQ/404330.pdf

Faust, G. T., 1963. Physical Properties and Mineralogy of Selected Samples of the Sediments from the Vicinity of the Brookhaven National Laboratory, Long Island, New York, USGS Geological Survey Bulletin 1156-B. U.S. Government Printing Office, Washington D.C.

Fetter, C. W., 1993. Contaminant Hydrogeology, Prentice Hall, Upper Saddle River, New Jersey.

HDR-APTIM 2023. Data Evaluation Report, Fulton Superfund Site, Operable Unit 2, Nassau County, New York. United States Environmental Protection Agency; EPA Work Assignment Number: 68HE0222F0037, EPA Contract Number: 68HE0318D0009. June.

HDR, 2010a. Uniform Federal Policy For Quality Assurance Project Plan For Region 2 Architect-Engineering Services Contract; Contract #EP-W-09-009 Fulton Avenue Operable Unit 2 – Remedial Investigation/Feasibility Study Garden City Park, Nassau County, New York Work Assignment #016-RICO-02LN. September 2010, Revised August 2012, December 2014, February 2015, June 2016, and August 2019.

HDR, 2010b. Remedial Investigation/Feasibility Study Work Plan, Fulton Avenue Superfund Site Operable Unit 2, Garden City Park, Nassau County, New York. United States Environmental Protection Agency; EPA Work Assignment Number: 016-RICO-02LN, EPA Contract Number: EP-W-09-009. Revisions 2010, 2013, 2015, 2019)

HDR, 2011. Site Characterization Report, Albertson Area Plume, Albertson, Nassau County, New York, NY NYSDEC Site # 130167. February 2011.

He, T, Wilson, J.T., Su, C and Wilkin, R.T., 2015. Review of Abiotic Degradation of Chlorinated Solvents by Reactive Iron Minerals in Aquifers. Groundwater Monitoring & Remediation Volume 35, Issue 3 Summer 2015, pages 57-75. NGWA

Howard, P.H., et al., 1991. Handbook of Environmental Degradation Rates, Lewis Publ., Chelsea, MI, 725p.

Isbister, 1966. Geology and Hydrology, Northeastern Nassau County, New York, United Sates Geologic Survey, United States Department of the Interior, Water Supply Paper 1825.

ITRC, 2015. Integrated DNAPL Characterization and Tools Selection, The Integrated Technology & Regulatory Council, DNAPL Site Characterization Team.

Karickhoff, 1984. Organic Pollutant Sorption on Aquatic Systems: Journal of Hydraulic Engineering, V10, pp. 833-846.

Lucius, J. E., et al., 1990. Properties and Hazards of 108 Selected Substances, USGS Open File Report, 90-408, 559p.

Lyman, W. J., P. J. Reidy, and B. Levy, 1992. Mobility and Degradation of Organic Contaminants in Subsurface Environments, Lewis Publishing, Chelsea, Michigan.

Misut, P. E.; Feldman, S. M., 1996, Delineation of areas contributing recharge to wells in central Long Island, New York, by particle tracking: U.S. Geological Survey, Open-File Report 95-703, vi, 47 p.

Montgomery, J.H., and Welkom, L.M., 1990. Groundwater Chemicals Desk Reference, Lewis Publ., Chelsea, MI, 650p.

Nemickas, B., Mallard, G.E. and Reilly, T.E., 1989. Availability and Historical Development of Ground-Water Resources of Long Island, New York – An Introduction. USGS Water-Resources Investigations Report 88-4113. Syosset, New York, 1989.

NOAA, 2022. NOAA US Department of Commerce. Record of Climatological Observations, Station: JFK International Airport, NY US USW 000094789. Generated July 20, 2022.

NYSDEC, 1999a. Fact Sheet: Environmental Investigations in Garden City Park Industrial Area (GCPIA). January 1999.

NYSDEC, 2000. Manfred Schulte Inactive Hazardous Waste Disposal Site. Town of North Hempstead, Nassau County, New York. March 24, 2000.

NYSDEC, 2021. Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations, 6 CRR-NY Part 703. Current through September 2021.

NYSDEC, 2022. Environmental Resource Mapper. Available online: https://gisservices.dec.ny.gov/gis/erm/.

NYSDEC. State Superfund Sites: Inactive Hazardous Waste Disposal Site Program. Available online: https://www.dec.ny.gov/chemical/8439.html.

NYSDOH, 2021. Public Water Systems; Maximum Contaminant Levels/ Monitoring requirements; Notifications Required, 10 CYRR-NY Part 5-1. Current through July 2021.

Payne, F. C., J. A. Quinnan, S. T. Potter, 2008. Remediation Hydraulics, CRC Press, New York.

Perlmutter, N. M. and Geraghty, J.J., 1963. Geology and Ground-Water Conditions in Southern Nassau and Southeastern Queens Counties Long Island, N.Y., USGS Water Supply Paper 1613-A. US Government Printing Office, Washington, D.C., 1963.

Pivetz, B., Keeley, A., Weber, E., Weaver, J., Wilson, J. and Ma, C., 2013. Synthesis Report on the State of Understanding of Chlorinated Solvent Transformation. USEPA Ground Water Issue Paper, EPA/600/R-13/237

Reilly, T. E., Buxton, H. T., Franke, O. L., Wait, R. L., 1983, Effects of Sanitary Sewers on Ground water Levels and Streams in Nassau and Suffolk Counties, New York, Part 1, Geohydrology, Modeling Strategy, and Regional Evaluation: U.S. Geological Survey Water-Resources Investigations Report 82-4045, 45 p.

Smolensky, D.A., Buxton, H.T. and Shernoff, P.K., 1989. Hydrogeologic Framework of Long Island, New York. USGS Hydrogeologic Investigations Atlas HA-709 (Sheets 1-3). United States Geological Survey, Reston, Virginia, 1990.

Smolenksy, D.A., and Feldman, S.M., 1995, Three-dimensional advection transport of volatile organic compounds in ground water beneath an industrial/residential area of Nassau County, New York: U.S. Geological Survey Water-Resources Investigations Report 92–4148, 53 p.

Tetra Tech, Inc., 1988. Chemical Data for Predicting the Fate of Organic Chemicals in Water, Vol.2, Database EPRI EA-5818, Vol.2, Elec. Power Res. Inst., Palo Alto, CA, 411p.

USCB, 2023. QuickFacts, New Hyde Park village, New York; Garden City Park CDP, New York; Garden City village, New York. Available online: https://www.census.gov/quickfacts/fact/table/newhydeparkvillagenewyork,gardencityparkcdpnewyork,gardencityvillagenewyork/POP010220

USCD, 2023. U.S. Climate Data, Garden City. Available online: https://www.usclimatedata.com/climate/garden-city/new-york/united-states/usny2080.

USDA, 2022. Natural Resources Conservation Service, Web Soil Survey. Available online: https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm.

USFWS, 2022. Endangered Species. IPaC Information for Planning and Consultation. Available online: https://ipac.ecosphere.fws.gov/location/EYC62Z56LRHXHG6J6DLQXYALV4/resources#endangered-species.

USGS, 1987. New York Ground-Water Quality. USGS Open-File Report 87-0742.

USGS, 1992. Ground-Water Quality in the Bethpage-Hicksville-Levittown Area, Long Island, New York. USGS Water Resources Research Investigation Report 90-4182.

USGS, 1999. Iron in the Aquifer System of Suffolk County, New York, 1990-98. USGS Water Resources Research Investigation Report 99-4126. December.

USGS, 2023. Lynbrook Quadrangle, New York – Nassau County, 7.5 Minute Series.

Verschuren, K., 1983. Handbook of Environmental Data on Organic Chemicals, 2nd Ed., Var Nastrand, Reihold, NY, 131p.

Weston, Inc., 1999. Hazard Ranking System Documentation Package Jackson Steel, Mineola/North Hempstead, Nassau County, New York. October 1999.

HDR APTIM
a Joint Venture

Table 2-1
Fulton Avenue Superfund Site OU2
Field Activity Summary

Field Activity	Work Conducted By	Dates
Baseline Sampling		
2011 Baseline Sampling		
Monitoring Well Reconnaissance (Existing monitoring well network)	HDR + GRB	5/17/2011 - 5/20/2011, 5/25/2011
Drum Drop Off and Sampling Event Mobilization	HDR + Metro Environmental	7/5/2011
Groundwater Sampling	HDR	7/6/2011 - 7/13/2011
IDW Liquid Sampling	HDR	7/14/2011
Additional Monitoring Well Reconnaissance (Existing monitoring well network)	HDR	10/31/2011 - 11/3/2011
Liquid IDW Disposal	HDR + American Environmental	11/1/2011
Phase 2		
2012-2013 Phase 2 Sampling		
Drum Drop Off, DPT Event Mobilization, & begin Geophysical Mark out	HDR, ADT, DGI, AARCO	6/22/2012
Groundwater Sampling - Existing GCPIA Monitoring Wells	HDR	7/9/2012
GeoProbe Direct Push Technology (DPT) Soil Boring and Sampling	HDR, ADT, DGI	6/25/2012 - 8/10/2012
Liquid IDW Sampling for Disposal	HDR, AARCO	8/10/2012
Weekly Secondary Containment Inspection and Pump Outs	HDR, AARCO	8/17/2013 - 1/09/2013
Second Phase DPT Mobilization - Site Recon	HDR, DGI, ADT	9/26/2012 - 10/1/2012
Second Phase DPT Geophysical Mark out	HDR, DGI	9/28/2012 - 10/5/2012
Additional Site Recon and Permits	HDR	10/16/2012
Second Mobilization DPT Soil Boring and Sampling	HDR, DGI, ADT	10/17/2012 - 1/04/2013
Liquid IDW Sampling for Disposal	HDR, AARCO	12/14/2012
Liquid IDW Disposal & Demobilization	HDR, AARCO	1/9/2013
Monitoring Well Reconnaissance (Existing monitoring well network)	HDR	3/11/2013 - 3/13/2013, 3/29/2013, 5/2/2013
Phase 2 Monitoring Well Sampling	HDR	5/29/2013 - 5/30/2013, 6/3/2013 - 6/6/2013
IDW Inspection	HDR, AARCO	6/21/2013, 6/28/2013
Liquid IDW Disposal & Demobilization	HDR, AARCO	6/28/2013
Third Mobilization DPT Boring and Sampling	HDR, ADT	8/5/2013 - 8/8/2013
PWS Sampling, Various Municipalities	HDR	11/12/2013
Phase 3		
2014 Phase 3 Sampling		
PWS Sampling, Various Municipalities	HDR	2/6/2014, 2/19/2014
Monitoring Well Reconnaissance (Existing monitoring well network)	HDR	4/1/2014 - 4/3/2014
Transducer Study Mobilization	HDR	4/21/2014 - 4/22/2014
Weekly Download Transducer Data	HDR	4/24/14, 5/2/14, 5/5/14, 5/9/14, 5/23/14, 8/15/14
RTK Monitoring Well Locations	HDR	4/28/2014 - 4/29/2014
Synoptic Water Level Round	HDR	6/5/14, 6/20/14, 7/3/14, 7/19/14, 7/31/14, 8/28/14, 9/11/14, 9/26/14, 10/17/14
Demob Transducer Study (Water Levels)	HDR	10/30/2014 - 10/31/2014
2014 Phase 3 July CSIA		
PWS Sampling, Various Municipalities	HDR	7/14/2014, 7/16/2014 - 7/17/2014
Groundwater Sampling Event - Existing Monitoring wells	HDR	7/23/2014 - 7/25/2014
IDW Liquid Disposal	HDR, AARCO	7/31/2014
Jackson Steel Facility Recon Exterior (Staging)	HDR	8/14/2014
Jackson Steel Facility Recon Interior Condition Survey (Staging)	HDR	9/25/2014
Staging Area Location Scout - 6 locations	HDR	9/29/2014
2014-2015 Phase 3 Former Zoe Sampling		
Zoey Chemical (NYSDEC) Site Walk through	HDR, CA Rich	10/20/2014
Recharge Basin Recon Zoey Chemical	HDR	11/4/2014
Mark out for Soil Vapor and Soil Gas Locations	HDR, DGI	12/9/2014
Soil Gas, Soil Vapor, Cesspool, and Groundwater Sampling - Zoey Chemical	HDR, CA Rich, ADT, AARCO	12/13/2014 - 12/14/2014
Cesspool Removal Oversight - Zoey Chemical (Soil Sample)	HDR, CA Rich	1/28/2015, 2/20/2015 - 2/21/2015
2015 Phase 3 PWS Sampling & Roselle Sampling		
PWS Sampling, Various Municipalities	HDR	8/5/2015
Roselle (NYSDEC) Split Sampling	HDR, CDM	8/6/2015
Phase 4		
2015-2016 Phase 4 Deep Boring Sampling		
Staging Area Location Scouting	HDR	9/15/2015
Clear Staging Area/Install Fence	HDR, AARCO	9/24/2015
Geophysical Mark out VPB Borings	HDR, Delta	10/2/2015
Mobilize IDW Staging Area and Mobilize for VPB sampling	HDR, AARCO, ADT	10/6/2016 - 10/7/2015
VPB and monitoring well installation, groundwater screening sampling, well development	HDR, AARCO, Cascade	10/13/2015 - 2/11/2016
Liquid IDW Sampling for Disposal	HDR AARCO	11/30/2015
IDW Liquid Disposal	HDR AARCO	12/15/2015 - 12/17/2015
IDW Weekly Inspections	HDR, AARCO	2/19/16, 2/26/16, 3/4/16, 3/11/16, 3/18/16, 3/24/16, 4/1/16, 4/11/16, 4/20/16
Groundwater Sampling	HDR	1/13/2016
IDW Samples collect for disposal	HDR, AARCO	2/26/2016
IDW Removal - Soil	HDR, AARCO	3/24/2016
IDW Removal - Liquid and Site Demobilization	HDR, AARCO	4/20/2016 - 4/22/2016
Site Restoration VPB Locations	HDR, Cascade	4/26/2016
Groundwater Sample DSB02RS & IDW Pickup	HDR, AARCO	8/24/2016
Demobilize from field trailer	HDR	9/30/2016
Phase 5		
2019 08-09 Phase 5 GW Sampling		
Monitoring Well Reconnaissance (Existing monitoring well network)	HDR	7/16/2019 - 7/17/2019
Synoptic Water Level Round & Drum Drop Off	HDR, IRT	8/27/2019
Groundwater Sampling - Round 1	HDR	8/28/2019 - 9/9/2019
PWS Sampling - Round 1	HDR	9/3/2019 - 9/4/2019
Liquid IDW Sampling for Disposal & Demobilization	HDR	9/10/2019
IDW Liquid Disposal	HDR, IRT	10/3/2019
2019 10 Phase 5 Soil Gas Sampling		
Soil Gas/Vapor Sampling Garden City Park Industrial Area (GCPIA) - Round 1	HDR	10/22/2019 - 10/25/2019
2019 Transducer Study		
Transducer Study Mobilization, Data Collection, Demob	HDR	September - December 2019
2019 12 Phase 5 GW Sampling		
Synoptic Water Level Round & Drum Drop Off	HDR, IRT	12/3/2019
Groundwater Sampling - Round 2	HDR	12/9/2019 - 12/12/2019
PWS Sampling - Round 2	HDR	12/11/2019 - 12/12/2019
Site Demobilization	HDR	12/13/2019
IDW Liquid Disposal	HDR, IRT	12/31/2019
2020 Phase 5 Soil Gas Sampling		
Soil Gas/Vapor Sampling GCPIA- Round 2	HDR	3/12/2020 - 3/13/2020, 3/16/2020 - 3/20/2020
Subcontractors		
Aquifer Drilling and Testing (ADT) - Driller/Traffic Control	AARCO Environmental Services (IDW)	GRB (Field Support)
Diversified Geophysics Investigation (DGI) - Geophysical	Delta Geophysical	Metro Environmental (IDW)
Innovative Recycling Technologies (IRT) - IDW	Cascade Drilling Company	American Environmental (IDW)
Notes:		
DPT - Direct Push Technology	VPB - Vertical Profile Boring	IDW - Investigation Derived Waste
PWS - Public Water Supply Wells	RTK - Real Time Kinematic	GCPIA - Garden City Park Industrial Area

HDR APTIM
a Joint Venture

Table 2-2
Fulton Ave Superfund Site OU2: Sample Summary Table
Phase 1 Baseline Groundwater Sampling

Location Name	Sampling Type	Sample Date	Sample Name	Sample Depth (ft bgs)	CLP Sample ID or Chain of Custody Sample ID	Analysis
Field Samples						
FULRW1 KOEPPEL	MW	7/12/2011	FUL_WG_FULRW1 KOEPPEL_100_N_20110712	100	FULRW1071211	TCL VOCs + TICs, TCL Pesticides
GCP03	MW	7/13/2011	FUL_WG_GCP03_35-35_N_20110713	35	FULGCP03071311	TCL VOCs + TICs
GCP12D	MW	7/13/2011	FUL_WG_GCP12D_153-153_N_20110713	153	FULGCP12D071311	TCL VOCs + TICs
GCP13S	MW	7/12/2011	FUL_WG_GCP13S_42-42_N_20110712	42	FULGCP13S071211	TCL VOCs + TICs
GCP14D	MW	7/12/2011	FUL_WG_GCP14D_148-148_N_20110712	148	FULGCP14D071211	TCL VOCs + TICs
GCP14S	MW	7/12/2011	FUL_WG_GCP14S_45-45_N_20110712	45	FULGCP14S071211	TCL VOCs + TICs
MW-14	MW	7/13/2011	FUL_WG_MW-14_65-65_N_20110713	65	FULMW14071311	TCL VOCs + TICs
MW-20A	MW	7/7/2011	FUL_WG_MW-20A_149-149_N_20110707	149	FULMW20A070711	TCL VOCs + TICs
MW-20B	MW	7/7/2011	FUL_WG_MW-20B_249-249_N_20110707	249	FULMW20B070711	TCL VOCs + TICs
MW-20C	MW	7/7/2011	FUL_WG_MW-20C_300-300_N_20110707	300	FULMW20C070711	TCL VOCs + TICs
MW-22A	MW	7/11/2011	FUL_WG_MW-22A_125-125_N_20110711	125	FULMW22A071111	TCL VOCs + TICs
MW-22B	MW	7/6/2011	FUL_WG_MW-22B_188-188_N_20110706	188	FULMW22B070611	TCL VOCs + TICs
MW-22C	MW	7/6/2011	FUL_WG_MW-22C_228-228_N_20110706	228	FULMW22C070611	TCL VOCs + TICs
MW-24A	MW	7/8/2011	FUL_WG_MW-24A_300-300_N_20110708	300	FULMW24A070811	TCL VOCs + TICs
MW-24B	MW	7/8/2011	FUL_WG_MW-24B_300-300_N_20110708	300	FULMW24B070811	TCL VOCs + TICs
MW-25A	MW	7/11/2011	FUL_WG_MW-25A_300-300_N_20110711	300	FULMW25A071111	TCL VOCs + TICs
N-10486	MW	7/11/2011	FUL_WG_GCP08_55-55_N_20110711	55	FULGP08071111	TCL VOCs + TICs
N-11735	MW	7/12/2011	FUL_WG_GCP13D_155-155_N_20110712	155	FULGCP13D071211	TCL VOCs + TICs
N-11739	MW	7/13/2011	FUL_WG_GCP12S_47-47_N_20110713	47	FULGCP12S071311	TCL VOCs + TICs
Field Duplicates						
GCP13S	MW	7/12/2011	FUL_WG_GCP13S_42-42_FD_20110712	42	FULMW300071211	TCL VOCs + TICs
Equipment (Rinsate) Blanks						
		7/12/2011	FUL_EB_20110712		FULMW400071211	TCL VOCs + TICs
Trip Blanks						
		7/6/2011	FUL_TB_20110706		FULMW100070611	TCL VOCs + TICs
		7/7/2011	FUL_TB_20110707		FULMW101070711	TCL VOCs + TICs
		7/8/2011	FUL_TB_20110708		FULMW102070811	TCL VOCs + TICs, TCL Pesticides
		7/11/2011	FUL_TB_20110711		FULMW1030071111	TCL VOCs + TICs
		7/12/2011	FUL_TB_20110712		FULMW104071211	TCL VOCs + TICs
		7/13/2011	FUL_TB_20110713		FULMW105071311	TCL VOCs + TICs

MW - Monitoring Well

HDR APTIM
a Joint Venture

Table 2-3
Fulton Ave Superfund Site OU2: Sample Summary Table
Phase 2 DPT and Groundwater Screening Sampling

Location Name	Sampling Type	Sample Date	Sample Name	Sample Depth (ft bgs)	CLP Sample ID or Chain of Custody Sample ID	Analysis
Field Samples						
SB-09	DPT	7/6/2012	FULSBWG-SB09-95-N-070612	95	0003	TCL VOCs + TICs
SB-11	DPT	7/11/2012	FULSBWG-SB11-72-N-071812	72	0034	TCL VOCs + TICs
		7/18/2012	FULSBWG-SB11-92-N-071812	92	0030	TCL VOCs + TICs
SB-13	DPT	7/17/2012	FULSBWG-SB13-95-N-071712	95	0028	TCL VOCs + TICs
SB-15	DPT	7/11/2012	FULSBWG-SB15-40-N-071112	40	0016	TCL VOCs + TICs
		7/11/2012	FULSBWG-SB15-55-N-071112	55	0020	TCL VOCs + TICs
		7/11/2012	FULSBWG-SB15-75-N-071112	75	0017	TCL VOCs + TICs
		7/11/2012	FULSBWG-SB15-95-N-071112	95	0018	TCL VOCs + TICs
SB-16	DPT	7/10/2012	FULSBWG-SB16-100-N-071012	100	0014	TCL VOCs + TICs
		7/10/2012	FULSBWG-SB16-41-N-071012	41	0021	TCL VOCs + TICs
		7/10/2012	FULSBWG-SB16-80-N-071012	80	0013	TCL VOCs + TICs
SB-17	DPT	7/12/2012	FULSBWG-SB17-39-N-071212	39	0026	TCL VOCs + TICs
		7/12/2012	FULSBWG-SB17-95-N-071212	95	0022	TCL VOCs + TICs
SB-18	DPT	7/2/2012	FULSBWG-SB18-40-N-070212	40	0001	TCL VOCs + TICs
SB-20	DPT	7/18/2012	FULSBWG-SB20-55-N-071812	55	0032	TCL VOCs + TICs
SB-23	DPT	7/20/2012	FULSBWG-SB23-80-N-072012	80	0040	TCL VOCs + TICs
SB-24	DPT	7/31/2012	FULSBWG-SB24-75-N-073112	75	0052	TCL VOCs + TICs
SB-28	DPT	7/27/2012	FULSBWG-SB28-95-N-072712	95	0045	TCL VOCs + TICs
SB-29	DPT	7/27/2012	FULSBWG-SB29-59-N-072712	59	0046	TCL VOCs + TICs
		7/27/2012	FULSBWG-SB29-95-N-072712	95	0048	TCL VOCs + TICs
SB-36	DPT	7/23/2012	FULSBWG-SB36-100-N-072312	100	0042	TCL VOCs + TICs
SB-38	DPT	7/23/2012	FULSBWG-SB38-95-N-072312	95	0043	TCL VOCs + TICs
SB-55	DPT	8/8/2012	FULSBWG-SB55-95-N-080812	95	0064	TCL VOCs + TICs
SB-57	DPT	8/8/2012	FULSBWG-SB57-50-N-080812	50	0060	TCL VOCs + TICs
		8/8/2012	FULSBWG-SB57-80-N-080812	80	0061	TCL VOCs + TICs
SB-70	DPT	11/1/2012	FULSBWG-SB70-53-N-110112	53	0065	MNA Parameters
		11/1/2012	FULSBWG-SB70-78-N-110112	78	0066	MNA Parameters
		11/1/2012	FULSBWG-SB70-98-N-110112	98	0067	MNA Parameters
SB-71	DPT	11/2/2012	FULSBWG-SB71-54-N-110112	54	0068	TCL VOCs + TICs, MNA Parameters
		11/2/2012	FULSBWG-SB71-74-N-110112	74	0069	TCL VOCs + TICs, MNA Parameters
		11/2/2012	FULSBWG-SB71-94-N-110112	94	0070	MNA Parameters
SB-72	DPT	11/14/2012	FULSBWG-SB72-53-N-111412	53	0072	TCL VOCs + TICs, MNA Parameters
		11/14/2012	FULSBWG-SB72-75-N-111412	75	0073	TCL VOCs + TICs, MNA Parameters
		11/14/2012	FULSBWG-SB72-95-N-111412	95	0074	TCL VOCs + TICs, MNA Parameters
SB-73	DPT	11/15/2012	FULSBWG-SB73-54-N-111512	54	0075	MNA Parameters
		11/15/2012	FULSBWG-SB73-69-N-111512	69	0076	MNA Parameters
		11/15/2012	FULSBWG-SB73-89-N-111512	89	0077	MNA Parameters
SB-74	DPT	11/16/2012	FULSBWG-SB74-55-N-111612	55	0078	TCL VOCs + TICs, MNA Parameters
		11/16/2012	FULSBWG-SB74-70-N-111612	70	0080	MNA Parameters
		11/16/2012	FULSBWG-SB74-90-N-111612	90	0081	MNA Parameters
SB-75	DPT	11/19/2012	FULSBWG-SB75-52-N-111912	52	0082	MNA Parameters
		11/19/2012	FULSBWG-SB75-59-N-111912	59	0083	MNA Parameters
		11/19/2012	FULSBWG-SB75-79-N-111912	79	0084	MNA Parameters
		11/19/2012	FULSBWG-SB75-99-N-111912	99	0085	MNA Parameters

HDR APTIM
a Joint Venture

Table 2-3
Fulton Ave Superfund Site OU2: Sample Summary Table
Phase 2 DPT and Groundwater Screening Sampling

Location Name	Sampling Type	Sample Date	Sample Name	Sample Depth (ft bgs)	CLP Sample ID or Chain of Custody Sample ID	Analysis
SB-77	DPT	12/4/2012	FULSBWG-SB77-35-N-120412	35	0112	MNA Parameters
		12/4/2012	FULSBWG-SB77-45-N-120412	45	0113	MNA Parameters
		12/4/2012	FULSBWG-SB77-65-N-120412	65	0114	MNA Parameters
		12/4/2012	FULSBWG-SB77-85-N-120412	85	0115	MNA Parameters
SB-78	DPT	12/3/2012	FULSBWG-SB78-35-N-120312	35	0116	MNA Parameters
		12/3/2012	FULSBWG-SB78-45-N-120312	45	0117	MNA Parameters
		12/3/2012	FULSBWG-SB78-65-N-120312	65	0118	MNA Parameters
		12/3/2012	FULSBWG-SB78-85-N-120312	85	0119	MNA Parameters
SB-79	DPT	11/30/2012	FULSBWG-SB79-35-N-113012	35	0108	MNA Parameters
		11/30/2012	FULSBWG-SB79-45-N-113012	45	0109	MNA Parameters
		11/30/2012	FULSBWG-SB79-65-N-113012	65	0110	MNA Parameters
		11/30/2012	FULSBWG-SB79-85-N-113012	85	0111	MNA Parameters
SB-80	DPT	11/29/2012	FULSBWG-SB80-34-N-112912	34	0104	MNA Parameters
		11/29/2012	FULSBWG-SB80-54-N-112912	54	0105	MNA Parameters
		11/29/2012	FULSBWG-SB80-74-N-112912	74	0106	MNA Parameters
		11/29/2012	FULSBWG-SB80-94-N-112912	94	0107	MNA Parameters
SB-81	DPT	11/28/2012	FULSBWG-SB81-35-N-112812	35	0091	MNA Parameters
		11/28/2012	FULSBWG-SB81-50-N-112812	50	0092	TCL VOCs + TICs, MNA Parameters
		11/28/2012	FULSBWG-SB81-70-N-112812	70	0094	MNA Parameters
		11/28/2012	FULSBWG-SB81-90-N-112812	90	0095	MNA Parameters
SB-82	DPT	11/27/2012	FULSBWG-SB82-34-N-112712	34	0096	MNA Parameters
		11/27/2012	FULSBWG-SB82-59-N-112712	59	0097	MNA Parameters
		11/27/2012	FULSBWG-SB82-79-N-112712	79	0098	MNA Parameters
SB-85	DPT	12/12/2012	FULSBWG-SB85-42-N-121212	42	0120	TCL VOCs + TICs, MNA Parameters
		12/12/2012	FULSBWG-SB85-65-N-121212	65	0121	MNA Parameters
		12/12/2012	FULSBWG-SB85-85-N-121212	85	0122	MNA Parameters
SB-86	DPT	12/13/2012	FULSBWG-SB86-40-N-121312	40	0124	MNA Parameters
		12/13/2012	FULSBWG-SB86-65-N-121312	65	0125	MNA Parameters
		12/13/2012	FULSBWG-SB86-85-N-121312	85	0126	MNA Parameters
SB-87	DPT	12/14/2012	FULSBWG-SB87-40-N-121412	40	0127	MNA Parameters
		12/14/2012	FULSBWG-SB87-65-N-121412	65	0128	MNA Parameters
		12/14/2012	FULSBWG-SB87-85-N-121412	85	0129	MNA Parameters
SB-88	DPT	12/17/2012	FULSBWG-SB88-40-N-121712	40	0130	MNA Parameters
		12/17/2012	FULSBWG-SB88-65-N-121712	65	0131	MNA Parameters
		12/17/2012	FULSBWG-SB88-85-N-121712	85	0132	MNA Parameters
SB-89	DPT	12/18/2012	FULSBWG-SB89-38-N-121812	38	0133	MNA Parameters
		12/18/2012	FULSBWG-SB89-58-N-121812	58	0134	MNA Parameters
		12/18/2012	FULSBWG-SB89-78-N-121812	78	0135	TCL VOCs + TICs, MNA Parameters
SB-90	DPT	12/20/2012	FULSBWG-SB90-39-N-122012	39	0140	MNA Parameters
		12/20/2012	FULSBWG-SB90-50-N-122012	50	0141	MNA Parameters
		12/20/2012	FULSBWG-SB90-70-N-122012	70	0142	TCL VOCs + TICs, MNA Parameters
SB-91	DPT	12/21/2012	FULSBWG-SB91-39-N-122112	39	0144	MNA Parameters
		12/21/2012	FULSBWG-SB91-50-N-122112	50	0145	MNA Parameters
		12/21/2012	FULSBWG-SB91-70-N-122112	70	0146	MNA Parameters

HDR APTIM
a Joint Venture

Table 2-3
Fulton Ave Superfund Site OU2: Sample Summary Table
Phase 2 DPT and Groundwater Screening Sampling

Location Name	Sampling Type	Sample Date	Sample Name	Sample Depth (ft bgs)	CLP Sample ID or Chain of Custody Sample ID	Analysis
SB-92	DPT	1/2/2013	FULSBWG-SB92-29-N-010213	29	0152	TCL VOCs + TICs, MNA Parameters
		1/2/2013	FULSBWG-SB92-35-N-010213	35	0153	TCL VOCs + TICs, MNA Parameters
		1/2/2013	FULSBWG-SB92-55-N-010213	55	0155	MNA Parameters
		1/2/2013	FULSBWG-SB92-75-N-010213	75	0156	MNA Parameters
SB-93	DPT	12/28/2012	FULSBWG-SB93-34-N-122812	34	0157	MNA Parameters
		12/28/2012	FULSBWG-SB93-52-N-122812	52	0158	MNA Parameters
		12/28/2012	FULSBWG-SB93-72-N-122812	72	0159	MNA Parameters
SB-94	DPT	12/26/2012	FULSBWG-SB94-41-N-122612	41	0147	TCL VOCs + TICs, MNA Parameters
		12/26/2012	FULSBWG-SB94-51-N-122612	51	0148	MNA Parameters
		12/26/2012	FULSBWG-SB94-71-N-122612	71	0149	MNA Parameters
SB-95	DPT	1/3/2013	FULSBWG-SB95-39-N-010313	39	0168	MNA Parameters
		1/3/2013	FULSBWG-SB95-60-N-010313	60	0169	MNA Parameters
		1/3/2013	FULSBWG-SB95-80-N-010313	80	0170	MNA Parameters
SB-96	DPT	12/27/2012	FULSBWG-SB96-41-N-122712	41	0160	TCL VOCs + TICs, MNA Parameters
		12/27/2012	FULSBWG-SB96-55-N-122712	55	0161	TCL VOCs + TICs, MNA Parameters
		12/27/2012	FULSBWG-SB96-75-N-122712	75	0162	TCL VOCs + TICs, MNA Parameters
		12/27/2012	FULSBWG-SB96-95-N-122712	95	0163	TCL VOCs + TICs, MNA Parameters
SB-97	DPT	1/4/2013	FULSBWG-SB97-39-N-010413	39	0171	MNA Parameters
		1/4/2013	FULSBWG-SB97-60-N-010413	60	0172	MNA Parameters
		1/4/2013	FULSBWG-SB97-80-N-010413	80	0173	MNA Parameters
SB-R1 RANDI	DPT	8/8/2013	FUL_WG_SB-R1 RANDI_59-59_N_20130808	59	0205	TCL VOCs + TICs, Iron & Manganese, MNA Parameters
		8/8/2013	FUL_WG_SB-R1 RANDI_74-74_N_20130808	74	0204	TCL VOCs + TICs, Iron & Manganese, MNA Parameters
		8/8/2013	FUL_WG_SB-R1 RANDI_94-94_N_20130808	94	0203	TCL VOCs + TICs, Iron & Manganese, MNA Parameters
SB-R2 CHAMINADE	DPT	8/7/2013	FUL_WG_SB-R2 CHAMINADE_100_N_20130807	100	FULSBWG-SB-R2-100-N-080713	TCL VOCs + TICs, Iron & Manganese, MNA Parameters
		8/7/2013	FUL_WG_SB-R2 CHAMINADE_40-40_N_20130807	40	FULSBWG-SB-R2-40-N-080713	TCL VOCs + TICs, Iron & Manganese, MNA Parameters
		8/7/2013	FUL_WG_SB-R2 CHAMINADE_60-60_N_20130807	60	FULSBWG-SB-R2-60-N-080713	TCL VOCs + TICs, Iron & Manganese, MNA Parameters
		8/7/2013	FUL_WG_SB-R2 CHAMINADE_80-80_N_20130807	80	FULSBWG-SB-R2-80-N-080713	TCL VOCs + TICs, Iron & Manganese, MNA Parameters
Field Duplicates						
SB-09	DPT	7/6/2012	FULSBWG-SB09-95-FD-070612	95	0004	TCL VOCs + TICs
SB-11	DPT	7/18/2012	FULSBWG-SB11-92-FD-071812	92	0031	TCL VOCs + TICs
SB-17	DPT	7/12/2012	FULSBWG-SB17-39-FD-071212	39	0027	TCL VOCs + TICs
SB-20	DPT	7/18/2012	FULSBWG-SB20-55-FD-071812	55	0033	TCL VOCs + TICs
SB-24	DPT	7/31/2012	FULSBWG-SB24-75-FD-073112	75	0053	TCL VOCs + TICs
SB-29	DPT	7/27/2012	FULSBWG-SB29-59-FD-072712	59	0047	TCL VOCs + TICs
SB-57	DPT	8/8/2012	FULSBWG-SB57-80-FD-080812	80	0062	TCL VOCs + TICs
SB-74	DPT	11/16/2012	FULSBWG-SB74-55-FD-111612	55	0079	TCL VOCs + TICs, MNA Parameters
SB-81	DPT	11/28/2012	FULSBWG-SB81-50-FD-112812	50	0093	TCL VOCs + TICs, MNA Parameters
SB-90	DPT	12/20/2012	FULSBWG-SB90-70-FD-122012	70	0143	TCL VOCs + TICs, MNA Parameters
SB-92	DPT	1/2/2013	FULSBWG-SB92-35-FD-010213	35	0154	TCL VOCs + TICs, MNA Parameters
SB-R2 CHAMINADE	DPT	8/7/2013	FUL_WG_SB-R2 CHAMINADE_100_FD_20130807	100	FULSBWG-SB-R2-100-FD-080713	TCL VOCs + TICs, Iron & Manganese, MNA Parameters
Equipment (Rinsate) Blanks						
		7/6/2012	FUL_EB_20120706		0006	TCL VOCs + TICs
		7/12/2012	FUL_EB_20120712		0023	TCL VOCs + TICs
		7/18/2012	FUL_EB_20120718		0035	TCL VOCs + TICs
		7/19/2012	FUL_EB_20120719		0038	TCL VOCs + TICs
		7/27/2012	FUL_EB_20120727		0049	TCL VOCs + TICs

HDR APTIM
a Joint Venture

Table 2-3
Fulton Ave Superfund Site OU2: Sample Summary Table
Phase 2 DPT and Groundwater Screening Sampling

Location Name	Sampling Type	Sample Date	Sample Name	Sample Depth (ft bgs)	CLP Sample ID or Chain of Custody Sample ID	Analysis
		7/31/2012	FUL_EB_20120731		0054	TCL VOCs + TICs
		8/7/2012	FUL_EB_20120807		0057	TCL VOCs + TICs
		11/16/2012	FUL_EB_20121116		0086	TCL VOCs + TICs
		11/29/2012	FUL_EB_20121129		0099	TCL VOCs + TICs
		12/19/2012	FUL_EB_20121219		0137	TCL VOCs + TICs
		1/2/2013	FUL_EB_20130102		0164	TCL VOCs + TICs
		8/8/2013	FUL_EB_20130808		0202	TCL VOCs + TICs
Field Blanks						
		7/6/2012	FUL_FB_20120706		0005	TCL VOCs + TICs
		7/12/2012	FUL_FB_20120712		0024	TCL VOCs + TICs
		7/18/2012	FUL_FB_20120718		0036	TCL VOCs + TICs
		7/19/2012	FUL_FB_20120719		0039	TCL VOCs + TICs
		7/27/2012	FUL_FB_20120727		0050	TCL VOCs + TICs
		7/31/2012	FUL_FB_20120731		0055	TCL VOCs + TICs
		8/7/2012	FUL_FB_20120807		0058	TCL VOCs + TICs
		11/16/2012	FUL_FB_20121116		0087	TCL VOCs + TICs
		11/29/2012	FUL_FB_20121129		0100	TCL VOCs + TICs
		12/19/2012	FUL_FB_20121219		0138	TCL VOCs + TICs
		1/2/2013	FUL_FB_20130102		0165	TCL VOCs + TICs
		8/7/2013	FUL_FB_20130807		FUL-FB080713	TCL VOCs + TICs
Trip Blanks						
		7/2/2012	FUL_TB_20120702		0002	TCL VOCs + TICs
		7/6/2012	FUL_TB_20120706		0007	TCL VOCs + TICs
		7/9/2012	FUL_TB_20120709		0012	TCL VOCs + TICs
		7/10/2012	FUL_TB_20120710		0015	TCL VOCs + TICs
		7/11/2012	FUL_TB_20120711		0019	TCL VOCs + TICs
		7/12/2012	FUL_TB_20120712		0025	TCL VOCs + TICs
		7/17/2012	FUL_TB_20120717		0029	TCL VOCs + TICs
		7/18/2012	FUL_TB_20120718		0037	TCL VOCs + TICs
		7/20/2012	FUL_TB_20120720		0041	TCL VOCs + TICs
		7/23/2012	FUL_TB_20120723		0044	TCL VOCs + TICs
		7/27/2012	FUL_TB_20120727		0051	TCL VOCs + TICs
		7/31/2012	FUL_TB_20120731		0056	TCL VOCs + TICs
		8/7/2012	FUL_TB_20120807		0059	TCL VOCs + TICs
		8/8/2012	FUL_TB_20120808		0063	TCL VOCs + TICs
		11/2/2012	FUL_TB_20121102		0071	TCL VOCs + TICs
		11/14/2012	FUL_TB_20121114		0088	TCL VOCs + TICs
		11/15/2012	FUL_TB_20121115		0089	TCL VOCs + TICs
		11/16/2012	FUL_TB_20121116		0090	TCL VOCs + TICs
		11/27/2012	FUL_TB_20121127		0101	TCL VOCs + TICs
		11/28/2012	FUL_TB_20121128		0102	TCL VOCs + TICs
		11/29/2012	FUL_TB_20121129		0103	TCL VOCs + TICs
		12/12/2012	FUL_TB_20121212		0123	TCL VOCs + TICs
		12/18/2012	FUL_TB_20121218		0136	TCL VOCs + TICs
		12/19/2012	FUL_TB_20121219		0139	TCL VOCs + TICs
		12/20/2012	FUL_TB_20121220		0150	TCL VOCs + TICs

HDR APTIM
a Joint Venture

Table 2-3
Fulton Ave Superfund Site OU2: Sample Summary Table
Phase 2 DPT and Groundwater Screening Sampling

Location Name	Sampling Type	Sample Date	Sample Name	Sample Depth (ft bgs)	CLP Sample ID or Chain of Custody Sample ID	Analysis
		12/26/2012	FUL_TB_20121226		0151	TCL VOCs + TICs
		12/27/2012	FUL_TB_20121227		0166	TCL VOCs + TICs
		1/2/2013	FUL_TB_20130102		0167	TCL VOCs + TICs

HDR APTIM
a Joint Venture

Table 2-3
Fulton Ave Superfund Site OU2: Sample Summary Table
Phase 2 Groundwater Sampling

Location Name	Sampling Type	Sample Date	Sample Name	Sample Depth (ft bgs)	CLP Sample ID or Chain of Custody Sample ID	Analysis
Field Samples						
GCP10D	MW	7/9/2012	FULMWWG-GCP-10D-107-N-070912	107	0011	TCL VOCs + TICs
GCP10S	MW	7/9/2012	FUL_WG_GCP10S_53-53_N_20120709	53	0010	TCL VOCs + TICs
GCP14D	MW	6/4/2013	FUL_WG_FULGCP14D_148-148_N_20130604	148	0186	TCL VOCs + TICs, Iron & Manganese, MNA Parameters
MW-10M JS	MW	6/5/2013	FUL_WG_MW-10M JS_298-298_N_20130605	298	0191	TCL VOCs + TICs, CSIA, Iron & Manganese, MNA Parameters
MW-11M JS	MW	6/3/2013	FUL_WG_MW-11M JS_297-297_N_20130603	297	0183	TCL VOCs + TICs, CSIA, Iron & Manganese, MNA Parameters
MW-15B	MW	6/4/2013	FUL_WG_MW-15B_300-300_N_20130604	300	0187	TCL VOCs + TICs, Iron & Manganese, MNA Parameters
MW-21C	MW	6/4/2013	FUL_WG_MW-21C_298-298_N_20130604	298	0188	TCL VOCs + TICs, Iron & Manganese, MNA Parameters
MW-24B	MW	6/5/2013	FUL_WG_MW-24B_300-300_N_20130605	300	0190	TCL VOCs + TICs, Iron & Manganese, MNA Parameters
MW-25A	MW	6/4/2013	FUL_WG_MW-25A_297-297_N_20130604	297	0189	TCL VOCs + TICs, CSIA, Iron & Manganese, MNA Parameters
MW-9M JS	MW	6/3/2013	FUL_WG_MW-9M JS_298-298_N_20130603	298	0182	TCL VOCs + TICs, CSIA, Iron & Manganese, MNA Parameters
N-00017	PWS	11/12/2013	FUL_WG_N-00017_435-435_N_20131112	435	0207	TCL VOCs + TICs, CSIA, Iron & Manganese, MNA Parameters
N-01614	MW	7/9/2012	FUL_WG_N-01614_70-70_N_20120709	70	0009	TCL VOCs + TICs
N-01958	PWS	11/12/2013	FUL_WG_N-01958_697-697_N_20131112	697	0206	TCL VOCs + TICs, Iron & Manganese, MNA Parameters
N-03185	PWS	5/29/2013	FUL_WG_N-03185_443-443_N_20130529	443	0176	TCL VOCs + TICs, CSIA, Iron & Manganese, MNA Parameters
N-03603	PWS	5/29/2013	FUL_WG_N-03603_468-468_N_20130529	468	0177	TCL VOCs + TICs, CSIA, Iron & Manganese, MNA Parameters
N-03881	PWS	5/30/2013	FUL_WG_N-03881_446-446_N_20130530	446	0179	TCL VOCs + TICs, CSIA, Iron & Manganese, MNA Parameters
N-07649	PWS	5/30/2013	FUL_WG_N-07649_185-185_N_20130530	165	0180	TCL VOCs + TICs, CSIA, Iron & Manganese, MNA Parameters
N-07650	PWS	5/30/2013	FUL_WG_N-07650_420-420_N_20130530	420	0181	TCL VOCs + TICs, CSIA, Iron & Manganese, MNA Parameters
N-08339	PWS	5/30/2013	FUL_WG_N-08339_333-333_N_20130530	333	0178	TCL VOCs + TICs, CSIA, Iron & Manganese, MNA Parameters
N-08409	PWS	5/29/2013	FUL_WG_N-08409_370-370_N_20130529	370	0174	TCL VOCs + TICs, CSIA, Iron & Manganese, MNA Parameters
N-08576	PWS	5/29/2013	FUL_WG_N-08576_475-475_N_20130529	475	0175	TCL VOCs + TICs, CSIA, Iron & Manganese, MNA Parameters
N-09942	MW	7/9/2012	FUL_WG_N-09942_64-64_N_20120709	64	0008	TCL VOCs + TICs
N-09949	MW	6/5/2013	FUL_WG_N-09949_95-95_N_20130605	95	0192	TCL VOCs + TICs, Iron & Manganese, MNA Parameters
Field Duplicates						
MW-10M JS	MW	6/5/2013	FUL_WG_MW-10M JS_298-298_FD_20130605	298	0193	TCL VOCs + TICs, Iron & Manganese, MNA Parameters
Equipment (Rinsate) Blanks						
		6/4/2013	FUL_EB_20130604		0185	TCL VOCs + TICs, Iron & Manganese, MNA Parameters
Field Blanks						
		6/4/2013	FUL_FB_20130604		0185a	TCL VOCs + TICs, Iron & Manganese, MNA Parameters
Trip Blanks						
		5/29/2013	FUL_TB_20130529		FULTB-052913	TCL VOCs + TICs, CSIA
		5/30/2013	FUL_TB_20130530		FULTB-053013	TCL VOCs + TICs, CSIA
		6/3/2013	FUL_TB_20130603		TB060313	TCL VOCs + TICs, CSIA
		6/4/2013	FUL_TB_20130604		TB060413	TCL VOCs + TICs, CSIA
		6/5/2013	FUL_TB_20130605		TB060513	TCL VOCs + TICs, CSIA
		11/12/2013	FUL_TB_20131112		0208	TCL VOCs + TICs, CSIA

MW - Monitoring Well
PWS - Public Water Supply Well

HDR APTIM
a Joint Venture

Table 2-4
Fulton Ave Superfund Site OU2: Sample Summary Table
Phase 3 Groundwater Sampling- February to July 2014

Location Name	Sampling Type	Sample Date	Sample Name	Sample Depth (ft bgs)	CLP Sample ID or Chain of Custody Sample ID	Analysis
Field Samples						
MW-11M JS	MW	7/25/2014	FUL_WG_MW-11M JS_300-300_N_20140725	300	FULMWWG-JS-MW-11M-072514	TCL VOCs, CSIA, Iron & Manganese, MNA Parameters
MW-24A	MW	7/24/2014	FUL_WG_MW-24A_297-297_N_20140724	297	FULMWWG-MW24A-N-072414	TCL VOCs, CSIA, Iron & Manganese, MNA Parameters
MW-25A	MW	7/23/2014	FUL_WG_MW-25A_297-297_N_20140723	297	FULMWWG-MW25A-N-072314	TCL VOCs, CSIA, Iron & Manganese, MNA Parameters
N-00017	PWS	2/6/2014	FUL_WG_N-00017_435-435_N_20140206	435	FULPWSWG-N00017-N-020614	TCL VOCs, Iron & Manganese, MNA Parameters
		7/16/2014	FUL_WG_N-00017_435-435_N_20140716	435	FULPWSWG-N00017-N-071614	TCL VOCs, CSIA, Iron & Manganese, MNA Parameters
N-00104	PWS	2/6/2014	FUL_WG_N-00104_350.5-350.5_N_20140206	350.5	FULPWSWG-N00104-N-020614	TCL VOCs, CSIA, Iron & Manganese, MNA Parameters
		7/17/2014	FUL_WG_N-00104_350.5-350.5_N_20140717	350.5	FULPWSWG-N00104-N-071714	TCL VOCs, CSIA, Iron & Manganese, MNA Parameters
N-01697	PWS	2/6/2014	FUL_WG_N-01697_498-498_N_20140206	498	FULPWSWG-N01697-N-020614	TCL VOCs, CSIA, Iron & Manganese, MNA Parameters
N-02487	PWS	7/17/2014	FUL_WG_N-02487_429-429_N_20140717	429	FULPWSWG-N02487-N-071714	TCL VOCs, CSIA, Iron & Manganese, MNA Parameters
N-03185	PWS	7/14/2014	FUL_WG_N-03185_443-443_N_20140714	443	FULPWSWG-N03185-N-071414	TCL VOCs, CSIA, Iron & Manganese, MNA Parameters
N-03603	PWS	7/14/2014	FUL_WG_N-03603_468-468_N_20140714	468	FULPWSWG-N03603-N-071414	TCL VOCs, CSIA, Iron & Manganese, MNA Parameters
N-03733	PWS	2/19/2014	FUL_WG_N-03733_430-430_N_20140219	430	FULPWSWG-N03733-N-021914	TCL VOCs, Iron & Manganese, MNA Parameters
		7/16/2014	FUL_WG_N-03733_430-430_N_20140716	430	FULPWSWG-N03733-N-071614	TCL VOCs, CSIA, Iron & Manganese, MNA Parameters
N-03881	PWS	7/16/2014	FUL_WG_N-03881_446-446_N_20140716	446	FULPWSWG-N03881-N-071614	TCL VOCs, CSIA, Iron & Manganese, MNA Parameters
N-04082	PWS	2/6/2014	FUL_WG_N-04082_442-442_N_20140206	442	FULPWSWG-N04082-N-020614	TCL VOCs, Iron & Manganese, MNA Parameters
N-05163	PWS	2/6/2014	FUL_WG_N-05163_450-450_N_20140206	450	FUL-PWS-WG-N05163-N-020614	TCL VOCs, Iron & Manganese, MNA Parameters
N-05596	PWS	2/6/2014	FUL_WG_N-05596_435.5-435.5_N_20140206	435.5	FULPWSWG-N05596-N-020614	TCL VOCs, Iron & Manganese, MNA Parameters
N-07649	PWS	7/16/2014	FUL_WG_N-07649_185-185_N_20140716	165	FULPWSWG-N07649-N-071614	TCL VOCs, CSIA, Iron & Manganese, MNA Parameters
N-07650	PWS	7/16/2014	FUL_WG_N-07650_420-420_N_20140716	420	FULPWSWG-N07650-N-071614	TCL VOCs, CSIA, Iron & Manganese, MNA Parameters
N-08248	PWS	2/6/2014	FUL_WG_N-08248_357.5-357.5_N_20140206	357.5	FULPWSWG-N08248-N-020614	TCL VOCs, Iron & Manganese, MNA Parameters
N-08339	PWS	2/6/2014	FUL_WG_N-08339_333-333_N_20140206	333	FULPWSWG-N08339-N-020614	TCL VOCs, CSIA, Iron & Manganese, MNA Parameters
		7/16/2014	FUL_WG_N-08339_333-333_N_20140716	333	FULPWSWG-N08339-N-071614	TCL VOCs, CSIA, Iron & Manganese, MNA Parameters
N-08409	PWS	7/17/2014	FUL_WG_N-08409_370-370_N_20140717	370	FULPWSWG-N08409-N-071714	TCL VOCs, CSIA, Iron & Manganese, MNA Parameters
N-08576	PWS	2/6/2014	FUL_WG_N-08576_475-475_N_20140206	475	FULPWSWG-N08576-N-020614	TCL VOCs, CSIA, Iron & Manganese, MNA Parameters
		7/14/2014	FUL_WG_N-08576_475-475_N_20140714	475	FULPWSWG-N08576-N-071414	TCL VOCs, CSIA, Iron & Manganese, MNA Parameters
N-11659	MW	7/24/2014	FUL_WG_N-11659_423-423_N_20140724	423	FULMWWG-N11659-N-072414	TCL VOCs, CSIA, Iron & Manganese, MNA Parameters
Field Duplicates						
MW-25A	MW	7/23/2014	FUL_WG_MW-25A_297-297_FD_20140723	297	FULMWWG-MW25A-FD-072314	TCL VOCs, Iron & Manganese, MNA Parameters
Equipment (Rinsate) Blanks						
		7/24/2014	FUL_EB_20140724		FUL-EB072414	TCL VOCs, Iron & Manganese, MNA Parameters
Field Blanks						
		7/24/2014	FUL_FB_20140724		FUL-FB072414	TCL VOCs, Iron & Manganese, MNA Parameters
Trip Blanks						
		2/6/2014	FUL_TB_20140206		FUL-TB-020614-ZYMAX	TCL VOCs
		2/19/2014	FUL_TB_20140219		TB-021914	TCL VOCs
		7/14/2014	FUL_TB_20140714		TB071414	TCL VOCs, CSIA
		7/16/2014	FUL_TB_20140716		TB071614	TCL VOCs, CSIA
		7/17/2014	FUL_TB_20140717		TB072314-zymax	TCL VOCs, CSIA
		7/23/2014	FUL_TB_20140723		FUL-TB072314-DESA	TCL VOCs
		7/23/2014	TB072314-ZYMAX			TCL VOCs, CSIA
		7/24/2014	FUL_TB_20140724		FUL-TB072414-DESA	TCL VOCs, CSIA
		7/24/2014	FUL-TB072414-DESA		FUL-TB072414-DESA	TCL VOCs
		7/25/2014	FUL_TB_20140725		TB-072514-zymax	TCL VOCs, CSIA

MW - Monitoring Well
PWS - Public Water Supply Well

HDR APTIM
a Joint Venture

Table 2-4
Fulton Ave Superfund Site OU2: Sample Summary Table
Phase 3 Soil Sampling- Former Zoe

Location Name	Sampling Type	Sample Date	Sample Name	Sample Depth (ft bgs)	CLP Sample ID or Chain of Custody Sample ID	Analysis
Field Samples						
HDRCP1 ZOE	Cesspool Soil	1/28/2015	FUL_SO_HDRCP1 ZOE_6-6_N_20150128	6	FULCPSO-HDRCP1-N-6-012815	TAL VOCs, Wet Chemistry
		1/28/2015	FUL_SO_HDRCP1 ZOE_8-8_N_20150128	8	FULCPSO-HDRCP1-N-8-012815	TAL VOCs, Wet Chemistry
		2/20/2015	FUL_SO_HDRCP1 ZOE_45-45_N_20150220	45	FULCPSO-HDRCP1-N-45-012815	TAL VOCs, CSIA, Wet Chemistry
HDRCP2 ZOE	Cesspool Soil	2/20/2015	FUL_SO_HDRCP2 ZOE_5.5-5.5_N_20150220	5.5	FULCPSO-HDRCP2-N-5.5-012815	TAL VOCs, CSIA, Wet Chemistry
		2/20/2015	FUL_SO_HDRCP3 ZOE_12-12_N_20150220	12	FULCPSO-HDRCP3-N-12-012815	TAL VOCs, CSIA, Wet Chemistry
Field Duplicates						
HDRCP1 ZOE	Cesspool Soil	2/20/2015	FUL_SO_HDRCP100 ZOE_45-45_FD_20150220	45	FULCPSO-HDRCP100-N-45-012815	TAL VOCs, CSIA, Wet Chemistry

HDR APTIM
a Joint Venture

Table 2-4
Fulton Ave Superfund Site OU2: Sample Summary Table
Phase 3 Groundwater Sampling- Former Zoe

Location Name	Sampling Type	Sample Date	Sample Name	Sample Depth (ft bgs)	CLP Sample ID or Chain of Custody Sample ID	Analysis
Field Samples						
MW-4 ZOE	MW	12/14/2014	FUL_WG_MW-4 ZOE_10.5-10.5_N_20141214	10.5	B0AA0	TCL VOCs, CSIA, Iron & Manganese, MNA Parameters, SVOCs (1,4-Dioxane)
Field Duplicates						
MW-4 ZOE	MW	12/14/2014	FUL_WG_MW-4 ZOE_10.5-10.5_FD_20141214	10.5	FULMWWG-HDRMW4-FD-10.5-121414	TCL VOCs, CSIA
Equipment (Rinsate) Blanks						
		12/14/2014	FUL_RB_20141214		B0AA1	TCL VOCs, CSIA, Iron & Manganese, MNA Parameters, SVOCs (1,4-Dioxane)
		2/20/2015	FUL_EB_20150220		EB-022015	TCL VOCs
Field Blanks						
		12/14/2014	FULZOE-FB121414		B0AA3	TCL VOCs, CSIA, Iron & Manganese, MNA Parameters, SVOCs (1,4-Dioxane)
Trip Blanks						
		12/14/2014	FULZOE-TB121414			CSIA

MW - Monitoring Well

HDR APTIM
a Joint Venture

Table 2-4
Fulton Ave Superfund Site OU2: Sample Summary Table
Phase 3 Soil Gas Sampling- Former Zoe

Location Name	Sampling Type	Sample Date	Sample Name	Sample Depth (ft bgs)	CLP Sample ID or Chain of Custody Sample ID	Analysis
Field Samples						
SSV-01 ZOE	Subslab Soil Vapor	12/13/2014	FUL_AS_SSV-01 ZOE_0.75-0.75_N_20141214	0.75	FULSV-HDRSSV-01_N-0.75-20141213-VOC	TAL VOCs, CSIA
SSV-02 ZOE	Subslab Soil Vapor	12/13/2014	FUL_AS_SSV-02 ZOE_0.75-0.75_N_20141214	0.75	FULSV-HDRSSV-02_N-0.75-20141213-VOC	TAL VOCs, CSIA
SSV-04 ZOE	Soil Gas	12/13/2014	FUL_AS_SSV-04 ZOE_8-8_N_20141214	8	FULSV-HDRSSV-04_N-8-20141213-VOC	TAL VOCs, CSIA
SV-IA ZOE	Indoor Air	12/13/2014	FUL_AI_SV-IA ZOE_3-3_N_20141214	3	FULSV-HDRIA-N-3-20141213-VOC	TAL VOCs, CSIA
SV-OA ZOE	Outdoor Air	12/13/2014	FUL_AO_SV-OA ZOE_4-4_N_20141214	4	FULSV-HDROA-N-4-20141213-VOC	TAL VOCs, CSIA
Field Duplicates						
SSV-01 ZOE	Subslab Soil Vapor	12/13/2014	FUL_AS_SSV-01 ZOE_0.75-0.75_FD_20141214	0.75	FULSV-HDRSSV-01_FD-0.75-20141213-VOC	TAL VOCs, CSIA

HDR APTIM
a Joint Venture

Table 2-4
Fulton Ave Superfund Site OU2: Sample Summary Table
Phase 3 2015 Roselle and Public Water Supply Sampling

Location Name	Sampling Type	Sample Date	Sample Name	Sample Depth (ft bgs)	CLP Sample ID or Chain of Custody Sample ID	Analysis
Field Samples						
MW-03 ROS	MW	8/6/2015	FUL_WG_MW-03 ROS_51-51_N_20150806	51	FUL-ROS-WG-MW03-51-N-080615	TCL VOCs, CSIA
MW-04 ROS	MW	8/6/2015	FUL_WG_MW-04 ROS_51-51_N_20150806	51	FUL-ROS-WG-MW04-51-N-080615	TCL VOCs, CSIA
MW-11 ROS	MW	8/6/2015	FUL_WG_MW-11 ROS_45-45_N_20150806	45	FUL-ROS-WG-MW11-45-N-080615	TCL VOCs, CSIA
MW-13 ROS	MW	8/6/2015	FUL_WG_MW-13 ROS_44-44_N_20150806	44	FUL-ROS-WG-MW13-44-N-080615	TCL VOCs, CSIA
N-00017	PWS	8/5/2015	FUL_WG_N-00017_435-435_N_20150805	435	FUL-PWS-WG-N00017-465-N-080515	TCL VOCs, CSIA
N-00104	PWS	8/5/2015	FUL_WG_N-00104_376-376_N_20150805	376	FUL-PWS-WG-N00104-376-N-080515	TCL VOCs, CSIA
N-07649	PWS	8/5/2015	FUL_WG_N-07649_185-185_N_20150805	165	FUL-PWS-WG-N07649-340-N-080515	TCL VOCs, CSIA
N-07650	PWS	8/5/2015	FUL_WG_N-07650_440-440_N_20150805	440	FUL-PWS-WG-N07650-440-N-080515	TCL VOCs, CSIA
N-08339	PWS	8/5/2015	FUL_WG_N-08339_463-463_N_20150805	463	FUL-PWS-WG-N08339-463-N-080515	TCL VOCs, CSIA
N-08576	PWS	8/5/2015	FUL_WG_N-08576_505-505_N_20150805	505	FUL-PWS-WG-N08576-505-N-080515	TCL VOCs, CSIA
Field Duplicates						
MW-04 ROS	MW	8/6/2015	FUL_WG_MW-04 ROS_51-51_FD_20150806	51	FUL-ROS-WG-MW54-51-N-080615	TCL VOCs, CSIA
Trip Blanks						
		8/5/2015	FUL_TB_20150805		TB-080515	TCL VOCs, CSIA
		8/6/2015	FUL_TB_20150806		FUL-TB-20150806	TCL VOCs, CSIA

MW - Monitoring Well
PWS - Public Water Supply Well

HDR APTIM
a Joint Venture

Table 2-5
Fulton Ave Superfund Site OU2: Sample Summary Table
Phase 4 Vertical Profile Boring- Soil Sampling

Location Name	Sampling Type	Sample Date	Sample Name	Sample Depth (ft bgs)	CLP Sample ID or Chain of Custody Sample ID	Analysis
Field Samples						
DSB01	Soil	10/14/2015	FUL_DSB01_4-5_SO_N_20151014	4 - 5	FUL_DSB01_4-5_SO_N_20151014	Wet Chemistry
		10/14/2015	FUL_DSB01_28-29_SO_N_20151014	28 - 29	FUL_DSB01_28-29_SO_N_20151014	Wet Chemistry
		10/14/2015	FUL_DSB01_52-53_SO_N_20151014	52 - 53	FUL_DSB01_52-53_SO_N_20151014	Wet Chemistry
		10/14/2015	FUL_DSB01_86-87_SO_N_20151014	86 - 87	FUL_DSB01_86-87_SO_N_20151014	Wet Chemistry
		10/15/2015	FUL_DSB01_111-112_SO_N_20151015	111 - 112	FUL_DSB01_111-112_SO_N_20151015	TAL Metals, Wet Chemistry
		10/15/2015	FUL_DSB01_157-158_SO_N_20151015	157 - 158	FUL_DSB01_157-158_SO_N_20151015	Wet Chemistry
		10/15/2015	FUL_DSB01_197-198_SO_N_20151015	197 - 198	FUL_DSB01_197-198_SO_N_20151015	Wet Chemistry
		10/15/2015	FUL_DSB01_215-216_SO_N_20151015	215 - 216	FUL_DSB01_215-216_SO_N_20151015	Wet Chemistry
		10/16/2015	FUL_DSB01_242-243_SO_N_20151016	242 - 243	FUL_DSB01_242-243_SO_N_20151016	Wet Chemistry
		10/16/2015	FUL_DSB01_272-273_SO_N_20151016	272 - 273	FUL_DSB01_272-273_SO_N_20151016	Wet Chemistry
		10/16/2015	FUL_DSB01_316-317_SO_N_20151016	316 - 317	FUL_DSB01_316-317_SO_N_20151016	Wet Chemistry
		10/19/2015	FUL_DSB01_334-335_SO_N_20151019	334 - 335	FUL_DSB01_334-335_SO_N_20151019	Wet Chemistry
		10/19/2015	FUL_DSB01_393-394_SO_N_20151019	393 - 394	FUL_DSB01_393-394_SO_N_20151019	Wet Chemistry
		10/20/2015	FUL_DSB01_435-436_SO_N_20151020	435 - 436	FUL_DSB01_435-436_SO_N_20151020	Wet Chemistry
		10/20/2015	FUL_DSB01_453-454_SO_N_20151020	453 - 454	FUL_DSB01_453-454_SO_N_20151020	Wet Chemistry
DSB02	Soil	11/11/2015	FUL_DSB02_55-56_SO_N_20151111	55 - 56	BQAB2	TAL VOCs, TAL Metals, Wet Chemistry
		11/11/2015	FUL_DSB02_15-16_SO_N_20151111	15 - 16	FUL_DSB02_15-16_SO_N_20151111	Wet Chemistry
		11/11/2015	FUL_DSB02_61-62_SO_N_20151111	61 - 62	FUL_DSB02_61-62_SO_N_20151111	Wet Chemistry
		11/11/2015	FUL_DSB02_79-80_SO_N_20151111	79 - 80	FUL_DSB02_79-80_SO_N_20151111	Wet Chemistry
		11/12/2015	FUL_DSB02_114-115_SO_N_20151112	114 - 115	B0AB5	TAL VOCs, TAL Metals, Wet Chemistry
		11/12/2015	FUL_DSB02_150-151_SO_N_20151112	150 - 151	B0AB6	TAL VOCs, TAL Metals, Wet Chemistry
		11/12/2015	FUL_DSB02_196-197_SO_N_20151112	196 - 197	B0AB7	TAL VOCs, TAL Metals, Wet Chemistry
		11/12/2015	FUL_DSB02_177-178_SO_N_20151112	177 - 178	FUL_DSB02_177-178_SO_N_20151112	Wet Chemistry
		11/13/2015	FUL_DSB02_213-214_SO_N_20151113	213 - 214	B0AC2	TAL VOCs, TAL Metals, Wet Chemistry
		11/13/2015	FUL_DSB02_242-243_SO_N_20151113	242 - 243	B0AC3	TAL VOCs, TAL Metals, Wet Chemistry
		11/13/2015	FUL_DSB02_269-270_SO_N_20151113	269 - 270	B0AC4	TAL VOCs, TAL Metals, Wet Chemistry
		11/13/2015	FUL_DSB02_243-244_SO_N_20151113	243 - 244	FUL_DSB02_243-244_SO_N_20151113	Wet Chemistry
		11/13/2015	FUL_DSB02_287-288_SO_N_20151113	287 - 288	FUL_DSB02_287-288_SO_N_20151113	Wet Chemistry
		11/14/2015	FUL_DSB02_337-338_SO_N_20151114	337 - 338	B0AC6	TAL VOCs, TAL Metals, Wet Chemistry
		11/14/2015	FUL_DSB02_354-355_SO_N_20151114	354 - 355	B0AC8	TAL VOCs, TAL Metals, Wet Chemistry
		11/16/2015	FUL_DSB02_364-365_SO_N_20151116	364 - 365	B0AC9	TAL VOCs, TAL Metals, Wet Chemistry
		11/16/2015	FUL_DSB02_383-384_SO_N_20151116	383 - 384	B0AD1	TAL VOCs, CSIA, TAL Metals, Wet Chemistry
		11/16/2015	FUL_DSB02_395-396_SO_N_20151116	395 - 396	B0AD3	TAL VOCs, TAL Metals, Wet Chemistry
		11/16/2015	FUL_DSB02_403-404_SO_N_20151116	403 - 404	B0AD4	TAL VOCs, TAL Metals, Wet Chemistry
		11/16/2015	FUL_DSB02_367-368_SO_N_20151116	367 - 368	FUL_DSB02_367-368_SO_N_20151116	Wet Chemistry
		11/17/2015	FUL_DSB02_412-413_SO_N_20151117	412 - 413	B0AD5	TAL VOCs, TAL Metals, Wet Chemistry
DSB02_HYD	Hydrant	11/11/2015	FUL_DSB02_WQ_HYDRANT_20151111	0 - 0	B0AB3	TAL VOCs, TAL Metals, Wet Chemistry
DSB02RS	Soil	12/14/2015	FUL_DSB02RS_378-379_SO_N_20151214	378 - 379	BCC61	TAL VOCs, CSIA, TAL Metals, Wet Chemistry
		12/14/2015	FUL_DSB02RS_368-369_SO_N_20151214	368 - 369	FUL_DSB02RS_368-369_SO_N_20151214	Wet Chemistry
		12/14/2015	FUL_DSB02RS_370_SO_N_20151214	370 - 370	FUL_DSB02RS_370_SO_N_20151214	Wet Chemistry
		12/14/2015	FUL_DSB02RS_387-388_SO_N_20151214	387 - 388	FUL_DSB02RS_387-388_SO_N_20151214	Wet Chemistry

HDR APTIM
a Joint Venture

Table 2-5
Fulton Ave Superfund Site OU2: Sample Summary Table
Phase 4 Vertical Profile Boring- Soil Sampling

Location Name	Sampling Type	Sample Date	Sample Name	Sample Depth (ft bgs)	CLP Sample ID or Chain of Custody Sample ID	Analysis
DSB03	Soil	1/11/2016	FUL_DSB03_29-30_SO_N_20160111	29 - 30	BCC66 / MBCC66	TAL VOCs, TAL Metals, Wet Chemistry
		1/11/2016	FUL_DSB03_86-87_SO_N_20160111	86 - 87	BCC67 / MBCC67	TAL VOCs, TAL Metals, Wet Chemistry
		1/12/2016	FUL_DSB03_106-107_SO_N_20160112	106 - 107	BCC68 / MBCC68	TAL VOCs, TAL Metals, Wet Chemistry
		1/12/2016	FUL_DSB03_156-157_SO_N_20160112	156 - 157	BCC71 / MBCC71	TAL VOCs, TAL Metals, Wet Chemistry
		1/12/2016	FUL_DSB03_157-158_SO_N_20160112	157 - 158	FUL_DSB03_157-158_SO_N_20160112	Wet Chemistry
		1/14/2016	FUL_DSB03_174-175_SO_N_20160114	174 - 175	BCC75 / MBCC75	TAL VOCs, TAL Metals, Wet Chemistry
		1/14/2016	FUL_DSB03_183-184_SO_N_20160114	183 - 184	BCC76 / MBCC76	TAL VOCs, TAL Metals, Wet Chemistry
		1/15/2016	FUL_DSB03_236-237_SO_N_20160115	236 - 237	BCC78 / MBCC78	TAL VOCs, TAL Metals, Wet Chemistry
		1/15/2016	FUL_DSB03_260-261_SO_N_20160115	260 - 261	BCC79 / MBCC79	TAL VOCs, TAL Metals, Wet Chemistry
		1/15/2016	FUL_DSB03_315-316_SO_N_20160115	315 - 316	BCC81 / MBCC81	TAL VOCs, TAL Metals, Wet Chemistry
		1/16/2016	FUL_DSB03_342-343_SO_N_20160116	342 - 343	BCC82 / MBCC82	TAL VOCs, TAL Metals, Wet Chemistry
		1/16/2016	FUL_DSB03_368-369_SO_N_20160116	368 - 369	BCC84 / MBCC84	TAL VOCs, TAL Metals, Wet Chemistry
		1/18/2016	FUL_DSB03_392-393_SO_N_20160118	392 - 393	BCC86 / MBCC86	TAL VOCs, TAL Metals, Wet Chemistry
		1/20/2016	FUL_DSB03_432-433_SO_N_20160120	432 - 433	BCC87 / MBCC87	TAL VOCs, TAL Metals, Wet Chemistry
		1/20/2016	FUL_DSB03_449-450_SO_N_20160120	449 - 450	BCC89 / MBCC89	TAL VOCs, TAL Metals, Wet Chemistry
		1/20/2016	FUL_DSB03_452-453_SO_N_20160120	452 - 453	BCC90 / MBCC90	TAL VOCs, TAL Metals, Wet Chemistry
		1/20/2016	FUL_DSB03_468-469_SO_N_20160120	468 - 469	BCC91 / MBCC91	TAL VOCs, TAL Metals, Wet Chemistry
		1/21/2016	FUL_DSB03_489-490_SO_N_20160121	489 - 490	FUL_DSB03_489-490_SO_N_20160121	TAL VOCs, TAL Metals, Wet Chemistry
DSB03_HYD	Hydrant	1/11/2016	FUL_DSB03_WQ_HYDRANT_20160111	0 - 0	BCC63	TAL VOCs, TAL Metals, Wet Chemistry
Field Duplicates						
DSB02	Soil	11/16/2015	FUL_DSB02_383-384_SO_FD_20151116	383 - 384	B0AD2	TAL VOCs, TAL Metals, Wet Chemistry
DSB03	Soil	1/12/2016	FUL_DSB03_106-107_SO_FD_20160112	106 - 107	BCC70 / MBCC70	TAL VOCs, TAL Metals, Wet Chemistry
Equipment (Rinsate) Blanks						
		10/30/2015	FUL_RB_20151030		B0AA9	TCL VOCs, CSIA, Iron & Manganese, MNA Parameters, SVOCs (1,4-Dioxane)
		11/12/2015	FUL_RB_20151112		B0AC1	TCL VOCs, CSIA, TAL Metals, MNA Parameters, SVOCs (1,4-Dioxane)

HDR APTIM
a Joint Venture

Table 2-5
Fulton Ave Superfund Site OU2: Sample Summary Table
Phase 4 Vertical Profile Boring Groundwater Screening/Sampling

Location Name	Sampling Type	Sample Date	Sample Name	Sample Depth (ft bgs)	CLP Sample ID or Chain of Custody Sample ID	Analysis
Field Samples						
DSB01	Grab	10/30/2015	FUL_DSB01_466-468_WG_N_20151030	466	B0AB0 / MB0AB0	TCL VOCs + TICs, TAL Metals, MNA Parameters
DSB02	MW	8/24/2016	FUL_DSB02RS_377_GW_N_20160824	377	FUL_DSB02RS_377_GW_N_20160824	TCL VOCs + TICs, TAL Metals, MNA Parameters
N-11171	MW	1/13/2016	FUL_N11171_215-235_WG_N_20160113	215	BCC72 / MBCC72	TCL VOCs + TICs, TAL Metals, MNA Parameters
N-11172	MW	1/13/2016	FUL_N11172_415-435_WG_N_20160113	415	BCC74 / MBCC74	TCL VOCs + TICs, TAL Metals, MNA Parameters
Field Duplicates						
DSB02	MW	8/24/2016	FUL_DSB02RS_377_GW_FD_20160824	377	FUL_DSB02RS_377_GW_FD_20160824	TCL VOCs + TICs, TAL Metals, MNA Parameters
Equipment (Rinsate) Blanks						
		10/14/2015	FUL_DRILL_WQ_2015_10_14		B0AA4 / MB0AA4	TCL VOCs + TICs, TAL Metals, MNA Parameters
		10/30/2015	FUL_EB_20151030		B0AA8 / MB0AA8	TCL VOCs + TICs, TAL Metals, MNA Parameters
		11/12/2015	FUL_EB_20151112		B0AB9 / MB0AB9	TCL VOCs + TICs, TAL Metals, MNA Parameters
		8/24/2016	FUL_EB_20160824		FUL_EB_20160824	TCL VOCs + TICs, TAL Metals, MNA Parameters
Field Blanks						
		10/30/2015	FUL_FB_20151030		B0AA7 / MB0AA7	TCL VOCs + TICs, TAL Metals, MNA Parameters
		11/12/2015	FUL_FB_20151112		B0AC0 / MB0AC0	TCL VOCs + TICs, TAL Metals, MNA Parameters
		1/11/2016	FUL_FB_20160111		BCC65 / MBCC65	TCL VOCs + TICs, TAL Metals, MNA Parameters
		8/24/2016	FUL_FB_20160824		FUL_FB_20160824	TCL VOCs + TICs, TAL Metals, MNA Parameters
Trip Blanks						
		10/14/2015	FUL_TB_2015_10_14		B0AA5	TCL VOCs + TICs
		10/30/2015	FUL_TB_20151030		B0AA6	TCL VOCs + TICs
		11/11/2015	FUL_DSB02_TB_20151111_ALS		B0AB4	TCL VOCs + TICs
		11/12/2015	FUL_TB_20151112_ALS		B0AB8	TCL VOCs + TICs
		11/13/2015	FUL_TB_20151113_ALS		B0AC5	TCL VOCs + TICs
		11/14/2015	FUL_TB_20151114_ALS		B0AC7	TCL VOCs + TICs
		11/16/2015	FUL_TB_20151116_ALS		B0AD0	TCL VOCs + TICs
		11/16/2015	FUL_TB_20151116_PACE		17402-2	TCL VOCs + TICs, CSIA
		11/17/2015	FUL_DSB02_TB_20151117_ALS		B0AD6	TCL VOCs + TICs
		12/14/2015	FUL_TB_20151214_CHEMTECH		BCC62	TCL VOCs + TICs
		12/14/2015	FUL_TB_20151214_PACE		17688-2	TCL VOCs + TICs, CSIA
		1/11/2016	FUL_TB_20160111_CHEM		BCC64	TCL VOCs + TICs
		1/12/2016	FUL_TB_20160112_CHEM		BCC69	TCL VOCs + TICs
		1/13/2016	FUL_TB_20160113_CHEM		BCC73	TCL VOCs + TICs
		1/14/2016	FUL_TB_20160114_CHEM		BCC77	TCL VOCs + TICs
		1/15/2016	FUL_TB_20160115_CHEM		BCC80	TCL VOCs + TICs
		1/16/2016	FUL_TB_20160116_CHEM		BCC83	TCL VOCs + TICs
		1/18/2016	FUL_TB_20160118_CHEM		BCC85	TCL VOCs + TICs
		1/20/2016	FUL_TB_20160120_CHEM		BCC88	TCL VOCs + TICs
		1/21/2016	FIL_TB_20160121_CHEM		FIL_TB_20160121_Chem	TCL VOCs + TICs
		8/24/2016	FUL_TB_2016_08_24_DESA		FUL_TB_2016_08_24_DESA	TCL VOCs + TICs

MW - Monitoring Well
PWS - Public Water Supply Well

HDR APTIM
a Joint Venture

Table 2-6
Fulton Ave Superfund Site OU2
Synoptic Groundwater Elevation and Monitoring Well Construction - 2019

Well ID	Alternate Well Name	Measuring Point Elevation	Well Depth (ft, bgs)	Top of Screen	Bottom of Screen	Aquifer	DTW (ft, bTOC) 08/27/19	Groundwater Elevation - 08/27/19	DTW (ft, bTOC) 12/03/19	Groundwater Elevation - 12/03/19
N-01126	E-10	89.11	69.70	70.3	73.3	Upper Glacial	37.11	52.00	36.71	52.40
N-10486	GCP08	93.49	58.65	50	60	Upper Glacial	38.39	55.10	39.57	53.92
N-10487	GCP09	92.33	58.80	51	61	Upper Glacial	35.77	56.56	37.10	55.23
N-11739	GCP12S	94.34	61.60	37	57	Upper Glacial	38.97	55.37	40.02	54.32
GCP18S	-	90.18	53.55	39	54	Upper Glacial	33.29	56.89	34.77	55.41
N-10330	GCP01	89.54	54.25	49	59	Upper Glacial	32.16	57.38	33.49	56.05
N-01614	-	105.21	74.70	65	75	Upper Glacial	39.98	65.23	41.64	63.57
MW-03 ROS	-	106.05	55.90	44.9	54.9	Upper Glacial	41.15	64.90	42.21	63.84
N-09942	-	115.53	65.70	55	65	Upper Glacial	48.00	67.53	49.19	66.34
MW-8S	-	101.38	68.00	57	67	Upper Glacial	47.00	54.38	47.94	53.44
MW-9S	-	96.83	66.85	58	68	Upper Glacial	46.69	50.14	47.64	49.19
MW-4 ZOE	-	79.85	45.00	30	45	Upper Glacial	NM	NM	24.21	55.64
N-09949	-	109.43	96.40	91	96	Upper Glacial	53.08	56.35	53.92	55.51
N-12274	-	109.69	69.30	60	70	Upper Glacial	42.23	67.46	42.65	67.04
N-12278	-	83.10	74.00	58	70	Upper Glacial	35.48	47.62	36.56	46.54
N-00097-1	-	80.69	32.30	25.7	35.7	Upper Glacial	27.52	53.17	28.51	52.18
N-00097-2	-	81.08	34.50	25	35	Upper Glacial	27.36	53.72	26.07	55.01
N-11729	GCP10D	104.72	111.15	88	113	Magothy	37.53	67.19	39.37	65.35
N-09712	-	139.39	153.00	142	153	Magothy	71.23	68.16	70.69	68.70
MW-15A	-	94.72	150.80	140	150	Magothy	37.06	57.66	37.88	56.84
MW-15B	N-13299	94.35	365.00	350	360	Magothy	37.72	56.63	38.11	56.24
MW-20A	N-13292	87.87	151.60	140	150	Magothy	34.33	53.54	35.46	52.41
MW-20B	-	87.52	244.00	244	254	Magothy	4.38	83.14	0.51	87.01
MW-20C	-	87.56	410.80	400	410	Magothy	35.21	52.35	35.47	52.09
MW-21A	N-13290	87.82	130.27	120	130	Magothy	30.35	57.47	31.51	56.31
MW-21B	-	87.71	340.00	330	340	Magothy	35.44	52.27	33.54	54.17
MW-21C	N-13300	87.79	404.66	390	400	Magothy	36.14	51.65	33.64	54.15
MW-23C	-	81.70	408.55	398	408	Magothy	37.92	43.78	34.91	46.79
MW-25A	-	79.30	353.75	340	350	Magothy	23.40	55.90	23.95	55.35
N-11171	M-6	77.39	225.85	215	235	Magothy	23.52	53.87	24.42	52.97
N-11172	M-5	77.30	465.30	415	435	Magothy	24.16	53.14	24.91	52.39
DSB02RS	-	91.52	380.50	372	382	Magothy	39.19	52.33	38.13	53.39
N-11735	GCP13D	86.18	161.50	145	170	Magothy	33.19	52.99	34.13	52.05
GCP18D	-	96.42	125.30	113	126	Magothy	32.97	63.45	34.43	61.99
N-11733	GCP07D	98.07	168.05	146	166	Magothy	43.55	54.52	44.19	53.88
N-11865	M-40	88.78	199.00	195	199	Magothy	40.61	48.17	40.97	47.81
N-11659	-	106.68	432.70	399	419	Magothy	52.00	54.68	50.05	56.63
MW-24A	-	98.93	361.00	345	355	Magothy	43.89	55.04	44.98	53.95
MW-24B	N-13285	99.06	427.43	415	425	Magothy	44.00	55.06	44.80	54.26
N-12113	M52	78.44	184.30	180	200	Magothy	31.65	46.79	32.75	45.69
N-12114	M51	78.83	425.50	400	425	Magothy	34.64	44.19	35.31	43.52
MW-10D	-	103.20	116.00	106	116	Magothy	48.15	55.05	49.20	54.00
MW-10MS	-	102.85	193.70	186	196	Magothy	48.79	54.06	49.96	52.89
MW-8D	-	101.40	115.80	106	116	Magothy	47.05	54.35	47.97	53.43
MW-9D	-	100.39	125.00	115	125	Magothy	46.64	53.75	47.33	53.06

HDR APTIM
a Joint Venture

Table 2-7
Fulton Ave Superfund Site OU2: Sample Summary Table
Phase 5 Groundwater Sampling

Location Name	Sampling Type	Sample Date	Sample Name	Sample Depth (ft bgs)	CLP Sample ID or Chain of Custody Sample ID	Analysis
Field Samples						
DSB02RS	MW	8/29/2019	DSB02RS-GW-377-20190829-0	377	BFD65 / MBFD65	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/6/2019	DSB02RS-GW-377-20191206-0	377	BFDE2	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
GCP18S	MW	9/5/2019	GCP18S-GW-46.5-20190905-0	46.5	BFDA9 / MBFDA9	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/12/2019	GCP18S-GW-46.5-20191212-0	46.5	BF726	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
MW-03 ROS	MW	8/28/2019	MW-03ROS-GW-050-20190829-0	50	BFD63 / MBFD63	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/11/2019	MW-03ROS-GW-050-20191211-0	50	BF712	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
MW-10D	MW	8/28/2019	MW-10D-GW-111-20190828-0	111	BFD59 / MBFD59	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/5/2019	MW-10D-GW-111-20191205-0	111	BFDD5	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
MW-10MS	MW	8/28/2019	MW-10MS-GW-190-20190829-0	190	BFD67 / MBFD67	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/5/2019	MW-10MS-GW-190-20191205-0	190	BFDD4	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
MW-15A	MW	9/3/2019	MW-15A-GW-145-20190903-0	145	BFD71 / MBFD71	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/9/2019	MW-15A-GW-145-20191209-0	145	BF6Z8	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
MW-20C	MW	9/3/2019	MW-20C-GW-405-20190903-0	405	BFD70 / MBFD70	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/9/2019	MW-20C-GW-405-20191209-0	405	BF701	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
MW-21C	MW	9/9/2019	MW-21C-GW-400-20190909-0	400	BFDC1 / MBFDC1	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/5/2019	MW-21C-GW-400-20191205-0	400	BFDD6	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
MW-21D	MW	9/9/2019	MW-21D-GW-455-20190909-0	455	BFDC2 / MBFDC2	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/5/2019	MW-21D-GW-455-20191205-0	455	BFDD3	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
MW-23C	MW	9/3/2019	MW-23C-GW-403-20190903-0	403	BFD83 / MBFD83	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/9/2019	MW-23C-GW-403-20191209-0	403	BF700	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
MW-24A	MW	9/5/2019	MW-24A-GW-350-20190905-0	350	BFDA2 / MBFDA2	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/11/2019	MW-24A-GW-350-20191211-0	350	BF716	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
MW-25A	MW	9/5/2019	MW-25A-GW-345-20190905-0	345	BFDA3 / MBFDA3	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/6/2019	MW-25A-GW-345-20191206-0	345	BFDE1	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
MW-26F	MW	9/5/2019	MW-26F-GW-410-20190905-0	410	BFDA6 / MBFDA6	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/9/2019	MW-26F-GW-410-20191209-0	410	BF6Z9	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
MW-26G	MW	9/5/2019	MW-26G-GW-443-20190905-0	443	BFDA7 / MBFDA7	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/9/2019	MW-26G-GW-443-20191209-0	443	BFDE6	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
MW-4 ZOE	MW	9/4/2019	MW-4ZOE-GW-037-20190904-0	37	BFD89 / MBFD89	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
MW-8D	MW	9/4/2019	MW-8D-GW-111-20190904-0	111	BFD85 / MBFD85	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/4/2019	MW-8D-GW-111-20191204-0	111	BFDC9	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
MW-8S	MW	9/4/2019	MW-8S-GW-062-20190904-0	52	BFD84 / MBFD84	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/4/2019	MW-8S-GW-062-20191204-0	62	BFDC6	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
MW-9D	MW	9/4/2019	MW-9D-GW-120-20190904-0	120	BFDA1 / MBFDA1	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/4/2019	MW-9D-GW-120-20191204-0	120	BFDC7	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
MW-9S	MW	9/4/2019	MW-9S-GW-063-20190904-0	63	BFDA0 / MBFDA0	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/4/2019	MW-9S-GW-063-20191204-0	63	BFDD0	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-00017	PWS	9/4/2019	N-00017-GW-405-465-20190904-0	405	BFD93 / MBFD93	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/12/2019	N-00017-GW-405-465-20191212-0	405	BF737	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-00104	PWS	9/3/2019	N-00104-GW-325-376-20190903-0	325	BFD80 / MBFD80	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/11/2019	N-00104-GW-325-376-20191211-0	325	BF718	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-01697	PWS	9/4/2019	N-01697-GW-478-518-20190904-0	478	BFD92 / MBFD92	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/11/2019	N-01697-GW-478-518-20191211-0	478	BF713	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters

MW - Monitoring Well
PWS - Public Water Supply Well

HDR APTIM
a Joint Venture

Table 2-7
Fulton Ave Superfund Site OU2: Sample Summary Table
Phase 5 Groundwater Sampling

Location Name	Sampling Type	Sample Date	Sample Name	Sample Depth (ft bgs)	CLP Sample ID or Chain of Custody Sample ID	Analysis
N-02487	PWS	9/3/2019	N-02487-GW-424-434-20190903-0	424	BFD82 / MBFD82	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/12/2019	N-02487-GW-424-434-20191212-0	424	BF730	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-03185	PWS	9/3/2019	N-03185-GW-423-463-20190903-0	423	BFD75 / MBFD75	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/12/2019	N-03185-GW-423-463-20191212-0	423	BF725	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-03603	PWS	9/3/2019	N-03603-GW-443-493-20190903-0	443	BFD74 / MBFD74	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/12/2019	N-03603-GW-443-493-20191212-0	443	BF723	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-03732	PWS	12/12/2019	N-03732-GW-310-350-20191212-0	310	BF729	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-03881	PWS	9/4/2019	N-03881-GW-426-466-20190904-0	426	BFD91 / MBFD91	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-04298	PWS	9/4/2019	N-04298-GW-344-394-20190904-0	344	BFD98 / MBFD98	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/12/2019	N-04298-GW-344-394-20191212-0	344	BF735	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-05603	PWS	9/3/2019	N-05603-GW-365-415-20190903-0	365	BFD79 / MBFD79	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/11/2019	N-05603-GW-365-415-20191211-0	365	BF711	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-06745	PWS	9/4/2019	N-06745-GW-304-344-20190904-0	304	BFD99 / MBFD99	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-07058	PWS	9/4/2019	N-07058-GW-380-440-20190904-0	380	BFD90 / MBFD90	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/11/2019	N-07058-GW-380-440-20191211-0	380	BF714	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-07649	PWS	9/4/2019	N-07649-GW-165-205-20190904-0	165	BFD95 / MBFD95	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/12/2019	N-07649-GW-165-205-20191212-0	165	BF732	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-07650	PWS	9/4/2019	N-07650-GW-400-420-20190904-0	400	BFD97 / MBFD97	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/12/2019	N-07650-GW-400-420-20191212-0	400	BF734	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-08248	PWS	9/3/2019	N-08248-GW-315-400-20190903-0	315	BFD81 / MBFD81	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/11/2019	N-08248-GW-315-400-20191211-0	315	BF719	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-08339	PWS	9/4/2019	N-08339-GW-308-358-20190904-0	308	BFD88 / MBFD88	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/11/2019	N-08339-GW-308-358-20191211-0	308	BF715	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-08409	PWS	9/3/2019	N-08409-GW-340-400-20190903-0	340	BFD78 / MBFD78	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/11/2019	N-08409-GW-340-400-20191211-0	340	BF710	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-08576	PWS	9/3/2019	N-08576-GW-445-505-20190903-0	445	BFD76 / MBFD76	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/12/2019	N-08576-GW-445-505-20191212-0	445	BF724	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-09949	MW	9/4/2019	N-09949-GW-93.5-20190904-0	93.5	BFD94 / MBFD94	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/10/2019	N-09949-GW-93.5-20191210-0	93.5	BF706	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-10330	MW	9/5/2019	N-10330-GW-052-20190905-0	52	BFDA8 / MBFDA8	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/12/2019	N-10330-GW-052-20191212-0	52	BF731	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-10486	MW	9/6/2019	N-10486-GW-054-20190906-0	54	BFDB2 / MBFDB2	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/11/2019	N-10486-GW-054-20191211-0	54	BF720	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-10487	MW	8/28/2019	N-10487-GW-056-20190828-0	56	BFD58 / MBFD58	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/6/2019	N-10487-GW-056-20191206-0	56	BFDD9	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-11171	MW	8/28/2019	N-11171-GW-220-20190829-0	220	BFD66 / MBFD66	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/6/2019	N-11171-GW-220-20191206-0	220	BFDE0	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-11659	MW	9/3/2019	N-11659-GW-409-20190903-0	409	BFD77 / MBFD77	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/10/2019	N-11659-GW-409-20191210-0	409	BF705	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-11733	MW	9/6/2019	N-11733-GW-156-20190906-0	156	BFDB3 / MBFDB3	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/10/2019	N-11733-GW-156-20191210-0	156	BF704	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-11735	MW	9/6/2019	N-11735-GW-153-20190906-0	153	BFDB5 / MBFDB5	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/10/2019	N-11735-GW-153-20191210-0	153	BF707	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-11739	MW	9/6/2019	N-11739-GW-047-20190906-0	47	BFDB6 / MBFDB6	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/12/2019	N-11739-GW-047-20191212-0	47	BF728	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-11865	MW	9/6/2019	N-11865-GW-195-20190906-0	195	BFDB4 / MBFDB4	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
		12/11/2019	N-11865-GW-195-20191211-0	195	BF717	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-14146	PWS	12/12/2019	N-14146-GW-370-430-20191212-0	370	BF727	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters

MW - Monitoring Well
PWS - Public Water Supply Well

HDR APTIM
a Joint Venture

Table 2-7
Fulton Ave Superfund Site OU2: Sample Summary Table
Phase 5 Groundwater Sampling

Location Name	Sampling Type	Sample Date	Sample Name	Sample Depth (ft bgs)	CLP Sample ID or Chain of Custody Sample ID	Analysis
Field Duplicates						
MW-03 ROS	MW	8/29/2019	MW-03ROS-GW-050-20190829-1	50	BFD64 / MBFD64	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-07649	PWS	9/4/2019	N-07649-GW-165-205-20190904-1	165	BFD96 / MBFD96	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
N-11739	MW	9/6/2019	N-11739-GW-047-20190906-1	47	BFDB7 / MBFDB7	TCL VOCs + TICs, CSIA, Organic Acids, Fe & Mn & Na, MNA Parameters
Equipment (Rinsate) Blanks						
		8/28/2019	EB-20190828		BFD60 / MBFD60	TCL VOCs + TICs, Organic Acids, Fe & Mn & Na, MNA Parameters
		9/9/2019	EB-20190909		BFDB8 / MBFDB8	TCL VOCs + TICs, Organic Acids, Fe & Mn & Na, MNA Parameters
Field Blanks						
		8/28/2019	FB-20190829		BFD68 / MBFD68	TCL VOCs + TICs, Organic Acids, Fe & Mn & Na, MNA Parameters
		8/28/2019	FB-20190828		BFD61 / MBFD61	TCL VOCs + TICs, Organic Acids, Fe & Mn & Na, MNA Parameters
		9/3/2019	FB-20190903		BFD72 / MBFD72	TCL VOCs + TICs, Organic Acids, Fe & Mn & Na, MNA Parameters
		9/4/2019	FB-20190904		BFD86 / MBFD86	TCL VOCs + TICs, Organic Acids, Fe & Mn & Na, MNA Parameters
		9/5/2019	FB-20190905		BFDA5 / MBFDA5	TCL VOCs + TICs, Organic Acids, Fe & Mn & Na, MNA Parameters
		9/6/2019	FB-20190906		BFDB1 / MBFDB1	TCL VOCs + TICs, Organic Acids, Fe & Mn & Na, MNA Parameters
		9/9/2019	FB-20190909		BFDB9 / MBFDB9	TCL VOCs + TICs, Organic Acids, Fe & Mn & Na, MNA Parameters
Trip Blanks						
		8/28/2019	TB-20190829		BFD69	TCL VOCs + TICs
		8/28/2019	TB-20190828		BFD62	TCL VOCs + TICs
		9/3/2019	TB-20190903		BFD73	TCL VOCs + TICs
		9/4/2019	TB-20190904		BFD87	TCL VOCs + TICs
		9/5/2019	TB-20190905		BFDA4	TCL VOCs + TICs
		9/6/2019	TB-20190906		BFDB0	TCL VOCs + TICs
		9/9/2019	TB-20190909		BFDC0	TCL VOCs + TICs

MW - Monitoring Well
PWS - Public Water Supply Well

HDR APTIM
a Joint Venture

Table 2-7
Fulton Ave Superfund Site OU2: Sample Summary Table
Phase 5 Soil Gas Sampling

Location Name	Sampling Type	Sample Date	Sample Name	CLP Sample ID or Chain of Custody Sample ID	Analysis
Field Samples					
118-FUL-3-SS	Subslab Soil	10/22/2019	118-FUL-3-SS-20191022	118-FUL-3-SS-20191022	TAL VOCs, CSIA
	Vapor	3/18/2020	118-FUL-3-SS-20200317	118-FUL-3-SS-20200317	TAL VOCs, CSIA
118-FUL-5-IA	Indoor Air	3/18/2020	118-FUL-5-IA-20200317	118-FUL-5-IA-20200317	TAL VOCs
118-FUL-5-SS	Subslab Soil	3/18/2020	118-FUL-5-SS-20200317	118-FUL-5-SS-20200317	TAL VOCs
118-FUL-OA	Vapor	3/18/2020	118-FUL-OA-20200317	118-FUL-OA-20200317	TAL VOCs
150-FUL-2-IA	Indoor Air	3/13/2020	150-FUL-2-IA-20200312	150-FUL-2-IA-20200312	TAL VOCs
150-FUL-2-SS	Subslab Soil	3/13/2020	150-FUL-2-SS-20200312	150-FUL-2-SS-20200312	TAL VOCs
150-FUL-3-IA	Vapor	3/13/2020	150-FUL-3-IA-20200312	150-FUL-3-IA-20200312	TAL VOCs
150-FUL-3-SS	Subslab Soil	3/13/2020	150-FUL-3-SS-20200312	150-FUL-3-SS-20200312	TAL VOCs
150-FUL-4-IA	Vapor	3/13/2020	150-FUL-4-IA-20200312	150-FUL-4-IA-20200312	TAL VOCs
150-FUL-4-SS	Subslab Soil	10/22/2019	150-FUL-4-SS-20191022	150-FUL-4-20191022	TAL VOCs, CSIA
	Vapor	3/13/2020	150-FUL-4-SS-20200312	150-FUL-4-SS-20200312	TAL VOCs
150-FUL-5-IA	Indoor Air	3/13/2020	150-FUL-5-IA-20200312	150-FUL-5-IA-20200312	TAL VOCs
150-FUL-5-SS	Subslab Soil	3/13/2020	150-FUL-5-SS-20200312	150-FUL-5-SS-20200312	TAL VOCs, CSIA
150-FUL-6-IA	Vapor	3/13/2020	150-FUL-6-IA-20200312	150-FUL-6-IA-20200312	TAL VOCs
150-FUL-6-SS	Subslab Soil	3/13/2020	150-FUL-6-SS-20200312	150-FUL-6-SS-20200312	TAL VOCs
150-FUL-7-IA	Vapor	3/13/2020	150-FUL-7-IA-20200312	150-FUL-7-IA-20200312	TAL VOCs
150-FUL-7-SS	Subslab Soil	10/22/2019	150-FUL-7-SS-20191022	150-FUL-7-20191022	TAL VOCs, CSIA
	Vapor	3/13/2020	150-FUL-7-SS-20200312	150-FUL-7-SS-20200312	TAL VOCs, CSIA
150-FUL-OA	Outdoor Air	3/13/2020	150-FUL-OA-20200312	150-FUL-OA-20200312	TAL VOCs
180-ATL-3-SS	Subslab Soil	10/24/2019	180-ATL-3-SS-20191024	180-ATL-3-SS-20191024	TAL VOCs, CSIA
	Vapor	3/18/2020	180-ATL-3-SS-20200317	180-ATL-3-SS-20200317	TAL VOCs, CSIA
180-ATL-6-SS	Subslab Soil	10/24/2019	180-ATL-6-SS-20191024	180-ATL-6-20191024	TAL VOCs, CSIA
	Vapor	3/18/2020	180-ATL-6-SS-20200317	180-ATL-6-SS-20200317	TAL VOCs, CSIA
194-ATL-3-IA	Indoor Air	3/17/2020	194-ATL-3-IA-20200316	194-ATL-3-IA-20200316	TAL VOCs
194-ATL-3-SS	Subslab Soil	10/25/2019	194-ATL-3-SS-20191025	194-ATL-3-SS-20191025	TAL VOCs, CSIA
	Vapor	3/17/2020	194-ATL-3-SS-20200316	194-ATL-3-SS-20200316	TAL VOCs, CSIA
194-ATL-4-IA	Indoor Air	3/17/2020	194-ATL-4-IA-20200316	194-ATL-4-IA-20200316	TAL VOCs
194-ATL-4-SS	Subslab Soil	3/17/2020	194-ATL-4-SS-20200316	194-ATL-4-SS-20200316	TAL VOCs
194-ATL-OA	Vapor	3/17/2020	194-ATL-OA-20200316	194-ATL-OA-20200316	TAL VOCs
197-ATL-1-IA	Indoor Air	3/17/2020	197-ATL-1-IA-20200316	197-ATL-1-IA-20200316	TAL VOCs
197-ATL-1-SS	Subslab Soil	10/25/2019	197-ATL-1-SS-20191025	197-ATL-1-SS-20191025	TAL VOCs, CSIA
	Vapor	3/17/2020	197-ATL-1-SS-20200316	197-ATL-1-SS-20200316	TAL VOCs, CSIA
200-FUL-4-IA	Indoor Air	3/17/2020	200-FUL-4-IA-20200316	200-FUL-4-IA-20200316	TAL VOCs
200-FUL-4-SS	Subslab Soil	3/17/2020	200-FUL-4-SS-20200316	200-FUL-4-SS-20200316	TAL VOCs
200-FUL-5-IA	Vapor	3/17/2020	200-FUL-5-IA-20200316	200-FUL-5-IA-20200316	TAL VOCs
200-FUL-5-SS	Subslab Soil	10/22/2019	200-FUL-5-SS-20191023	200-FUL-5-20191023	TAL VOCs, CSIA
	Vapor	3/17/2020	200-FUL-5-SS-20200316	200-FUL-5-SS-20200316	TAL VOCs, CSIA
200-FUL-6-IA	Indoor Air	3/17/2020	200-FUL-6-IA-20200316	200-FUL-6-IA-20200316	TAL VOCs
200-FUL-6-SS	Subslab Soil	3/17/2020	200-FUL-6-SS-20200316	200-FUL-6-SS-20200316	TAL VOCs
270-PARK-1-IA	Vapor	3/20/2020	270-PARK-1-IA-20200319	270-PARK-1-IA-20200319	TAL VOCs
270-PARK-1-SS	Subslab Soil	3/20/2020	270-PARK-1-SS-20200319	270-PARK-1-SS-20200319	TAL VOCs
270-PARK-4-IA	Vapor	3/20/2020	270-PARK-4-IA-20200319	270-PARK-4-IA-20200319	TAL VOCs
270-PARK-4-SS	Subslab Soil	3/20/2020	270-PARK-4-SS-20200319	270-PARK-4-SS-20200319	TAL VOCs
270-PARK-OA	Vapor	3/20/2020	270-PARK-OA-20200319	270-PARK-OA-20200319	TAL VOCs

HDR APTIM
a Joint Venture

Table 2-7
Fulton Ave Superfund Site OU2: Sample Summary Table
Phase 5 Soil Gas Sampling

Location Name	Sampling Type	Sample Date	Sample Name	CLP Sample ID or Chain of Custody Sample ID	Analysis
40-ROS-16-SS	Subslab Soil Vapor	10/23/2019	40-ROS-16-SS-20191023	40-ROS-16-SS-20191023	TAL VOCs, CSIA
		3/20/2020	40-ROS-16-SS-20200319	40-ROS-16-SS-20200319	TAL VOCs, CSIA
40-ROS-21-SS	Subslab Soil Vapor	10/23/2019	40-ROS-21-SS-20191023	40-ROS-21-SS-20191023	TAL VOCs, CSIA
		3/20/2020	40-ROS-21-SS-20200319	40-ROS-21-SS-20200319	TAL VOCs, CSIA
Field Duplicates					
150-FUL-2-SS	Subslab Soil Vapor	3/13/2020	150-FUL-2D-SS-20200312	150-FUL-2D-SS-20200312	TAL VOCs
200-FUL-6-SS		3/17/2020	200-FUL-6D-SS-20200316	200-FUL-6D-SS-20200316	TAL VOCs

Fulton Avenue Superfund Site OU2 RI/FS
Table 4-1
Potential Delineation Criteria (PDC) - Groundwater Screening

Analyte	CAS	EPA MCLs (ug/l)	NYSWQS 703.5 (ug/l)	NY TOGS 1.1.1 (ug/l)	NYDOH MCLs (ug/l)	Potential Delineation Criteria (ug/l)
Metals						
Aluminum	7429-90-5					
Antimony	7440-36-0	6	3		6	3
Arsenic	7440-38-2	10	25		10	10
Barium	7440-39-3	2000	1000		2000	1000
Beryllium	7440-41-7	4	3	3	4	3
Cadmium	7440-43-9		5		5	5
Calcium	7440-70-2					
Chromium, Total	7440-47-3	100	50		100	50
Cobalt	7440-48-4					
Copper	7440-50-8	1300	200			200
Ferrous Iron	8053-60-9					
Iron	7439-89-6		300		300	300
Iron, Ion (Fe2+)	15438-31-0					
Lead	7439-92-1	15	25			15
Magnesium	7439-95-4		35000	35000		35000
Manganese	7439-96-5		300		300	300
Nickel	7440-02-0		100			100
Potassium	7440-09-7					
Selenium	7782-49-2	50	10		50	10
Silver	7440-22-4		50		100	50
Sodium	7440-23-5		20000			20000
Thallium	7440-28-0	2	0.5	0.5	2	0.5
Vanadium	7440-62-2					
Zinc	7440-66-6		2000	2000	5000	2000
VOCs						
1,1,1,2-Tetrachloroethane	630-20-6		5		5	5
1,1,1-Trichloroethane	71-55-6	200	5		5	5
1,1,2,2-Tetrachloroethane	79-34-5		5		5	5
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1		5			5
1,1,2-Trichloroethane	79-00-5	5	1		5	1
1,1-Dichloroethane	75-34-3		5		5	5
1,1-Dichloroethene	75-35-4	7	5		5	5
1,1-Dichloropropene	563-58-6				5	5
1,2,3-Trichlorobenzene	87-61-6		5		5	5
1,2,3-Trichloropropane	96-18-4		0.04		5	0.04
1,2,4,5-Tetramethylbenzene	95-93-2					
1,2,4-Trichlorobenzene	120-82-1	70	5		5	5
1,2,4-Trimethylbenzene	95-63-6		5		5	5
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	0.04		0.2	0.04
1,2-Dibromoethane	106-93-4	0.05	0.0006		0.05	0.0006
1,2-Dichlorobenzene	95-50-1	600	3		5	3
1,2-Dichloroethane	107-06-2	5	0.6		5	0.6
1,2-Dichloropropane	78-87-5	5	1		5	1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8		5		5	5
1,3-Dichlorobenzene	541-73-1		3		5	3
1,3-Dichloropropane	142-28-9		5		5	5
1,4-Dichlorobenzene	106-46-7	75	3		5	3
1,4-Diethyl Benzene	105-05-5					
1,4-Dioxane (P-Dioxane)	123-91-1				1	1
2,2-Dichloropropane	594-20-7		5		5	5
2,4-DICHLOROTOLUENE	95-73-8		5			5
2-Butanone	78-93-3		50	50		50
2-Chlorotoluene	95-49-8		5		5	5
2-Hexanone	591-78-6		50	50		50
4-Chlorotoluene	106-43-4		5		5	5
4-Methyl-2-Pentanone	108-10-1					

Table 4-1

Potential Delineation Criteria (PDC) - Groundwater Screening

Analyte	CAS	EPA MCLs (ug/l)	NYSWQS 703.5 (ug/l)	NY TOGS 1.1.1 (ug/l)	NYDOH MCLs (ug/l)	Potential Delineation Criteria (ug/l)
Acetone	67-64-1		50	50		50
Benzene	71-43-2	5	1		5	1
Bromobenzene	108-86-1		5		5	5
Bromochloromethane	74-97-5		5		5	5
Bromodichloromethane	75-27-4	80	50	50	80	50
Bromoform	75-25-2	80	50	50	80	50
Bromomethane	74-83-9		5		5	5
Butane, 2-Methoxy 2-Methyl	994-05-8					
Carbon Disulfide	75-15-0		60	60		60
Carbon Tetrachloride	56-23-5	5	5		5	5
Chlorobenzene	108-90-7	100	5		5	5
Chlorodifluoromethane	75-45-6				80	80
Chloroethane	75-00-3		5		5	5
Chloroform	67-66-3	80	7		80	7
Chloromethane	74-87-3		5		5	5
cis-1,2-Dichloroethene	156-59-2	70	5		5	5
cis-1,3-Dichloropropene	10061-01-5				5	5
Cyclohexane	110-82-7					
Cymene	99-87-6		5		5	5
Dibromochloromethane	124-48-1	80	50	50	80	50
Dibromomethane	74-95-3		5		5	5
Dichlorodifluoromethane	75-71-8		5		5	5
Ethanol	64-17-5					
Ethyl Tert-Butyl Ether	637-92-3					
Ethylbenzene	100-41-4	700	5		5	5
Hexachlorobutadiene	87-68-3		0.5		5	0.5
Isopropyl Ether	108-20-3					
Isopropylbenzene	98-82-8		5		5	5
M, P Xylenes	179601-23-1					
Methane	74-82-8					
Methyl Acetate	79-20-9					
Methyl tert-Butyl Ether	1634-04-4		10	10	10	10
Methyl-2-Butanol; 2-	75-85-4					
Methylcyclohexane	108-87-2					
Methylene Chloride	75-09-2	5	5		5	5
Naphthalene	91-20-3		10	10		10
N-Butylbenzene	104-51-8		5		5	5
N-Propylbenzene	103-65-1		5		5	5
o-Xylene (1,2-Dimethylbenzene)	95-47-6		5		5	5
Sec-Butylbenzene	135-98-8		5		5	5
Styrene	100-42-5	100	5		5	5
T-Butylbenzene	98-06-6		5		5	5
tert Amyl ethyl ether	919-94-8					
Tert-Butyl Alcohol	75-65-0					
Tetrachloroethene (PCE)	127-18-4	5	5		5	5
Toluene	108-88-3	1000	5		5	5
trans-1,2-Dichloroethene	156-60-5	100	5		5	5
trans-1,3-Dichloropropene	10061-02-6				5	5
Trichloroethene (TCE)	79-01-6	5	5		5	5
Trichlorofluoromethane	75-69-4		5		5	5
Vinyl Acetate	108-05-4					
Vinyl Chloride	75-01-4	2	2		2	2
Xylenes, Total	1330-20-7	10000	5			5
1,2,3-Trimethyl Benzene	526-73-8		5			5
1,2,4-Trimethylbenzene	95-63-6		5		5	5
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8		5		5	5
Biphenyl (Diphenyl)	92-52-4		5			5

Fulton Avenue Superfund Site OU2 RI/FS
Table 4-1
Potential Delineation Criteria (PDC) - Groundwater Screening

Analyte	CAS	EPA MCLs (ug/l)	NYSWQS 703.5 (ug/l)	NY TOGS 1.1.1 (ug/l)	NYDOH MCLs (ug/l)	Potential Delineation Criteria (ug/l)
Chlorodifluoromethane	75-45-6				80	80
Crotonaldehyde, (E)-	123-73-9		5			5
M-Cymene	535-77-3		5			5
Naphthalene	91-20-3		10	10		10
N-Propylbenzene	103-65-1		5		5	5
O-Cymene (O-Isopropyltoluene)	527-84-4		5			5
Propenylbenzene	637-50-3		5			5
Sec-Butylbenzene	135-98-8		5		5	5
Tetrahydrofuran	109-99-9		50			5
SVOCs						
1,4-Dioxane (P-Dioxane)	123-91-1				1	1
Pesticides						
Aldrin	309-00-2					
Alpha BHC (Alpha Hexachlorocyclohexane)	319-84-6		0.01			0.01
Alpha Endosulfan	959-98-8					
Alpha-Chlordane	5103-71-9					
Beta BHC (Beta Hexachlorocyclohexane)	319-85-7		0.04			0.04
Beta Endosulfan	33213-65-9					
Beta-Chlordane	5103-74-2					
Delta BHC (Delta Hexachlorocyclohexane)	319-86-8		0.04			0.04
Dieldrin	60-57-1		0.004			0.004
Endosulfan Sulfate	1031-07-8					
Endrin	72-20-8	2			2	2
Endrin Aldehyde	7421-93-4		5			5
Endrin Ketone	53494-70-5		5			5
Gamma BHC (Lindane)	58-89-9	0.2	0.05		0.2	0.05
Heptachlor	76-44-8	0.4	0.04		0.4	0.04
Heptachlor Epoxide	1024-57-3	0.2	0.03		0.2	0.03
Methoxychlor	72-43-5	40	35		40	35
P,P'-DDD	72-54-8		0.3			0.3
P,P'-DDE	72-55-9		0.2			0.2
P,P'-DDT	50-29-3		0.2			0.2
Toxaphene	8001-35-2	3	0.06		3	0.06
Wet Chemistry						
Biochemical Oxygen Demand (BOD)	BOD					
Chloride (As Cl)	16887-00-6		250000		250000	250000
COD - Chemical Oxygen Demand	COD					
Ethane	74-84-0					
Ethene	74-85-1					
Lime (as Calcium Carbonate)	471-34-1					
Methane	74-82-8					
Nitrate + Nitrite (as N)	NN		10000		10000	10000
Nitrogen	7727-37-9					
Nitrogen, Ammonia (As N)	7664-41-7		2000			2000
Nitrogen, Kjeldahl, Total	KN					
Nitrogen, Nitrate (As N)	14797-55-8	10000	10000		10000	10000
Phosphate	14265-44-2					
Sulfate (As So4)	14808-79-8		250000		250000	250000
Total Organic Carbon	TOC					

Fulton Avenue Superfund Site OU2 RI/FS
Table 4-1
Notes for Potential Delineation Criteria

Matrix	Potential Delineation Criteria	Definitions
Groundwater	EPA MCLs	EPA National Primary Drinking Water regulation Maximum Contaminant Levels- EPA MCLs (a)
	NYSDEC Groundwater Criteria and Applicable Screening Levels	New York State Part 703.5 Criteria, Class GA (b)
		1,4-Dioxane Maximum Contaminant Levels (c)
	NYSDEC TOGS 1.1.1	Technical and Operational Guidance Series (1.1.1) (d)
	NYDOH MCLs	10 NYCRR 5.1- Organic Chemical Maximum Contaminant Level Determination (e)

References:

(a) EPA Maximum Contaminant Levels
https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations

(b) New York State Part 703.5 Water quality standards for taste-, color- and odor-producing, toxic and other deleterious substances
https://govt.westlaw.com/nycrr/Document/I4ed90418cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)&bhcp=1

(c) Drinking Water Quality Council Recommends Nation's Most Protective Maximum Contaminant Levels for Three Unregulated Contaminants in Drinking Water
https://www.health.ny.gov/press/releases/2018/2018-12-18_drinking_water_quality_council_recommendations.htm

(d) Division of Water Technical and Operational Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitiations
https://extapps.dec.ny.gov/docs/water_pdf/togs111.pdf

(e) Section 225 of the Public Health Law, Subpart 5-1 of Title 10 (Health) of the Officail Compilation of Codes, Rules and Regulation of the State of New York
https://regs.health.ny.gov/sites/default/files/proposed-regulations/Maximum%20Contaminant%20Levels%20%28MCLs%29.pdf

Notes:

Non-cancer Hazard Index (HI) = 1, which falls between EPA's cancer risk range of 1E-06 and 1E-04.

HDR APTIM
a Joint Venture

Table 4-2
Fulton OU2 Remedial Investigation
Groundwater Analytical Results - Phase 5 - VOCs

				Sampling Event:	2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling	
				Location:	DSB02RS		GCP18S		MW-03 ROS		MW-03 ROS		MW-10D		MW-10MS		MW-15A		MW-20C		MW-21C		MW-21D		MW-23C	
				Sample:	DSB02RS-GW-377-20190829-0		GCP18S-GW-46.5-20190905-0		MW-03ROS-GW-050-20190829-0		MW-03ROS-GW-050-20190829-1		MW-10D-GW-111-20190828-0		MW-10MS-GW-190-20190829-0		MW-15A-GW-145-20190903-0		MW-20C-GW-405-20190903-0		MW-21C-GW-400-20190909-0		MW-21D-GW-455-20190909-0		MW-23C-GW-403-20190903-0	
				Sample Type:	N		N		N		FD		N		N		N		N		N		N		N	
				Sample Date:	8/29/2019		9/5/2019		8/28/2019		8/29/2019		8/28/2019		8/28/2019		9/3/2019		9/3/2019		9/9/2019		9/9/2019		9/3/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
VOCs																										
1,1,1-Trichloroethane	71-55-6	TRG	5	ug/l	0.53		0.5	U	**5.4**	J	**6.2**	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.17	J	0.5	U
1,1,2,2-Tetrachloroethane	79-34-5	TRG	5	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	TRG	5	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloroethane	79-00-5	TRG	1	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethane	75-34-3	TRG	5	ug/l	0.22	J	0.5	U	25	U	25	U	0.5	U	0.5	U	0.28	J	0.5	U	0.2	J	0.17	J	0.5	U
1,1-Dichloroethene	75-35-4	TRG	5	ug/l	3		0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U
1,2,3-Trichlorobenzene	87-61-6	TRG	5	ug/l	0.2	J	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2,4-Trichlorobenzene	120-82-1	TRG	5	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dibromo-3-Chloropropane	96-12-8	TRG	0.04	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dibromoethane	106-93-4	TRG	0.0006	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichlorobenzene	95-50-1	TRG	3	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethane	107-06-2	TRG	0.6	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloropropane	78-87-5	TRG	1	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,3-Dichlorobenzene	541-73-1	TRG	3	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,4-Dichlorobenzene	106-46-7	TRG	3	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
2-Butanone	78-93-3	TRG	50	ug/l	5	U	5	U	250	U	250	U	5	U	5	U	5	U	5	U	3	J	5	U	5	U
2-Hexanone	591-78-6	TRG	50	ug/l	5	U	5	U	250	U	250	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
4-Methyl-2-Pentanone	108-10-1	TRG		ug/l	5	U	5	U	250	U	250	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Acetone	67-64-1	TRG	50	ug/l	5	U	5	U	250	U	250	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Benzene	71-43-2	TRG	1	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromochloromethane	74-97-5	TRG	5	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromodichloromethane	75-27-4	TRG	50	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromoform	75-25-2	TRG	50	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromomethane	74-83-9	TRG	5	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon Disulfide	75-15-0	TRG	60	ug/l	0.44	J	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.14	J
Carbon Tetrachloride	56-23-5	TRG	5	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.16	J	0.5	U
Chlorobenzene	108-90-7	TRG	5	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroethane	75-00-3	TRG	5	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroform	67-66-3	TRG	7	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloromethane	74-87-3	TRG	5	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
cis-1,2-Dichloroethene	156-59-2	TRG	5	ug/l	5		1.9		**210**		**220**		0.5	U	0.61		4.4		0.5	U	**32**	D	0.41	J	0.5	U
cis-1,3-Dichloropropene	10061-01-5	TRG	5	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Cyclohexane	110-82-7	TRG		ug/l	0.5	U	0.46	J	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Dibromochloromethane	124-48-1	TRG	50	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Dichlorodifluoromethane	75-71-8	TRG	5	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	100-41-4	TRG	5	ug/l	0.5	U	0.33	J	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U
Isopropylbenzene	98-82-8	TRG	5	ug/l	0.5	U	1.4		25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U
M, P Xylenes	179601-23-1	TRG		ug/l	0.5	U	0.5	U	5.6	J	5.8	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U
Methyl Acetate	79-20-9	TRG		ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	2.3		0.5	U	0.5	U
Methyl tert-Butyl Ether	1634-04-4	TRG	10	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.23	J	0.14	J	0.5	U	0.5	U	0.5	U	0.82	
Methylcyclohexane	108-87-2	TRG		ug/l	0.5	U	0.79		25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methylene Chloride	75-09-2	TRG	5	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
o-Xylene (1,2-Dimethylbenzene)	95-47-6	TRG	5	ug/l	0.5	U	0.5	U	**12**	J	**13**	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U
Styrene	100-42-5	TRG	5	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U
Tetrachloroethene (PCE)	127-18-4	TRG	5	ug/l	**30**	D	3.2		**13**	J	**14**	J	0.16	J	3.4		**61**	D	0.75		**57**	D	**87**	D	4.8	
Toluene	108-88-3	TRG	5	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U
trans-1,2-Dichloroethene	156-60-5	TRG	5	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.13	J-	0.5	U	0.5	U
trans-1,3-Dichloropropene	10061-02-6	TRG	5	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Trichloroethene (TCE)	79-01-6	TRG	5	ug/l	**23**	D	0.81		**590**		**580**		0.5	U	**41**	D	3.8		1		**8.5**	J-	4.6		**26**	D
Trichlorofluoromethane	75-69-4	TRG	5	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Vinyl Chloride	75-01-4	TRG	2	ug/l	0.5	U	0.5	U	25	U	25	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Total Alkane Tics	E966796	TIC		ug/l	0	N	0	N	0	N	0	N	0	N	0	N	0	N	0	N	0	N	0	N	0	N

HDR APTIM
a Joint Venture

Table 4-2
Fulton OU2 Remedial Investigation
Groundwater Analytical Results - Phase 5 - VOCs

				Sampling Event:	2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling	
				Location:	MW-24A		MW-25A		MW-26F		MW-26G		MW-4 ZOE		MW-8D		MW-8S		MW-9D		MW-9S		N-00017		N-00104	
				Sample:	MW-24A-GW-350-20190905-0		MW-25A-GW-345-20190905-0		MW-26F-GW-410-20190905-0		MW-26G-GW-443-20190905-0		MW-4ZOE-GW-037-20190904-0		MW-8D-GW-111-20190904-0		MW-8S-GW-062-20190904-0		MW-9D-GW-120-20190904-0		MW-9S-GW-063-20190904-0		N-00017-GW-405-465-20190904-0		N-00104-GW-325-376-20190903-0	
				Sample Type:	N		N		N		N		N		N		N		N		N		N		N	
				Sample Date:	9/5/2019		9/5/2019		9/5/2019		9/5/2019		9/4/2019		9/4/2019		9/4/2019		9/4/2019		9/4/2019		9/4/2019		9/3/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
VOCs																										
1,1,1-Trichloroethane	71-55-6	TRG	5	ug/l	0.16	J	0.22	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2,2-Tetrachloroethane	79-34-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloroethane	79-00-5	TRG	1	ug/l	0.22	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethane	75-34-3	TRG	5	ug/l	0.18	J	0.5	U	0.5	U	0.11	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.15	J	0.5	U
1,1-Dichloroethene	75-35-4	TRG	5	ug/l	1.4		0.62		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2,3-Trichlorobenzene	87-61-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2,4-Trichlorobenzene	120-82-1	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dibromo-3-Chloropropane	96-12-8	TRG	0.04	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dibromoethane	106-93-4	TRG	0.0006	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichlorobenzene	95-50-1	TRG	3	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethane	107-06-2	TRG	0.6	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloropropane	78-87-5	TRG	1	ug/l	0.57		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,3-Dichlorobenzene	541-73-1	TRG	3	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,4-Dichlorobenzene	106-46-7	TRG	3	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
2-Butanone	78-93-3	TRG	50	ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2-Hexanone	591-78-6	TRG	50	ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
4-Methyl-2-Pentanone	108-10-1	TRG		ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Acetone	67-64-1	TRG	50	ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Benzene	71-43-2	TRG	1	ug/l	0.15	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromochloromethane	74-97-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromodichloromethane	75-27-4	TRG	50	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromoform	75-25-2	TRG	50	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromomethane	74-83-9	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon Disulfide	75-15-0	TRG	60	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon Tetrachloride	56-23-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chlorobenzene	108-90-7	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroethane	75-00-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroform	67-66-3	TRG	7	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloromethane	74-87-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
cis-1,2-Dichloroethene	156-59-2	TRG	5	ug/l	1.3		2		**5.6**		0.36	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
cis-1,3-Dichloropropene	10061-01-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Cyclohexane	110-82-7	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Dibromochloromethane	124-48-1	TRG	50	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Dichlorodifluoromethane	75-71-8	TRG	5	ug/l	0.5	U	0.33	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	100-41-4	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Isopropylbenzene	98-82-8	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
M, P Xylenes	179601-23-1	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methyl Acetate	79-20-9	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methyl tert-Butyl Ether	1634-04-4	TRG	10	ug/l	0.14	J	0.83		0.48	J	0.6		0.15	J	0.5	U	0.5	U	0.14	J	0.5	U	0.21	J	0.5	U
Methylcyclohexane	108-87-2	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methylene Chloride	75-09-2	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
o-Xylene (1,2-Dimethylbenzene)	95-47-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Styrene	100-42-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Tetrachloroethene (PCE)	127-18-4	TRG	5	ug/l	**19**		**23**	D	**17**		**7.9**		2.9		0.12	J	0.26	J	0.18	J	0.35	J	**7.2**		0.5	U
Toluene	108-88-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
trans-1,2-Dichloroethene	156-60-5	TRG	5	ug/l	0.5	U	0.5	U	0.13	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
trans-1,3-Dichloropropene	10061-02-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Trichloroethene (TCE)	79-01-6	TRG	5	ug/l	**180**	D	**26**	D	**17**		**23**	D	0.28	J	0.5	U	0.5	U	0.5	U	0.5	U	0.71		2	
Trichlorofluoromethane	75-69-4	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Vinyl Chloride	75-01-4	TRG	2	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Total Alkane Tics	E966796	TIC		ug/l	0	N	0	N	0	N	0	N	0	N	0	N	0	N	0	N	0	N	0	N	0	N

Table 4-2
Fulton OU2 Remedial Investigation
Groundwater Analytical Results - Phase 5 - VOCs

				Sampling Event:	2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling	
				Location:	N-01697		N-02487		N-03185		N-03603		N-03881		N-04298		N-05603		N-06745		N-07058		N-07649		N-07649	
				Sample:	N-01697-GW-478-518-20190904-0		N-02487-GW-424-434-20190903-0		N-03185-GW-423-463-20190903-0		N-03603-GW-443-493-20190903-0		N-03881-GW-426-466-20190904-0		N-04298-GW-344-394-20190904-0		N-05603-GW-365-415-20190903-0		N-06745-GW-304-344-20190904-0		N-07058-GW-380-440-20190904-0		N-07649-GW-165-205-20190904-0		N-07649-GW-165-205-20190904-1	
				Sample Type:	N		N		N		N		N		N		N		N		N		N		FD	
				Sample Date:	9/4/2019		9/3/2019		9/3/2019		9/3/2019		9/4/2019		9/4/2019		9/3/2019		9/4/2019		9/4/2019		9/4/2019		9/4/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
VOCs																										
1,1,1-Trichloroethane	71-55-6	TRG	5	ug/l	0.2	J	0.5	U	0.49	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.23	J	0.54		0.54	
1,1,2,2-Tetrachloroethane	79-34-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloroethane	79-00-5	TRG	1	ug/l	0.5	U	0.5	U	0.11	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethane	75-34-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	2.7		2.8	
1,1-Dichloroethene	75-35-4	TRG	5	ug/l	1.1		0.5	U	2.2		0.5	U	0.41	J	0.5	U	0.5	U	0.5	U	0.5	U	3		3.6	
1,2,3-Trichlorobenzene	87-61-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2,4-Trichlorobenzene	120-82-1	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dibromo-3-Chloropropane	96-12-8	TRG	0.04	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dibromoethane	106-93-4	TRG	0.0006	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichlorobenzene	95-50-1	TRG	3	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.13	J	0.13	J
1,2-Dichloroethane	107-06-2	TRG	0.6	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloropropane	78-87-5	TRG	1	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.56		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,3-Dichlorobenzene	541-73-1	TRG	3	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,4-Dichlorobenzene	106-46-7	TRG	3	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.25	J	0.25	J
2-Butanone	78-93-3	TRG	50	ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2-Hexanone	591-78-6	TRG	50	ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
4-Methyl-2-Pentanone	108-10-1	TRG		ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Acetone	67-64-1	TRG	50	ug/l	5	U	5	U	5	U	5	U	50	U	5	U	5	U	5	U	5	U	5	U	5	U
Benzene	71-43-2	TRG	1	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromochloromethane	74-97-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromodichloromethane	75-27-4	TRG	50	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromoform	75-25-2	TRG	50	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromomethane	74-83-9	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon Disulfide	75-15-0	TRG	60	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon Tetrachloride	56-23-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.69		0.5	U	0.5	U	0.23	J	0.5	U	0.5	U	0.5	U
Chlorobenzene	108-90-7	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.34	J	0.5	U	0.5	U	0.58		0.61	
Chloroethane	75-00-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroform	67-66-3	TRG	7	ug/l	0.5	U	1.4		0.5	U	0.5	U	0.5	U	1.2		0.5	U	0.84		0.5	U	0.5	U	0.5	U
Chloromethane	74-87-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
cis-1,2-Dichloroethene	156-59-2	TRG	5	ug/l	0.14	J	0.5	U	0.22	J	0.5	U	1.7		0.5	U	0.5	U	0.21	J	2.2		**5.3**		**5.6**	
cis-1,3-Dichloropropene	10061-01-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Cyclohexane	110-82-7	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Dibromochloromethane	124-48-1	TRG	50	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Dichlorodifluoromethane	75-71-8	TRG	5	ug/l	0.5	U	0.5	U	0.15	J	0.5	U	0.5	U	0.5	U	0.5	U	3.2		0.5	U	0.5	U	0.5	U
Ethylbenzene	100-41-4	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Isopropylbenzene	98-82-8	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
M, P Xylenes	179601-23-1	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methyl Acetate	79-20-9	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methyl tert-Butyl Ether	1634-04-4	TRG	10	ug/l	0.5	U	0.49	J	0.32	J	0.5	U	0.5	U	0.18	J	1		0.44	J	0.5	U	0.45	J	0.5	
Methylcyclohexane	108-87-2	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methylene Chloride	75-09-2	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
o-Xylene (1,2-Dimethylbenzene)	95-47-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Styrene	100-42-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Tetrachloroethene (PCE)	127-18-4	TRG	5	ug/l	4.4		4.1		**12**		0.44	J	**42**	D	3.1		**80**	D	**120**	D	**250**	D	**18**		**24**	D
Toluene	108-88-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
trans-1,2-Dichloroethene	156-60-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
trans-1,3-Dichloropropene	10061-02-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Trichloroethene (TCE)	79-01-6	TRG	5	ug/l	**7.4**		0.5	U	**26**	D	**13**		**79**	D	**5.1**		2.2		**7.8**		**36**	D	**31**	D	**40**	D
Trichlorofluoromethane	75-69-4	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Vinyl Chloride	75-01-4	TRG	2	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.34	J	0.3	J
Total Alkane Tics	E966796	TIC		ug/l	0	N	0	N	0	N	0	N	0	N	0	N	0	N	0	N	0	N	0	N	0	N

HDR APTIM
a Joint Venture

Table 4-2
Fulton OU2 Remedial Investigation
Groundwater Analytical Results - Phase 5 - VOCs

				Sampling Event:	2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling	
				Location:	N-07650		N-08248		N-08339		N-08409		N-08576		N-09949		N-10330		N-10486		N-10487		N-11171		N-11659	
				Sample:	N-07650-GW-400-420-20190904-0		N-08248-GW-315-400-20190903-0		N-08339-GW-308-358-20190904-0		N-08409-GW-340-400-20190903-0		N-08576-GW-445-505-20190903-0		N-09949-GW-93.5-20190904-0		N-10330-GW-052-20190905-0		N-10486-GW-054-20190906-0		N-10487-GW-056-20190828-0		N-11171-GW-220-20190829-0		N-11659-GW-409-20190903-0	
				Sample Type:	N		N		N		N		N		N		N		N		N		N		N	
				Sample Date:	9/4/2019		9/3/2019		9/4/2019		9/3/2019		9/3/2019		9/4/2019		9/5/2019		9/6/2019		8/28/2019		8/28/2019		9/3/2019	
Analyte	**CAS**	**Result Type**	**Proposed Delineation Criteria**	**Units**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
VOCs																										
1,1,1-Trichloroethane	71-55-6	TRG	5	ug/l	0.88		0.5	U	0.45	J	0.46	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2,2-Tetrachloroethane	79-34-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.18	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloroethane	79-00-5	TRG	1	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethane	75-34-3	TRG	5	ug/l	**16**		0.5	U	0.2	J	0.17	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.21	J	0.5	U
1,1-Dichloroethene	75-35-4	TRG	5	ug/l	**6.2**		0.5	U	0.5	U	3.2		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ
1,2,3-Trichlorobenzene	87-61-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2,4-Trichlorobenzene	120-82-1	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dibromo-3-Chloropropane	96-12-8	TRG	0.04	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dibromoethane	106-93-4	TRG	0.0006	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichlorobenzene	95-50-1	TRG	3	ug/l	0.19	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethane	107-06-2	TRG	0.6	ug/l	0.51		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloropropane	78-87-5	TRG	1	ug/l	0.28	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.37	J
1,3-Dichlorobenzene	541-73-1	TRG	3	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,4-Dichlorobenzene	106-46-7	TRG	3	ug/l	0.51		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.15	J	0.5	U	0.5	U	0.5	U	0.5	U
2-Butanone	78-93-3	TRG	50	ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2-Hexanone	591-78-6	TRG	50	ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
4-Methyl-2-Pentanone	108-10-1	TRG		ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Acetone	67-64-1	TRG	50	ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Benzene	71-43-2	TRG	1	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromochloromethane	74-97-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromodichloromethane	75-27-4	TRG	50	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromoform	75-25-2	TRG	50	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromomethane	74-83-9	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon Disulfide	75-15-0	TRG	60	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon Tetrachloride	56-23-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chlorobenzene	108-90-7	TRG	5	ug/l	0.56		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.11	J	0.5	U	0.5	U	0.5	U	0.5	U
Chloroethane	75-00-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroform	67-66-3	TRG	7	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5		0.5	U	0.5	U	0.5	U
Chloromethane	74-87-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
cis-1,2-Dichloroethene	156-59-2	TRG	5	ug/l	**24**	D	0.5	U	**5.1**		0.58		0.5	U	0.5	U	**60**	D	0.21	J	0.5	U	0.5	U	0.5	UJ
cis-1,3-Dichloropropene	10061-01-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Cyclohexane	110-82-7	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.42	J	0.5	U	0.5	U	0.5	U	0.5	U
Dibromochloromethane	124-48-1	TRG	50	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Dichlorodifluoromethane	75-71-8	TRG	5	ug/l	0.51		0.5	U	0.5	U	1.9		0.76		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.36	J
Ethylbenzene	100-41-4	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Isopropylbenzene	98-82-8	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	2.2		0.5	U	0.5	U	0.5	U	0.5	U
M, P Xylenes	179601-23-1	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methyl Acetate	79-20-9	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methyl tert-Butyl Ether	1634-04-4	TRG	10	ug/l	0.5	U	0.13	J	0.57		0.36	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.12	J	0.13	J
Methylcyclohexane	108-87-2	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	2.1		0.5	U	0.5	U	0.5	U	0.5	U
Methylene Chloride	75-09-2	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
o-Xylene (1,2-Dimethylbenzene)	95-47-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Styrene	100-42-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Tetrachloroethene (PCE)	127-18-4	TRG	5	ug/l	**33**	D	**9.1**		**180**	D	**70**	D	**15**		0.5	U	**910**	D	**6.2**		0.22	J	0.52		**390**	D
Toluene	108-88-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
trans-1,2-Dichloroethene	156-60-5	TRG	5	ug/l	0.11	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.52		0.5	U	0.5	U	0.5	U	0.5	UJ
trans-1,3-Dichloropropene	10061-02-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Trichloroethene (TCE)	79-01-6	TRG	5	ug/l	**43**	D	0.5	U	**22**	D	**5.5**		**7.8**		0.5	U	**300**	D	2		0.5	U	0.37	J	0.17	J
Trichlorofluoromethane	75-69-4	TRG	5	ug/l	0.3	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Vinyl Chloride	75-01-4	TRG	2	ug/l	0.73		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Total Alkane Tics	E966796	TIC		ug/l	0	N	0	N	0	N	0	N	0	N	0	N	0	N	0	N	0	N	0	N	0	N

HDR APTIM
a Joint Venture

Table 4-2
Fulton OU2 Remedial Investigation
Groundwater Analytical Results - Phase 5 - VOCs

				Sampling Event:	2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling	
				Location:	N-11733		N-11735		N-11739		N-11739		N-11865		DSB02RS		GCP18S		MW-03 ROS		MW-10D		MW-10MS		MW-15A	
				Sample:	N-11733-GW-156-20190906-0		N-11735-GW-153-20190906-0		N-11739-GW-047-20190906-0		N-11739-GW-047-20190906-1		N-11865-GW-195-20190906-0		DSB02RS-GW-377-20191206-0		GCP18S-GW-46.5-20191212-0		MW-03ROS-GW-050-20191211-0		MW-10D-GW-111-20191205-0		MW-10MS-GW-190-20191205-0		MW-15A-GW-145-20191209-0	
				Sample Type:	N		N		N		FD		N		N		N		N		N		N		N	
				Sample Date:	9/6/2019		9/6/2019		9/6/2019		9/6/2019		9/6/2019		12/6/2019		12/12/2019		12/11/2019		12/5/2019		12/5/2019		12/9/2019	
Analyte	**CAS**	**Result Type**	**Proposed Delineation Criteria**	**Units**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
VOCs																										
1,1,1-Trichloroethane	71-55-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	**5.3**		0.5	U	0.5	U	0.5	U
1,1,2,2-Tetrachloroethane	79-34-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloroethane	79-00-5	TRG	1	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethane	75-34-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.17	J	0.5	U	4.6	J	0.5	U	0.5	U	0.16	J
1,1-Dichloroethene	75-35-4	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	1		0.5	U	5	U	0.5	U	0.5	U	0.5	U
1,2,3-Trichlorobenzene	87-61-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
1,2,4-Trichlorobenzene	120-82-1	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
1,2-Dibromo-3-Chloropropane	96-12-8	TRG	0.04	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
1,2-Dibromoethane	106-93-4	TRG	0.0006	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
1,2-Dichlorobenzene	95-50-1	TRG	3	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethane	107-06-2	TRG	0.6	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloropropane	78-87-5	TRG	1	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
1,3-Dichlorobenzene	541-73-1	TRG	3	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
1,4-Dichlorobenzene	106-46-7	TRG	3	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.096	J
2-Butanone	78-93-3	TRG	50	ug/l	5	U	5	U	5	U	5	U	5	UJ	5	U	5	U	50	U	5	U	5	U	5	U
2-Hexanone	591-78-6	TRG	50	ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	50	U	5	U	5	U	5	U
4-Methyl-2-Pentanone	108-10-1	TRG		ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	50	U	5	U	5	U	5	U
Acetone	67-64-1	TRG	50	ug/l	5	U	5	U	5	U	5	U	5	UJ	5	U	5	U	50	U	5	U	5	U	5	U
Benzene	71-43-2	TRG	1	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.18	J	0.5	U	5	U	0.5	U	0.5	U	0.5	U
Bromochloromethane	74-97-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
Bromodichloromethane	75-27-4	TRG	50	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
Bromoform	75-25-2	TRG	50	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
Bromomethane	74-83-9	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
Carbon Disulfide	75-15-0	TRG	60	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.1	J+	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
Carbon Tetrachloride	56-23-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
Chlorobenzene	108-90-7	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
Chloroethane	75-00-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
Chloroform	67-66-3	TRG	7	ug/l	0.5	U	0.46	J	0.5	U	0.5	U	0.67	J+	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.037	J
Chloromethane	74-87-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
cis-1,2-Dichloroethene	156-59-2	TRG	5	ug/l	0.5	U	1.3		0.5	U	0.5	U	0.5	UJ	**5.4**		**11**		**320**		0.5	U	0.17	J	3.9	
cis-1,3-Dichloropropene	10061-01-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
Cyclohexane	110-82-7	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	2.7		5	U	0.5	U	0.5	U	0.5	U
Dibromochloromethane	124-48-1	TRG	50	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
Dichlorodifluoromethane	75-71-8	TRG	5	ug/l	0.5	U	0.13	J	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	100-41-4	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.059	J	**15**		2.1	J	0.5	U	0.5	U	0.5	U
Isopropylbenzene	98-82-8	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	**9**		4.4	J	0.5	U	0.5	U	0.5	U
M, P Xylenes	179601-23-1	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1.5		7.5		0.5	U	0.5	U	0.5	U
Methyl Acetate	79-20-9	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
Methyl tert-Butyl Ether	1634-04-4	TRG	10	ug/l	0.5	U	0.26	J	0.5	U	0.5	U	0.5	UJ	0.049	J	0.5	U	5	U	0.5	U	0.14	J	0.08	J
Methylcyclohexane	108-87-2	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	3.2		5	U	0.5	U	0.5	U	0.5	U
Methylene Chloride	75-09-2	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
o-Xylene (1,2-Dimethylbenzene)	95-47-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.13	J	0.57		**19**		0.5	U	0.5	U	0.5	U
Styrene	100-42-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
Tetrachloroethene (PCE)	127-18-4	TRG	5	ug/l	2		**5.4**		0.18	J	0.13	J	2.6		**11**		1.4		**25**		0.22	J	0.29	J	**49**	
Toluene	108-88-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
trans-1,2-Dichloroethene	156-60-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.52		5	U	0.5	U	0.5	U	0.5	U
trans-1,3-Dichloropropene	10061-02-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
Trichloroethene (TCE)	79-01-6	TRG	5	ug/l	0.5	U	1.5		0.5	U	0.5	U	0.17	J	**5.8**		0.62		**830**		0.5	U	5		5	
Trichlorofluoromethane	75-69-4	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
Vinyl Chloride	75-01-4	TRG	2	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U
Total Alkane Tics	E966796	TIC		ug/l	0	N	0	N	0	N	0	N	0	N												

Table 4-2
Fulton OU2 Remedial Investigation
Groundwater Analytical Results - Phase 5 - VOCs

HDR APTIM
a Joint Venture

				Sampling Event:	2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling	
				Location:	MW-20C		MW-21C		MW-21D		MW-23C		MW-24A		MW-25A		MW-26F		MW-26G		MW-26G		MW-8D		MW-8S	
				Sample:	MW-20C-GW-405-20191209-0		MW-21C-GW-400-20191205-0		MW-21D-GW-455-20191205-0		MW-23C-GW-403-20191209-0		MW-24A-GW-350-20191211-0		MW-25A-GW-345-20191206-0		MW-26F-GW-410-20191209-0		MW-26G-GW-443-20191209-0		MW-26G-GW-443-20191209-1		MW-8D-GW-111-20191204-0		MW-8S-GW-062-20191204-0	
				Sample Type:	N		N		N		N		N		N		N		N		FD		N		N	
				Sample Date:	12/9/2019		12/5/2019		12/5/2019		12/9/2019		12/11/2019		12/6/2019		12/9/2019		12/9/2019		12/9/2019		12/4/2019		12/4/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
VOCs																										
1,1,1-Trichloroethane	71-55-6	TRG	5	ug/l	0.5	U	0.24	J	0.18	J	0.5	U	0.19	J	0.24	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2,2-Tetrachloroethane	79-34-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloroethane	79-00-5	TRG	1	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.19	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethane	75-34-3	TRG	5	ug/l	0.5	U	0.24	J	0.14	J	0.5	U	0.16	J	0.5	U	0.5	U	0.1	J	0.088	J	0.5	U	0.5	U
1,1-Dichloroethene	75-35-4	TRG	5	ug/l	0.5	U	1.1		0.81		0.5	U	1.3		0.66		0.5	U	0.5	U	0.15	J	0.5	U	0.5	U
1,2,3-Trichlorobenzene	87-61-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2,4-Trichlorobenzene	120-82-1	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dibromo-3-Chloropropane	96-12-8	TRG	0.04	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dibromoethane	106-93-4	TRG	0.0006	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichlorobenzene	95-50-1	TRG	3	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethane	107-06-2	TRG	0.6	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloropropane	78-87-5	TRG	1	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.57		0.39	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,3-Dichlorobenzene	541-73-1	TRG	3	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,4-Dichlorobenzene	106-46-7	TRG	3	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.074	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
2-Butanone	78-93-3	TRG	50	ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2-Hexanone	591-78-6	TRG	50	ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
4-Methyl-2-Pentanone	108-10-1	TRG		ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Acetone	67-64-1	TRG	50	ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Benzene	71-43-2	TRG	1	ug/l	0.93		0.055	J	0.5	U	0.37	J	0.1	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromochloromethane	74-97-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromodichloromethane	75-27-4	TRG	50	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromoform	75-25-2	TRG	50	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromomethane	74-83-9	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon Disulfide	75-15-0	TRG	60	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon Tetrachloride	56-23-5	TRG	5	ug/l	0.5	U	0.5	U	0.15	J	0.5	U	0.096	J	0.084	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chlorobenzene	108-90-7	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroethane	75-00-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroform	67-66-3	TRG	7	ug/l	0.036	J	0.5	U	0.5	U	0.5	U	0.27	J	0.5	U	0.5	U	0.058	J	0.066	J	0.5	U	0.5	U
Chloromethane	74-87-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
cis-1,2-Dichloroethene	156-59-2	TRG	5	ug/l	0.5	U	**26**		0.32	J	0.27	J	1.1		2.1		3.8		0.34	J	0.32	J	0.5	U	0.5	U
cis-1,3-Dichloropropene	10061-01-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.21	J	0.5	U	0.5	U	0.5	U
Cyclohexane	110-82-7	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Dibromochloromethane	124-48-1	TRG	50	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Dichlorodifluoromethane	75-71-8	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.36	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	100-41-4	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Isopropylbenzene	98-82-8	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
M, P Xylenes	179601-23-1	TRG		ug/l	0.12	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methyl Acetate	79-20-9	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.23	J	0.5	U	0.5	U	0.5	U	0.5	U
Methyl tert-Butyl Ether	1634-04-4	TRG	10	ug/l	0.5	U	0.5	U	0.5	U	0.56		0.11	J	0.68		0.37	J	0.42	J	0.38	J	0.5	U	0.5	U
Methylcyclohexane	108-87-2	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methylene Chloride	75-09-2	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
o-Xylene (1,2-Dimethylbenzene)	95-47-6	TRG	5	ug/l	0.082	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Styrene	100-42-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Tetrachloroethene (PCE)	127-18-4	TRG	5	ug/l	1.1		**160**		**100**		2.1		**20**		**22**		**14**		**5.5**		3.7		0.066	J	0.18	J
Toluene	108-88-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
trans-1,2-Dichloroethene	156-60-5	TRG	5	ug/l	0.5	U	0.093	J	0.5	U	0.5	U	0.5	U	0.5	U	0.071	J	0.5	U	0.5	U	0.5	U	0.5	U
trans-1,3-Dichloropropene	10061-02-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Trichloroethene (TCE)	79-01-6	TRG	5	ug/l	2.4		**16**		**6.2**		**12**		**140**		**27**		**15**		**25**		**21**		0.5	U	0.5	U
Trichlorofluoromethane	75-69-4	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Vinyl Chloride	75-01-4	TRG	2	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Total Alkane Tics	E966796	TIC		ug/l																						

HDR APTIM
a Joint Venture

Table 4-2
Fulton OU2 Remedial Investigation
Groundwater Analytical Results - Phase 5 - VOCs

				Sampling Event:	**2019 12 Phase 5 GW Sampling**		**2019 12 Phase 5 GW Sampling**		**2019 12 Phase 5 GW Sampling**		**2019 12 Phase 5 GW Sampling**		**2019 12 Phase 5 GW Sampling**		**2019 12 Phase 5 GW Sampling**		**2019 12 Phase 5 GW Sampling**		**2019 12 Phase 5 GW Sampling**		**2019 12 Phase 5 GW Sampling**		**2019 12 Phase 5 GW Sampling**		**2019 12 Phase 5 GW Sampling**	
				Location:	**MW-9D**		**MW-9D**		**MW-9S**		**N-00017**		**N-00104**		**N-01697**		**N-02487**		**N-03185**		**N-03603**		**N-03732**		**N-04298**	
				Sample:	**MW-9D-GW-120-20191204-0**		**MW-9D-GW-120-20191204-1**		**MW-9S-GW-063-20191204-0**		**N-00017-GW-405-465-20191212-0**		**N-00104-GW-325-376-20191211-0**		**N-01697-GW-478-518-20191211-0**		**N-02487-GW-424-434-20191212-0**		**N-03185-GW-423-463-20191212-0**		**N-03603-GW-443-493-20191212-0**		**N-03732-GW-310-350-20191212-0**		**N-04298-GW-344-394-20191212-0**	
				Sample Type:	**N**		**FD**		**N**		**N**		**N**		**N**		**N**		**N**		**N**		**N**		**N**	
				Sample Date:	**12/4/2019**		**12/4/2019**		**12/4/2019**		**12/12/2019**		**12/11/2019**		**12/11/2019**		**12/12/2019**		**12/12/2019**		**12/12/2019**		**12/12/2019**		**12/12/2019**	
Analyte	**CAS**	**Result Type**	**Proposed Delineation Criteria**	**Units**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
VOCs																										
1,1,1-Trichloroethane	71-55-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.22	J	0.5	U	0.75		0.5	U	0.5	U	0.083	J
1,1,2,2-Tetrachloroethane	79-34-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	TRG	5	ug/l	0.33	J	0.3	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloroethane	79-00-5	TRG	1	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethane	75-34-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.14	J	0.5	U	0.11	J	0.5	U	0.19	J	0.5	U	0.5	U	0.5	U
1,1-Dichloroethene	75-35-4	TRG	5	ug/l	0.22	J	0.21	J	0.5	U	0.5	U	0.5	U	0.96		0.5	U	2.9		0.5	U	0.5	U	0.3	J
1,2,3-Trichlorobenzene	87-61-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2,4-Trichlorobenzene	120-82-1	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dibromo-3-Chloropropane	96-12-8	TRG	0.04	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dibromoethane	106-93-4	TRG	0.0006	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichlorobenzene	95-50-1	TRG	3	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethane	107-06-2	TRG	0.6	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.092	J	0.5	U	0.5	U	0.5	U
1,2-Dichloropropane	78-87-5	TRG	1	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,3-Dichlorobenzene	541-73-1	TRG	3	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,4-Dichlorobenzene	106-46-7	TRG	3	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
2-Butanone	78-93-3	TRG	50	ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2-Hexanone	591-78-6	TRG	50	ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
4-Methyl-2-Pentanone	108-10-1	TRG		ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Acetone	67-64-1	TRG	50	ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Benzene	71-43-2	TRG	1	ug/l	0.058	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromochloromethane	74-97-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromodichloromethane	75-27-4	TRG	50	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromoform	75-25-2	TRG	50	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromomethane	74-83-9	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon Disulfide	75-15-0	TRG	60	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon Tetrachloride	56-23-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.04	J	0.052	J	0.042	J	0.061	J	0.068	J	0.035	J	0.035	J	0.5	U
Chlorobenzene	108-90-7	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroethane	75-00-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroform	67-66-3	TRG	7	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.6		0.055	J	1.5		0.5	U	0.5	U	0.5	U	1.1	
Chloromethane	74-87-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
cis-1,2-Dichloroethene	156-59-2	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.15	J	0.5	U	0.26	J	0.16	J	0.5	U	0.5	U
cis-1,3-Dichloropropene	10061-01-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Cyclohexane	110-82-7	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Dibromochloromethane	124-48-1	TRG	50	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Dichlorodifluoromethane	75-71-8	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.095	J	0.5	U	0.22	J	0.5	U	0.5	U	0.5	U
Ethylbenzene	100-41-4	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Isopropylbenzene	98-82-8	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
M, P Xylenes	179601-23-1	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methyl Acetate	79-20-9	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methyl tert-Butyl Ether	1634-04-4	TRG	10	ug/l	0.19	J	0.22	J	0.5	U	0.17	J	0.12	J	0.06	J	0.45	J	0.31	J	0.5	U	0.11	J	0.14	J
Methylcyclohexane	108-87-2	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methylene Chloride	75-09-2	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
o-Xylene (1,2-Dimethylbenzene)	95-47-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Styrene	100-42-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Tetrachloroethene (PCE)	127-18-4	TRG	5	ug/l	0.11	J	0.093	J	0.14	J	**6.8**		0.086	J	4.4		4.4		**17**		0.5		**200**		2.4	
Toluene	108-88-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
trans-1,2-Dichloroethene	156-60-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
trans-1,3-Dichloropropene	10061-02-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Trichloroethene (TCE)	79-01-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.69		2		**7.7**		0.07	J	**32**		**28**		0.16	J	4.3	
Trichlorofluoromethane	75-69-4	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Vinyl Chloride	75-01-4	TRG	2	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Total Alkane Tics	E966796	TIC		ug/l																						

Table 4-2
Fulton OU2 Remedial Investigation
Groundwater Analytical Results - Phase 5 - VOCs

				Sampling Event:	2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling	
				Location:	N-05603		N-07058		N-07649		N-07649		N-07650		N-08248		N-08339		N-08409		N-08576		N-09949		N-10330	
				Sample:	N-05603-GW-365-415-20191211-0		N-07058-GW-380-440-20191211-0		N-07649-GW-165-205-20191212-0		N-07649-GW-165-205-20191212-1		N-07650-GW-400-420-20191212-0		N-08248-GW-315-400-20191211-0		N-08339-GW-308-358-20191211-0		N-08409-GW-340-400-20191211-0		N-08576-GW-445-505-20191212-0		N-09949-GW-93.5-20191210-0		N-10330-GW-052-20191212-0	
				Sample Type:	N		N		N		FD		N		N		N		N		N		N		N	
				Sample Date:	12/11/2019		12/11/2019		12/12/2019		12/12/2019		12/12/2019		12/11/2019		12/11/2019		12/11/2019		12/12/2019		12/10/2019		12/12/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
VOCs																										
1,1,1-Trichloroethane	71-55-6	TRG	5	ug/l	0.5	U	0.27	J	0.59		0.57		1		0.5	U	0.46	J	0.52		0.076	J	0.5	U	5	U
1,1,2,2-Tetrachloroethane	79-34-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.15	J	0.5	U	0.5	U	0.5	U	0.22	J	0.24	J	0.5	U	5	U
1,1,2-Trichloroethane	79-00-5	TRG	1	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.11	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
1,1-Dichloroethane	75-34-3	TRG	5	ug/l	0.5	U	0.15	J	2.9		3		**16**		0.5	U	0.19	J	0.16	J	0.5	U	0.5	U	5	U
1,1-Dichloroethene	75-35-4	TRG	5	ug/l	0.5	U	0.69		3.6		3.7		**6.8**		0.5	U	0.69		3.1		0.26	J	0.5	U	5	U
1,2,3-Trichlorobenzene	87-61-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
1,2,4-Trichlorobenzene	120-82-1	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
1,2-Dibromo-3-Chloropropane	96-12-8	TRG	0.04	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
1,2-Dibromoethane	106-93-4	TRG	0.0006	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
1,2-Dichlorobenzene	95-50-1	TRG	3	ug/l	0.5	U	0.5	U	0.12	J	0.12	J	0.29	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
1,2-Dichloroethane	107-06-2	TRG	0.6	ug/l	0.5	U	0.5	U	0.18	J	0.19	J	0.57		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
1,2-Dichloropropane	78-87-5	TRG	1	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
1,3-Dichlorobenzene	541-73-1	TRG	3	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
1,4-Dichlorobenzene	106-46-7	TRG	3	ug/l	0.12	J	0.5	U	0.3	J	0.29	J	0.59		0.5	U	0.5	U	0.5	U	0.5	U	0.087	J	5	U
2-Butanone	78-93-3	TRG	50	ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	50	U
2-Hexanone	591-78-6	TRG	50	ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	50	U
4-Methyl-2-Pentanone	108-10-1	TRG		ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	50	U
Acetone	67-64-1	TRG	50	ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	50	U
Benzene	71-43-2	TRG	1	ug/l	0.5	U	0.5	U	0.064	J	0.059	J	0.18	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
Bromochloromethane	74-97-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
Bromodichloromethane	75-27-4	TRG	50	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
Bromoform	75-25-2	TRG	50	ug/l	0.5	U	0.28	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
Bromomethane	74-83-9	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
Carbon Disulfide	75-15-0	TRG	60	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
Carbon Tetrachloride	56-23-5	TRG	5	ug/l	0.046	J	0.085	J	0.5	U	0.5	U	0.077	J	0.5	U	0.17	J	0.15	J	0.15	J	0.5	U	5	U
Chlorobenzene	108-90-7	TRG	5	ug/l	0.24	J	0.5	U	0.75		0.74		1.3		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.36	J
Chloroethane	75-00-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
Chloroform	67-66-3	TRG	7	ug/l	0.13	J	0.16	J	0.5	U	0.5	U	0.5	U	0.14	J	0.16	J	0.4	J	0.5	U	0.5	U	5	U
Chloromethane	74-87-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
cis-1,2-Dichloroethene	156-59-2	TRG	5	ug/l	0.28	J	2.5		**5.4**		**5.6**		**15**		0.5	U	**5.2**		0.61		0.12	J	0.5	U	**710**	
cis-1,3-Dichloropropene	10061-01-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
Cyclohexane	110-82-7	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
Dibromochloromethane	124-48-1	TRG	50	ug/l	0.5	U	0.27	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
Dichlorodifluoromethane	75-71-8	TRG	5	ug/l	0.17	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	2.1		0.66		0.5	U	5	U
Ethylbenzene	100-41-4	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
Isopropylbenzene	98-82-8	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	**10**	
M, P Xylenes	179601-23-1	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
Methyl Acetate	79-20-9	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
Methyl tert-Butyl Ether	1634-04-4	TRG	10	ug/l	0.73		0.14	J	0.46	J	0.47	J	0.12	J	0.13	J	0.46	J	0.33	J	0.5	U	0.5	U	5	U
Methylcyclohexane	108-87-2	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	3.9	J
Methylene Chloride	75-09-2	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.15	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
o-Xylene (1,2-Dimethylbenzene)	95-47-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
Styrene	100-42-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
Tetrachloroethene (PCE)	127-18-4	TRG	5	ug/l	**73**		**320**		**20**		**19**		**12**		**9**		**200**		**74**		**17**		0.5	U	**160**	
Toluene	108-88-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
trans-1,2-Dichloroethene	156-60-5	TRG	5	ug/l	0.5	U	0.5	U	0.08	J	0.073	J	0.11	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1.9	J
trans-1,3-Dichloropropene	10061-02-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
Trichloroethene (TCE)	79-01-6	TRG	5	ug/l	1.9		**37**		**35**		**34**		**20**		0.5	U	**24**		**6.7**		**8.9**		0.5	U	**130**	
Trichlorofluoromethane	75-69-4	TRG	5	ug/l	0.5	U	0.5	U	0.069	J	0.064	J	0.34	J	0.5	U	0.5	U	0.5	U	0.076	J	0.5	U	5	U
Vinyl Chloride	75-01-4	TRG	2	ug/l	0.5	U	0.5	U	0.33	J	0.37	J	1.3		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U
Total Alkane Tics	E966796	TIC		ug/l																						

HDR APTIM
a Joint Venture

Table 4-2
Fulton OU2 Remedial Investigation
Groundwater Analytical Results - Phase 5 - VOCs

				Sampling Event:	2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling	
				Location:	N-10486		N-10487		N-11171		N-11659		N-11733		N-11735		N-11739		N-11865		N-14146	
				Sample:	N-10486-GW-054-20191211-0		N-10487-GW-056-20191206-0		N-11171-GW-220-20191206-0		N-11659-GW-409-20191210-0		N-11733-GW-156-20191210-0		N-11735-GW-153-20191210-0		N-11739-GW-047-20191212-0		N-11865-GW-195-20191211-0		N-14146-GW-370-430-20191212-0	
				Sample Type:	N		N		N		N		N		N		N		N		N	
				Sample Date:	12/11/2019		12/6/2019		12/6/2019		12/10/2019		12/10/2019		12/10/2019		12/12/2019		12/11/2019		12/12/2019	
Analyte	**CAS**	**Result Type**	**Proposed Delineation Criteria**	**Units**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
VOCs																						
1,1,1-Trichloroethane	71-55-6	TRG	5	ug/l	0.5	U	0.5	U	0.15	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.38	J
1,1,2,2-Tetrachloroethane	79-34-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloroethane	79-00-5	TRG	1	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethane	75-34-3	TRG	5	ug/l	0.5	U	0.5	U	0.13	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.37	J
1,1-Dichloroethene	75-35-4	TRG	5	ug/l	0.5	U	0.5	U	0.32	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1.3	
1,2,3-Trichlorobenzene	87-61-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2,4-Trichlorobenzene	120-82-1	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dibromo-3-Chloropropane	96-12-8	TRG	0.04	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dibromoethane	106-93-4	TRG	0.0006	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichlorobenzene	95-50-1	TRG	3	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethane	107-06-2	TRG	0.6	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloropropane	78-87-5	TRG	1	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,3-Dichlorobenzene	541-73-1	TRG	3	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,4-Dichlorobenzene	106-46-7	TRG	3	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
2-Butanone	78-93-3	TRG	50	ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2-Hexanone	591-78-6	TRG	50	ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
4-Methyl-2-Pentanone	108-10-1	TRG		ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Acetone	67-64-1	TRG	50	ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Benzene	71-43-2	TRG	1	ug/l	0.5	U	0.5	U	0.08	J	0.87		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromochloromethane	74-97-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromodichloromethane	75-27-4	TRG	50	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromoform	75-25-2	TRG	50	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromomethane	74-83-9	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon Disulfide	75-15-0	TRG	60	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon Tetrachloride	56-23-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.058	J
Chlorobenzene	108-90-7	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroethane	75-00-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroform	67-66-3	TRG	7	ug/l	0.18	J	0.5	U	0.5	U	0.5	U	0.26	J	0.38	J	0.5	U	0.5	U	0.5	U
Chloromethane	74-87-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
cis-1,2-Dichloroethene	156-59-2	TRG	5	ug/l	0.2	J	0.5	U	0.29	J	0.5	U	0.5	U	0.85		0.5	U	0.5	U	0.09	J
cis-1,3-Dichloropropene	10061-01-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Cyclohexane	110-82-7	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Dibromochloromethane	124-48-1	TRG	50	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Dichlorodifluoromethane	75-71-8	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.1	J	0.5	U	0.5	U	0.5	U
Ethylbenzene	100-41-4	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Isopropylbenzene	98-82-8	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
M, P Xylenes	179601-23-1	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methyl Acetate	79-20-9	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methyl tert-Butyl Ether	1634-04-4	TRG	10	ug/l	0.5	U	0.5	U	0.21	J	0.5	U	0.5	U	0.15	J	0.5	U	0.5	U	0.14	J
Methylcyclohexane	108-87-2	TRG		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methylene Chloride	75-09-2	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
o-Xylene (1,2-Dimethylbenzene)	95-47-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Styrene	100-42-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Tetrachloroethene (PCE)	127-18-4	TRG	5	ug/l	4		0.83		**6.8**		0.5	U	1.4		4.4		0.5	U	2.1		2.1	
Toluene	108-88-3	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
trans-1,2-Dichloroethene	156-60-5	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
trans-1,3-Dichloropropene	10061-02-6	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Trichloroethene (TCE)	79-01-6	TRG	5	ug/l	1.7		0.056	J	**13**		0.057	J	0.5	U	1.4		0.5	U	0.17	J	2.6	
Trichlorofluoromethane	75-69-4	TRG	5	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Vinyl Chloride	75-01-4	TRG	2	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Total Alkane Tics	E966796	TIC		ug/l																		

Table 4-2
Fulton OU2 Remedial Investigation
Groundwater Analytical Results - Phase 5 - VOCs

HDR APTIM
a Joint Venture

				Sampling Event:	**2019 08-09 Phase 5 GW Sampling**		**2019 08-09 Phase 5 GW Sampling**		**2019 08-09 Phase 5 GW Sampling**		**2019 08-09 Phase 5 GW Sampling**		**2019 08-09 Phase 5 GW Sampling**		**2019 08-09 Phase 5 GW Sampling**		**2019 08-09 Phase 5 GW Sampling**		**2019 08-09 Phase 5 GW Sampling**		**2019 08-09 Phase 5 GW Sampling**		**2019 08-09 Phase 5 GW Sampling**		**2019 08-09 Phase 5 GW Sampling**	
				Location:	**DSB02RS**		**GCP18S**		**MW-03 ROS**		**MW-03 ROS**		**MW-10MS**		**MW-15A**		**MW-21C**		**MW-23C**		**MW-26F**		**N-07650**		**N-10330**	
				Sample:	**DSB02RS-GW-377-20190829-0**		**GCP18S-GW-46.5-20190905-0**		**MW-03ROS-GW-050-20190829-0**		**MW-03ROS-GW-050-20190829-1**		**MW-10MS-GW-190-20190829-0**		**MW-15A-GW-145-20190903-0**		**MW-21C-GW-400-20190909-0**		**MW-23C-GW-403-20190903-0**		**MW-26F-GW-410-20190905-0**		**N-07650-GW-400-420-20190904-0**		**N-10330-GW-052-20190905-0**	
				Sample Type:	**N**		**N**		**N**		**FD**		**N**		**N**		**N**		**N**		**N**		**N**		**N**	
				Sample Date:	**8/29/2019**		**9/5/2019**		**8/28/2019**		**8/29/2019**		**8/28/2019**		**9/3/2019**		**9/9/2019**		**9/3/2019**		**9/5/2019**		**9/4/2019**		**9/5/2019**	
Analyte	**CAS**	**Result Type**	**Proposed Delineation Criteria**	**Units**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
VOCs																										
(3-Methyl-2-Butenyl)-Benzene	4489-84-3	TIC		ug/l			1.6	JN																	5.5	JN
.alpha.-Ionone	127-41-3	TIC		ug/l													1.2	JN								
1,2,3,4-Tetrahydro-1,5-dimethylnaphthalene	21564-91-0	TIC		ug/l			0.63	JN																		
1,2,3,4-Tetrahydro-5,7-Dimethyl Naphthalene	21693-54-9	TIC		ug/l																						
1,2,3,4-Tetramethylbenzene	488-23-3	TIC		ug/l			3.3	JN	880	JN	900	JN														
1,2,3,5-Tetramethylbenzene	527-53-7	TIC		ug/l			4	JN																		
1,2,3-Trimethyl Benzene	526-73-8	TIC	5	ug/l			2.6	JN	**73**	JN	**81**	JN														
1,2,4,5-Tetramethylbenzene	95-93-2	TIC		ug/l																						
1,2,4-Trimethylbenzene	95-63-6	TIC	5	ug/l																						
1,2-Diethylbenzene	135-01-3	TIC		ug/l			0.89	JN	670	JN	2400	JN	0.65	JN												
1,2-Dimethylindan	17057-82-8	TIC		ug/l			0.86	JN																		
1,2-Dimethylnaphthalene	573-98-8	TIC		ug/l																						
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	TIC	5	ug/l																						
1,3-Diethyl Benzene	141-93-5	TIC		ug/l																						
1,3-Dimethylnaphthalene	575-41-7	TIC		ug/l																						
1,4-Diethyl Benzene	105-05-5	TIC		ug/l					2400	JN																
1-Butenyl-(E)-Benzene	1005-64-7	TIC		ug/l																						
1-ETHENYL-3-ETHYLBENZENE	7525-62-4	TIC		ug/l			9	JN			190	JN													6	JN
1-Ethyl Naphthalene	1127-76-0	TIC		ug/l																						
1-Ethyl-2,3-Dimethylbenzene	933-98-2	TIC		ug/l			5	JN	410	JN																
1-ETHYL-2,4,5-TRIMETHYLBENZENE	17851-27-3	TIC		ug/l					50	JN																
1-Ethyl-3-Methyl Benzene	620-14-4	TIC		ug/l					31	JN																
1-Ethyltoluene	611-14-3	TIC		ug/l			5.3	JN																		
1H-INDENE 2,3-DIHYDRO-5-METHYL-	874-35-1	TIC		ug/l					310	JN															9.1	JN
1h-Indene, 2,3-Dihydro-1, 1,3-Trimethy	4912-92-9	TIC		ug/l			2.1	JN																	7.8	JN
1h-Indene, 2,3-Dihydro-1,3-Dimethyl-	17059-48-2	TIC		ug/l			3.1	JN																	4.5	JN
1H-Indene, 2,3-Dihydro-1,6-...	20836-11-7	TIC		ug/l																						
1H-Indene, 2,3-Dihydro-2-Methyl-	6682-71-9	TIC		ug/l			3.2	JN																	4.7	JN
1-Methyl-2(Propenyl)Benzene	1074-17-5	TIC		ug/l																						
1-Methylindan	767-58-8	TIC		ug/l					170	JN																
1-methylnaphthalene	90-12-0	TIC		ug/l					90	JN	120	JN														
1-Pentenylbenzene	824-90-8	TIC		ug/l			2.5	JN																		
2,3-Dihydro-1h-Indene	496-11-7	TIC		ug/l			8.9	JN																		
2,3-Dimethyl Naphthalene	581-40-8	TIC		ug/l																						
2,7-Dimethyl Naphthalene	582-16-1	TIC		ug/l																						
2-ETHENYL-1,3,5-TRIMETHYLBENZENE	769-25-5	TIC		ug/l			1.5	JN																		
2-Ethyl-1,4-Dimethyl Benzene	1758-88-9	TIC		ug/l			3.1	JN	430	JN	430	JN														
2-Methylnaphthalene	91-57-6	TIC		ug/l																						
3-METHYLBUT-2-EN-2-YLBENZENE	769-57-3	TIC		ug/l																						
3-Phenylbut-1-ene	934-10-1	TIC		ug/l																						
4-ETHENYL-1,2-DIMETHYLBENZENE	27831-13-6	TIC		ug/l																						
4-Ethyl-1,2-Dimethyl Benzene	934-80-5	TIC		ug/l			2.4	JN			980	JN														
Aminomethanesulfonic acid	13881-91-9	TIC		ug/l															0.64	JN						
Azulene	275-51-4	TIC		ug/l																						
Benzene, (2-methyl-1-butenyl)-	56253-64-6	TIC		ug/l																					5.6	JN
Benzene, 1,3-diethyl-5-methyl-	2050-24-0	TIC		ug/l			0.71	JN																		
Benzene, 1,3-dimethyl-5-(1-methylethyl)-	4706-90-5	TIC		ug/l					26	JN	29	JN														
Benzene, 1-Ethyl-2,4-Dimethyl	874-41-9	TIC		ug/l					980	JN																
Benzene, 1-Ethyl-4-(1-Methylethyl)-	4218-48-8	TIC		ug/l			0.85	JN	110	JN	110	JN														
Benzene, 1-Methyl-4-(1-Methylpropyl)-	1595-16-0	TIC		ug/l					51	JN	54	JN														
Benzene, 1-methyl-4-propyl-	1074-55-1	TIC		ug/l			1.7	JN	200	JN	180	JN														
Benzene, 2-Butenyl	1560-06-1	TIC		ug/l					1400	JN	1400	JN														
Benzene, 2-ethenyl-1,4-dimethyl-	2039-89-6	TIC		ug/l			4.1	JN			310	JN														
Benzene, 4-(2-Butenyl)-1,2-DIM	54340-86-2	TIC		ug/l																						
BENZENE, PENTAMETHYL-	700-12-9	TIC		ug/l					28	JN	33	JN														
BENZOCYCLOHEPTATRIENE	264-09-5	TIC		ug/l							74	JN														
Biphenyl (Diphenyl)	92-52-4	TIC	5	ug/l																						
Bis(3-methylbutyl) fluorene-2,7-di	253664-95-8	TIC		ug/l	1.3	JN																				
Chlorodifluoromethane	75-45-6	TIC	80	ug/l																						
Cis-2-Pentene	627-20-3	TIC		ug/l																						
Ethanol	64-17-5	TIC		ug/l																	1.1	JN				

HDR APTIM
a Joint Venture

Table 4-2
Fulton OU2 Remedial Investigation
Groundwater Analytical Results - Phase 5 - VOCs

				Sampling Event:	2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling	
				Location:	DSB02RS		GCP18S		MW-03 ROS		MW-03 ROS		MW-10MS		MW-15A		MW-21C		MW-23C		MW-26F		N-07650		N-10330	
				Sample:	DSB02RS-GW-377-20190829-0		GCP18S-GW-46.5-20190905-0		MW-03ROS-GW-050-20190829-0		MW-03ROS-GW-050-20190829-1		MW-10MS-GW-190-20190829-0		MW-15A-GW-145-20190903-0		MW-21C-GW-400-20190909-0		MW-23C-GW-403-20190903-0		MW-26F-GW-410-20190905-0		N-07650-GW-400-420-20190904-0		N-10330-GW-052-20190905-0	
				Sample Type:	N		N		N		FD		N		N		N		N		N		N		N	
				Sample Date:	8/29/2019		9/5/2019		8/28/2019		8/29/2019		8/28/2019		9/3/2019		9/9/2019		9/3/2019		9/5/2019		9/4/2019		9/5/2019	
Analyte	**CAS**	**Result Type**	**Proposed Delineation Criteria**	**Units**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
Furan	110-00-9	TIC		ug/l																						
Hex-1-enylbenzene	828-15-9	TIC		ug/l			1.3	JN																		
Isobutyraldehyde	78-84-2	TIC		ug/l																						
Isopropanol	67-63-0	TIC		ug/l											0.95	JN										
M-Cymene	535-77-3	TIC	5	ug/l			1.2	JN																		
Naphthalene	91-20-3	TIC	10	ug/l																						
Naphthalene, 1,2,3,4-tetrahydro-1-	1559-81-5	TIC		ug/l																					5.1	JN
Naphthalene, 1,2,3,4-tetrahydro-1,4-dime	4175-54-6	TIC		ug/l																						
Naphthalene, 1,2,3,4-tetrahydro-2-methyl	3877-19-8	TIC		ug/l			3.8	JN																		
Naphthalene, 1,2,3,4-Tetrahydro-5-Methyl	2809-64-5	TIC		ug/l																						
Naphthalene, 1,2,3,4-Tetrahydro-6-Methyl	1680-51-9	TIC		ug/l																						
Naphthalene, 1,6-Dimethyl-	575-43-9	TIC		ug/l																						
N-Propylbenzene	103-65-1	TIC	5	ug/l			1.8	JN																		
O-Cymene (O-Isopropyltoluene)	527-84-4	TIC	5	ug/l					450	JN	450	JN														
OXIRANE,2-METHYL-2-PHENYL-	2085-88-3	TIC		ug/l			1.3	JN																		
Propenylbenzene	637-50-3	TIC	5	ug/l																					5	JN
Sec-Butylbenzene	135-98-8	TIC	5	ug/l					190	JN																
Sulfur Dioxide	7446-09-5	TIC		ug/l			0.86	JN																		
Tetralin	119-64-2	TIC		ug/l			5.7	JN	34	JN	39	JN														
Unknown Alkane-01	UNKALK1	TIC		ug/l																						
Unknown Alkane-02	UNKALK2	TIC		ug/l																						
Unknown Alkane-03	UNKALK3	TIC		ug/l																						
Unknown With 2nd Highest Conc.	UNKNOWN2	TIC		ug/l																			1.3	J		
Unknown With 3rd Highest Conc.	UNKNOWN3	TIC		ug/l																						
Unknown With 4th Highest Conc.	UNKNOWN4	TIC		ug/l																						
Unknown With 5th Highest Conc.	UNKNOWN5	TIC		ug/l																						
Unknown With 6th Highest Conc.	UNKNOWN6	TIC		ug/l																						
Unknown With Highest Conc.	UNKNOWN1	TIC		ug/l			1.9	J															0.58	J		

HDR APTIM
a Joint Venture

Table 4-2
Fulton OU2 Remedial Investigation
Groundwater Analytical Results - Phase 5 - VOCs

				Sampling Event:	2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling	
				Location:	N-10487		N-11171		DSB02RS		GCP18S		MW-03 ROS		MW-20C		N-03185		N-04298		N-08576		N-10330	
				Sample:	N-10487-GW-056-20190828-0		N-11171-GW-220-20190829-0		DSB02RS-GW-377-20191206-0		GCP18S-GW-46.5-20191212-0		MW-03ROS-GW-050-20191211-0		MW-20C-GW-405-20191209-0		N-03185-GW-423-463-20191212-0		N-04298-GW-344-394-20191212-0		N-08576-GW-445-505-20191212-0		N-10330-GW-052-20191212-0	
				Sample Type:	N		N		N		N		N		N		N		N		N		N	
				Sample Date:	8/28/2019		8/28/2019		12/6/2019		12/12/2019		12/11/2019		12/9/2019		12/12/2019		12/12/2019		12/12/2019		12/12/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
VOCs																								
(3-Methyl-2-Butenyl)-Benzene	4489-84-3	TIC		ug/l																				
.alpha.-Ionone	127-41-3	TIC		ug/l																				
1,2,3,4-Tetrahydro-1,5-dimethylnaphthalene	21564-91-0	TIC		ug/l																				
1,2,3,4-Tetrahydro-5,7-Dimethyl Naphthalene	21693-54-9	TIC		ug/l																			5.7	NJD
1,2,3,4-Tetramethylbenzene	488-23-3	TIC		ug/l							12	NJ	750	NJD										
1,2,3,5-Tetramethylbenzene	527-53-7	TIC		ug/l									1200	NJD										
1,2,3-Trimethyl Benzene	526-73-8	TIC	5	ug/l							**15**	NJ	**24**	NJD										
1,2,4,5-Tetramethylbenzene	95-93-2	TIC		ug/l							8.2	NJ	1000	NJD										
1,2,4-Trimethylbenzene	95-63-6	TIC	5	ug/l							**41**	NJ	**140**	NJD										
1,2-Diethylbenzene	135-01-3	TIC		ug/l									850	NJD										
1,2-Dimethylindan	17057-82-8	TIC		ug/l							14	NJ												
1,2-Dimethylnaphthalene	573-98-8	TIC		ug/l																	0.53	NJ		
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	TIC	5	ug/l							**6.8**	NJ	**200**	NJD										
1,3-Diethyl Benzene	141-93-5	TIC		ug/l									3300	NJD										
1,3-Dimethylnaphthalene	575-41-7	TIC		ug/l																	1	NJ		
1,4-Diethyl Benzene	105-05-5	TIC		ug/l									2600	NJD										
1-Butenyl-(E)-Benzene	1005-64-7	TIC		ug/l							7.7	NJ	98	NJD										
1-ETHENYL-3-ETHYLBENZENE	7525-62-4	TIC		ug/l																			16	NJD
1-Ethyl Naphthalene	1127-76-0	TIC		ug/l																	0.56	NJ		
1-Ethyl-2,3-Dimethylbenzene	933-98-2	TIC		ug/l									470	NJD										
1-ETHYL-2,4,5-TRIMETHYLBENZENE	17851-27-3	TIC		ug/l																				
1-Ethyl-3-Methyl Benzene	620-14-4	TIC		ug/l									57	NJD										
1-Ethyltoluene	611-14-3	TIC		ug/l							7	NJ	25	NJD										
1H-INDENE 2,3-DIHYDRO-5-METHYL-	874-35-1	TIC		ug/l																				
1h-Indene, 2,3-Dihydro-1, 1,3-Trimethy	4912-92-9	TIC		ug/l																			5.1	NJD
1h-Indene, 2,3-Dihydro-1,3-Dimethyl-	17059-48-2	TIC		ug/l							16	NJ												
1H-Indene, 2,3-Dihydro-1,6-...	20836-11-7	TIC		ug/l																			13	NJD
1H-Indene, 2,3-Dihydro-2-Methyl-	6682-71-9	TIC		ug/l																			10	NJD
1-Methyl-2(Propenyl)Benzene	1074-17-5	TIC		ug/l									190	NJD										
1-Methylindan	767-58-8	TIC		ug/l							27	NJ												
1-methylnaphthalene	90-12-0	TIC		ug/l									23	NJD							2.2	NJ		
1-Pentenylbenzene	824-90-8	TIC		ug/l																				
2,3-Dihydro-1h-Indene	496-11-7	TIC		ug/l							60	NJ											22	NJD
2,3-Dimethyl Naphthalene	581-40-8	TIC		ug/l																	2.2	NJ		
2,7-Dimethyl Naphthalene	582-16-1	TIC		ug/l													0.74	NJ			1	NJ		
2-ETHENYL-1,3,5-TRIMETHYLBENZENE	769-25-5	TIC		ug/l																				
2-Ethyl-1,4-Dimethyl Benzene	1758-88-9	TIC		ug/l							15	NJ	880	NJD										
2-Methylnaphthalene	91-57-6	TIC		ug/l							7.8	NJ	55	NJD							0.77	NJ		
3-METHYLBUT-2-EN-2-YLBENZENE	769-57-3	TIC		ug/l							5.4	NJ												
3-Phenylbut-1-ene	934-10-1	TIC		ug/l																			11	NJD
4-ETHENYL-1,2-DIMETHYLBENZENE	27831-13-6	TIC		ug/l									84	NJD										
4-Ethyl-1,2-Dimethyl Benzene	934-80-5	TIC		ug/l							5.4	NJ												
Aminomethanesulfonic acid	13881-91-9	TIC		ug/l																				
Azulene	275-51-4	TIC		ug/l			1.1	JN					780	NJD										
Benzene, (2-methyl-1-butenyl)-	56253-64-6	TIC		ug/l							20	NJ												
Benzene, 1,3-diethyl-5-methyl-	2050-24-0	TIC		ug/l							5.6	NJ	98	NJD										
Benzene, 1,3-dimethyl-5-(1-methylethyl)-	4706-90-5	TIC		ug/l									170	NJD										
Benzene, 1-Ethyl-2,4-Dimethyl	874-41-9	TIC		ug/l							15	NJ	990	NJD										
Benzene, 1-Ethyl-4-(1-Methylethyl)-	4218-48-8	TIC		ug/l																				
Benzene, 1-Methyl-4-(1-Methylpropyl)-	1595-16-0	TIC		ug/l									56	NJD										
Benzene, 1-methyl-4-propyl-	1074-55-1	TIC		ug/l									250	NJD										
Benzene, 2-Butenyl	1560-06-1	TIC		ug/l																				
Benzene, 2-ethenyl-1,4-dimethyl-	2039-89-6	TIC		ug/l							35	NJ	290	NJD										
Benzene, 4-(2-Butenyl)-1,2-DIM	54340-86-2	TIC		ug/l							6.4	NJ												
BENZENE, PENTAMETHYL-	700-12-9	TIC		ug/l									28	NJD										
BENZOCYCLOHEPTATRIENE	264-09-5	TIC		ug/l																				
Biphenyl (Diphenyl)	92-52-4	TIC	5	ug/l																	1.9	NJ		
Bis(3-methylbutyl) fluorene-2,7-di	253664-95-8	TIC		ug/l																				
Chlorodifluoromethane	75-45-6	TIC	80	ug/l															0.66	NJ				
Cis-2-Pentene	627-20-3	TIC		ug/l					0.51	NJ														
Ethanol	64-17-5	TIC		ug/l																				

HDR APTIM
a Joint Venture

Table 4-2
Fulton OU2 Remedial Investigation
Groundwater Analytical Results - Phase 5 - VOCs

				Sampling Event:	2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling	
				Location:	N-10487		N-11171		DSB02RS		GCP18S		MW-03 ROS		MW-20C		N-03185		N-04298		N-08576		N-10330	
				Sample:	N-10487-GW-056-20190828-0		N-11171-GW-220-20190829-0		DSB02RS-GW-377-20191206-0		GCP18S-GW-46.5-20191212-0		MW-03ROS-GW-050-20191211-0		MW-20C-GW-405-20191209-0		N-03185-GW-423-463-20191212-0		N-04298-GW-344-394-20191212-0		N-08576-GW-445-505-20191212-0		N-10330-GW-052-20191212-0	
				Sample Type:	N		N		N		N		N		N		N		N		N		N	
				Sample Date:	8/28/2019		8/28/2019		12/6/2019		12/12/2019		12/11/2019		12/9/2019		12/12/2019		12/12/2019		12/12/2019		12/12/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Furan	110-00-9	TIC		ug/l	0.94	JN																		
Hex-1-enylbenzene	828-15-9	TIC		ug/l																				
Isobutyraldehyde	78-84-2	TIC		ug/l											0.51	NJ								
Isopropanol	67-63-0	TIC		ug/l																				
M-Cymene	535-77-3	TIC	5	ug/l																				
Naphthalene	91-20-3	TIC	10	ug/l							9.5	NJ	**860**	NJD										
Naphthalene, 1,2,3,4-tetrahydro-1-	1559-81-5	TIC		ug/l																				
Naphthalene, 1,2,3,4-tetrahydro-1,4-dime	4175-54-6	TIC		ug/l							4.5	NJ											6.6	NJD
Naphthalene, 1,2,3,4-tetrahydro-2-methyl	3877-19-8	TIC		ug/l							7.8	NJ											5.6	NJD
Naphthalene, 1,2,3,4-Tetrahydro-5-Methyl	2809-64-5	TIC		ug/l							14	NJ												
Naphthalene, 1,2,3,4-Tetrahydro-6-Methyl	1680-51-9	TIC		ug/l							7.4	NJ												
Naphthalene, 1,6-Dimethyl-	575-43-9	TIC		ug/l																	1.6	NJ		
N-Propylbenzene	103-65-1	TIC	5	ug/l							**7.3**	NJ											**5.9**	NJD
O-Cymene (O-Isopropyltoluene)	527-84-4	TIC	5	ug/l																				
OXIRANE,2-METHYL-2-PHENYL-	2085-88-3	TIC		ug/l																				
Propenylbenzene	637-50-3	TIC	5	ug/l																				
Sec-Butylbenzene	135-98-8	TIC	5	ug/l									**230**	NJD									**5.7**	NJD
Sulfur Dioxide	7446-09-5	TIC		ug/l																				
Tetralin	119-64-2	TIC		ug/l							13	NJ	26	NJD										
Unknown Alkane-01	UNKALK1	TIC		ug/l					0.83	J														
Unknown Alkane-02	UNKALK2	TIC		ug/l					1.9	J														
Unknown Alkane-03	UNKALK3	TIC		ug/l					0.57	J														
Unknown With 2nd Highest Conc.	UNKNOWN2	TIC		ug/l					0.61	J	14	J	340	JD									18	JD
Unknown With 3rd Highest Conc.	UNKNOWN3	TIC		ug/l									410	JD									21	JD
Unknown With 4th Highest Conc.	UNKNOWN4	TIC		ug/l									50	JD									10	JD
Unknown With 5th Highest Conc.	UNKNOWN5	TIC		ug/l									65	JD									13	JD
Unknown With 6th Highest Conc.	UNKNOWN6	TIC		ug/l									26	JD									8	JD
Unknown With Highest Conc.	UNKNOWN1	TIC		ug/l	0.59	J			0.81	J	34	J	840	JD									5.8	JD

HDR APTIM
a Joint Venture

Table 4-3
Fulton OU2 Remedial Investigation
Groundwater Analytical Results - Phase 5 - Metals

Sampling Event:					2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling	
Location:					DSB02RS		GCP18S		MW-03 ROS		MW-03 ROS		MW-10D		MW-10MS		MW-15A		MW-20C		MW-21C		MW-21D		MW-23C		MW-24A		MW-25A	
Sample:					DSB02RS-GW-377-20190829-0		GCP18S-GW-46.5-20190905-0		MW-03ROS-GW-050-20190829-0		MW-03ROS-GW-050-20190829-1		MW-10D-GW-111-20190828-0		MW-10MS-GW-190-20190829-0		MW-15A-GW-145-20190903-0		MW-20C-GW-405-20190903-0		MW-21C-GW-400-20190909-0		MW-21D-GW-455-20190909-0		MW-23C-GW-403-20190903-0		MW-24A-GW-350-20190905-0		MW-25A-GW-345-20190905-0	
Sample Type:					N		N		N		FD		N		N		N		N		N		N		N		N		N	
Sample Date:					8/29/2019		9/5/2019		8/28/2019		8/29/2019		8/28/2019		8/28/2019		9/3/2019		9/3/2019		9/9/2019		9/9/2019		9/3/2019		9/5/2019		9/5/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Metals																														
Ferrous Iron	8053-60-9 / 15438-31-0	TRG		mg/l	148	J	7.8	J	8.2	J	8.5	J	*0.2*	*UJ*	0.08	J	0.75	J	0.25	J	1.36	J	0.32	J	2.5	J	0.09	J	0.2	J
Iron	7439-89-6	TRG	300	ug/l	**405000**	D	**14200**		**14100**		**14600**		**7890**		**338**		**2530**		**17800**		**6470**		**21200**		**379000**	D	**35000**		**3820**	
Manganese	7439-96-5	TRG	300	ug/l	**8560**	D	**890**		88.8		90.9		44.7		23.8		64.9		94.8		96		245		**2170**	D	175		33.9	
Sodium	7440-23-5	TRG	20000	ug/l	**36000**		**44200**		7280		7290		**48900**		**28800**		**49400**		**57200**		**102000**		15200		**33900**		18600		**21700**	

Sampling Event:					2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling	
Location:					MW-25A		MW-26F		MW-26G		MW-4 ZOE		MW-8D		MW-8S		MW-9D		MW-9S		N-00017		N-00104		N-01697		N-02487		N-03185	
Sample:					MW-25A-GW-345-		MW-26F-GW-410-		MW-26G-GW-443-		MW-4ZOE-GW-		MW-8D-GW-111-		MW-8S-GW-062-		MW-9D-GW-120-		MW-9S-GW-063-		N-00017-GW-405-		N-00104-GW-325-		N-01697-GW-478-		N-02487-GW-424-		N-03185-GW-423-	
Sample Type:					N		N		N		N		N		N		N		N		N		N		N		N		N	
Sample Date:					9/5/2019		9/5/2019		9/5/2019		9/4/2019		9/4/2019		9/4/2019		9/4/2019		9/4/2019		9/4/2019		9/3/2019		9/4/2019		9/3/2019		9/3/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Metals																														
Ferrous Iron	8053-60-9 / 15438-31-0	TRG		mg/l	0.2	J	*0.1*	*UJ*	0.3	J	*0.1*	*UJ*	*1*	*UJ*	*0.1*	*UJ*	0.04	J	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*
Iron	7439-89-6	TRG	300	ug/l	**3820**		**831**		**402**		181	J	**14000**		**1390**		**4470**		**1100**		41.7	J	41.6	J	*200*	*U*	203		58.5	J
Iron, Ion (Fe2+)	15438-31-0	TRG		mg/l																										
Manganese	7439-96-5	TRG	300	ug/l	33.9		103		85.3		2.1		22.8		51		32.8		159		30		*1*	*U*	10.2		2.9		7.3	
Sodium	7440-23-5	TRG	20000	ug/l	**21700**		**23800**		19500		**38400**		**28000**		**62200**		**99300**		**117000**		**35000**		15300		15400		**20800**		**34600**	

Sampling Event:					2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling	
Location:					N-03603		N-03881		N-04298		N-05603		N-06745		N-07058		N-07649		N-07649		N-07650		N-08248		N-08339		N-08409		N-08576	
Sample:					N-03603-GW-443-		N-03881-GW-426-		N-04298-GW-344-		N-05603-GW-365-		N-06745-GW-304-		N-07058-GW-380-		N-07649-GW-165-		N-07649-GW-165-		N-07650-GW-400-		N-08248-GW-315-		N-08339-GW-308-		N-08409-GW-340-		N-08576-GW-445-	
Sample Type:					N		N		N		N		N		N		N		FD		N		N		N		N		N	
Sample Date:					9/3/2019		9/4/2019		9/4/2019		9/3/2019		9/4/2019		9/4/2019		9/4/2019		9/4/2019		9/4/2019		9/3/2019		9/4/2019		9/3/2019		9/3/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Metals																														
Ferrous Iron	8053-60-9 / 15438-31-0	TRG		mg/l	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*
Iron	7439-89-6	TRG	300	ug/l	*200*	*U*	79	J	49.2	J	48.6	J	46.8	J	31.5	J	63.9	J	70.8	J	103	J	174	J	38.6	J	73.7	J	24.3	J
Iron, Ion (Fe2+)	15438-31-0	TRG		mg/l																										
Manganese	7439-96-5	TRG	300	ug/l	0.44	J	1.5		105		2		1.2		*1*	*U*	2.4		2.5		4		1.2		2.6		0.41	J	1.2	
Sodium	7440-23-5	TRG	20000	ug/l	11300		11200		**50300**		**27000**		**21700**		16200		**30200**		**30700**		**36200**		18100		**21500**		**24600**		10900	

Sampling Event:					2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling	
Location:					N-09949		N-10330		N-10486		N-10487		N-11171		N-11659		N-11733		N-11735		N-11739		N-11739		N-11865		DSB02RS		GCP18S	
Sample:					N-09949-GW-93.5-		N-10330-GW-052-		N-10486-GW-054-		N-10487-GW-056-		N-11171-GW-220-		N-11659-GW-409-		N-11733-GW-156-		N-11735-GW-153-		N-11739-GW-047-		N-11739-GW-047-		N-11865-GW-195-		DSB02RS-GW-377-		GCP18S-GW-46.5-	
Sample Type:					N		N		N		N		N		N		N		N		N		FD		N		N		N	
Sample Date:					9/4/2019		9/5/2019		9/6/2019		8/28/2019		8/28/2019		9/3/2019		9/6/2019		9/6/2019		9/6/2019		9/6/2019		9/6/2019		12/6/2019		12/12/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Metals																														
Ferrous Iron	8053-60-9 / 15438-31-0	TRG		mg/l	*0.1*	*UJ*	8	J	*0.1*	*UJ*	*0.1*	*UJ*	4.4	J	0.48	J	0.04	J	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	0.29	J	0.89	J	16.5	J
Iron	7439-89-6	TRG	300	ug/l	198	J	**13200**		109	J	**1500**		**28000**		**25600**		**306**		99	J	120	J	144	J	**5910**		**120000**		**22000**	
Iron, Ion (Fe2+)	15438-31-0	TRG		mg/l																							0.89	J	16.5	J
Manganese	7439-96-5	TRG	300	ug/l	50.9		**310**		**4520**	D	28.2		278		**385**		26.4		2.8		13		11.6		123		**1700**		**390**	
Sodium	7440-23-5	TRG	20000	ug/l	**55700**		**99900**		**87800**		**32300**		**31800**		17300		**58500**		**35400**		**55400**		**54900**		8330		**62600**		**38600**	

HDR APTIM
a Joint Venture

Table 4-3
Fulton OU2 Remedial Investigation
Groundwater Analytical Results - Phase 5 - Metals

				Sampling Event:	2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling	
				Location:	MW-03 ROS		MW-10D		MW-10MS		MW-15A		MW-20C		MW-21C		MW-21D		MW-23C		MW-24A		MW-25A		MW-26F	
				Sample:	MW-03ROS-GW-050-20191211-0		MW-10D-GW-111-20191205-0		MW-10MS-GW-190-20191205-0		MW-15A-GW-145-20191209-0		MW-20C-GW-405-20191209-0		MW-21C-GW-400-20191205-0		MW-21D-GW-455-20191205-0		MW-23C-GW-403-20191209-0		MW-24A-GW-350-20191211-0		MW-25A-GW-345-20191206-0		MW-26F-GW-410-20191209-0	
				Sample Type:	N		N		N		N		N		N		N		N		N		N		N	
				Sample Date:	12/11/2019		12/5/2019		12/5/2019		12/9/2019		12/9/2019		12/5/2019		12/5/2019		12/9/2019		12/11/2019		12/6/2019		12/9/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Metals																										
Ferrous Iron	8053-60-9 / 15438-31-0	TRG		mg/l	19.2	J	*0.1*	*U*	0.04	J	0.91	J	*0.1*	*UJ*	0.76	J	3.78	J	0.09	J	0.54	J	0.19	J	1.27	J
Iron	7439-89-6	TRG	300	ug/l	**34000**		**3300**		**6400**		**9600**		**18000**		**20000**		**36000**		**13000**		**13000**		**2700**		**1200**	
Manganese	7439-96-5	TRG	300	ug/l	220		15		190		73		110		190		210		79		69		19		82	
Sodium	7440-23-5	TRG	20000	ug/l	9760		**48700**		**25100**		**44100**		**37300**		**38600**		11800		**55600**		16500		18400		18700	

				Sampling Event:	2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling	
				Location:	MW-26G		MW-26G		MW-8D		MW-8S		MW-9D		MW-9D		MW-9S		N-00017		N-00104		N-01697		N-02487	
				Sample:	MW-26G-GW-443-		MW-26G-GW-443-		MW-8D-GW-111-		MW-8S-GW-062-		MW-9D-GW-120-		MW-9D-GW-120-		MW-9S-GW-063-		N-00017-GW-405-		N-00104-GW-325-		N-01697-GW-478-		N-02487-GW-424-	
				Sample Type:	N		FD		N		N		N		FD		N		N		N		N		N	
				Sample Date:	12/9/2019		12/9/2019		12/4/2019		12/4/2019		12/4/2019		12/4/2019		12/4/2019		12/12/2019		12/11/2019		12/11/2019		12/12/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Metals																										
Ferrous Iron	8053-60-9 / 15438-31-0	TRG		mg/l	*0.1*	*UJ*	1.3	J	*0.2*	*UJ*	*0.1*	*UJ*	0.05	J	0.05	J	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*
Iron	7439-89-6	TRG	300	ug/l	**1500**		**1600**		**7200**		**530**		300		250		**700**		*20*	*U*	*20*	*U*	*20*	*U*	26	
Iron, Ion (Fe2+)	15438-31-0	TRG		mg/l	*0.1*	*UJ*	1.3	J	*0.2*	*UJ*	*0.1*	*UJ*	0.05	J	0.05	J	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*
Manganese	7439-96-5	TRG	300	ug/l	98		97		16		28		11		10		190		26		*1*	*U*	9.5		1.6	
Sodium	7440-23-5	TRG	20000	ug/l	**21700**		18700		**27600**		**67200**		**36200**		**36800**		**108000**		**32800**		14400		14100		19800	

				Sampling Event:	2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling	
				Location:	N-03185		N-03603		N-03732		N-04298		N-05603		N-07058		N-07649		N-07649		N-07650		N-08248		N-08339	
				Sample:	N-03185-GW-423-		N-03603-GW-443-		N-03732-GW-310-		N-04298-GW-344-		N-05603-GW-365-		N-07058-GW-380-		N-07649-GW-165-		N-07649-GW-165-		N-07650-GW-400-		N-08248-GW-315-		N-08339-GW-308-	
				Sample Type:	N		N		N		N		N		N		N		FD		N		N		N	
				Sample Date:	12/12/2019		12/12/2019		12/12/2019		12/12/2019		12/11/2019		12/11/2019		12/12/2019		12/12/2019		12/12/2019		12/11/2019		12/11/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Metals																										
Ferrous Iron	8053-60-9 / 15438-31-0	TRG		mg/l	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*
Iron	7439-89-6	TRG	300	ug/l	*20*	*U*	21		23		*20*	*U*	25		*20*	*U*	*20*	*U*	*20*	*U*	75		290		*20*	*U*
Iron, Ion (Fe2+)	15438-31-0	TRG		mg/l	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*
Manganese	7439-96-5	TRG	300	ug/l	9.3		1.6		*1*	*U*	120		2.4		*1*	*U*	2.3		2.8		4.6		*1*	*U*	2.5	
Sodium	7440-23-5	TRG	20000	ug/l	**32600**		10300		16700		**49400**		**23400**		14400		**29500**		**29200**		**31600**		16900		20000	

				Sampling Event:	2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling	
				Location:	N-08409		N-08576		N-09949		N-10330		N-10486		N-10487		N-11171		N-11659		N-11733		N-11735		N-11739		N-11865		N-14146	
				Sample:	N-08409-GW-340-		N-08576-GW-445-		N-09949-GW-93.5-		N-10330-GW-052-		N-10486-GW-054-		N-10487-GW-056-		N-11171-GW-220-		N-11659-GW-409-		N-11733-GW-156-		N-11735-GW-153-		N-11739-GW-047-		N-11865-GW-195-		N-14146-GW-370-	
				Sample Type:	N		N		N		N		N		N		N		N		N		N		N		N		N	
				Sample Date:	12/11/2019		12/12/2019		12/10/2019		12/12/2019		12/11/2019		12/6/2019		12/6/2019		12/10/2019		12/10/2019		12/10/2019		12/12/2019		12/11/2019		12/12/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Metals																														
Ferrous Iron	8053-60-9 / 15438-31-0	TRG		mg/l	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	8.48	J	*0.1*	*UJ*	*0.1*	*UJ*	6.61	J	0.57	J	*0.1*	*UJ*	0.06	J	*0.1*	*UJ*	0.19	J	*0.1*	*UJ*
Iron	7439-89-6	TRG	300	ug/l	*20*	*U*	*20*	*U*	28		**11000**		*20*	*U*	**470**		**11000**		**39000**		61		**3400**		32		**10000**		23	
Iron, Ion (Fe2+)	15438-31-0	TRG		mg/l	*0.1*	*UJ*	*0.1*	*UJ*	*0.1*	*UJ*	8.48	J	*0.1*	*UJ*	*0.1*	*UJ*	6.61	J	0.57	J	*0.1*	*UJ*	0.06	J	*0.1*	*UJ*	0.19	J	*0.1*	*UJ*
Manganese	7439-96-5	TRG	300	ug/l	*1*	*U*	1.2		47		**310**		**2700**		18		270		**420**		2.9		83		16		100		1.1	
Sodium	7440-23-5	TRG	20000	ug/l	**23500**		10300		**53100**		**90900**		**94600**		**70500**		**23500**		14800		**56400**		**32800**		**29200**		8020		17700	

HDR APTIM a Joint Venture

Table 4-4
Fulton OU2 Remedial Investigation
Groundwater Analytical Results - Phase 5 - Organic Acids

				Sampling Event:	2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling	
				Location:	DSB02RS		GCP18S		MW-03 ROS		MW-03 ROS		MW-10D		MW-10MS		MW-15A		MW-20C		MW-21C		MW-21D		MW-23C		MW-24A		MW-25A	
				Sample:	DSB02RS-GW-377-20190829-0		GCP18S-GW-46.5-20190905-0		MW-03ROS-GW-050-20190829-0		MW-03ROS-GW-050-20190829-1		MW-10D-GW-111-20190828-0		MW-10MS-GW-190-20190829-0		MW-15A-GW-145-20190903-0		MW-20C-GW-405-20190903-0		MW-21C-GW-400-20190909-0		MW-21D-GW-455-20190909-0		MW-23C-GW-403-20190903-0		MW-24A-GW-350-20190905-0		MW-25A-GW-345-20190905-0	
				Sample Type:	N		N		N		FD		N		N		N		N		N		N		N		N		N	
				Sample Date:	8/29/2019		9/5/2019		8/28/2019		8/29/2019		8/28/2019		8/28/2019		9/3/2019		9/3/2019		9/9/2019		9/9/2019		9/3/2019		9/5/2019		9/5/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Organic Acids																														
Acetic Acid	64-19-7	TRG		mg/l	1	U	1	U	0.98	J	1		1	U	1	U	1	U	1	U	19		1	U	1	U	1	U	1	U
Butanoic Acid	107-92-6	TRG		mg/l	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
L-Lactic Acid	79-33-4	TRG		mg/l	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Propionic Acid	79-09-4	TRG		mg/l	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Pyruvic Acid	127-17-3	TRG		mg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

				Sampling Event:	2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling	
				Location:	MW-26F		MW-26G		MW-4 ZOE		MW-8D		MW-8S		MW-9D		MW-9S		N-00017		N-00104		N-01697		N-02487		N-03185		N-03603	
				Sample:	MW-26F-GW-410-		MW-26G-GW-443-		MW-4ZOE-GW-		MW-8D-GW-111-		MW-8S-GW-062-		MW-9D-GW-120-		MW-9S-GW-063-		N-00017-GW-405-		N-00104-GW-325-		N-01697-GW-478-		N-02487-GW-424-		N-03185-GW-423-		N-03603-GW-443-	
				Sample Type:	N		N		N		N		N		N		N		N		N		N		N		N		N	
				Sample Date:	9/5/2019		9/5/2019		9/4/2019		9/4/2019		9/4/2019		9/4/2019		9/4/2019		9/4/2019		9/3/2019		9/4/2019		9/3/2019		9/3/2019		9/3/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Organic Acids																														
Acetic Acid	64-19-7	TRG		mg/l	2.1		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Butanoic Acid	107-92-6	TRG		mg/l	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
L-Lactic Acid	79-33-4	TRG		mg/l	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Propionic Acid	79-09-4	TRG		mg/l	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Pyruvic Acid	127-17-3	TRG		mg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

				Sampling Event:	2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling	
				Location:	N-03881		N-04298		N-05603		N-06745		N-07058		N-07649		N-07649		N-07650		N-08248		N-08339		N-08409		N-08576		N-09949	
				Sample:	N-03881-GW-426-		N-04298-GW-344-		N-05603-GW-365-		N-06745-GW-304-		N-07058-GW-380-		N-07649-GW-165-		N-07649-GW-165-		N-07650-GW-400-		N-08248-GW-315-		N-08339-GW-308-		N-08409-GW-340-		N-08576-GW-445-		N-09949-GW-93.5-	
				Sample Type:	N		N		N		N		N		N		FD		N		N		N		N		N		N	
				Sample Date:	9/4/2019		9/4/2019		9/3/2019		9/4/2019		9/4/2019		9/4/2019		9/4/2019		9/4/2019		9/3/2019		9/4/2019		9/3/2019		9/3/2019		9/4/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Organic Acids																														
Acetic Acid	64-19-7	TRG		mg/l	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Butanoic Acid	107-92-6	TRG		mg/l	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
L-Lactic Acid	79-33-4	TRG		mg/l	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Propionic Acid	79-09-4	TRG		mg/l	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Pyruvic Acid	127-17-3	TRG		mg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

				Sampling Event:	2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling	
				Location:	N-10330		N-10486		N-10487		N-11171		N-11659		N-11733		N-11735		N-11739		N-11739		N-11865		DSB02RS		GCP18S		MW-03 ROS	
				Sample:	N-10330-GW-052-		N-10486-GW-054-		N-10487-GW-056-		N-11171-GW-220-		N-11659-GW-409-		N-11733-GW-156-		N-11735-GW-153-		N-11739-GW-047-		N-11739-GW-047-		N-11865-GW-195-		DSB02RS-GW-377-		GCP18S-GW-46.5-		MW-03ROS-GW-	
				Sample Type:	N		N		N		N		N		N		N		N		FD		N		N		N		N	
				Sample Date:	9/5/2019		9/6/2019		8/28/2019		8/28/2019		9/3/2019		9/6/2019		9/6/2019		9/6/2019		9/6/2019		9/6/2019		12/6/2019		12/12/2019		12/11/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Organic Acids																														
Acetic Acid	64-19-7	TRG		mg/l	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	3.4	
Butanoic Acid	107-92-6	TRG		mg/l	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
L-Lactic Acid	79-33-4	TRG		mg/l	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Propionic Acid	79-09-4	TRG		mg/l	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Pyruvic Acid	127-17-3	TRG		mg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

HDR APTIM
a Joint Venture

Table 4-4
Fulton OU2 Remedial Investigation
Groundwater Analytical Results - Phase 5 - Organic Acids

				Sampling Event:	2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling	
				Location:	MW-10D		MW-10MS		MW-15A		N-10486		N-10487		MW-20C		MW-21C		MW-21D		MW-23C		MW-24A		MW-25A		MW-26F		MW-26G	
				Sample:	MW-10D-GW-111-20191205-0		MW-10MS-GW-190-20191205-0		MW-15A-GW-145-20191209-0		N-10486-GW-054-20191211-0		N-10487-GW-056-20191206-0		MW-20C-GW-405-20191209-0		MW-21C-GW-400-20191205-0		MW-21D-GW-455-20191205-0		MW-23C-GW-403-20191209-0		MW-24A-GW-350-20191211-0		MW-25A-GW-345-20191206-0		MW-26F-GW-410-20191209-0		MW-26G-GW-443-20191209-0	
				Sample Type:	N		N		N		N		N		N		N		N		N		N		N		N		N	
				Sample Date:	12/5/2019		12/5/2019		12/9/2019		12/11/2019		12/6/2019		12/9/2019		12/5/2019		12/5/2019		12/9/2019		12/11/2019		12/6/2019		12/9/2019		12/9/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Organic Acids																														
Acetic Acid	64-19-7	TRG		mg/l	1	U	1	U	1	U	1	U	1	U	1	U	1.3		1	U	1	U	1	U	1	U	7		1	U
Butanoic Acid	107-92-6	TRG		mg/l	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
L-Lactic Acid	79-33-4	TRG		mg/l	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Propionic Acid	79-09-4	TRG		mg/l	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Pyruvic Acid	127-17-3	TRG		mg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

				Sampling Event:	2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling	
				Location:	MW-26G		MW-8D		MW-8S		MW-9D		MW-9D		MW-9S		N-00017		N-00104		N-01697		N-02487		N-03185		N-03603		N-03732	
				Sample:	MW-26G-GW-443-		MW-8D-GW-111-		MW-8S-GW-062-		MW-9D-GW-120-		MW-9D-GW-120-		MW-9S-GW-063-		N-00017-GW-405-		N-00104-GW-325-		N-01697-GW-478-		N-02487-GW-424-		N-03185-GW-423-		N-03603-GW-443-		N-03732-GW-310-	
				Sample Type:	FD		N		N		N		FD		N		N		N		N		N		N		N		N	
				Sample Date:	12/9/2019		12/4/2019		12/4/2019		12/4/2019		12/4/2019		12/4/2019		12/12/2019		12/11/2019		12/11/2019		12/12/2019		12/12/2019		12/12/2019		12/12/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Organic Acids																														
Acetic Acid	64-19-7	TRG		mg/l	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Butanoic Acid	107-92-6	TRG		mg/l	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
L-Lactic Acid	79-33-4	TRG		mg/l	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Propionic Acid	79-09-4	TRG		mg/l	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Pyruvic Acid	127-17-3	TRG		mg/l	0.91		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

				Sampling Event:	2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling	
				Location:	N-04298		N-05603		N-07058		N-07649		N-07649		N-07650		N-08248		N-08339		N-08409		N-08576		N-09949		N-10330		N-11171	
				Sample:	N-04298-GW-344-		N-05603-GW-365-		N-07058-GW-380-		N-07649-GW-165-		N-07649-GW-165-		N-07650-GW-400-		N-08248-GW-315-		N-08339-GW-308-		N-08409-GW-340-		N-08576-GW-445-		N-09949-GW-93.5-		N-10330-GW-052-		N-11171-GW-220-	
				Sample Type:	N		N		N		N		FD		N		N		N		N		N		N		N		N	
				Sample Date:	12/12/2019		12/11/2019		12/11/2019		12/12/2019		12/12/2019		12/12/2019		12/11/2019		12/11/2019		12/11/2019		12/12/2019		12/10/2019		12/12/2019		12/6/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Organic Acids																														
Acetic Acid	64-19-7	TRG		mg/l	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Butanoic Acid	107-92-6	TRG		mg/l	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
L-Lactic Acid	79-33-4	TRG		mg/l	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Propionic Acid	79-09-4	TRG		mg/l	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Pyruvic Acid	127-17-3	TRG		mg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

				Sampling Event:	2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling	
				Location:	N-11659		N-11733		N-11735		N-11739		N-11865		N-14146	
				Sample:	N-11659-GW-409-		N-11733-GW-156-		N-11735-GW-153-		N-11739-GW-047-		N-11865-GW-195-		N-14146-GW-370-	
				Sample Type:	N		N		N		N		N		N	
				Sample Date:	12/10/2019		12/10/2019		12/10/2019		12/12/2019		12/11/2019		12/12/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Organic Acids																
Acetic Acid	64-19-7	TRG		mg/l	1	U	1	U	1	U	1	U	1	U	1	U
Butanoic Acid	107-92-6	TRG		mg/l	2	U	2	U	2	U	2	U	2	U	2	U
L-Lactic Acid	79-33-4	TRG		mg/l	1	U	1	U	1	U	1	U	1	U	1	U
Propionic Acid	79-09-4	TRG		mg/l	1	U	1	U	1	U	1	U	1	U	1	U
Pyruvic Acid	127-17-3	TRG		mg/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

HDR APTIM
a Joint Venture

Table 4-5
Fulton OU2 Remedial Investigation
Groundwater Analytical Results - Phase 5 - Biodegradation Indicator Parameters

				Sampling Event:	2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling	
				Location:	DSB02RS		GCP18S		MW-03 ROS		MW-03 ROS		MW-10D		MW-10MS		MW-15A		MW-20C		MW-21C		MW-21D		MW-23C		MW-24A	
				Sample:	DSB02RS-GW-377-20190829-0		GCP18S-GW-46.5-20190905-0		MW-03ROS-GW-050-20190829-0		MW-03ROS-GW-050-20190829-1		MW-10D-GW-111-20190828-0		MW-10MS-GW-190-20190829-0		MW-15A-GW-145-20190903-0		MW-20C-GW-405-20190903-0		MW-21C-GW-400-20190909-0		MW-21D-GW-455-20190909-0		MW-23C-GW-403-20190903-0		MW-24A-GW-350-20190905-0	
				Sample Type:	N		N		N		FD		N		N		N		N		N		N		N		N	
				Sample Date:	8/29/2019		9/5/2019		8/28/2019		8/29/2019		8/28/2019		8/28/2019		9/3/2019		9/3/2019		9/9/2019		9/9/2019		9/3/2019		9/5/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Wet Chemistry																												
Alkalinity	471-34-1	TRG		mg/l	110		38		23		24		29		12		73		73		76		35		61		61	
Biochemical Oxygen Demand (BOD)	BOD	TRG		mg/l			2.9						2	U			2	U	2	U	18.9		2	U	2	U	2	U
Chloride (As Cl)	16887-00-6	TRG	250	mg/l	54		83		8.6		8.7		110		57		68		64		160		24		49		20	
COD - Chemical Oxygen Demand	COD	TRG		mg/l	29		20	U	68		66		20	U	20	U	20	U	20	U	71		20	U	20	U	20	U
Ethane	74-84-0	TRG		ug/l																								
Ethene	74-85-1	TRG		ug/l																								
Methane	74-82-8	TRG		ug/l																								
Nitrate + Nitrite (as N)	NN	TRG	10	mg/l	0.7		0.56		0.05	U	0.097		4.5		3		1.3		0.05	U	0.05	U	5.3		0.69		6.1	
Nitrogen, Ammonia (As N)	7664-41-7	TRG	2	mg/l	0.5		0.16		0.46		0.46		0.05	U	0.05	U	0.2		**2.2**		0.34		0.6		0.27		0.31	
Nitrogen, Kjeldahl, Total	KN	TRG		mg/l	2.3		0.19		0.91		0.95		0.1	U	0.1	U	0.26		3.2		0.55		0.59		0.84		0.55	
Phosphate	14265-44-2	TRG		mg/l	0.94		0.048		0.043		0.044		0.28		0.08		0.08		0.39		0.12		0.1		0.087		0.063	
Sulfate (As So4)	14808-79-8	TRG	250	mg/l	23		13		1	U	1	U	38		38		34		23		1	U	21		20		32	
Total Organic Carbon	TOC	TRG		mg/l	6.2		1.9		18		20		1.2		1	U	1.1		4.2		15		1	U	1.5		1.7	

				Sampling Event:	2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling	
				Location:	MW-25A		MW-26F		MW-26G		MW-4 ZOE		MW-8D		MW-8S		MW-9D		MW-9S		N-00017		N-00104		N-01697		N-02487	
				Sample:	MW-25A-GW-345-		MW-26F-GW-410-		MW-26G-GW-443-		MW-4ZOE-GW-		MW-8D-GW-111-		MW-8S-GW-062-		MW-9D-GW-120-		MW-9S-GW-063-		N-00017-GW-405-		N-00104-GW-325-		N-01697-GW-478-		N-02487-GW-424-	
				Sample Type:	N		N		N		N		N		N		N		N		N		N		N		N	
				Sample Date:	9/5/2019		9/5/2019		9/5/2019		9/4/2019		9/4/2019		9/4/2019		9/4/2019		9/4/2019		9/4/2019		9/3/2019		9/4/2019		9/3/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Wet Chemistry																												
Alkalinity	471-34-1	TRG		mg/l	38		110		36		32		15		17		30		13		26		17		5.3		24	
Biochemical Oxygen Demand (BOD)	BOD	TRG		mg/l	2	U	2.6		2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Chloride (As Cl)	16887-00-6	TRG	250	mg/l	35		28		34		63		51		120		180		230		59		30		31		32	
COD - Chemical Oxygen Demand	COD	TRG		mg/l	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Ethane	74-84-0	TRG		ug/l																								
Ethene	74-85-1	TRG		ug/l																								
Methane	74-82-8	TRG		ug/l																								
Nitrate + Nitrite (as N)	NN	TRG	10	mg/l	4.2		0.05	U	0.36		3.5		4.2		3.8		5.2		5.2		3.4		2.5		2		4.4	
Nitrogen, Ammonia (As N)	7664-41-7	TRG	2	mg/l	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.27		0.05	U	0.05	U	0.05	U
Nitrogen, Kjeldahl, Total	KN	TRG		mg/l	0.2		0.1	U	0.1	U	0.1	U	0.53		0.1	U	0.52		0.1	U	0.27		0.1	U	0.1	U	0.1	U
Phosphate	14265-44-2	TRG		mg/l	0.068		0.05		0.074		0.045		0.094		0.081		0.11		0.071		0.048		0.06		0.031		0.1	
Sulfate (As So4)	14808-79-8	TRG	250	mg/l	32		5.1		27		25		32		32		36		36		26		12		13		31	
Total Organic Carbon	TOC	TRG		mg/l	1.5		2.9		1	U	1		1.6		1.3		2.2		1.2		1		1	U	1	U	1	

				Sampling Event:	2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling	
				Location:	N-03185		N-03603		N-03881		N-04298		N-05603		N-06745		N-07058		N-07649		N-07649		N-07650		N-08248		N-08339	
				Sample:	N-03185-GW-423-		N-03603-GW-443-		N-03881-GW-426-		N-04298-GW-344-		N-05603-GW-365-		N-06745-GW-304-		N-07058-GW-380-		N-07649-GW-165-		N-07649-GW-165-		N-07650-GW-400-		N-08248-GW-315-		N-08339-GW-308-	
				Sample Type:	N		N		N		N		N		N		N		N		FD		N		N		N	
				Sample Date:	9/3/2019		9/3/2019		9/4/2019		9/4/2019		9/3/2019		9/4/2019		9/4/2019		9/4/2019		9/4/2019		9/4/2019		9/3/2019		9/4/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Wet Chemistry																												
Alkalinity	471-34-1	TRG		mg/l	14		9.8		14		16		37		16		12		49		49		80		16		8.7	
Biochemical Oxygen Demand (BOD)	BOD	TRG		mg/l	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Chloride (As Cl)	16887-00-6	TRG	250	mg/l	62		20		18		92		42		46		33		52		51		49		36		44	
COD - Chemical Oxygen Demand	COD	TRG		mg/l	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Ethane	74-84-0	TRG		ug/l																								
Ethene	74-85-1	TRG		ug/l																								
Methane	74-82-8	TRG		ug/l																								
Nitrate + Nitrite (as N)	NN	TRG	10	mg/l	5		2.3		6.8		3.9		4.2		4.1		4.1		5		5		4.6		4.8		3	
Nitrogen, Ammonia (As N)	7664-41-7	TRG	2	mg/l	0.05	U	0.05	U	0.05	U	0.05	U	0.4		0.05	U	0.05	U	1.1		1.1		1.7		0.05	U	0.05	U
Nitrogen, Kjeldahl, Total	KN	TRG		mg/l	0.1	U	0.1	U	0.1	U	0.1	U	0.58		0.1	U	0.1	U	1.3		1.3		2.4		0.1	U	0.1	U
Phosphate	14265-44-2	TRG		mg/l	0.054		0.052		0.045		0.054		0.069		0.059		0.054		0.063		0.059		0.05		0.063		0.056	
Sulfate (As So4)	14808-79-8	TRG	250	mg/l	25		10		12		21		29		30		22		37		37		28		22		30	
Total Organic Carbon	TOC	TRG		mg/l	1	U	1	U	1		1	U	1.1		1	U	1	U	1.1		1	U	1.6		1	U	1	U

Table 4-5
Fulton OU2 Remedial Investigation
Groundwater Analytical Results - Phase 5 - Biodegradation Indicator Parameters

HDR APTIM
a Joint Venture

				Sampling Event:	2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling		2019 08-09 Phase 5 GW Sampling	
				Location:	N-08409		N-08576		N-09949		N-10330		N-10486		N-10487		N-11171		N-11659		N-11733		N-11735		N-11739		N-11739	
				Sample:	N-08409-GW-340-400-20190903-0		N-08576-GW-445-505-20190903-0		N-09949-GW-93.5-20190904-0		N-10330-GW-052-20190905-0		N-10486-GW-054-20190906-0		N-10487-GW-056-20190828-0		N-11171-GW-220-20190829-0		N-11659-GW-409-20190903-0		N-11733-GW-156-20190906-0		N-11735-GW-153-20190906-0		N-11739-GW-047-20190906-0		N-11739-GW-047-20190906-1	
				Sample Type:	N		N		N		N		N		N		N		N		N		N		N		FD	
				Sample Date:	9/3/2019		9/3/2019		9/4/2019		9/5/2019		9/6/2019		8/28/2019		8/28/2019		9/3/2019		9/6/2019		9/6/2019		9/6/2019		9/6/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Wet Chemistry																												
Alkalinity	471-34-1	TRG		mg/l	20		12		42		68		50		44		47		28		15		15		8.6		11	
Biochemical Oxygen Demand (BOD)	BOD	TRG		mg/l	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	15.7				*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*
Chloride (As Cl)	16887-00-6	TRG	250	mg/l	48		18		140		200		130		64		52		31		110		62		89		120	
COD - Chemical Oxygen Demand	COD	TRG		mg/l	*20*	*U*	*20*	*U*	*20*	*U*	*20*	*U*	*20*	*U*	58		*20*	*U*	*20*	*U*	*20*	*U*	*20*	*U*	*20*	*U*	*20*	*U*
Ethane	74-84-0	TRG		ug/l																								
Ethene	74-85-1	TRG		ug/l																								
Methane	74-82-8	TRG		ug/l																								
Nitrate + Nitrite (as N)	NN	TRG	10	mg/l	6.5		4.6		4.3		*0.05*	*U*	1.1		2		0.46		4.7		4.5		5.8		5.5		5	
Nitrogen, Ammonia (As N)	7664-41-7	TRG	2	mg/l	*0.05*	*U*	*0.05*	*U*	0.84		*0.05*	*U*	*0.05*	*U*	0.58		0.27		0.96		*0.05*	*U*	*0.05*	*U*	*0.05*	*U*	*0.05*	*U*
Nitrogen, Kjeldahl, Total	KN	TRG		mg/l	*0.1*	*U*	*0.1*	*U*	1		*0.1*	*U*	*0.1*	*U*	2.4		0.39		1.1		*0.1*	*U*	*0.1*	*U*	*0.1*	*U*	*0.1*	*U*
Phosphate	14265-44-2	TRG		mg/l	0.08		0.047		0.06		0.047		0.048		0.24		0.06		0.069		0.05		0.06		0.057		0.053	
Sulfate (As So4)	14808-79-8	TRG	250	mg/l	37		11		26		23		35		7.3		27		23		29		37		24		29	
Total Organic Carbon	TOC	TRG		mg/l	1.1		*1*	*U*	1.3		2.2		1.6		19		1.4		1.2		1.2		*1*	*U*	1.1		*1*	*U*

				Sampling Event:	2019 08-09 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling	
				Location:	N-11865		DSB02RS		GCP18S		MW-03 ROS		MW-10D		MW-10MS		MW-15A		MW-20C		MW-21C		MW-21D		MW-23C		MW-24A	
				Sample:	N-11865-GW-195-		DSB02RS-GW-377-		GCP18S-GW-46.5-		MW-03ROS-GW-		MW-10D-GW-111-		MW-10MS-GW-		MW-15A-GW-145-		MW-20C-GW-405-		MW-21C-GW-400-		MW-21D-GW-455-		MW-23C-GW-403-		MW-24A-GW-350-	
				Sample Type:	N		N		N		N		N		N		N		N		N		N		N		N	
				Sample Date:	9/6/2019		12/6/2019		12/12/2019		12/11/2019		12/5/2019		12/5/2019		12/9/2019		12/9/2019		12/5/2019		12/5/2019		12/9/2019		12/11/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Wet Chemistry																												
Alkalinity	471-34-1	TRG		mg/l	32		130		57		42		29		12		54		130		64		34		55		57	
Biochemical Oxygen Demand (BOD)	BOD	TRG		mg/l	*2*	*U*	5.2		6.2		30.5		*2*	*U*	*2*	*U*	*2*	*UJ*	*2*	*U*	6.1		*2*	*U*	*2*	*U*	*2*	*U*
Chloride (As Cl)	16887-00-6	TRG	250	mg/l	12		50		70		14		94		49		58		24		61		19		75		19	
COD - Chemical Oxygen Demand	COD	TRG		mg/l	*20*	*U*	110		*20*	*U*	92		*20*	*U*	*20*	*U*	*20*	*U*	30		*20*	*U*	*20*	*U*	*20*	*U*	*20*	*U*
Ethane	74-84-0	TRG		ug/l			11.7		*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*
Ethene	74-85-1	TRG		ug/l			*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*
Methane	74-82-8	TRG		ug/l			3980		4470		*2*	*U*	*2*	*U*	*2*	*U*	161	K	4.43		2430		16.3		2640		137	
Nitrate + Nitrite (as N)	NN	TRG	10	mg/l	0.41		*0.05*	*U*	*0.05*	*UL*	0.22		4.7		2.6		1.5		0.054		1.2		5.3		*0.05*	*U*	7	
Nitrogen, Ammonia (As N)	7664-41-7	TRG	2	mg/l	0.16		0.54		0.28		1.1		*0.05*	*U*	*0.05*	*U*	*0.05*	*U*	**3.5**		0.33		0.18		0.76		0.15	
Nitrogen, Kjeldahl, Total	KN	TRG		mg/l	0.13		1.9		0.45		1.6		0.12		0.28		0.15		4.2		0.76		0.27		0.81		0.4	
Phosphate	14265-44-2	TRG		mg/l	0.05		0.52		0.059	L	0.11	L	0.27		0.4		0.14		0.23		0.21		0.17		0.038		0.14	
Sulfate (As So4)	14808-79-8	TRG	250	mg/l	2.2		2.8		8.9		1.5		37		29		34		22		19		24		7.9		31	
Total Organic Carbon	TOC	TRG		mg/l	*1*	*U*	5.1		4.4		27		1.2		1.1		1.1		6.1		2.7		*1*	*U*	*1*	*U*	1.1	

				Sampling Event:	2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling	
				Location:	MW-25A		MW-26F		MW-26G		MW-26G		MW-8D		MW-8S		MW-9D		MW-9D		MW-9S		N-00017		N-00104		N-01697	
				Sample:	MW-25A-GW-345-		MW-26F-GW-410-		MW-26G-GW-443-		MW-26G-GW-443-		MW-8D-GW-111-		MW-8S-GW-062-		MW-9D-GW-120-		MW-9D-GW-120-		MW-9S-GW-063-		N-00017-GW-405-		N-00104-GW-325-		N-01697-GW-478-	
				Sample Type:	N		N		N		FD		N		N		N		FD		N		N		N		N	
				Sample Date:	12/6/2019		12/9/2019		12/9/2019		12/9/2019		12/4/2019		12/4/2019		12/4/2019		12/4/2019		12/4/2019		12/12/2019		12/11/2019		12/11/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Wet Chemistry																												
Alkalinity	471-34-1	TRG		mg/l	40		96		48		44		17		20		28		28		18		27		17		6.2	
Biochemical Oxygen Demand (BOD)	BOD	TRG		mg/l	2.1		6.2	J	*2*	*UJ*	*2*	*UJ*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*
Chloride (As Cl)	16887-00-6	TRG	250	mg/l	29		28		27		30		52		120		66		65		200		58		28		31	
COD - Chemical Oxygen Demand	COD	TRG		mg/l	*20*	*U*	*20*	*U*	*20*	*U*	*20*	*U*	*20*	*U*	*20*	*U*	*20*	*U*	*20*	*U*	*20*	*U*	*20*	*U*	*20*	*U*	*20*	*U*
Ethane	74-84-0	TRG		ug/l	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*
Ethene	74-85-1	TRG		ug/l	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*	*2*	*U*
Methane	74-82-8	TRG		ug/l	527		3920		84.2		77.9		*2*	*U*	*2*	*U*	17.8		17.8		*2*	*U*	3.56		*2*	*U*	*2*	*U*
Nitrate + Nitrite (as N)	NN	TRG	10	mg/l	4.9		*0.05*	*U*	*0.05*	*U*	*0.05*	*U*	4.2		3.3		5.8		5.9		6.8		3.4		2.6		1.9	
Nitrogen, Ammonia (As N)	7664-41-7	TRG	2	mg/l	*0.05*	*U*	*0.05*	*U*	*0.05*	*U*	*0.05*	*U*	*0.05*	*U*	*0.05*	*U*	*0.05*	*U*	*0.05*	*U*	*0.05*	*U*	0.26		*0.05*	*U*	*0.05*	*U*
Nitrogen, Kjeldahl, Total	KN	TRG		mg/l	0.19		0.14		*0.1*	*U*	*0.1*	*U*	0.36		*0.1*	*U*	*0.1*	*U*	0.16		0.22		0.26		*0.1*	*U*	*0.1*	*U*
Phosphate	14265-44-2	TRG		mg/l	0.14		0.027		0.041		0.041		0.32		0.13		0.14		0.14		0.11		0.055		0.061		0.037	
Sulfate (As So4)	14808-79-8	TRG	250	mg/l	30		6.4		19		22		30		33		32		32		28		23		11		13	
Total Organic Carbon	TOC	TRG		mg/l	*1*	*U*	2		*1*	*U*	*1*	*U*	1.7		*1*	*U*	1.7		1.5		1.9		*1*	*U*	*1*	*U*	1.4	

HDR APTIM
a Joint Venture

Table 4-5
Fulton OU2 Remedial Investigation
Groundwater Analytical Results - Phase 5 - Biodegradation Indicator Parameters

				Sampling Event:	2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling	
				Location:	N-02487		N-03185		N-03603		N-03732		N-04298		N-05603		N-07058		N-07649		N-07649		N-07650		N-08248		N-08339	
				Sample:	N-02487-GW-424-434-20191212-0		N-03185-GW-423-463-20191212-0		N-03603-GW-443-493-20191212-0		N-03732-GW-310-350-20191212-0		N-04298-GW-344-394-20191212-0		N-05603-GW-365-415-20191211-0		N-07058-GW-380-440-20191211-0		N-07649-GW-165-205-20191212-0		N-07649-GW-165-205-20191212-1		N-07650-GW-400-420-20191212-0		N-08248-GW-315-400-20191211-0		N-08339-GW-308-358-20191211-0	
				Sample Type:	N		N		N		N		N		N		N		N		FD		N		N		N	
				Sample Date:	12/12/2019		12/12/2019		12/12/2019		12/12/2019		12/12/2019		12/11/2019		12/11/2019		12/12/2019		12/12/2019		12/12/2019		12/11/2019		12/11/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Wet Chemistry																												
Alkalinity	471-34-1	TRG		mg/l	23		14		9.9		20		16		30		13		53		53		73		16		9.2	
Biochemical Oxygen Demand (BOD)	BOD	TRG		mg/l	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Chloride (As Cl)	16887-00-6	TRG	250	mg/l	31		67		21		42		98		46		31		48		50		48		36		42	
COD - Chemical Oxygen Demand	COD	TRG		mg/l	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Ethane	74-84-0	TRG		ug/l	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Ethene	74-85-1	TRG		ug/l	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Methane	74-82-8	TRG		ug/l	2	U	2	U	2	U	2	U	2	U	2	U	2	U	15.5		15.5		16.1		2	U	2	U
Nitrate + Nitrite (as N)	NN	TRG	10	mg/l	4.3		4.9		2		3.7		3.8		4.3		4.2		4.8		4.8		4.5		4.7		3	
Nitrogen, Ammonia (As N)	7664-41-7	TRG	2	mg/l	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.34		0.05	U	1.5		1.5		1.8		0.05	U	0.05	U
Nitrogen, Kjeldahl, Total	KN	TRG		mg/l	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.37		0.1	U	1.4		1.5		1.8		0.1	U	0.1	U
Phosphate	14265-44-2	TRG		mg/l	0.099		0.056		0.055		0.071		0.064		0.067		0.062		0.069		0.07		0.054		0.064		0.064	
Sulfate (As So4)	14808-79-8	TRG	250	mg/l	28		22		8.9		17		19		28		21		34		34		25		21		28	
Total Organic Carbon	TOC	TRG		mg/l	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1.1		1.1		1.5		1	U	1	U

				Sampling Event:	2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling		2019 12 Phase 5 GW Sampling	
				Location:	N-08409		N-08576		N-09949		N-10330		N-10486		N-10487		N-11171		N-11659		N-11733		N-11735		N-11739		N-11865	
				Sample:	N-08409-GW-340-		N-08576-GW-445-		N-09949-GW-93.5-		N-10330-GW-052-		N-10486-GW-054-		N-10487-GW-056-		N-11171-GW-220-		N-11659-GW-409-		N-11733-GW-156-		N-11735-GW-153-		N-11739-GW-047-		N-11865-GW-195-	
				Sample Type:	N		N		N		N		N		N		N		N		N		N		N		N	
				Sample Date:	12/11/2019		12/12/2019		12/10/2019		12/12/2019		12/11/2019		12/6/2019		12/6/2019		12/10/2019		12/10/2019		12/10/2019		12/12/2019		12/11/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Wet Chemistry																												
Alkalinity	471-34-1	TRG		mg/l	22		14		51		73		42		82		47		35		16		22		13		33	
Biochemical Oxygen Demand (BOD)	BOD	TRG		mg/l	2	U	2	U	2	U	2		2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Chloride (As Cl)	16887-00-6	TRG	250	mg/l	47		19		130		190		170		100		44		22		110		64		71		13	
COD - Chemical Oxygen Demand	COD	TRG		mg/l	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	23		20	U	20	U
Ethane	74-84-0	TRG		ug/l	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Ethene	74-85-1	TRG		ug/l	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Methane	74-82-8	TRG		ug/l	2	U	2	U	49		575		2	U	32.6		621		2	U	2	U	9.12		2	U	124	
Nitrate + Nitrite (as N)	NN	TRG	10	mg/l	6.3		4.5		2.2		0.095		1.9		2.4		3.1		4.6		4.7		5.8		5.1		0.26	
Nitrogen, Ammonia (As N)	7664-41-7	TRG	2	mg/l	0.05	U	0.05	U	0.31		0.05	U	0.05	U	0.05	U	0.075		0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Nitrogen, Kjeldahl, Total	KN	TRG		mg/l	0.1	U	0.1	U	0.45		0.19		0.1	U	0.27		0.12		0.1	U	0.13		0.4		0.1	U	0.1	U
Phosphate	14265-44-2	TRG		mg/l	0.078		0.046		0.05		0.049		0.058		0.073		0.073		0.044		0.044		0.11		0.083		0.054	
Sulfate (As So4)	14808-79-8	TRG	250	mg/l	36		9.9		30		18		23		22		32		23		26		36		18		2.6	
Total Organic Carbon	TOC	TRG		mg/l	1	U	1	U	1.7		2.8		1.3		2.3		1	U	1	U	1	U	1	U	1	U	1	U

				Sampling Event:	2019 12 Phase 5 GW Sampling	
				Location:	N-14146	
				Sample:	N-14146-GW-370-	
				Sample Type:	N	
				Sample Date:	12/12/2019	
Analyte	CAS	Result Type	Proposed Delineation Criteria	Units	Result	Qual
Wet Chemistry						
Alkalinity	471-34-1	TRG		mg/l	19	
Biochemical Oxygen Demand (BOD)	BOD	TRG		mg/l	2	U
Chloride (As Cl)	16887-00-6	TRG	250	mg/l	39	
COD - Chemical Oxygen Demand	COD	TRG		mg/l	20	U
Ethane	74-84-0	TRG		ug/l	2	U
Ethene	74-85-1	TRG		ug/l	2	U
Methane	74-82-8	TRG		ug/l	2	U
Nitrate + Nitrite (as N)	NN	TRG	10	mg/l	4	
Nitrogen, Ammonia (As N)	7664-41-7	TRG	2	mg/l	0.05	U
Nitrogen, Kjeldahl, Total	KN	TRG		mg/l	0.1	U
Phosphate	14265-44-2	TRG		mg/l	0.067	
Sulfate (As So4)	14808-79-8	TRG	250	mg/l	25	
Total Organic Carbon	TOC	TRG		mg/l	1	U

HDR APTIM
a Joint Venture

Notes
Fulton OU2 Remedial Investigation
Groundwater Analytical Results - Phase 5

Qualifiers	Definitions
D	Sample was run under dilution.
J	Estimated value. +/- indicates direction of bias.
K	Estimated value, biased high.
L	Estimated value, biased low.
N	Tentatively identified compound and an estimated value.
U	Result was not detected. Reporting detection limit is listed instead.

Matrix	Proposed Delineation Criteria (PDC)	Definitions
Groundwater	EPA MCLs	EPA National Primary Drinking Water regulation Maximum Contaminant Levels- EPA MCLs (a)
	NYSDEC Groundwater Criteria and Applicable Screening Levels	New York State Part 703.5 Criteria, Class GA (b)
		1,4-Dioxane Maximum Contaminant Levels (c)
	NYSDEC TOGS 1.1.1	Technical and Operational Guidance Series (1.1.1) (d)
	NYDOH MCLs	10 NYCRR 5.1- Organic Chemical Maximum Contaminant Level Determination (e)

References:

(a) EPA Maximum Contaminant Levels
https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations

(b) New York State Part 703.5 Water quality standards for taste-, color- and odor-producing, toxic and other deleterious substances
https://govt.westlaw.com/nycrr/Document/I4ed90418cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)&bhcp=1

(c) Drinking Water Quality Council Recommends Nation's Most Protective Maximum Contaminant Levels for Three Unregulated Contaminants in Drinking Water
https://www.health.ny.gov/press/releases/2018/2018-12-18_drinking_water_quality_council_recommendations.htm

(d) Division of Water Technical and Operational Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitiations
https://extapps.dec.ny.gov/docs/water_pdf/togs111.pdf

(e) Section 225 of the Public Health Law, Subpart 5-1 of Title 10 (Health) of the Officail Compilation of Codes, Rules and Regulation of the State of New York
https://regs.health.ny.gov/sites/default/files/proposed-regulations/Maximum%20Contaminant%20Levels%20%28MCLs%29.pdf

Abbreviations:

N - Normal Sample
FD - Field Duplicate Sample
TRG - Target Results
TIC - Tentatively Identified Compounds

Notes:

VALUE	Result was non-detect. Reporting detection limit is shown.
VALUE	Result exceeds proposed delineation criteria.

HDR APTIM
a Joint Venture

Table 4-6
Fulton Ave Superfund Site OU2
Groundwater Analytical Results
Phase 5 - Statistical Summary

Chemical Name	Units	Max Result	Min Result	Total Number of Detects	Total Number of Samples
Metals					
Ferrous Iron (Fe2+)	mg/l	148	0.04	35	91
Iron	ug/l	405000	21	78	91
Manganese	ug/l	8560	0.41	84	91
Sodium	ug/l	117000	7280	91	91
VOCs					
1,1,1-Trichloroethane	ug/l	5.4	0.076	28	91
1,1,2,2-Tetrachloroethane	ug/l			0	91
1,1,2-Trichloro-1,2,2-Trifluoroethane	ug/l	0.33	0.18	4	91
1,1,2-Trichloroethane	ug/l	0.22	0.11	4	91
1,1-Dichloroethane	ug/l	16	0.1	29	91
1,1-Dichloroethene	ug/l	6.8	0.22	26	91
1,2,3-Trichlorobenzene	ug/l	0.2	0.2	1	91
1,2,4-Trichlorobenzene	ug/l			0	91
1,2-Dibromo-3-Chloropropane	ug/l			0	91
1,2-Dibromoethane	ug/l			0	91
1,2-Dichlorobenzene	ug/l	0.29	0.12	4	91
1,2-Dichloroethane	ug/l	0.57	0.092	4	91
1,2-Dichloropropane	ug/l	0.57	0.28	6	91
1,3-Dichlorobenzene	ug/l			0	91
1,4-Dichlorobenzene	ug/l	0.59	0.074	9	91
2-Butanone	ug/l	3	3	1	91
2-Hexanone	ug/l			0	91
4-Methyl-2-Pentanone	ug/l			0	91
Acetone	ug/l			0	91
Benzene	ug/l	0.93	0.055	11	91
Bromochloromethane	ug/l			0	91
Bromodichloromethane	ug/l			0	91
Bromoform	ug/l	0.28	0.28	1	91
Bromomethane	ug/l			0	91
Carbon Disulfide	ug/l	0.44	0.1	3	91
Carbon Tetrachloride	ug/l	0.69	0.035	20	91
Chlorobenzene	ug/l	1.3	0.11	8	91
Chloroethane	ug/l			0	91
Chloroform	ug/l	1.5	0.036	22	91
Chloromethane	ug/l			0	91
cis-1,2-Dichloroethene	ug/l	710	0.09	50	91
cis-1,3-Dichloropropene	ug/l	0.21	0.21	1	91
Cyclohexane	ug/l	2.7	0.42	3	91
Dibromochloromethane	ug/l	0.27	0.27	1	91
Dichlorodifluoromethane	ug/l	3.2	0.095	15	91
Ethylbenzene	ug/l	15	0.059	4	91
Isopropylbenzene	ug/l	10	1.4	5	91
M, P Xylenes	ug/l	7.5	0.12	4	91
Methyl Acetate	ug/l	2.3	0.23	2	91
Methyl tert-Butyl Ether	ug/l	1	0.049	48	91
Methylcyclohexane	ug/l	3.9	0.79	4	91
Methylene Chloride	ug/l	0.15	0.15	1	91
o-Xylene (1,2-Dimethylbenzene)	ug/l	19	0.082	5	91

HDR APTIM
a Joint Venture

Table 4-6
Fulton Ave Superfund Site OU2
Groundwater Analytical Results
Phase 5 - Statistical Summary

Chemical Name	Units	Max Result	Min Result	Total Number of Detects	Total Number of Samples
Styrene	ug/l			0	91
Tetrachloroethene (PCE)	ug/l	910	0.066	86	91
Toluene	ug/l			0	91
trans-1,2-Dichloroethene	ug/l	1.9	0.071	10	91
trans-1,3-Dichloropropene	ug/l			0	91
Trichloroethene (TCE)	ug/l	830	0.056	71	91
Trichlorofluoromethane	ug/l	0.34	0.069	4	91
Vinyl Chloride	ug/l	1.3	0.33	4	91
Organic Acids					
Acetic Acid	mg/l	19	0.98	6	91
Butanoic Acid	mg/l			0	91
L-Lactic Acid	mg/l			0	91
Propionic Acid	mg/l			0	91
Pyruvic Acid	mg/l			0	91
Parameters					
Alkalinity	mg/l	130	5.3	91	91
Biochemical Oxygen Demand (BOD)	mg/l	30.5	2	11	87
Chloride (As Cl)	mg/l	230	8.6	91	91
COD - Chemical Oxygen Demand	mg/l	110	23	8	91
Ethane	ug/l	11.7	11.7	1	45
Ethene	ug/l			0	45
Methane	ug/l	4470	3.56	21	45
Nitrate + Nitrite (as N)	mg/l	7	0.054	81	91
Nitrogen, Ammonia (As N)	mg/l	3.5	0.075	32	91
Nitrogen, Kjeldahl, Total	mg/l	4.2	0.12	46	91
Phosphate	mg/l	0.94	0.027	91	91
Sulfate (As So4)	mg/l	38	1.5	89	91
Total Organic Carbon	mg/l	27	1	51	91
CSIA					
CSPC13C12	d13C ‰, VPDB	-15.2	-31.7	63	91
CSPCl37Cl35	d37Cl ‰, SMOC	3.1	-1.6	64	91
CSTC13C12	d13C ‰, VPDB	-22.3	-48	57	91
CSTCl37Cl35	d37Cl ‰, SMOC	7	-0.4	57	91
CSTH2H1	d2H ‰, VSMOW	599	-138	14	91

HDR APTIM
a Joint Venture

Table 4-7
Fulton Ave Superfund Site OU2
Fulton Avenue OU2 Plume Rationale

Location	Alt Name	Depth (ft bgs)	In OU2 Plume (Y/N)	Rationale No. 1	Rationale No. 2	Rationale No. 3
MW-20C	MW-20C	405	Yes	Consistent with Point Source Release of TCE	H/V Distribution is consistent with Groundwater Flow Direction	Within Capture Zone/Source Area of N-03881
MW-23C	MW-23C	403	Yes	Consistent with Point Source Release of TCE	H/V Distribution is consistent with Groundwater Flow Direction	Within Capture Zone/Source Area of N-03881
MW-25A	MW-25A	345	Yes	Consistent with Point Source Release of TCE	H/V Distribution is consistent with Groundwater Flow Direction	Within Capture Zone/Source Area of N-03881
MW-26F	MW-26F	410	Yes	Consistent with Point Source Release of TCE	H/V Distribution is consistent with Groundwater Flow Direction	Within Capture Zone/Source Area of N-03881
MW-26G	MW-26G	443	Yes	Consistent with Point Source Release of TCE	H/V Distribution is consistent with Groundwater Flow Direction	Within Capture Zone/Source Area of N-03881
N-03881	WELL 9	426	Yes	Consistent with Point Source Release of TCE	H/V Distribution is consistent with Groundwater Flow Direction	Within Capture Zone/Source Area of N-03881
N-11171	M-6	220	Yes	Consistent with Point Source Release of TCE	H/V Distribution is consistent with Groundwater Flow Direction	Within Capture Zone/Source Area of N-03881
DSB02RS	*DSB02RS*	*377*	*No*	*TCE not Point Source Release (PCE)*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
GCP18S	*GCP18S*	*46.5*	*No*	*TCE not Point Source Release (PCE)*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
MW-03 ROS	*MW-03 ROS*	*50*	*No*	*Consistent with Point Source Release of TCE*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
MW-10D	*MW-10D*	*111*	*No*	*No TCE in Groundwater*		
MW-10MS	*MW-10MS*	*190*	*No*	*TCE is primary Source Compound*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
MW-15A	*MW-15A*	*145*	*No*	*TCE not Point Source Release (PCE)*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
MW-21C	*N-13300*	*400*	*No*	*TCE not Point Source Release (PCE)*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
MW-21D	*MW-21D*	*455*	*No*	*TCE not Point Source Release (PCE)*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
MW-24A	*N-13284*	*350*	*No*	*Consistent with Point Source Release of TCE*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
MW-4 ZOE	*MW-4 ZOE*	*37*	*No*	*No TCE Exceedances in Groundwater*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
MW-8D	*MW-8D*	*111*	*No*	*No TCE in Groundwater*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
MW-8S	*MW-8S*	*52*	*No*	*No TCE in Groundwater*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
MW-9D	*MW-9D*	*120*	*No*	*No TCE in Groundwater*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
MW-9S	*MW-9S*	*63*	*No*	*No TCE in Groundwater*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-00017	*WELL 20*	*405*	*No*	*TCE not Point Source Release (PCE)*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-00104	*WELL 2*	*325*	*No*	*No TCE Exceedances in Groundwater*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-01697	*WELL 8*	*478*	*No*	*TCE not Point Source Release (PCE)*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-02487	*N-02487*	*424*	*No*	*TCE not Point Source Release (PCE)*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-03185	*WELL 4*	*423*	*No*	*Consistent with Point Source Release of TCE*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-03603	*WELL 1*	*443*	*No*	*Consistent with Point Source Release of TCE*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-03732	*WELL 1*	*310*	*No*	*TCE not Point Source Release (PCE)*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-04298	*WELL 35A*	*344*	*No*	*Consistent with Point Source Release of TCE*	*Cross-gradient to groundwater flow*	*outside of the capture zone/recharge area of N-03881*
N-05603	*WELL 6*	*365*	*No*	*TCE not Point Source Release (PCE)*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-06745	*WELL 44C*	*304*	*No*	*TCE not Point Source Release (PCE)*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-07058	*WELL 13*	*380*	*No*	*TCE not Point Source Release (PCE)*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-07649	*WELL 57*	*165*	*No*	*Consistent with Point Source Release of TCE*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-07650	*WELL 57A*	*400*	*No*	*Consistent with Point Source Release of TCE*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-08248	*WELL 4*	*315*	*No*	*No TCE in Groundwater*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-08339	*WELL 14*	*308*	*No*	*TCE not Point Source Release (PCE)*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-08409	*WELL 9*	*340*	*No*	*TCE not Point Source Release (PCE)*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-08576	*WELL 7*	*445*	*No*	*TCE not Point Source Release (PCE)*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-09949	*N-09949*	*93.5*	*No*	*No TCE in Groundwater*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-10330	*GCP01*	*52*	*No*	*TCE not Point Source Release (PCE)*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-10486	*GCP08*	*54*	*No*	*TCE not Point Source Release (PCE)*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-10487	*GCP09*	*56*	*No*	*TCE not Point Source Release (PCE)*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-11659	*N-11659*	*409*	*No*	*TCE not Point Source Release (PCE)*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-11733	*GCP07D*	*156*	*No*	*No TCE in Groundwater*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-11735	*GCP13D*	*153*	*No*	*TCE not Point Source Release (PCE)*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-11739	*GCP12S*	*47*	*No*	*No TCE in Groundwater*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-11865	*M-40*	*195*	*No*	*TCE not Point Source Release (PCE)*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*
N-14146	*N-14146*	*370*	*No*	*TCE not Point Source Release (PCE)*	*Cross-gradient to groundwater flow*	*Outside of the capture zone/recharge area of N-03881*

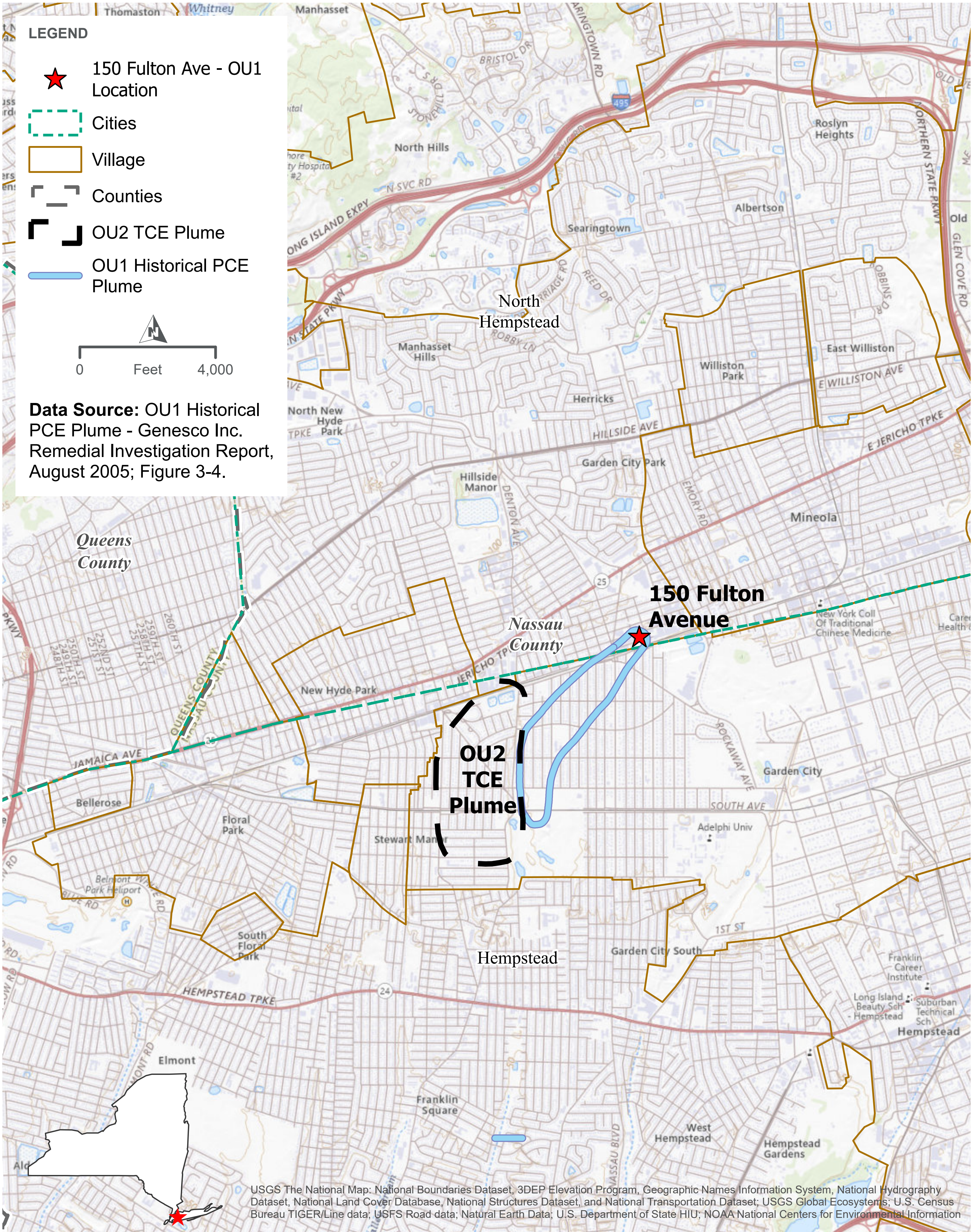
Highlighted wells are considered OU2 Plume wells.
H/V = Horizontal and Vertical

HDR APTIM
a Joint Venture

Table 4-8
Fulton Ave Superfund Site OU2
Phase 5 - Groundwater Geochemical Conditions Data

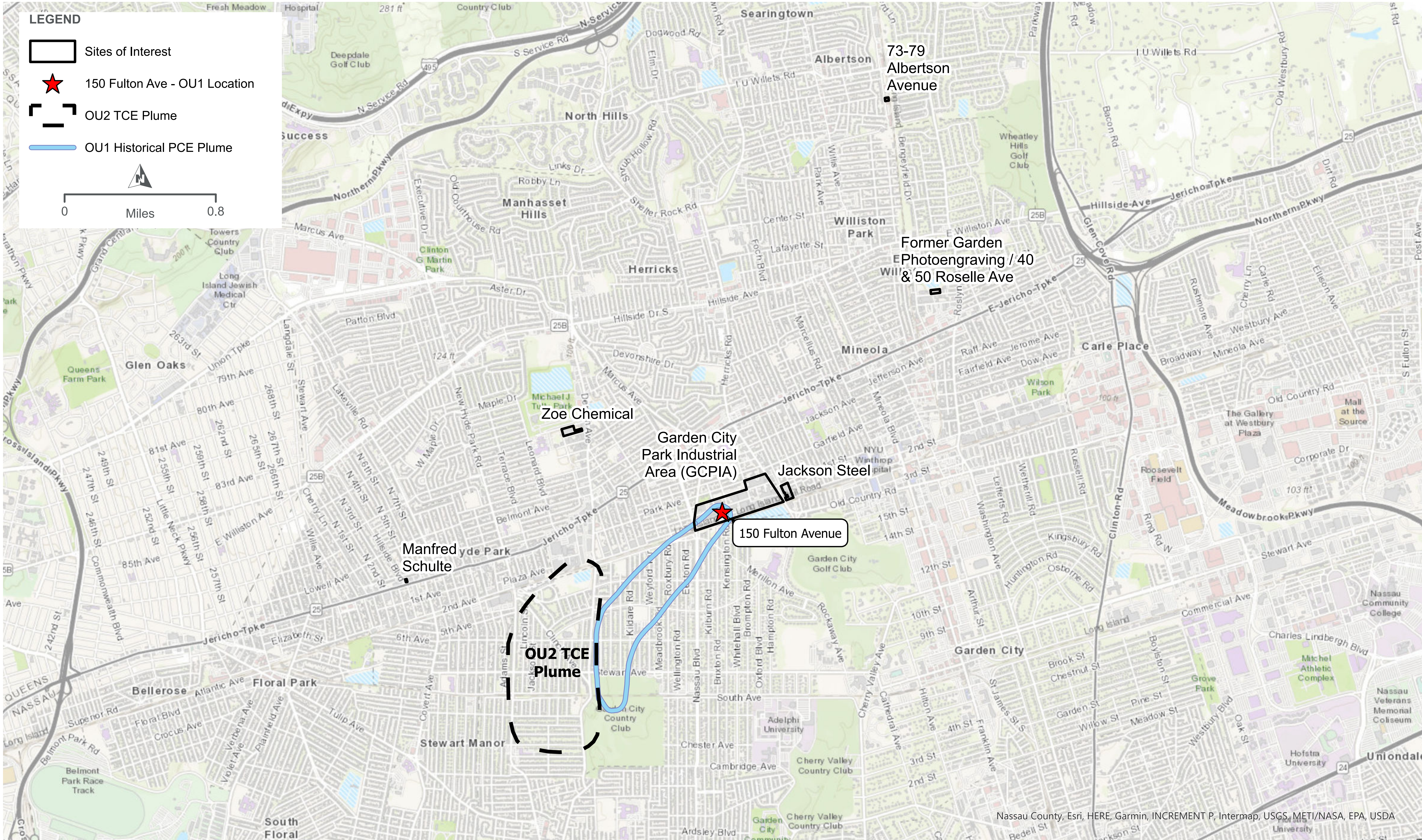
Location	Screen Depth (ft bgs)	2019 Event	Time	Est. Liters Purged	Purge Rate (Lpm)	Temp. (C°)	Cond. (mS/cm)	ORP (mV)	D.O. (mg/L)	pH	TDS (mg/L)	Salinity (ppth)	Turbidity (NTU)	Depth to Water
DSB02RS	372 - 382	Fall	11:00	5.25	0.15	19.36	0.304	-249	0	7.8	0.198	0.1	Max	39.06
MW-03 ROS	44.9 - 54.9	Fall	09:20	9	0.225	16.34	0.077	-110	0	6.97	0.05	0	0	39.96
MW-10D	106 - 116	Fall	15:10	9.75	0.15	20.11	0.321	277	6.85	6.3	0.208	0.2	336	48.27
MW-10MS	186 - 196	Fall	13:10	7.25	0.1	19.09	0.243	225	0.73	5.63	0.158	0.1	19.98	50.71
MW-15A	140 - 150	Fall	12:25	10.95	0.12	21.65	0.351	-67	0	6.97	0.228	0.2	21.5	37.17
MW-20C*	400 - 410	Fall	9:35	10.75	0.1	16.99	0.424	-121	0	11.37	0.276	0.2	47.4	39.52
MW-23C*	398 - 408	Fall	15:50	23.5	0.35	15.37	0.241	-40	0	6.61	0.157	0.1	55.5	37.55
MW-24A	345 - 355	Fall	11:55	6	0.2	17.17	0.229	-124	0	7.24	0.149	0.1	62.2	44.1
MW-25A*	340 - 350	Fall	15:40	4.5	0.15	16.24	0.223	14	0	6.55	0.145	0.1	52.1	23.15
MW-26F*	405 - 415	Fall	11:10	9	0.2	16.41	0.208	-256	0	9.33	0.135	0.1	2.31	NA
MW-26G*	438 - 448	Fall	09:45	6.125	0.175	15.94	0.174	23	0.46	6.52	0.113	0.1	0.42	NA
MW-4 ZOE	30 - 45	Fall	09:55	10.5	0.3	19.45	0.265	159	5.48	6.46	0.172	0.1	3.28	23.01
MW-8D	106 - 116	Fall	11:25	5	0.1	19.65	0.266	256	2.59	5.64	0.173	0.1	1635	46.99
MW-8S	57 - 67	Fall	9:40	13	0.2	17.33	0.446	246	3.54	5.68	0.29	0.2	12.3	46.93
MW-9D	115 - 125	Fall	14:50	8.8	0.16	20.01	0.609	175	2.53	6.1	0.383	0.3	83.5	46.65
MW-9S	58 - 68	Fall	12:30	6.75	0.15	22.45	0.305	197	1.57	5.86	0.196	0.1	3.49	46.53
N-09949	91 - 96	Fall	13:40	6	0.12	18.73	0.494	193	0	5.86	0.321	0.2	1.73	53
N-10330 (GCP-1)	49 - 59	Fall	13:45	7.5	0.25	18.41	0.582	-88	0	6.93	0.372	0.3	0.77	32
N-10486 (GCP-8)	50 - 60	Fall	8:40	4	0.1	17.78	0.47	150	0	6.32	0.305	0.2	1.14	38.21
N-10487 (GCP-9)	51 - 61	Fall	16:50	16	0.2	16.84	0.241	153	0	7.15	0.156	0.1	25.7	35.67
N-11171 (M-6)*	215 - 235	Fall	13:55	9.75	0.15	16.27	0.272	-53	0	6.57	0.177	0.1	26.2	23.38
N-11659	399 - 419	Fall	10:30	10.75	0.2	18.21	0.18	13	0.43	6.6	0.117	0.1	35	51.55
N-11733 (GCP-7D)	146 - 166	Fall	10:50	5.5	0.1	19.89	0.385	195	5.84	5.86	0.25	0.2	7.01	43.45
N-11735 (GCP-13D)	145 - 170	Fall	11:50	8.25	0.275	15.79	0.263	201	7.43	5.74	0.171	0.1	0	33.23
N-11739 (GCP-12S)	37 - 57	Fall	13:50	10.75	0.25	15.17	0.175	221	8.99	5.99	0.115	0.1	1.13	38.81
GCP-18S	39 - 54	Fall	15:45	5.4	0.18	17.69	0.306	-20	0	6.53	0.199	0.1	12.9	33.21
N-11865	195 - 199	Fall	09:20	11.25	0.225	17.17	0.08	-65	0	6.97	0.052	0	22.4	40.56
N-11739 (GCP-12S)	37 - 57	Winter	10:35	7.05	0.235	11.65	0.269	374	6.5	5.68	0.175	0.1	0.59	40.21
N-11735 (GCP-13D)	145 - 170	Winter	16:35	15.375	0.265	13.56	0.434	321	7.02	4.82	0.282	0.2	62.1	34.18
N-11733 (GCP-7D)	146 - 166	Winter	10:00	8.1	0.28	14.41	0.556	343	10.39	4.67	0.355	0.3	0.32	44.39
N-11171 (M-6)*	215 - 235	Winter	11:57	12	0.15	11.4	0.381	-46	2.59	5.91	0.248	0.2	2.44	24.67
N-10486 (GCP-8)	50 - 60	Winter	13:15	8.8	0.22	12.38	0.764	202	2.76	5.92	0.49	0.4	0.41	39.69
MW-9S	58 - 68	Winter	14:44	14	0.2	13.6	0.577	276	2.32	5.61	0.369	0.3	2.21	47.64
MW-9D	115 - 125	Winter	11:15	18.75	0.25	13.84	0.291	216	2.72	5.77	0.189	0.1	6.15	47.79
MW-25A*	340 - 350	Winter	15:32	19	0.2	13.87	0.305	76	2.17	5.93	0.198	0.1	71.3	24.2
MW-24A	345 - 355	Winter	10:50	26	0.26	12.42	0.326	-125	3.26	6.49	0.212	0.2	62.5	44.77
MW-21D	450 - 460	Winter	11:10	9.5	0.1	13.07	0.167	26	0	6.69	0.108	0.1	107.3	33.31
MW-21C	390 - 400	Winter	15:23	16.5	0.15	13.09	0.473	-101	2.13	7.89	0.307	0.2	64	33.21
MW-20C*	400 - 410	Winter	15:45	5.41	0.121	13.55	0.758	1	4.39	10.86	0.486	0.4	20	39.4
MW-15A	140 - 150	Winter	12:10	7.035	0.115	14.09	0.436	16	2.73	6.15	0.283	0.2	87.7	38.5
DSB02RS	372 - 382	Winter	15:50	24	0.4	13.41	0.307	-167	0.42	11.38	0.199	0.15	1716	39.75
GCP-18S	39 - 54	Winter	09:35	10.5	0.3	13.72	0.349	-67	0.68	6.94	0.226	0.17	2.18	34.35
MW-03 ROS	44.9 - 54.9	Winter	9:10	9	0.3	14.1	0.176	-107	1.01	7.05	0.114	0.08	2.47	41.3
MW-10D	106 - 116	Winter	14:25	9	0.2	14.02	0.414	224	7.39	6.27	0.269	0.2	109	49.19
MW-10MS	186 - 196	Winter	11:40	7	0.2	13.95	0.131	180	0.26	6.87	0.094	0.06	786	48.5
MW-23C*	398 - 408	Winter	15:40	12	0.2	13.99	0.327	-57	1.95	9.97	0.212	0.16	22.4	36.32
MW-26F*	405 - 415	Winter	12:15	13	0.2	13.78	0.23	-208	0.98	8.63	0.15	0.11	3.6	NA
MW-26G*	438 - 448	Winter	10:50	15	0.3	13.86	0.197	-49	0.55	6.95	0.128	0.09	0	NA
MW-8D	106 - 116	Winter	13:55	12	0.2	14.06	0.276	284	6.95	5.91	0.179	0.13	240	48
MW-8S	57 - 67	Winter	11:00	6	0.2	14.3	0.454	269	7.98	5.96	0.295	0.22	7.82	47.95
N-09949	91 - 96	Winter	3:15	11.25	0.25	14.41	0.493	186	1.16	5.89	0.32	0.24	0.61	53.95
N-10330 (GCP-1)	49 - 59	Winter	11:55	9	0.3	13.71	0.665	-65	0.71	7.09	0.426	0.32	1.07	33.3
N-10487 (GCP-9)	51 - 61	Winter	9:50	6	0.2	12.92	0.501	1	6.96	7.27	0.321	0.24	2.23	37.1
N-11659	399 - 419	Winter	11:25	12.75	0.15	15.15	0.016	14	3.86	8.78	0.011	0.01	59	50.03
N-11865	195 - 199	Winter	12:05	10.5	0.3	17.32	0.095	-46	1.32	7.25	0.062	0.04	26.9	40.79

* Well is part of the OU2 plume.
NA - Not Applicable; wells MW-26F and MW-26G are part of a multiport well and DTW readings could not be taken.



HDR APTIM
a Joint Venture

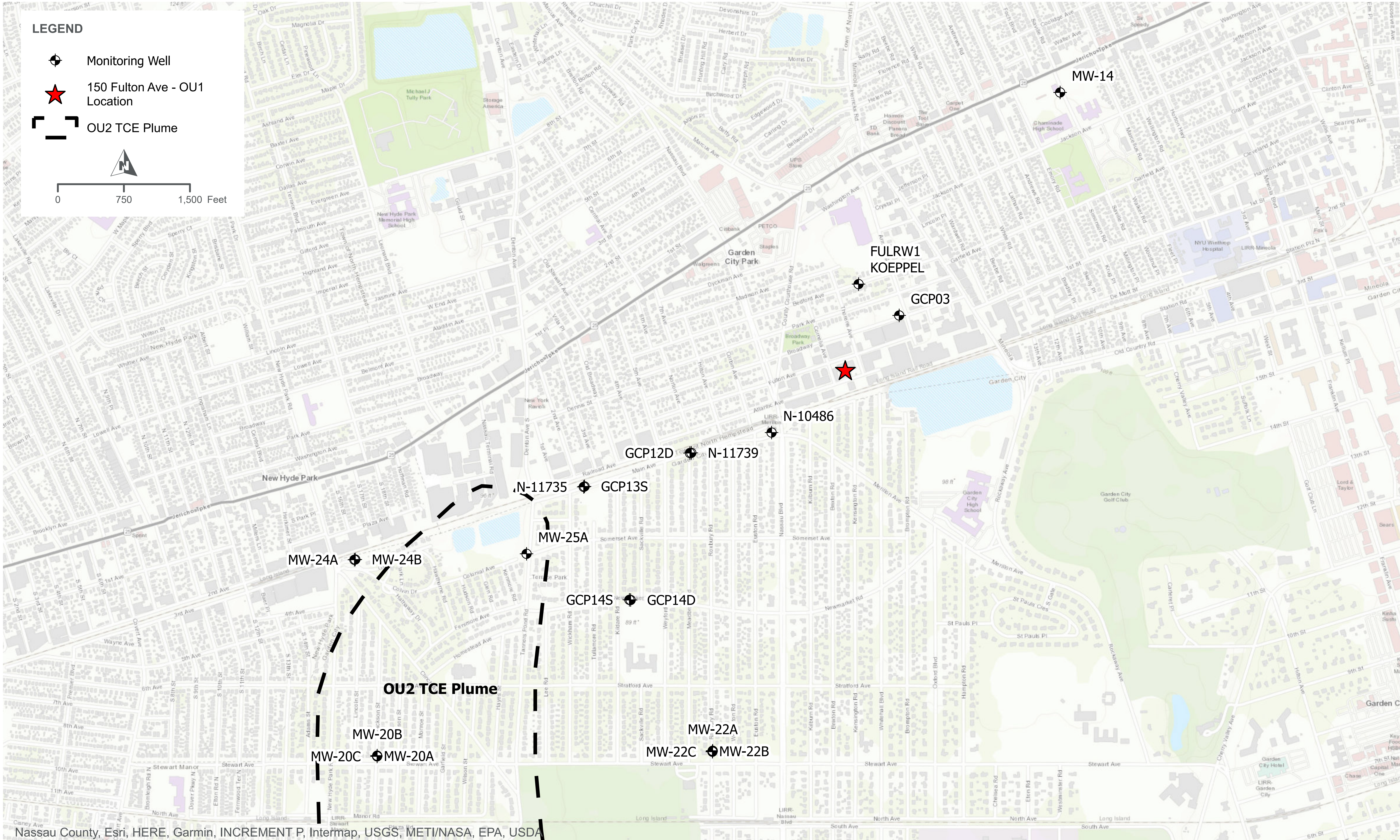
SITE LOCATION MAP
FULTON AVE SUPERFUND SITE OU2
FIGURE 1-1



HDR APTIM
a Joint Venture

SITES OF INTEREST
FULTON AVE SUPERFUND SITE OU2
FIGURE 1-2

PATH: \\NJ-MAHWAH\ACTIVEPROJECTS\6706\20000051\10042584\7.0_GIS_MODELS\7.2_WIP\MAP_DOCS\DRAFT\2023_RI\2023_RI.APRX - USER: HROSADO - DATE: 6/17/2024



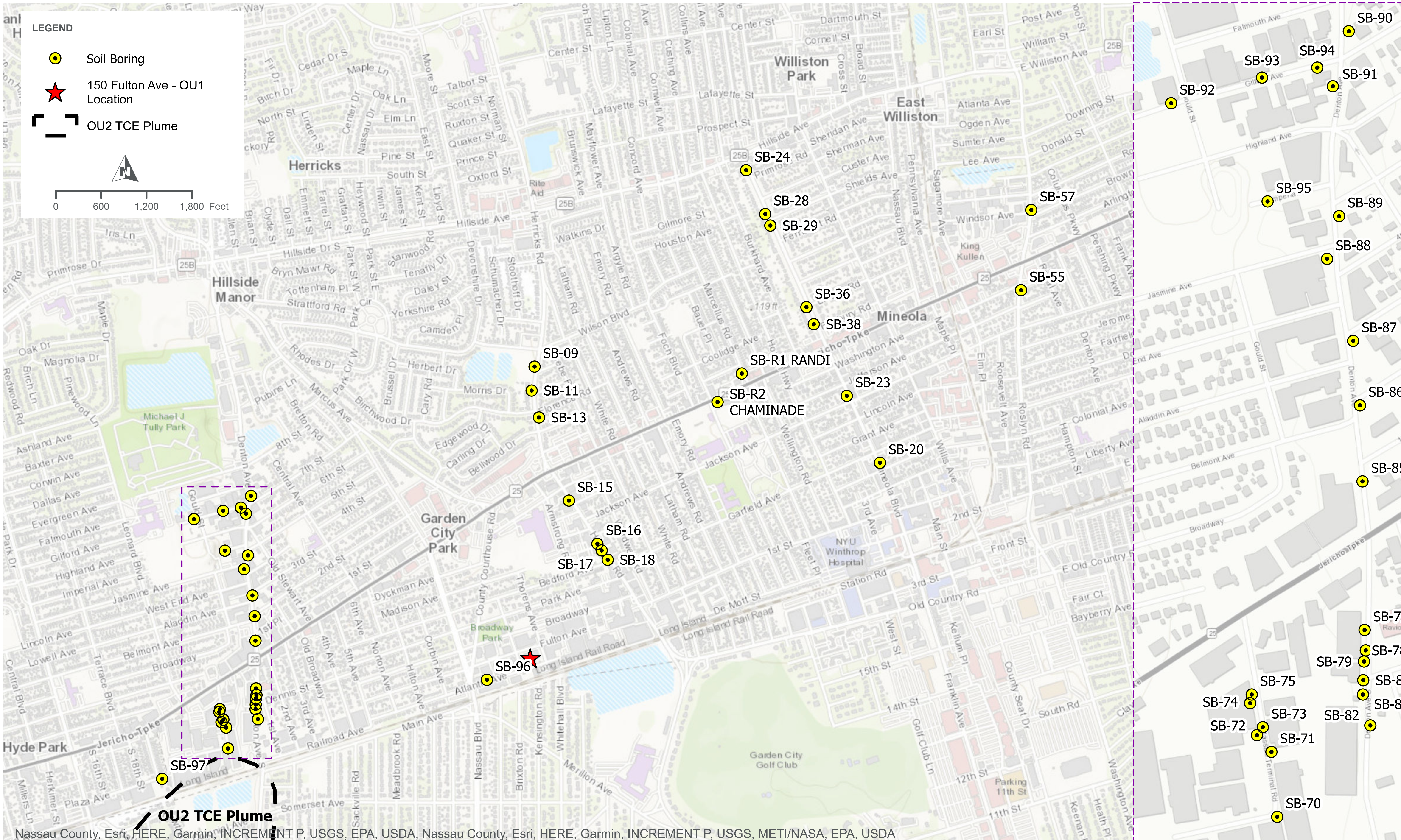
HDR APTIM
a Joint Venture

BASELINE MONITORING WELL SAMPLING LOCATIONS – JULY 2011

FULTON AVE SUPERFUND SITE OU2

FIGURE 2-1

PATH: \\NJ-MAHWAH\ACTIVEPROJECTS\6706\20000051\10042584\7.0_GIS_MODELS\7.2_WIP\MAP_DOCS\DRAFT\2023_RI\2023_RI.APRX - USER: HROSADO - DATE: 6/17/2024

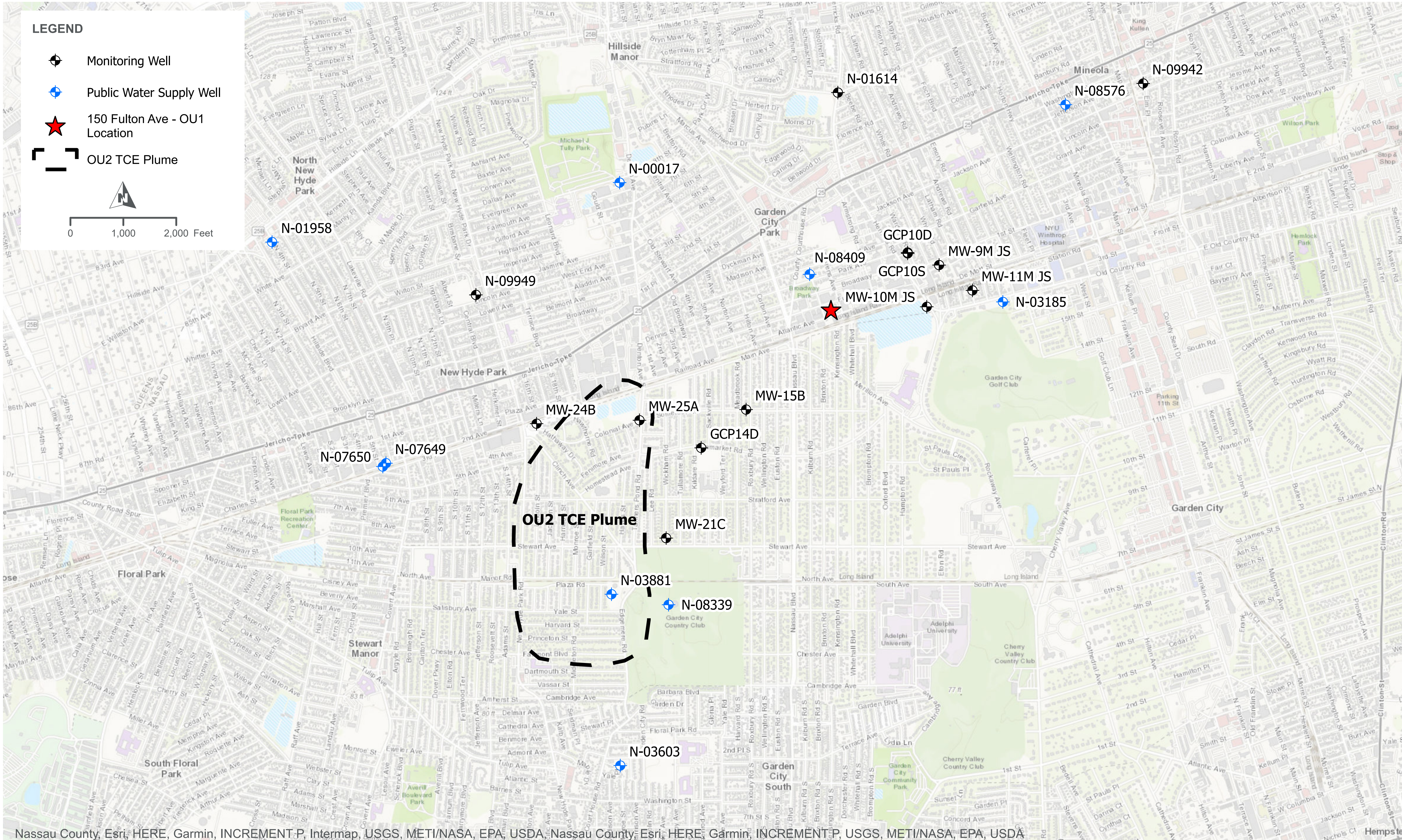


HDR APTIM
a Joint Venture

PHASE 2 DPT AND GROUNDWATER SCREENING SAMPLING LOCATIONS – JULY 2012 – AUGUST 2013

FULTON AVE SUPERFUND SITE OU2

FIGURE 2-2



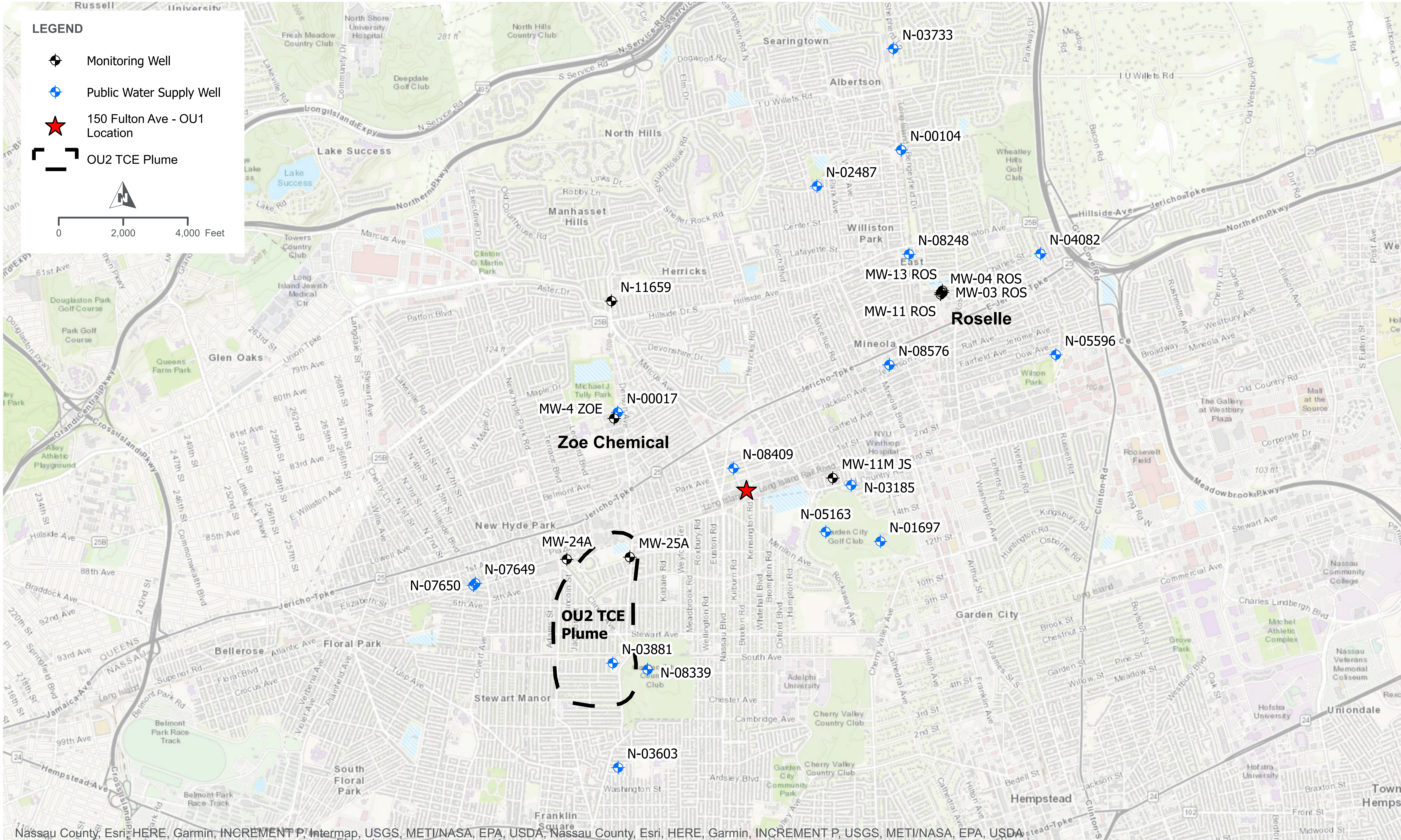
HDR APTIM
a Joint Venture

PHASE 2 MONITORING WELL AND PUBLIC WATER SUPPLY WELL GROUNDWATER SAMPLING LOCATIONS – MAY – NOVEMBER 2013

FULTON AVE SUPERFUND SITE OU2

FIGURE 2-3

PATH: \\NJ-MAHWAH\ACTIVEPROJECTS\6706\20000051\10042584\7.0_GIS_MODELS\7.2_WIP\MAP_DOCS\DRAFT\2023_RI\2023_RI.APRX - USER: HROSADO - DATE: 6/17/2024



HDR APTIM
a Joint Venture

PHASE 3 GROUNDWATER GROUNDWATER SAMPLING LOCATIONS – FEBRUARY 2014 - AUGUST 2015

FULTON AVE SUPERFUND SITE OU2

FIGURE 2-4

PATH: \\NJ-MAHWAH\ACTIVEPROJECTS\6706\20000051\10042584\7.0_GIS_MODELS\7.2_WIP\MAP_DOCS\DRAFT\2023_RI\2023_RI.APRX - USER: HROSADO - DATE: 7/30/2024

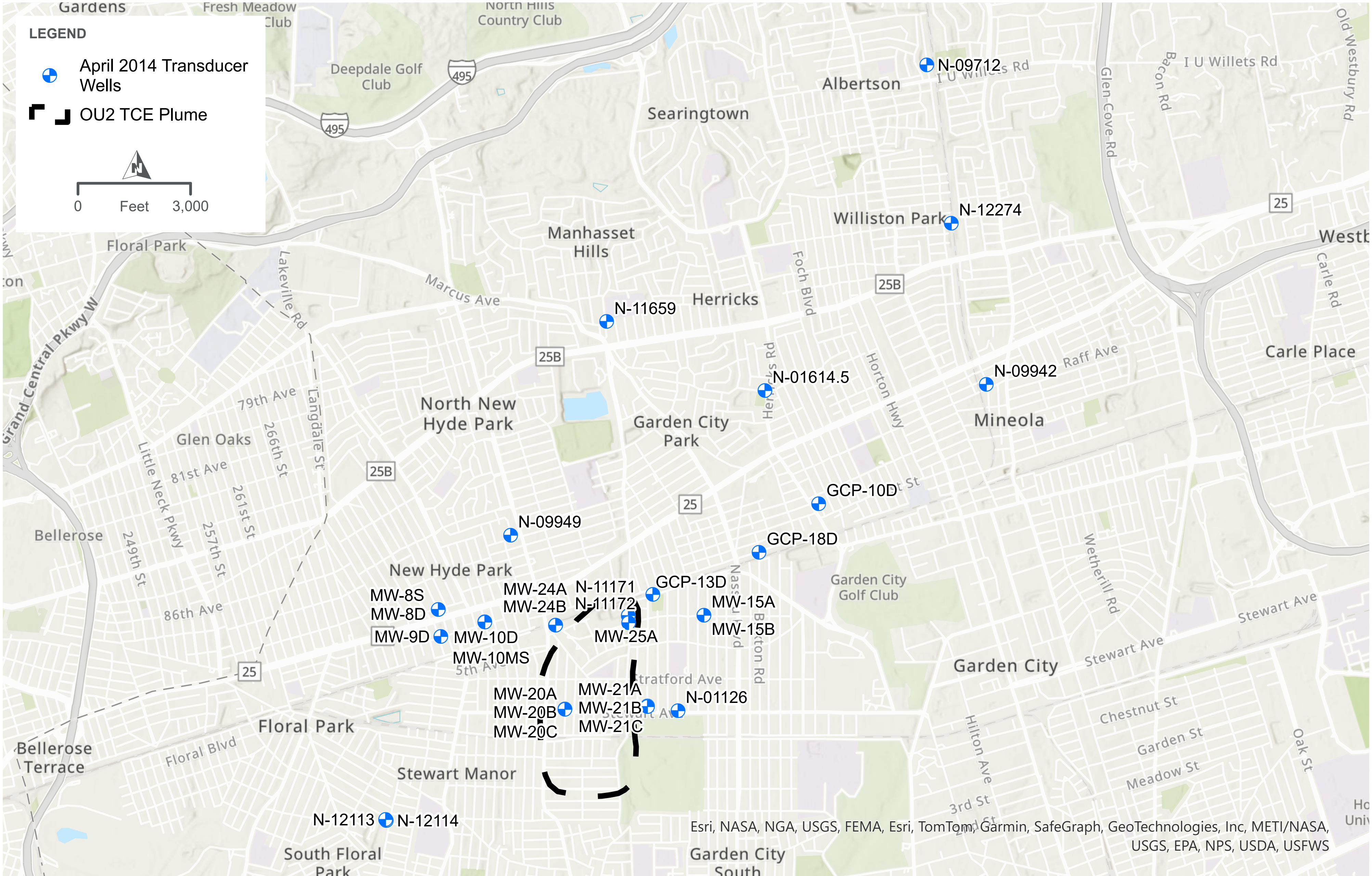
HDR APTIM
a Joint Venture

PHASE 3 ZOE CHEMICAL SOIL AND VAPOR SAMPLING LOCATIONS – DECEMBER 2014 – FEBRUARY 2015

FULTON AVE SUPERFUND SITE OU2

FIGURE 2-5

PATH: \\NJ-MAHWAH\ACTIVEPROJECTS\6706\20000051\10042584\7.0_GIS_MODELS\7.2_WIP\MAP_DOCS\DRAFT\2023_RI\2023_RI.APRX - USER: HROSADO - DATE: 1/24/2024

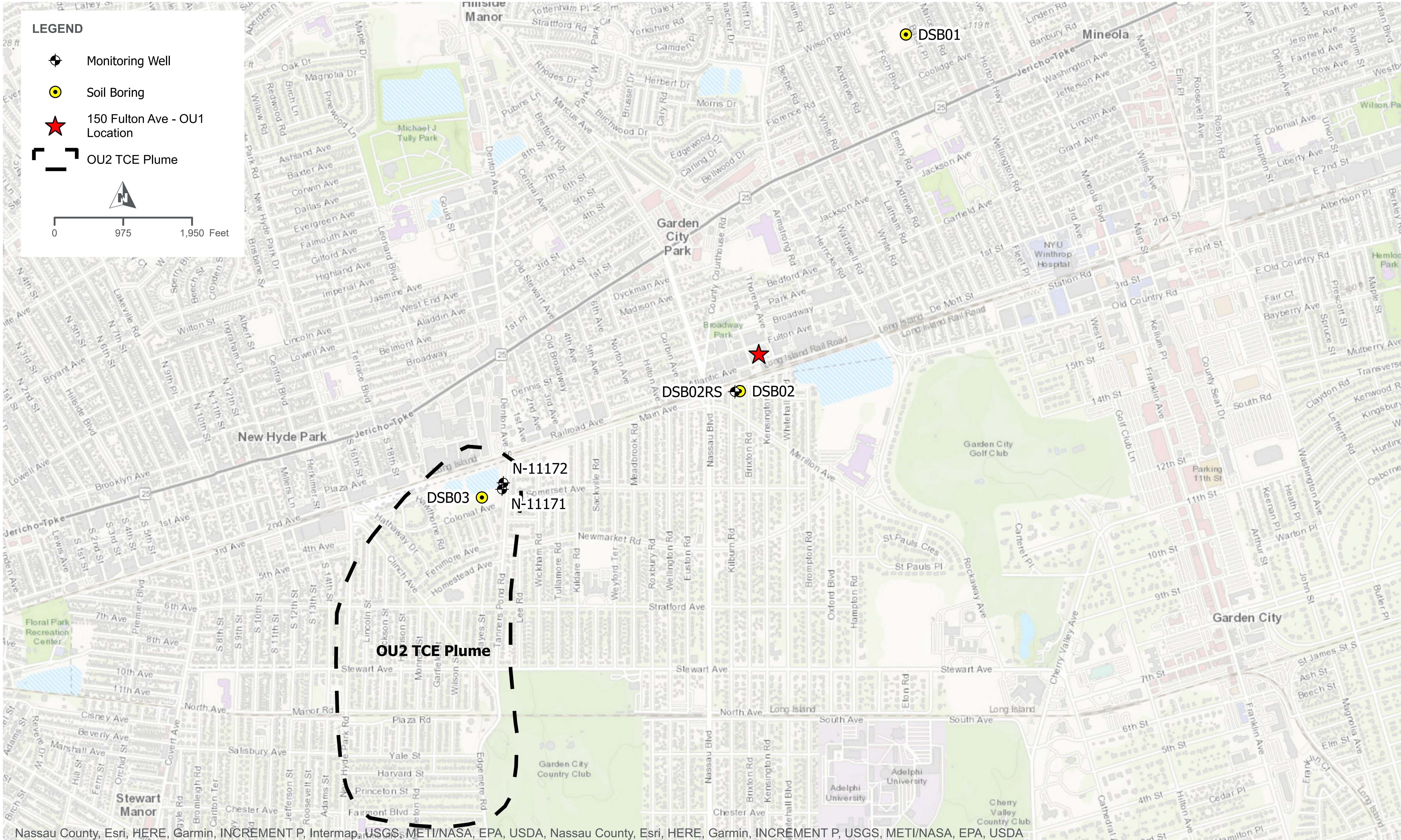


HDR APTIM
a Joint Venture

PHASE 3 TRANSDUCER STUDY MONITORING WELLS – APRIL 2014

FULTON AVE SUPERFUND SITE OU2

FIGURE 2-6

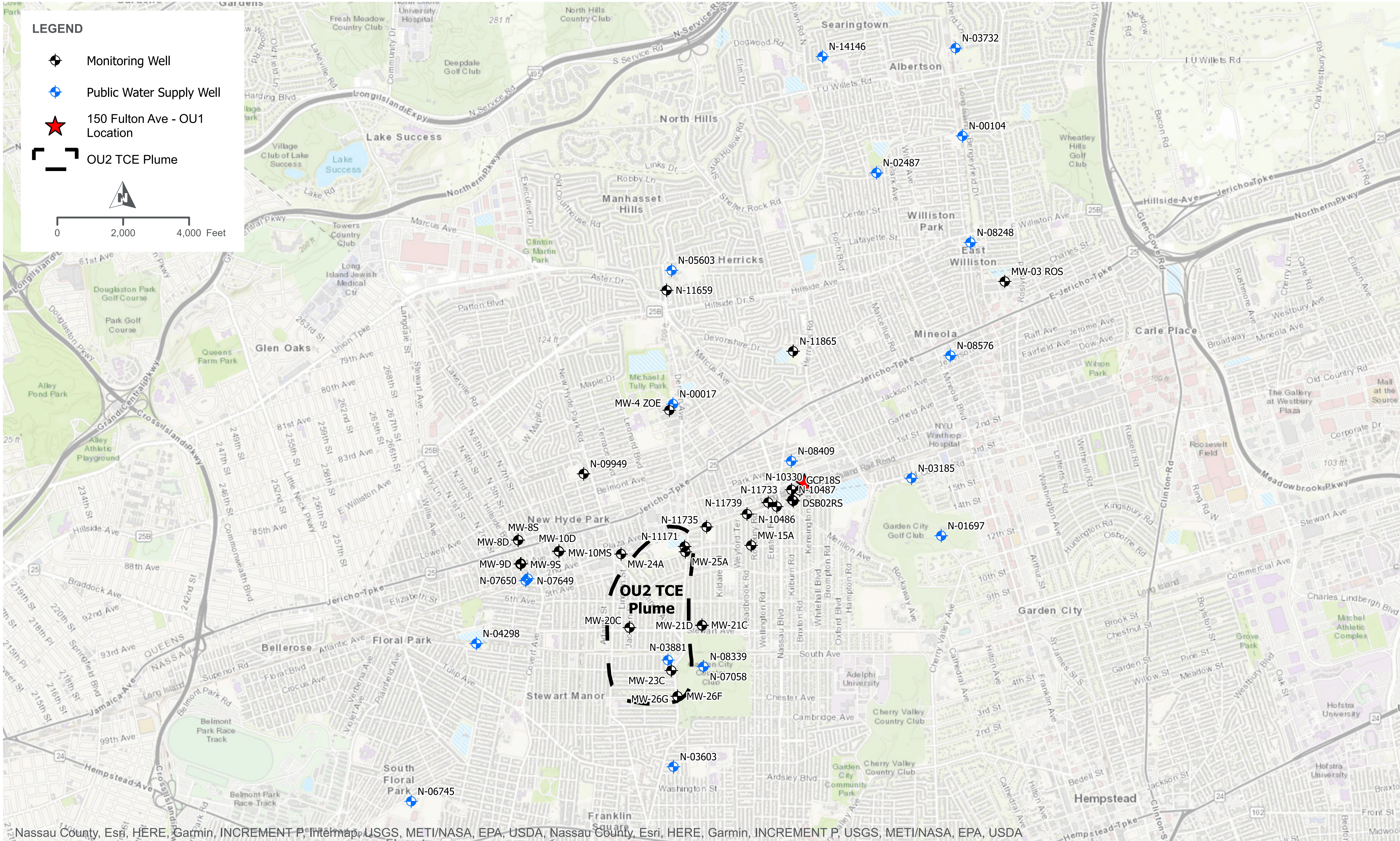


HDR APTIM
a Joint Venture

PHASE 4 VERTICAL PROFILE BORING AND MONITORING WELL LOCATIONS - DECEMBER 2015 - JANUARY 2016

FULTON AVE SUPERFUND SITE OU2

FIGURE 2-7



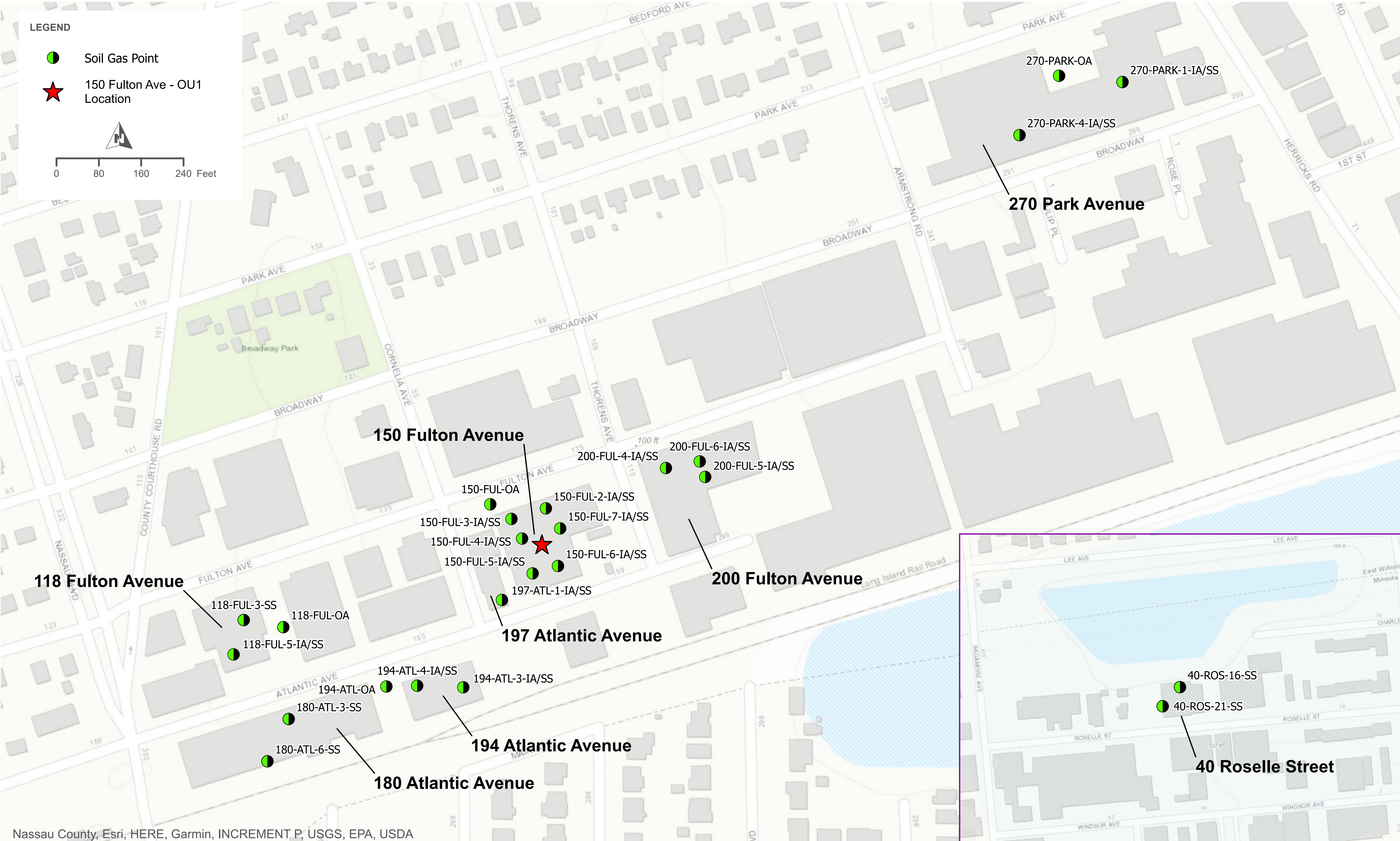
HDR APTIM
a Joint Venture

PHASE 5 GROUNDWATER SAMPLING LOCATIONS – AUGUST & DECEMBER 2019

FULTON AVE SUPERFUND SITE OU2

FIGURE 2-8

PATH: \\NJ-MAHWAH\ACTIVEPROJECTS\6706\20000051\10042584\7.0_GIS_MODELS\7.2_WIP\MAP_DOCS\DRAFT\2023_RI\2023_RI.APRX - USER: HROSADO - DATE: 6/17/2024



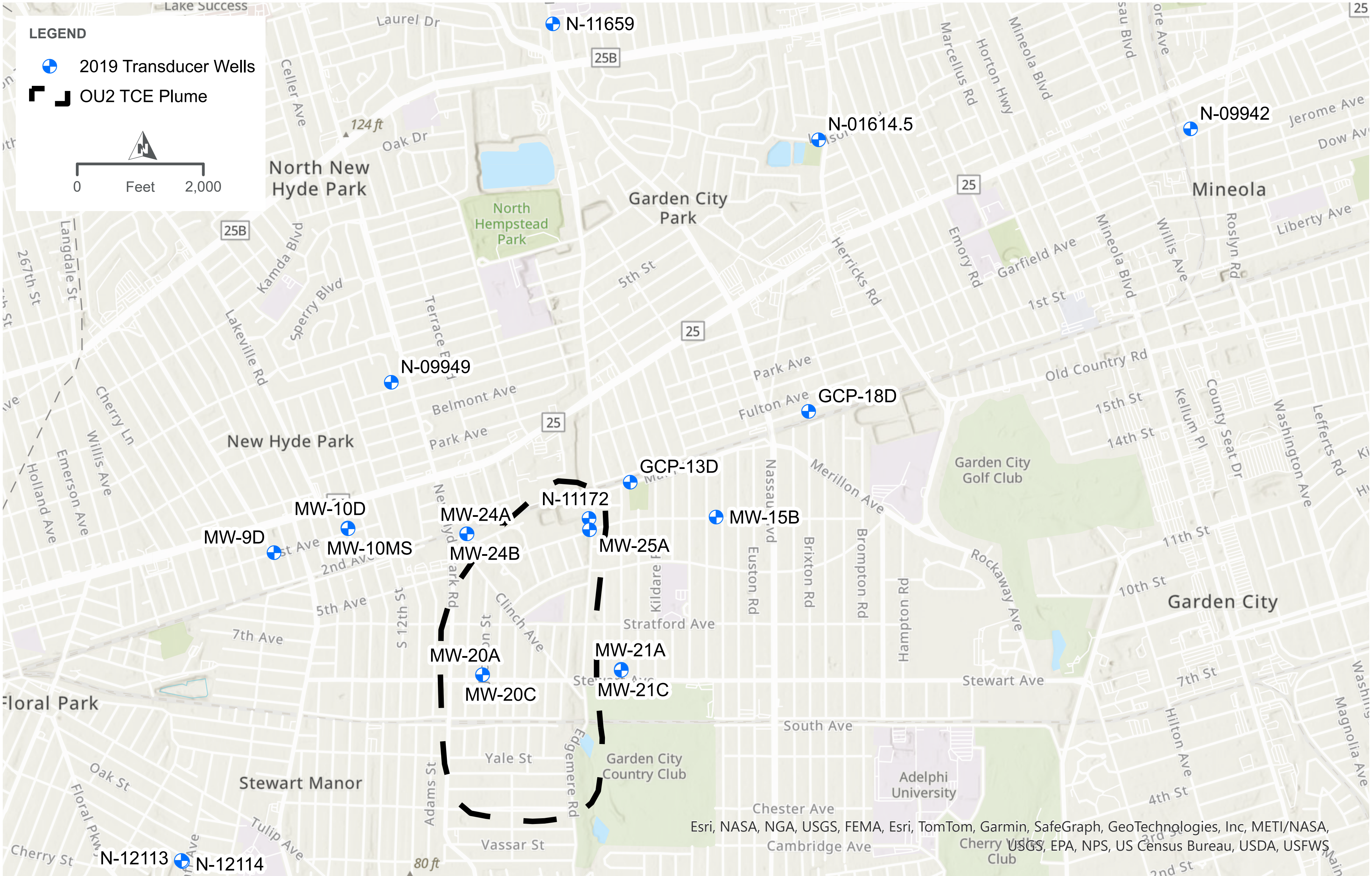
HDR APTIM
a Joint Venture

PHASE 5 SOIL VAPOR SAMPLING LOCATIONS – OCTOBER 2019 & MARCH 2020

FULTON AVE SUPERFUND SITE OU2

FIGURE 2-9

PATH: \\NJ-MAHWAH\ACTIVEPROJECTS\6706\20000051\10042584\7.0_GIS_MODELS\7.2_WIP\MAP_DOCS\DRAFT\2023_RI\2023_RI.APRX - USER: HROSADO - DATE: 1/30/2024

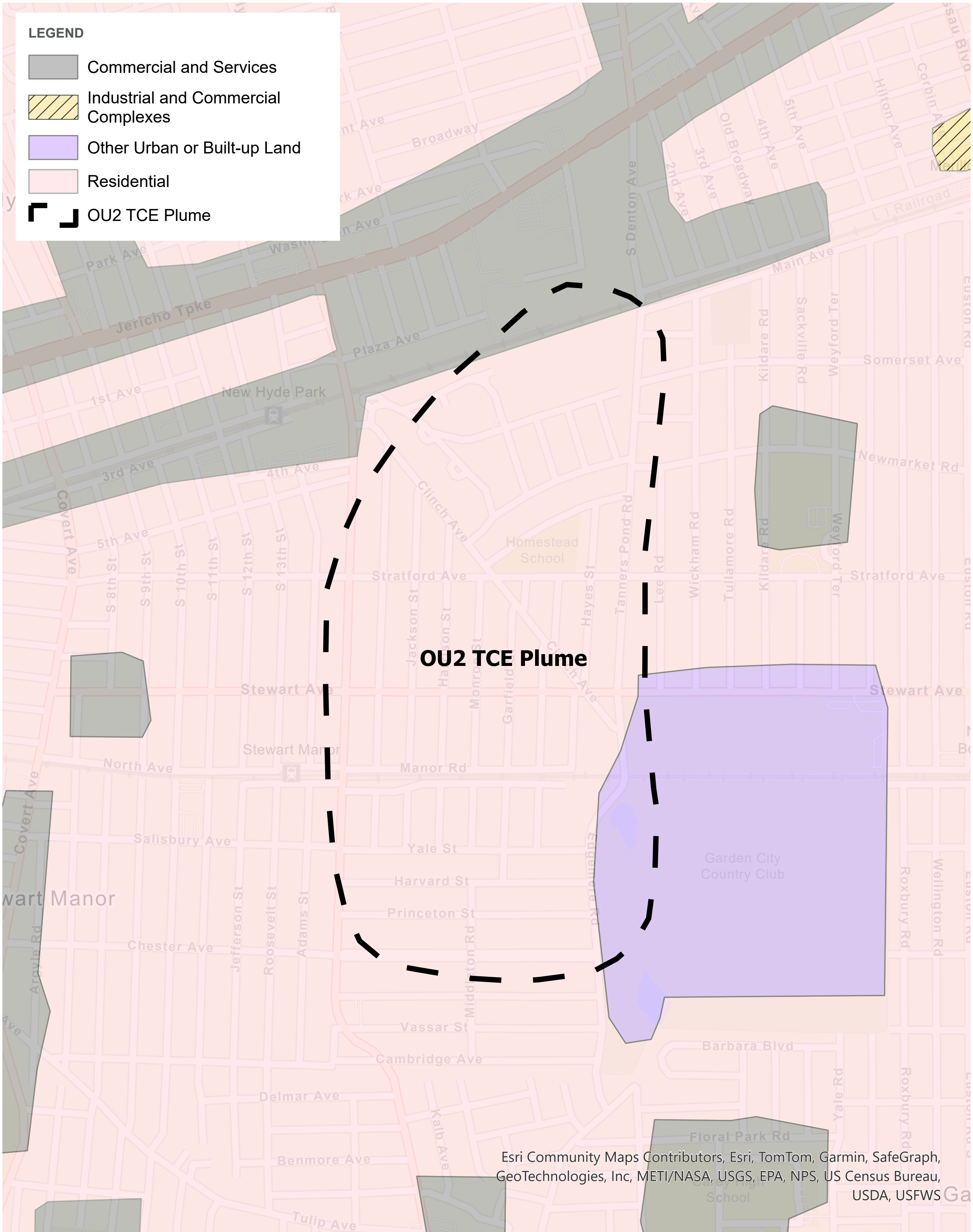


HDR APTIM
a Joint Venture

PHASE 5 TRANSDUCER STUDY MONITORING WELLS – SEPTEMBER 2019

FULTON AVE SUPERFUND SITE OU2

FIGURE 2-10



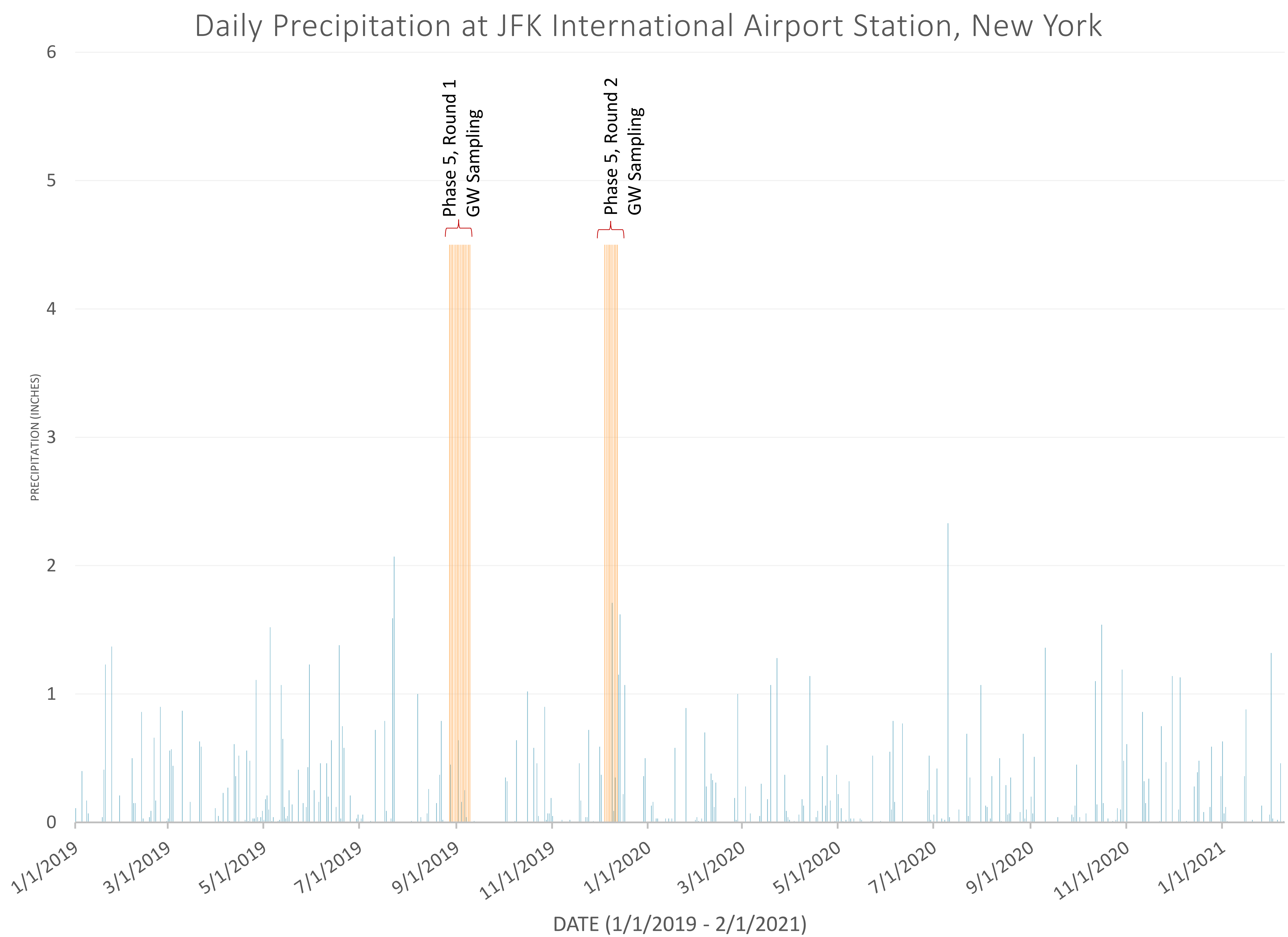
HDR APTIM
a Joint Venture

0 Feet 1,000

LAND USE AND LAND COVER

FULTON AVE SUPERFUND SITE OU2

FIGURE 3-1

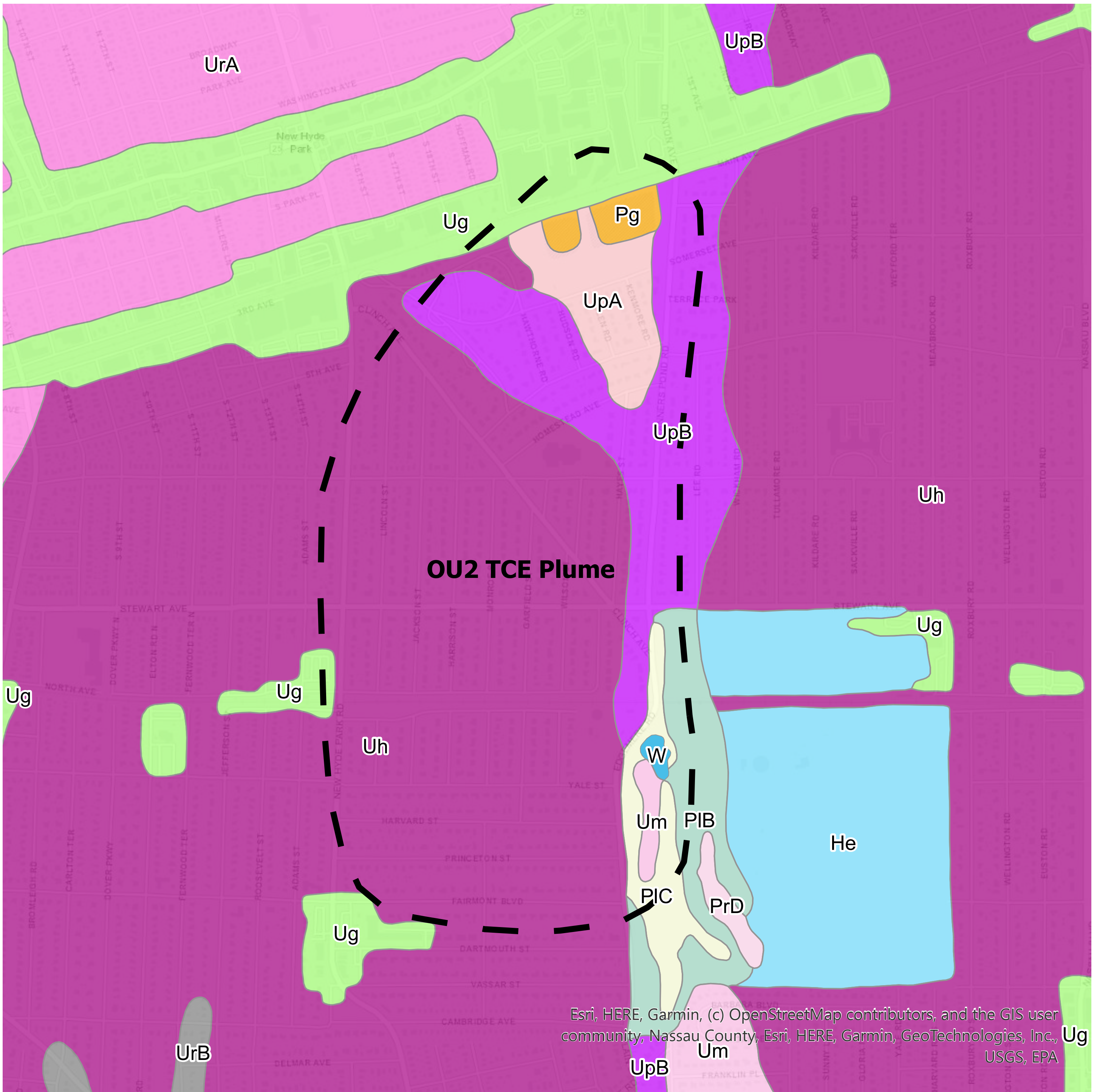


Source: NOAA, 2022b. NOAA US Department of Commerce. Record of Climatological Observations, Station: JFK International Airport, NY US USW 000094789. Generated July 20, 2022.
https://www.ncdc.noaa.gov/cdo-web/datasets/GHCND/stations/GHCND:USW00094789/detail

HDR APTIM
a Joint Venture

PRECIPITATION CHART – JANUARY 2019 THROUGH FEBRUARY 2021
FULTON AVE SUPERFUND SITE OU2
FIGURE 3-2

He	*Hempstead silt loam*	
Pg	*Pits, ground-water recharge*	
PlB	*Plymouth loamy sand, 3 to 8 percent slopes*	
PlC	*Plymouth loamy sand, 8 to 15 percent slopes*	
PrD	*Plymouth-Riverhead complex, 15 to 35 percent slopes*	
Ug	*Urban land*	
Uh	*Urban land-Hempstead complex*	
Um	*Urban land-Mineola complex*	
UpA	*Urban land-Plymouth complex, 0 to 3 percent slopes*	
UpB	*Urban land-Plymouth complex, 3 to 8 percent slopes*	
UrA	*Urban land-Riverhead complex, 0 to 3 percent slopes*	
UrB	*Urban land-Riverhead complex, 3 to 8 percent slopes*	
W	*Water*	



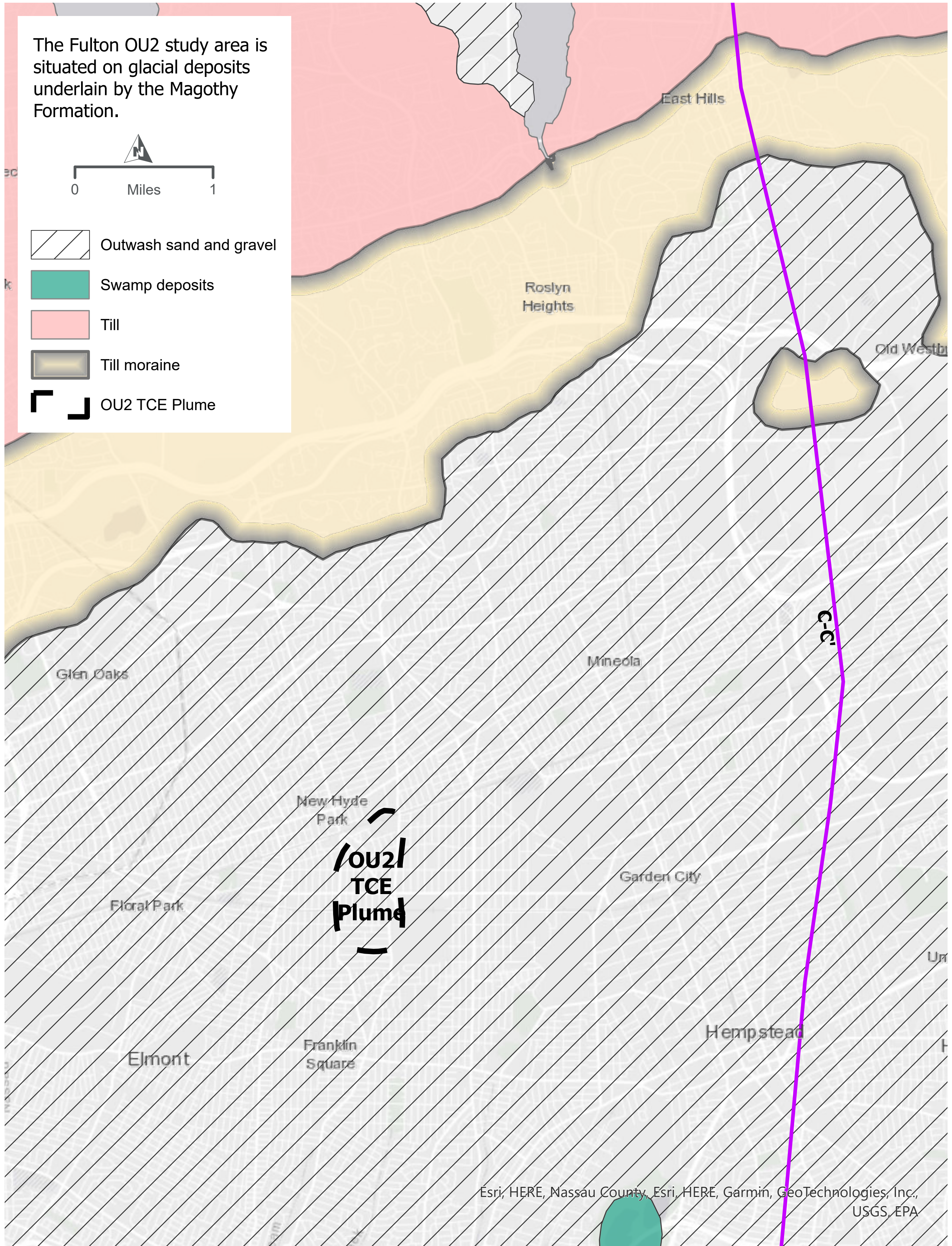
HDR APTIM
a Joint Venture

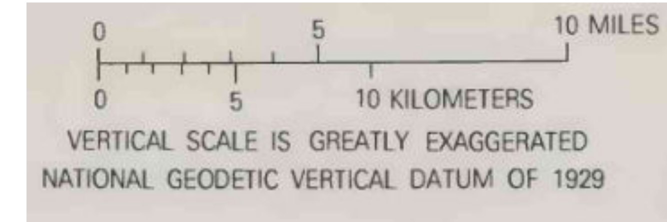
0 Feet 1,000

SURFACE SOILS

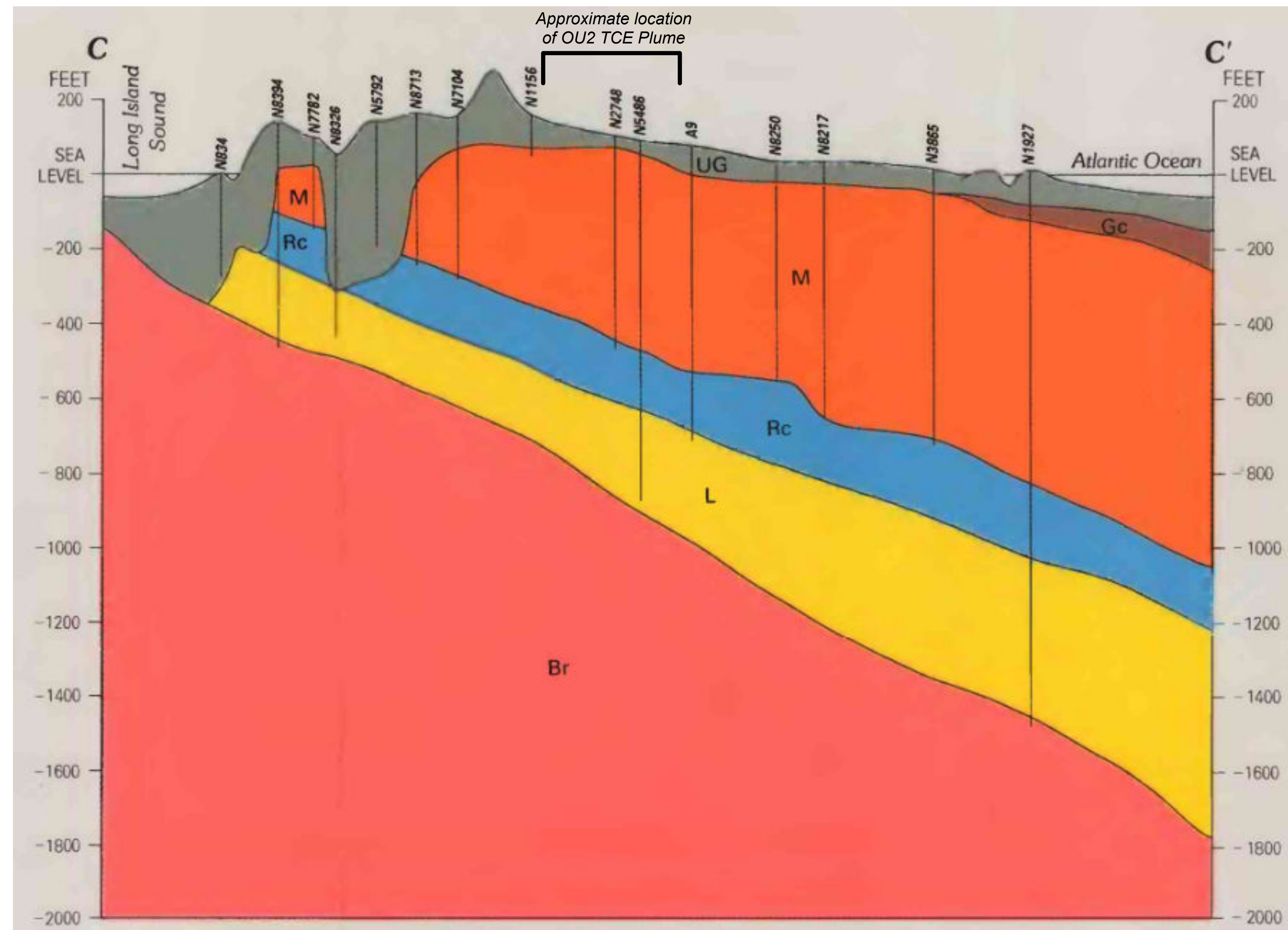
FULTON AVE SUPERFUND SITE OU2

FIGURE 3-3



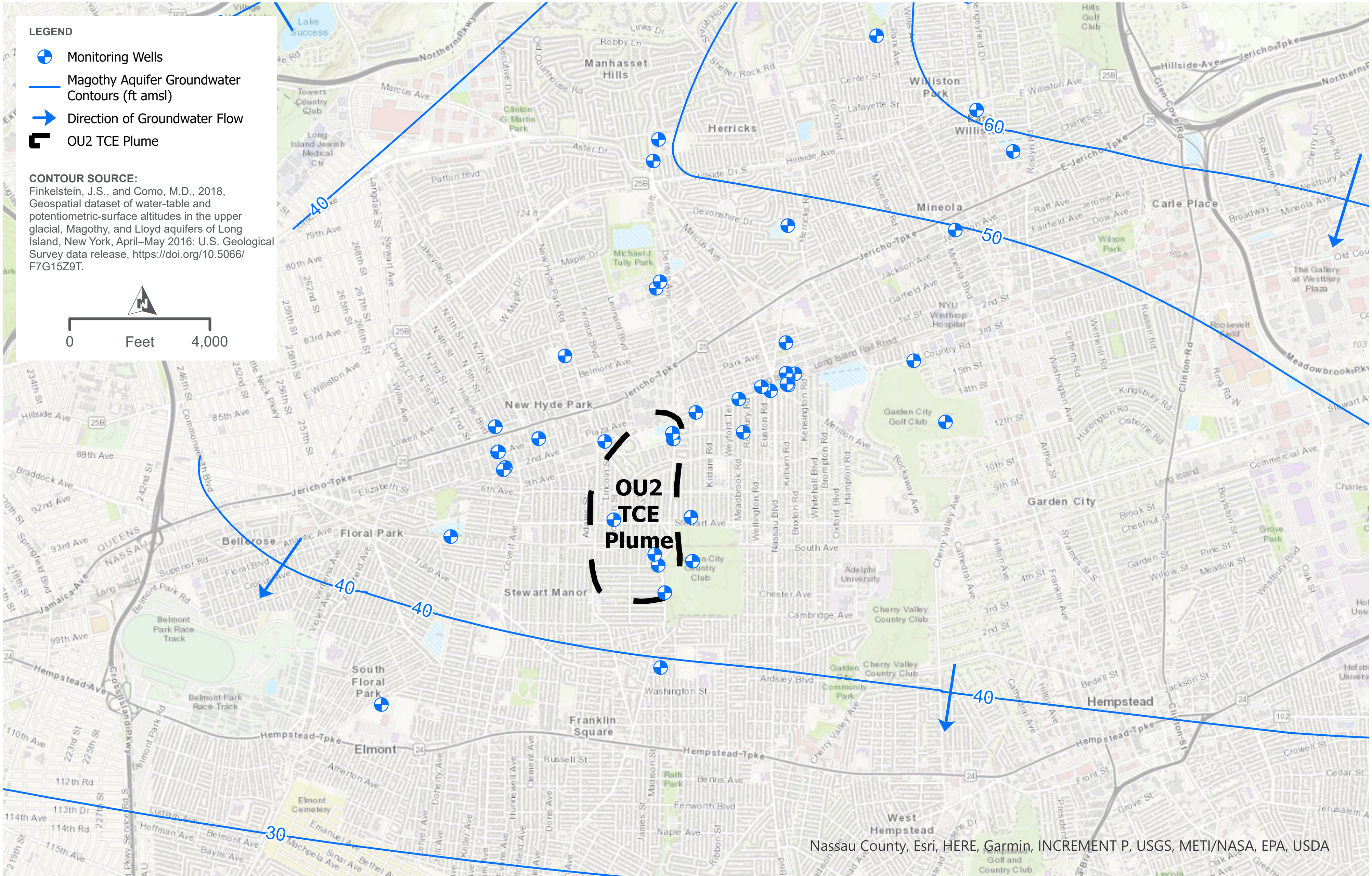


DATA SOURCE:
Hydrologic framework of Long Island, New York
Hydrologic Atlas 709
By: Douglas A. Smolensky, Herbert T. Buxton, and Peter K. Shernoff



HDR APTIM
a Joint Venture

PLAN VIEW AND CROSS SECTION GEOLOGY
FULTON AVE SUPERFUND SITE OU2
FIGURE 3-4

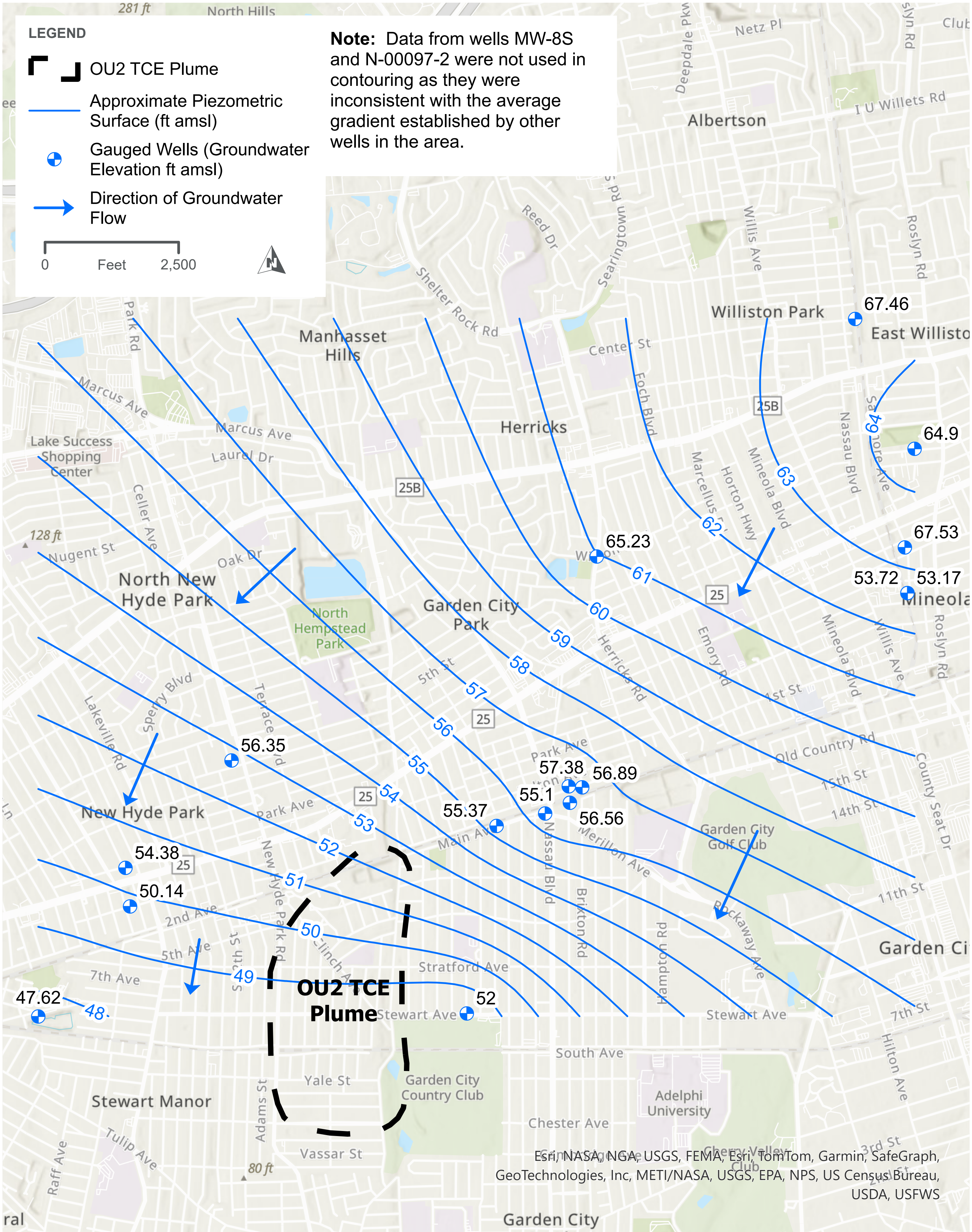


HDR APTIM
a Joint Venture

REGIONAL POTENTIOMETRIC SURFACE OF MAGOTHY AQUIFER

FULTON AVE SUPERFUND SITE OU2

FIGURE 3-5



PIEZOMETRIC SURFACE – UPPER GLACIAL AQUIFER – AUGUST 27, 2019

HDR APTIM
a Joint Venture

FULTON AVE SUPERFUND SITE OU2

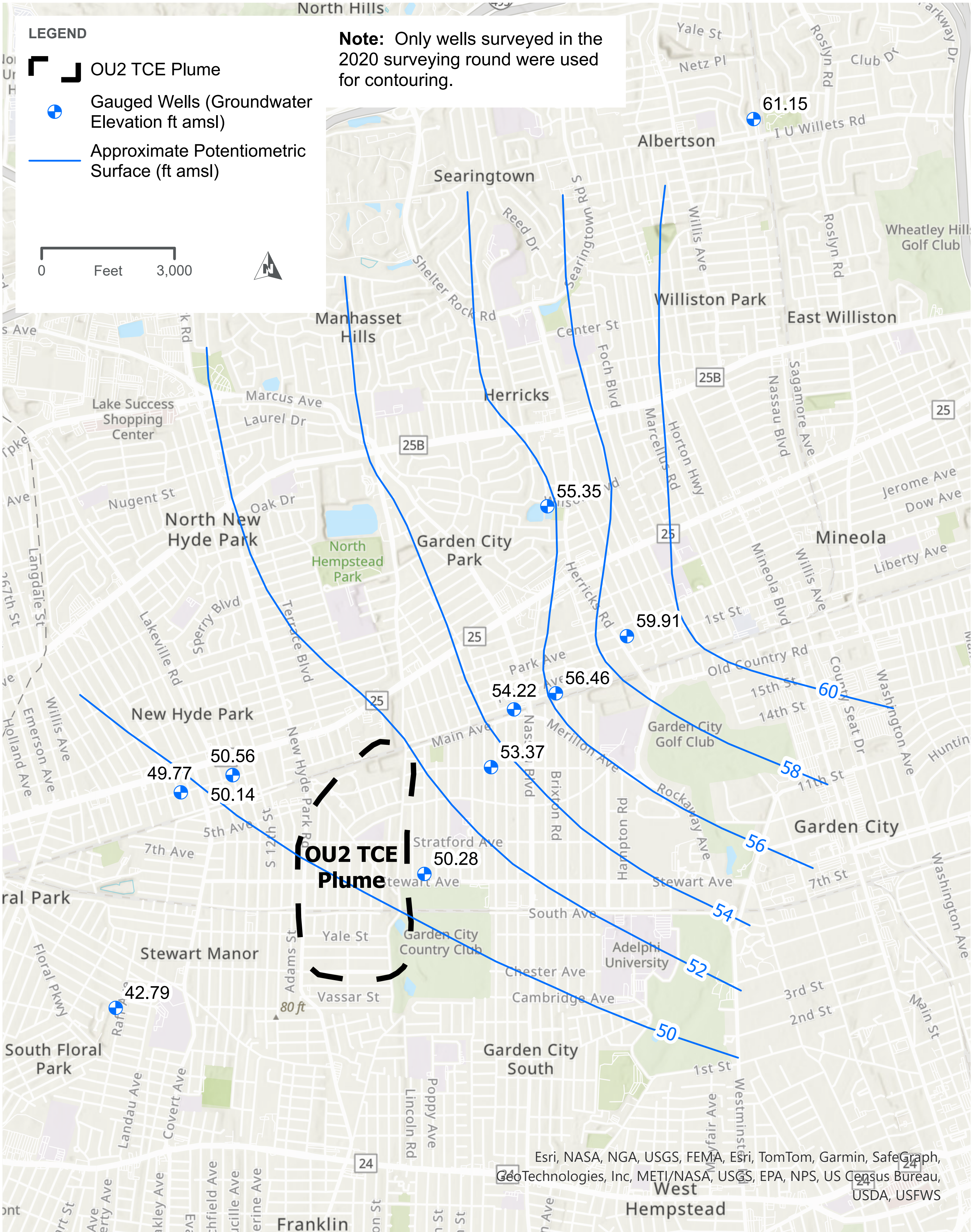
FIGURE 3-6

PIEZOMETRIC SURFACE – UPPER GLACIAL AQUIFER – DECEMBER 3, 2019

FULTON AVE SUPERFUND SITE OU2

FIGURE 3-7

HDR APTIM
a Joint Venture

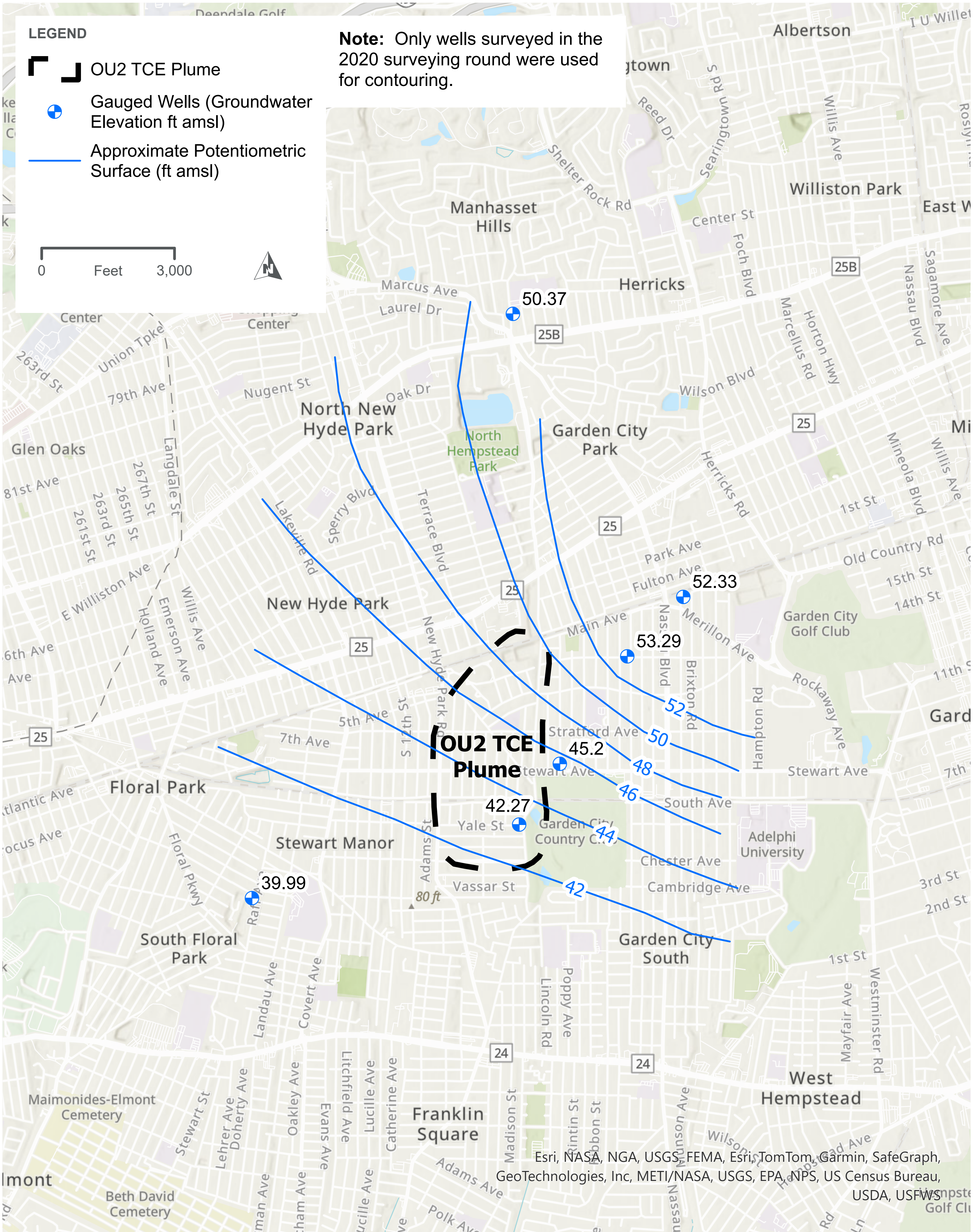


HDR APTIM
a Joint Venture

PIEZOMETRIC SURFACE – SHALLOW MAGOTHY – AUGUST 27, 2019

FULTON AVE SUPERFUND SITE OU2

FIGURE 3-8A



HDR APTIM
a Joint Venture

PIEZOMETRIC SURFACE – DEEP MAGOTHY – AUGUST 27, 2019

FULTON AVE SUPERFUND SITE OU2

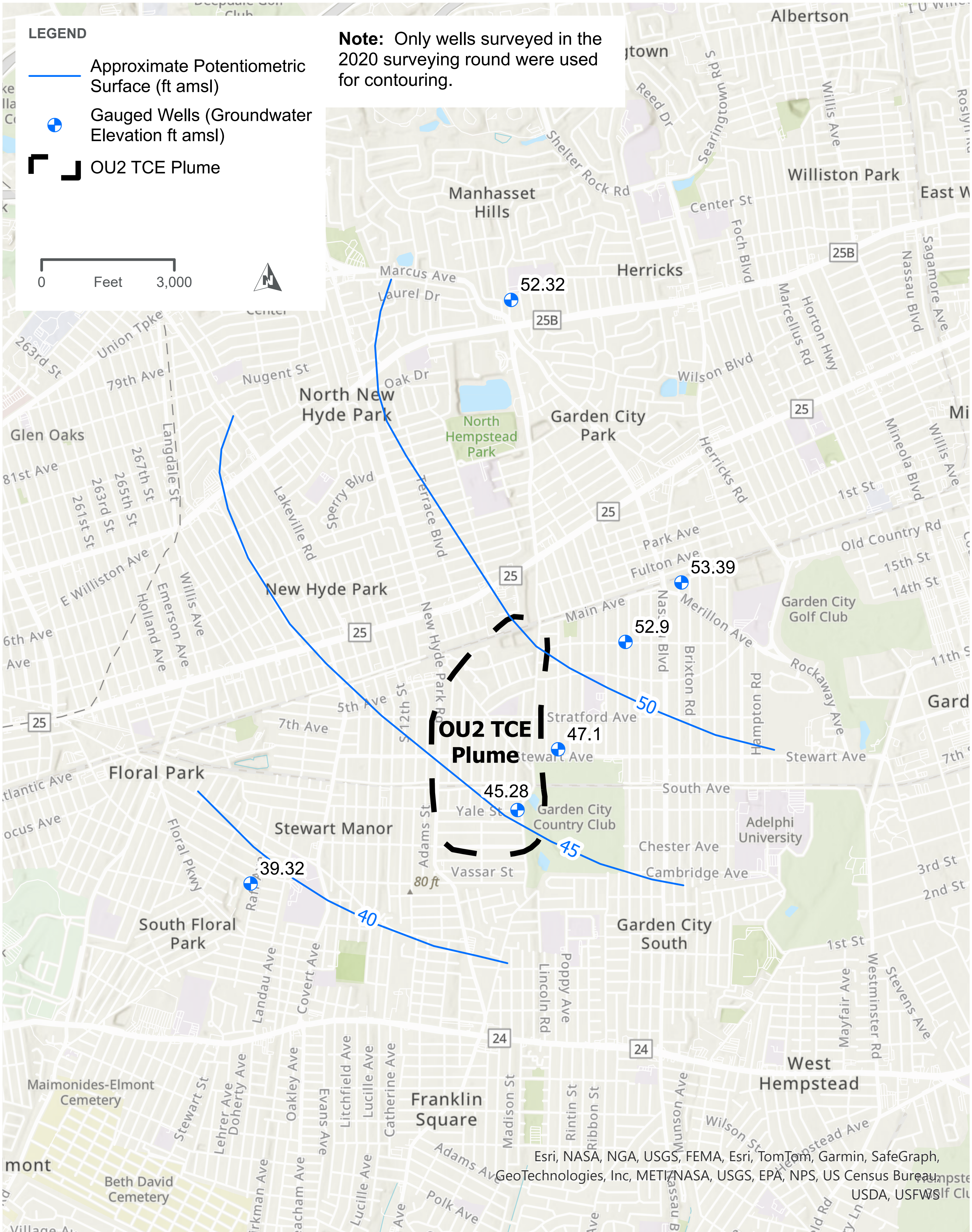
FIGURE 3-8B

HDR APTIM
a Joint Venture

PIEZOMETRIC SURFACE – SHALLOW MAGOTHY – DECEMBER 3, 2019

FULTON AVE SUPERFUND SITE OU2

FIGURE 3-9A

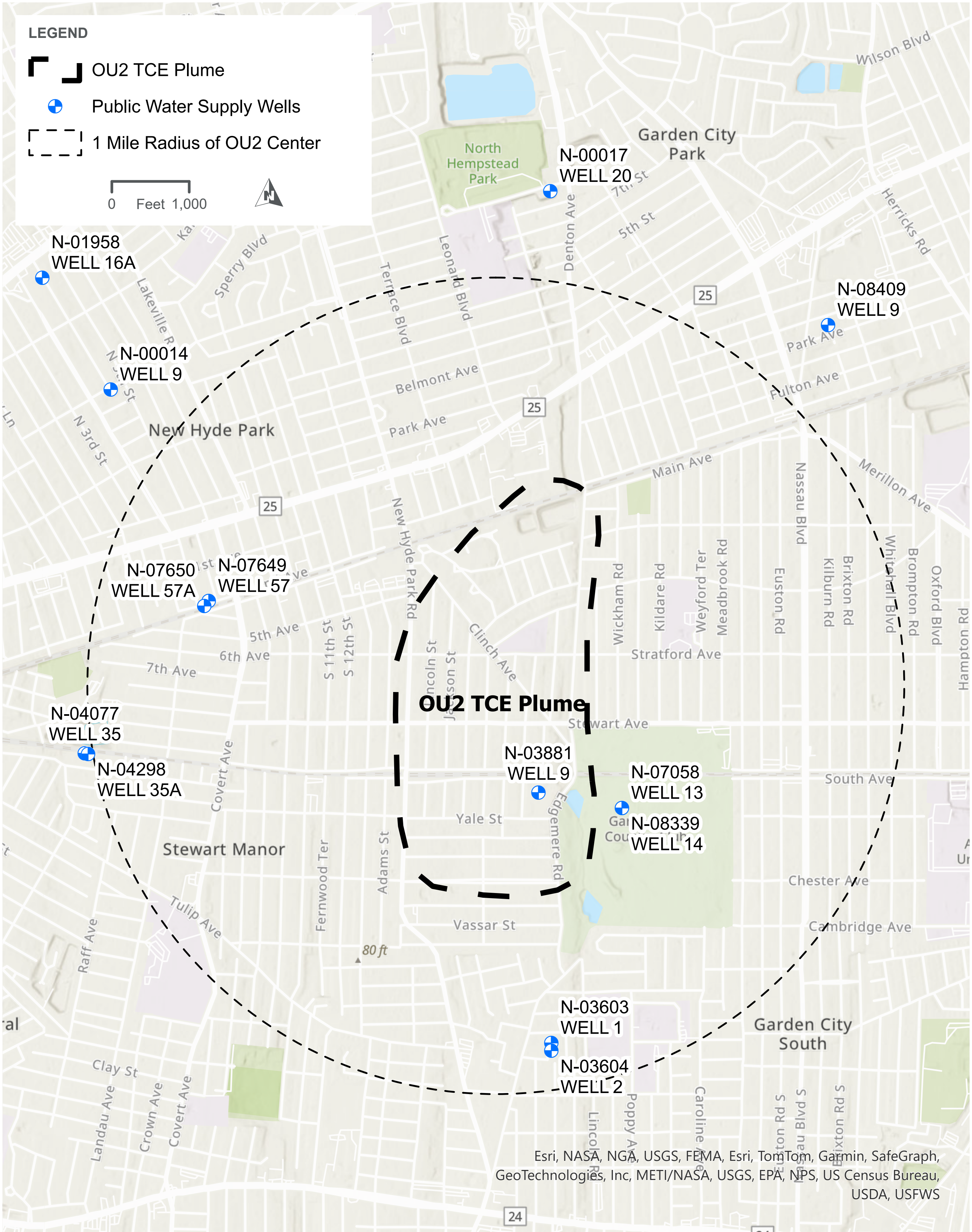


PIEZOMETRIC SURFACE – DEEP MAGOTHY – DECEMBER 3, 2019

FULTON AVE SUPERFUND SITE OU2

HDR APTIM
a Joint Venture

FIGURE 3-9B



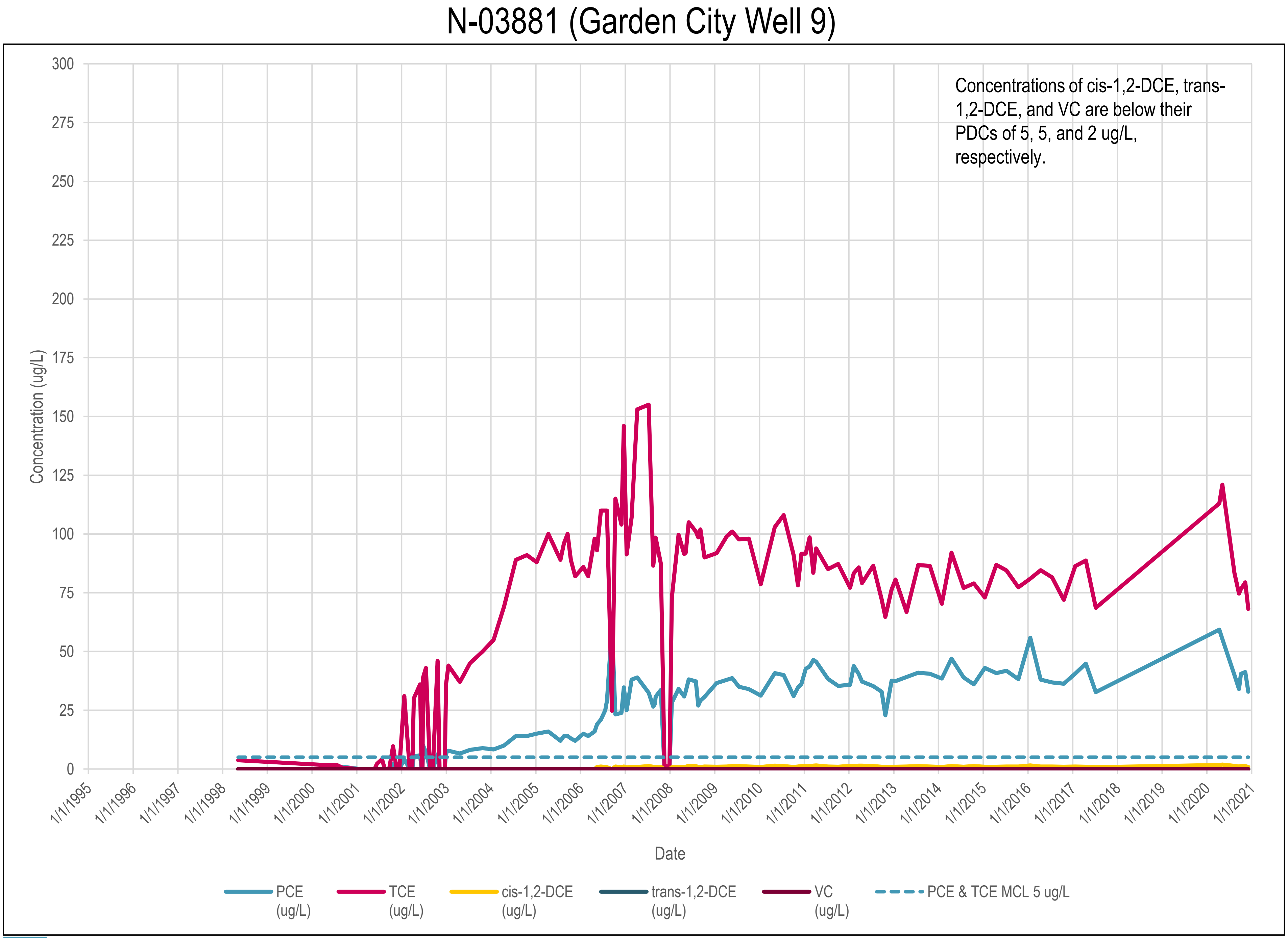
HDR APTIM
a Joint Venture

NEARBY PUBLIC WATER SUPPLY WELLS

FULTON AVE SUPERFUND SITE OU2

FIGURE 3-10

PATH: \\NJ-MAHWAH\ACTIVEPROJECTS\6706\20000051\10042584\7.0_GIS_MODELS\7.2_WIP\MAP_DOCS\DRAFT\2023_RI\2023_RI.APRX - USER: HROSADO - DATE: 12/3/2024



HDR APTIM
a Joint Venture

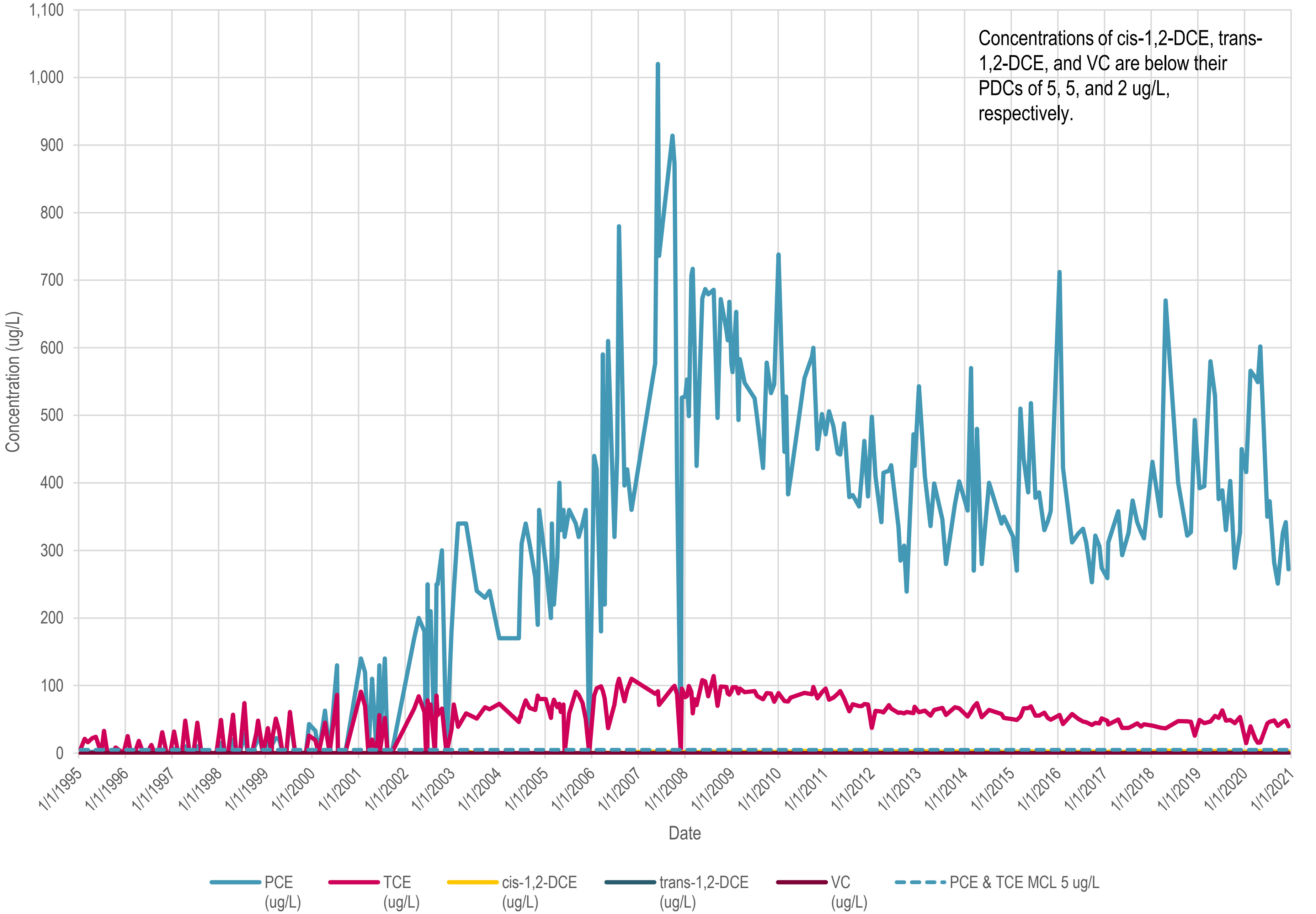
PATH: \\nj-mahwah\ActiveProjects\6706\20000051\10042584\4.0_Data_Ref_Info\4.2_WIP\Analysis Outputs\VOCs_TrendCharts

PUBLIC WATER SUPPLY WELL CONCENTRATION VOC N-03881

FULTON AVE SUPERFUND SITE OU2

FIGURE 3-11

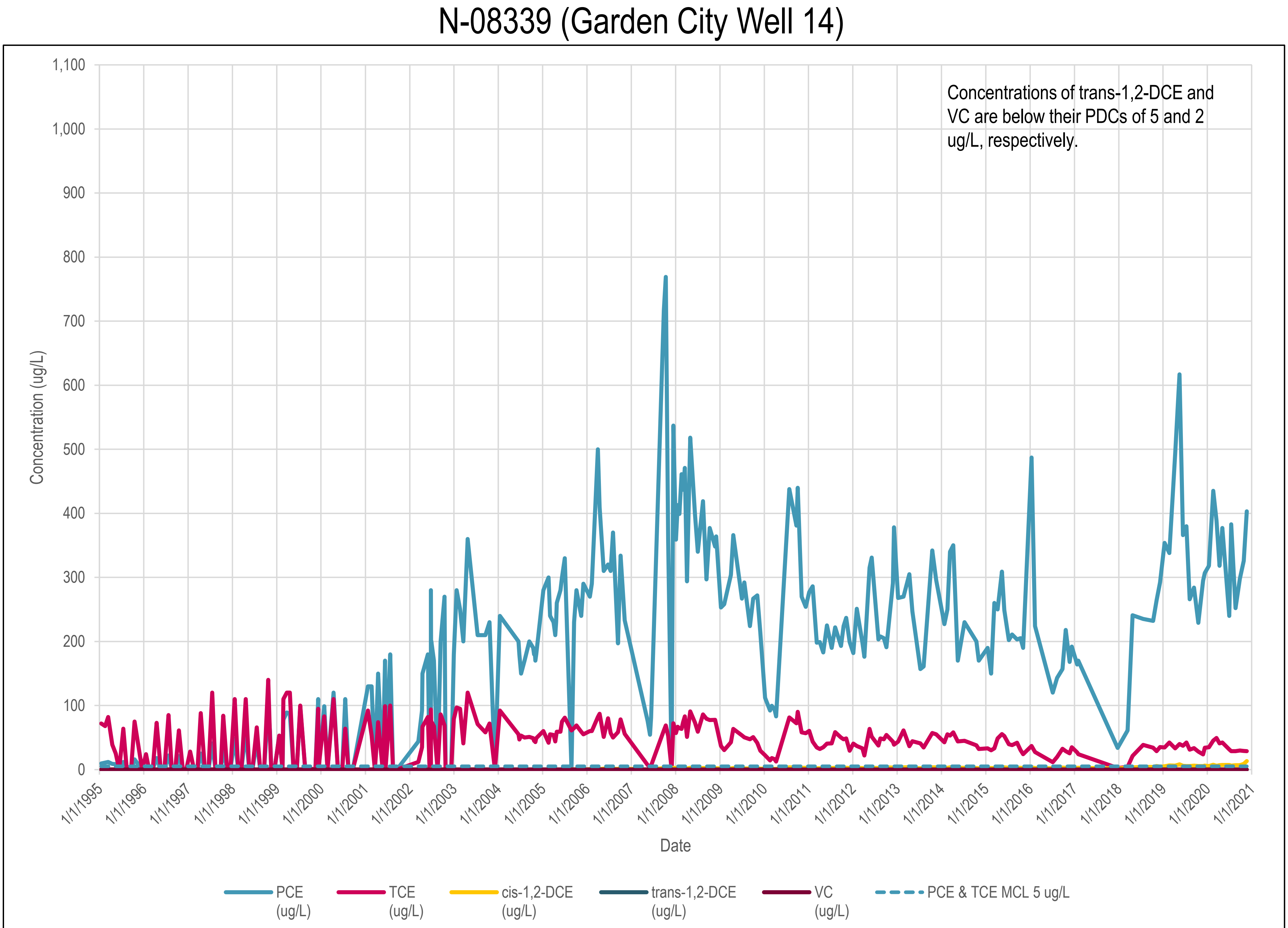
N-07058 (Garden City Well 13)



HDR APTIM
a Joint Venture

PUBLIC WATER SUPPLY WELL CONCENTRATION VOC N-07058
FULTON AVE SUPERFUND SITE OU2
FIGURE 3-12

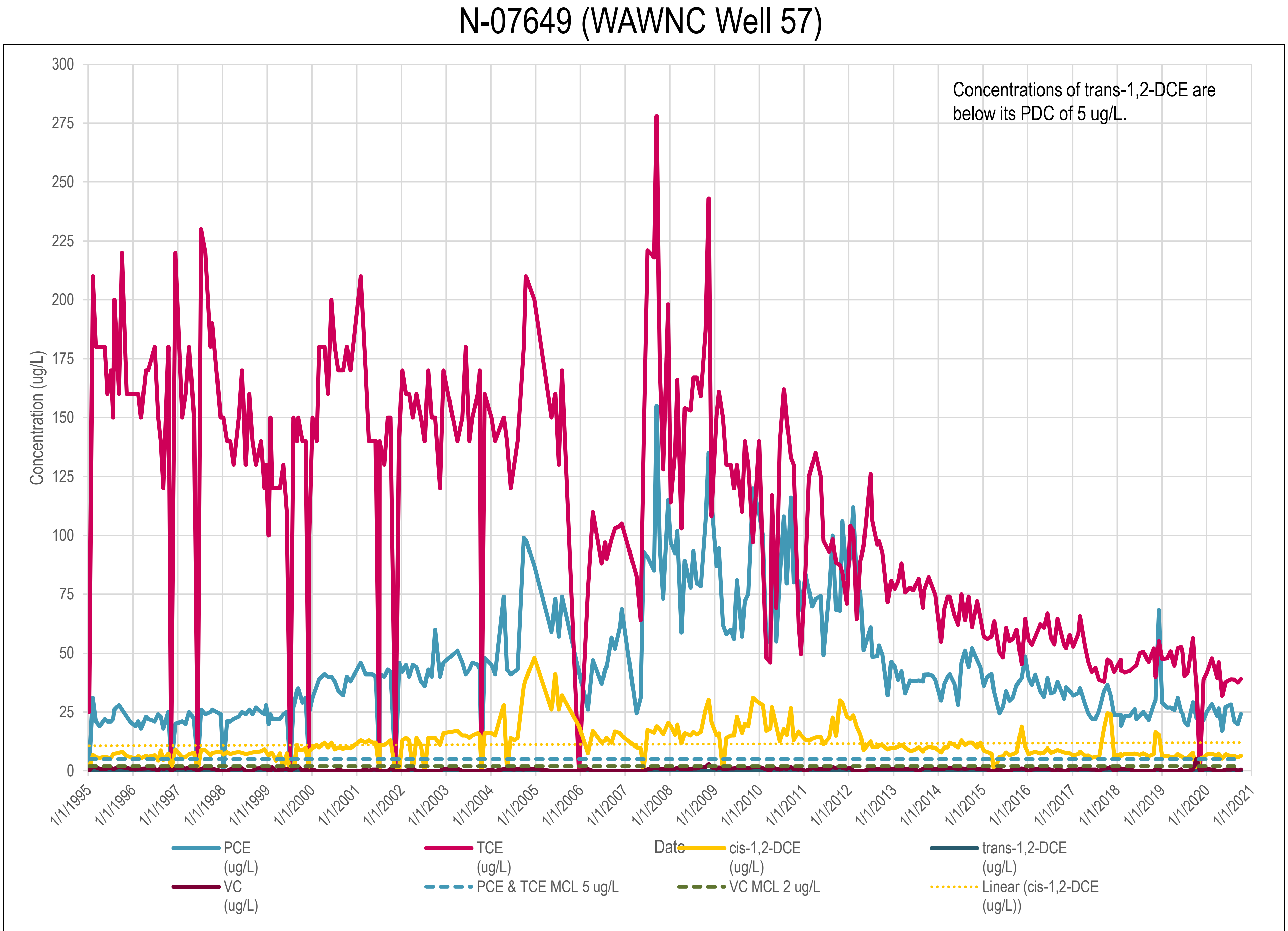
PATH: \\nj-mahwah\ActiveProjects\6706\20000051\10042584\4.0_Data_Ref_Info\4.2_WIP\Analysis Outputs\VOCs_TrendCharts



HDR APTIM
a Joint Venture

PUBLIC WATER SUPPLY WELL CONCENTRATION VOC N-08339
FULTON AVE SUPERFUND SITE OU2
FIGURE 3-13

PATH: \\nj-mahwah\ActiveProjects\6706\20000051\10042584\4.0_Data_Ref_Info\4.2_WIP\Analysis Outputs\VOCs_TrendCharts

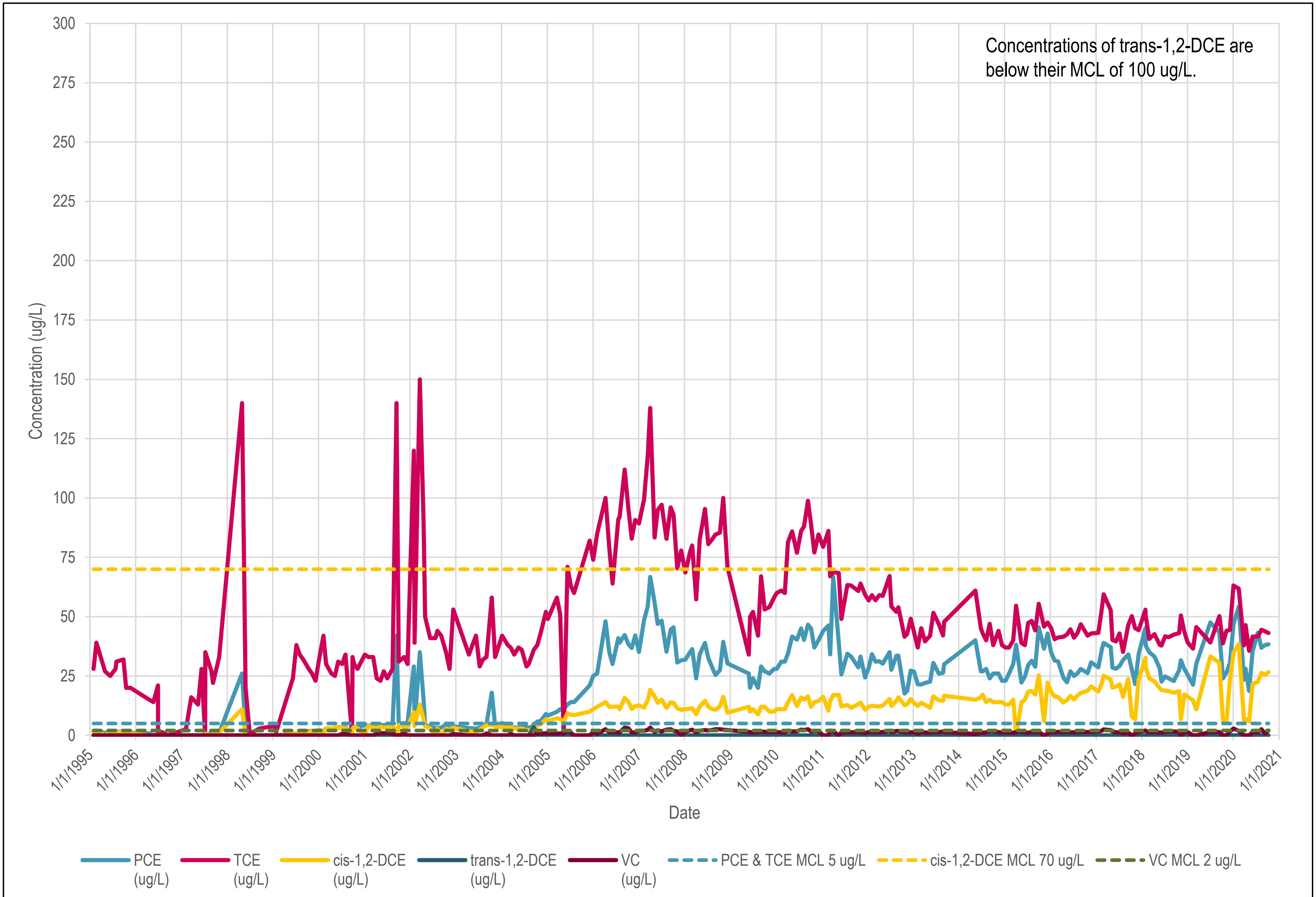


HDR APTIM
a Joint Venture

PUBLIC WATER SUPPLY WELL CONCENTRATION VOC N-07649
FULTON AVE SUPERFUND SITE OU2
FIGURE 3-14

PATH: \\nj-mahwah\ActiveProjects\6706\20000051\10042584\4.0_Data_Ref_Info\4.2_WIP\Analysis Outputs\VOCs_TrendCharts

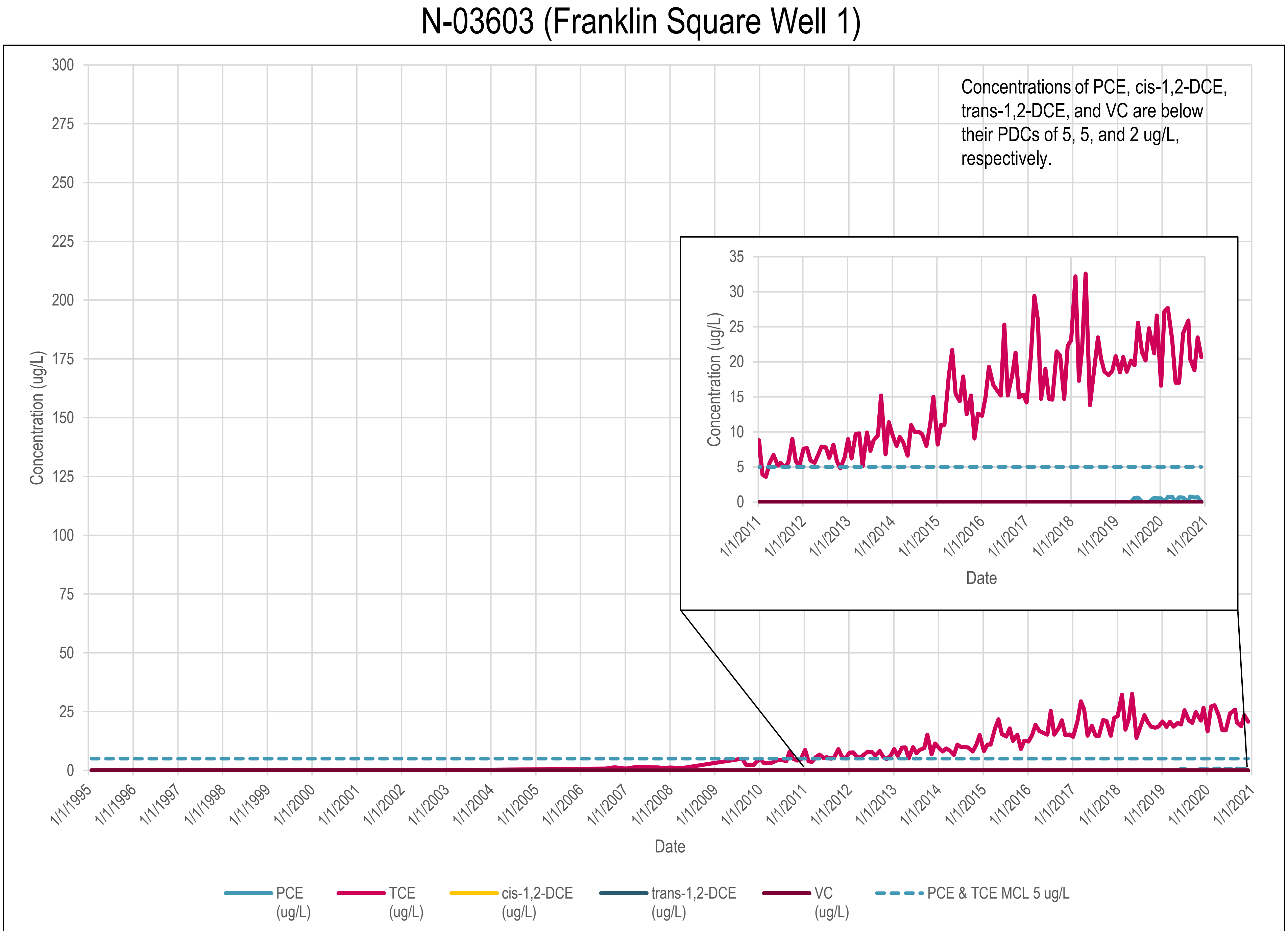
N-07650 (WAWNC Well 57A)



HDR APTIM
a Joint Venture

PUBLIC WATER SUPPLY WELL CONCENTRATION VOC N-07650
FULTON AVE SUPERFUND SITE OU2
FIGURE 3-15

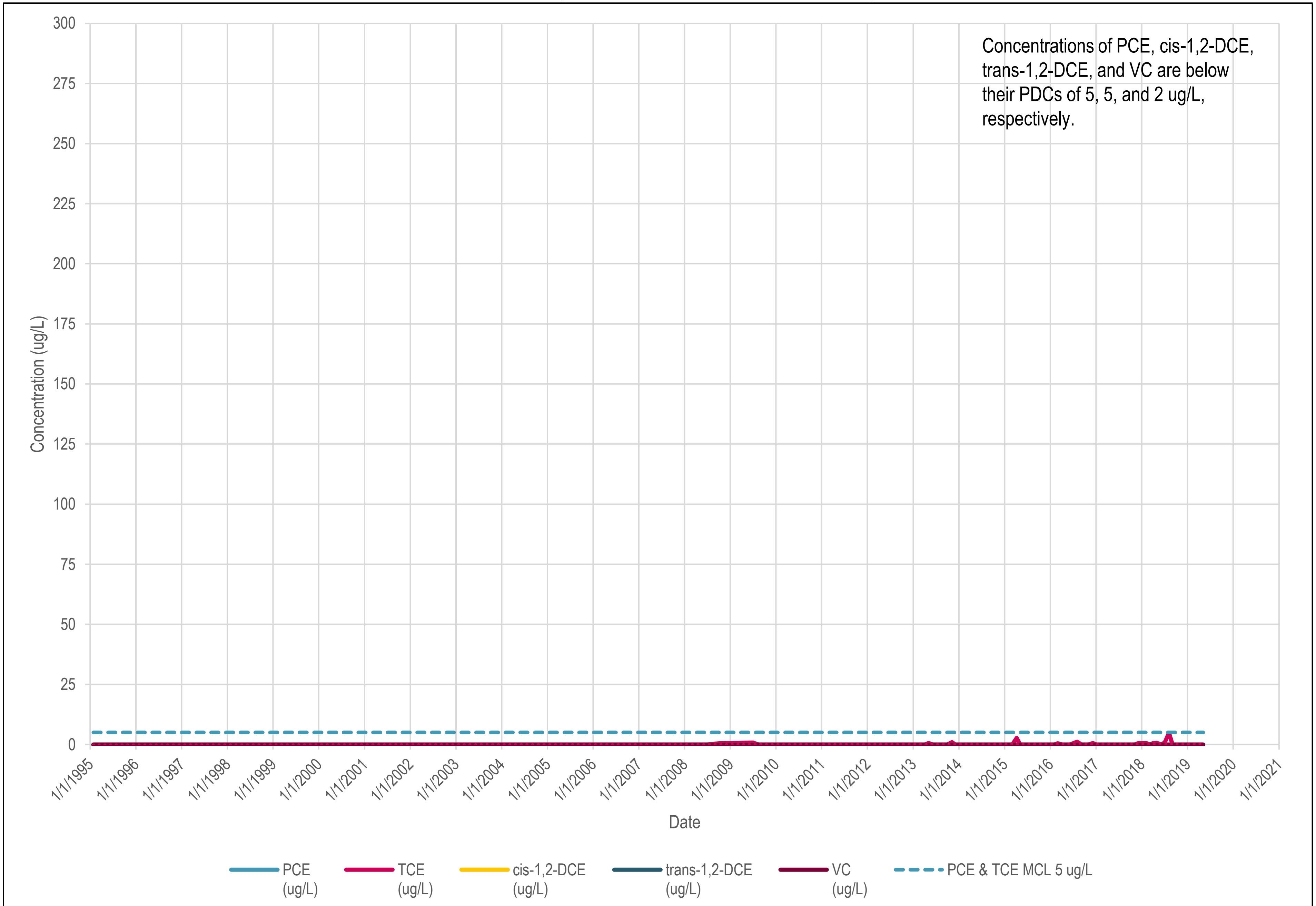
PATH: \\nj-mahwah\ActiveProjects\6706\20000051\10042584\4.0_Data_Ref_Info\4.2_WIP\Analysis Outputs\VOCs_TrendCharts



HDR APTIM
a Joint Venture

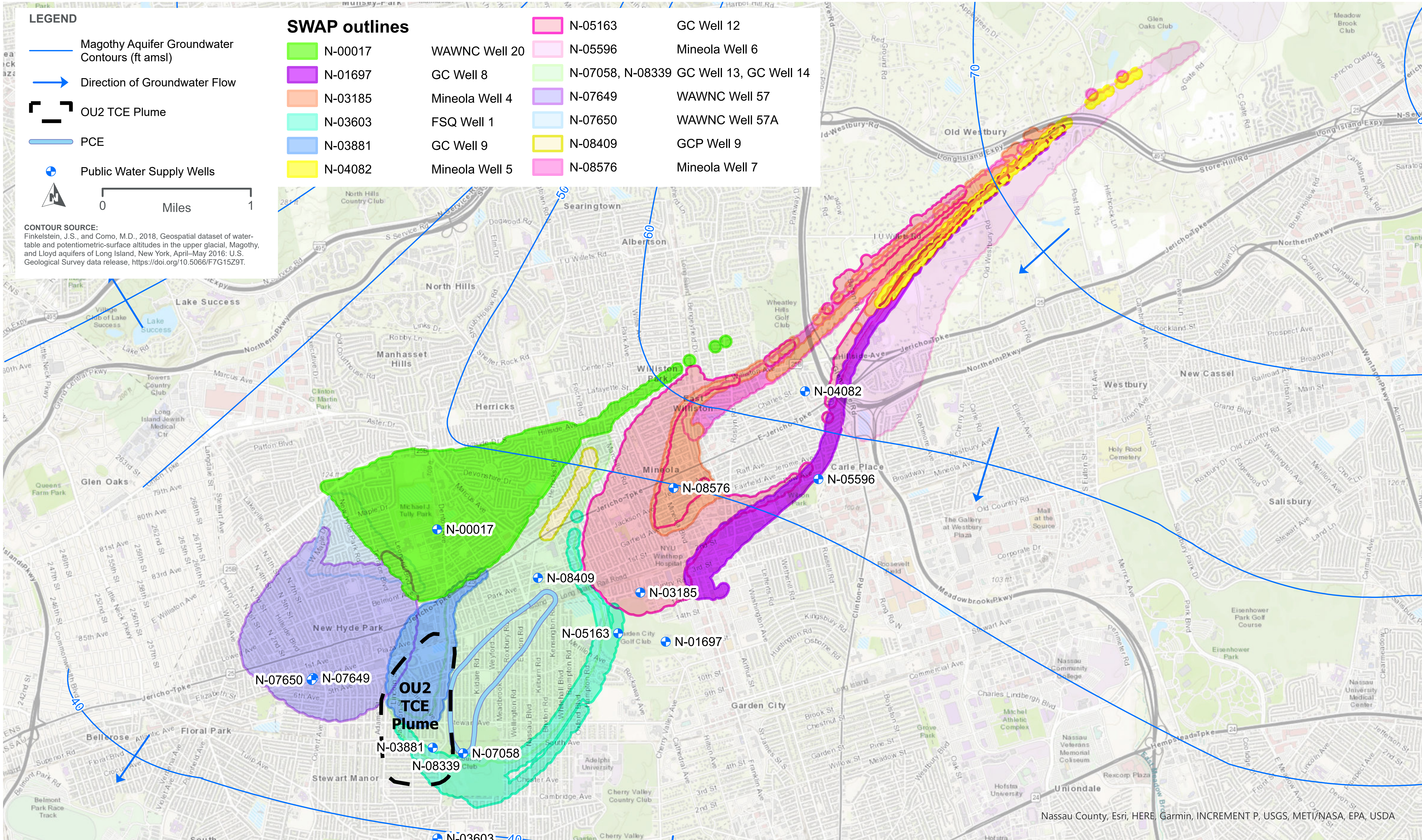
PUBLIC WATER SUPPLY WELL CONCENTRATION VOC N-03603
FULTON AVE SUPERFUND SITE OU2
FIGURE 3-16

N-03604 (Franklin Square Well 2)



HDR APTIM
a Joint Venture

PUBLIC WATER SUPPLY WELL CONCENTRATION VOC N-03604
FULTON AVE SUPERFUND SITE OU2
FIGURE 3-17



HDR APTIM
a Joint Venture

NASSAU COUNTY DEPARTMENT OF HEALTH SOURCE WATER ASSESSMENT PROGRAM (SWAP) MAPS

FULTON AVE SUPERFUND SITE OU2

FIGURE 3-18

PATH: \\NJ-MAHWAH\ACTIVEPROJECTS\6706\20000051\10042584\7.0_GIS_MODELS\7.2_WIP\MAP_DOCS\DRAFT\2023_RI\2023_RI.APRX - USER: HROSADO - DATE: 6/17/2024

HDR APTIM
a Joint Venture

SURFACE WATER AND RECHARGE LOCATIONS

FULTON AVE SUPERFUND SITE OU2

FIGURE 3-19

N-00017		9/4/2019	12/12/2019
Analyte	PDCs		
Metals			
Sodium	20000	35000	32800
VOCs			
Tetrachloroethene (PCE)	5	7.2	6.8

MW-4 ZOE		9/4/2019
Analyte	PDCs	
Metals		
Sodium	20000	38400

N-10486		9/6/2019	12/11/2019
Analyte	PDCs		
Metals			
Manganese	300	4520 D	2700
Sodium	20000	87800	94600
VOCs			
Tetrachloroethene (PCE)	5	6.2	

N-11733		9/6/2019	12/10/2019
Analyte	PDCs		
Metals			
Iron	300	306	
Sodium	20000	58500	56400

N-11739		9/6/2019	9/6/2019 (Dup)	12/12/2019
Analyte	PDCs			
Metals				
Sodium	20000	55400	54900	29200

N-11735		9/6/2019	12/10/2019
Analyte	PDCs		
Metals			
Iron	300		3400
Sodium	20000	35400	32800
VOCs			
Tetrachloroethene (PCE)	5	5.4	

N-11659		9/3/2019	12/10/2019
Analyte	PDCs		
Metals			
Iron	300	25600	39000
Manganese	300	385	420
VOCs			
Tetrachloroethene (PCE)	5	390 D	

N-05603		9/3/2019	12/11/2019
Analyte	PDCs		
Metals			
Sodium	20000	27000	23400
VOCs			
Tetrachloroethene (PCE)	5	80 D	73

N-11865		9/6/2019	12/11/2019
Analyte	PDCs		
Metals			
Iron	300	5910	10000

N-02487		9/3/2019
Analyte	PDCs	
Metals		
Sodium	20000	20800

N-03732		12/12/2019
Analyte	PDCs	
VOCs		
Tetrachloroethene (PCE)	5	200

N-08248		9/3/2019	12/11/2019
Analyte	PDCs		
VOCs			
Tetrachloroethene (PCE)	5	9.1	9

MW-03 ROS		8/28/2019	8/29/2019 (Dup)	12/11/2019
Analyte	PDCs			
Metals				
Iron	300	14100	14600	34000
VOCs				
1,1,1-Trichloroethane	5	5.4 J	6.2 J	5.3
cis-1,2-Dichloroethene	5	210	220	320
Naphthalene	10			860 NJD
o-Xylene	5	12 J	13 J	19
Tetrachloroethene (PCE)	5	13 J	14 J	25
Trichloroethene (TCE)	5	590	580	830
1,2,3-Trimethyl Benzene	5	73 JN	81 JN	24 NJD
1,2,4-Trimethylbenzene	5			140 NJD
1,3,5-Trimethylbenzene	5			200 NJD
O-Cymene	5	450 JN	450 JN	
Sec-Butylbenzene	5	190 JN		230 NJD

N-08576		9/3/2019	12/12/2019
Analyte	PDCs		
VOCs			
Tetrachloroethene (PCE)	5	15	17
Trichloroethene (TCE)	5	7.8	8.9

N-08409		9/3/2019	12/11/2019
Analyte	PDCs		
Metals			
Sodium	20000	24600	23500
VOCs			
Tetrachloroethene (PCE)	5	70 D	74
Trichloroethene (TCE)	5	5.5	6.7

N-10330		9/5/2019	12/12/2019
Analyte	PDCs		
Metals			
Iron	300	13200	11000
Manganese	300	310	310
Sodium	20000	99900	90900
VOCs			
cis-1,2-Dichloroethene	5	60 D	710
Isopropylbenzene	5		10
N-Propylbenzene	5		5.9 NJD
Sec-Butylbenzene	5		5.7 NJD
Tetrachloroethene (PCE)	5	910 D	160
Trichloroethene (TCE)	5	300 D	130

GCP18S		9/5/2019	12/12/2019
Analyte	PDCs		
Metals			
Iron	300	14200	22000
Manganese	300	890	390
Sodium	20000	44200	38600
VOCs			
cis-1,2-Dichloroethene	5		11
Ethylbenzene	5		15
Isopropylbenzene	5		9
1,2,3-Trimethyl Benzene	5		15 NJ
1,2,4-Trimethylbenzene	5		41 NJ
1,3,5-Trimethylbenzene	5		6.8 NJ
N-Propylbenzene	5		7.3 NJ

N-03185		9/3/2019	12/12/2019
Analyte	PDCs		
Metals			
Sodium	20000	34600	32600
VOCs			
Tetrachloroethene (PCE)	5	12	17
Trichloroethene (TCE)	5	26 D	32

DSB02RS		8/29/2019	12/6/2019
Analyte	PDCs		
Metals			
Iron	300	405000 D	120000
Manganese	300	8560 D	1700
Sodium	20000	36000	62600
VOCs			
cis-1,2-Dichloroethene	5		5.4
Tetrachloroethene (PCE)	5	30 D	11
Trichloroethene (TCE)	5	23 D	5.8

N-10487		8/28/2019	12/6/2019
Analyte	PDCs		
Metals			
Iron	300	1500	470
Sodium	20000	32300	70500

N-01697		9/4/2019	12/11/2019
Analyte	PDCs		
VOCs			
Trichloroethene (TCE)	5	7.4	7.7

MW-15A		9/3/2019	12/9/2019
Analyte	PDCs		
Metals			
Iron	300	2530	9600
Sodium	20000	49400	44100
VOCs			
Tetrachloroethene (PCE)	5	61 D	49

MW-25A		9/5/2019	12/6/2019
Analyte	PDCs		
Metals			
Iron	300	3820	2700
Sodium	20000	21700	
VOCs			
Tetrachloroethene (PCE)	5	23 D	22
Trichloroethene (TCE)	5	26 D	27

N-11171		8/28/2019	12/6/2019
Analyte	PDCs		
Metals			
Iron	300	28000	11000
Sodium	20000	31800	23500
VOCs			
Tetrachloroethene (PCE)	5		6.8
Trichloroethene (TCE)	5		13

MW-21C		9/9/2019	12/5/2019
Analyte	PDCs		
Metals			
Iron	300	6470	20000
Sodium	20000	102000	38600
VOCs			
cis-1,2-Dichloroethene	5	32 D	26
Tetrachloroethene (PCE)	5	57 D	160
Trichloroethene (TCE)	5	8.5 J-	16

MW-21D		9/9/2019	12/5/2019
Analyte	PDCs		
Metals			
Iron	300	21200	36000
VOCs			
Tetrachloroethene (PCE)	5	87 D	100
Trichloroethene (TCE)	5		6.2

N-07058		9/4/2019	12/11/2019
Analyte	PDCs		
VOCs			
Tetrachloroethene (PCE)	5	250 D	320
Trichloroethene (TCE)	5	36 D	37

N-08339		9/4/2019	12/11/2019
Analyte	PDCs		
Metals			
Sodium	20000	21500	
VOCs			
cis-1,2-Dichloroethene	5	5.1	5.2
Tetrachloroethene (PCE)	5	180 D	200
Trichloroethene (TCE)	5	22 D	24

MW-26G		9/5/2019	12/9/2019	12/9/2019 (Dup)
Analyte	PDCs			
Metals				
Iron	300	402	1500	1600
Sodium	20000		21700	
VOCs				
Tetrachloroethene (PCE)	5	7.9	5.5	
Trichloroethene (TCE)	5	23 D	25	21

MW-26F		9/5/2019	12/9/2019
Analyte	PDCs		
Metals			
Iron	300	831	1200
Sodium	20000	23800	
VOCs			
cis-1,2-Dichloroethene	5	5.6	
Tetrachloroethene (PCE)	5	17	14
Trichloroethene (TCE)	5	17	15

N-03603		9/3/2019	12/12/2019
Analyte	PDCs		
VOCs			
Trichloroethene (TCE)	5	13	28

MW-23C		9/3/2019	12/9/2019
Analyte	PDCs		
Metals			
Iron	300	379000 D	13000
Manganese	300	2170 D	
Sodium	20000	33900	55600
VOCs			
Trichloroethene (TCE)	5	26 D	12

N-06745		9/4/2019
Analyte	PDCs	
Metals		
Sodium	20000	21700
VOCs		
Tetrachloroethene (PCE)	5	120 D
Trichloroethene (TCE)	5	7.8

N-03881		9/4/2019
Analyte	PDCs	
VOCs		
Tetrachloroethene (PCE)	5	42 D
Trichloroethene (TCE)	5	79 D

MW-20C		9/3/2019	12/9/2019
Analyte	PDCs		
Metals			
Iron	300	17800	18000
Sodium	20000	57200	37300
Wet Chemistry			
Nitrogen, Ammonia (As N)	2000	2200	3500

N-04298		9/4/2019	12/12/2019
Analyte	PDCs		
Metals			
Sodium	20000	50300	49400
VOCs			
Trichloroethene (TCE)	5	5.1	

MW-24A		9/5/2019	12/11/2019
Analyte	PDCs		
Metals			
Iron	300	35000	13000
VOCs			
Tetrachloroethene (PCE)	5	19	20
Trichloroethene (TCE)	5	180 D	140

N-07650		9/4/2019	12/12/2019
Analyte	PDCs		
Metals			
Sodium	20000	36200	31600
VOCs			
1,1-Dichloroethane	5	16	16
1,1-Dichloroethene	5	6.2	6.8
cis-1,2-Dichloroethene	5	24 D	15
Tetrachloroethene (PCE)	5	33 D	12
Trichloroethene (TCE)	5	43 D	20

N-07649		9/4/2019	9/4/2019 (Dup)	12/12/2019	12/12/2019 (Dup)
Analyte	PDCs				
Metals					
Sodium	20000	30200	30700	29500	29200
VOCs					
cis-1,2-Dichloroethene	5	5.3	5.6	5.4	5.6
Tetrachloroethene (PCE)	5	18	24 D	20	19
Trichloroethene (TCE)	5	31 D	40 D	35	34

MW-9D		9/4/2019	12/4/2019	12/4/2019 (Dup)
Analyte	PDCs			
Metals				
Iron	300	4470		
Sodium	20000	99300	36200	36800

MW-9S		9/4/2019	12/4/2019
Analyte	PDCs		
Metals			
Iron	300	1100	700
Sodium	20000	117000	108000

MW-8D		9/4/2019	12/4/2019
Analyte	PDCs		
Metals			
Iron	300	14000	7200
Sodium	20000	28000	27600

MW-8S		9/4/2019	12/4/2019
Analyte	PDCs		
Metals			
Iron	300	1390	530
Sodium	20000	62200	67200

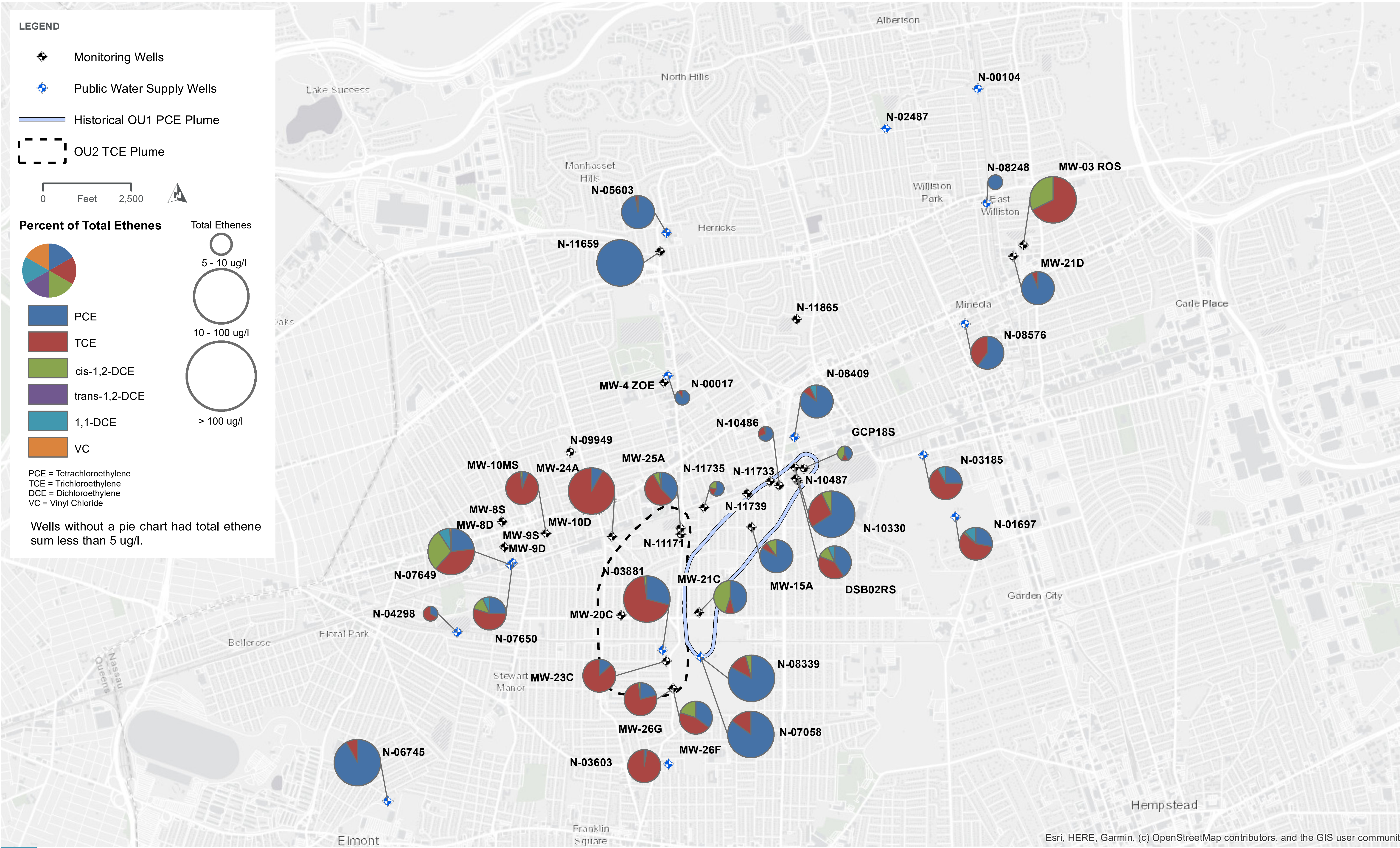
MW-10D		8/28/2019	12/5/2019
Analyte	PDCs		
Metals			
Iron	300	7890	3300
Sodium	20000	48900	48700

MW-10MS		8/28/2019	12/5/2019
Analyte	PDCs		
Metals			
Iron	300	338	6400
Sodium	20000	28800	25100
VOCs			
Trichloroethene (TCE)	5	41 D	

N-09949		9/4/2019	12/10/2019
Analyte	PDCs		
Metals			
Sodium	20000	55700	53100

HDR APTIM
a Joint Venture

PHASE 5 GROUNDWATER PDC EXCEEDANCES
FULTON AVE SUPERFUND SITE OU2
FIGURE 4-1

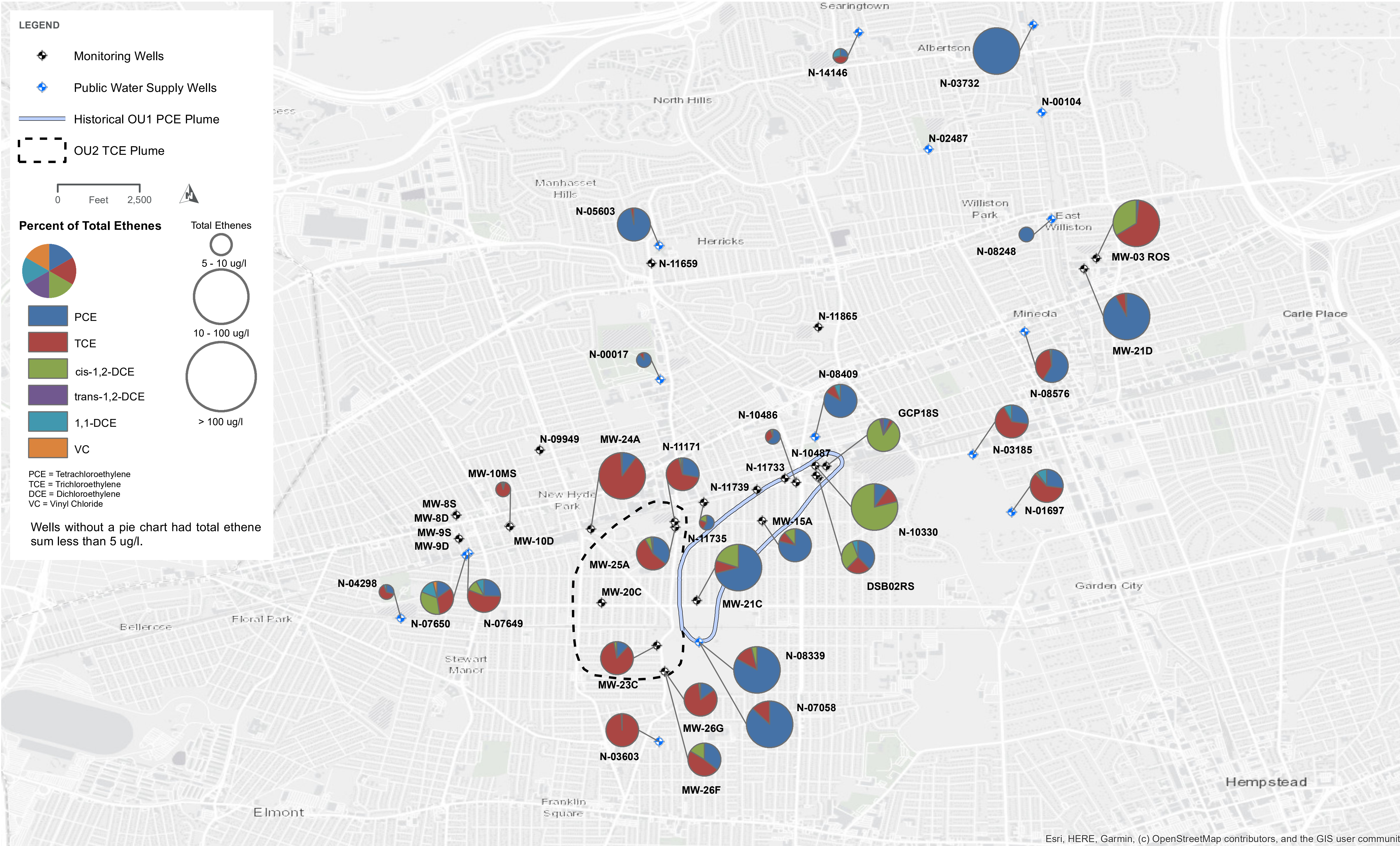


HDR APTIM
a Joint Venture

PHASE 5 TOTAL ETHENE PIE CHARTS - AUGUST/SEPTEMBER 2019

FULTON AVE SUPERFUND SITE OU2

FIGURE 4-2



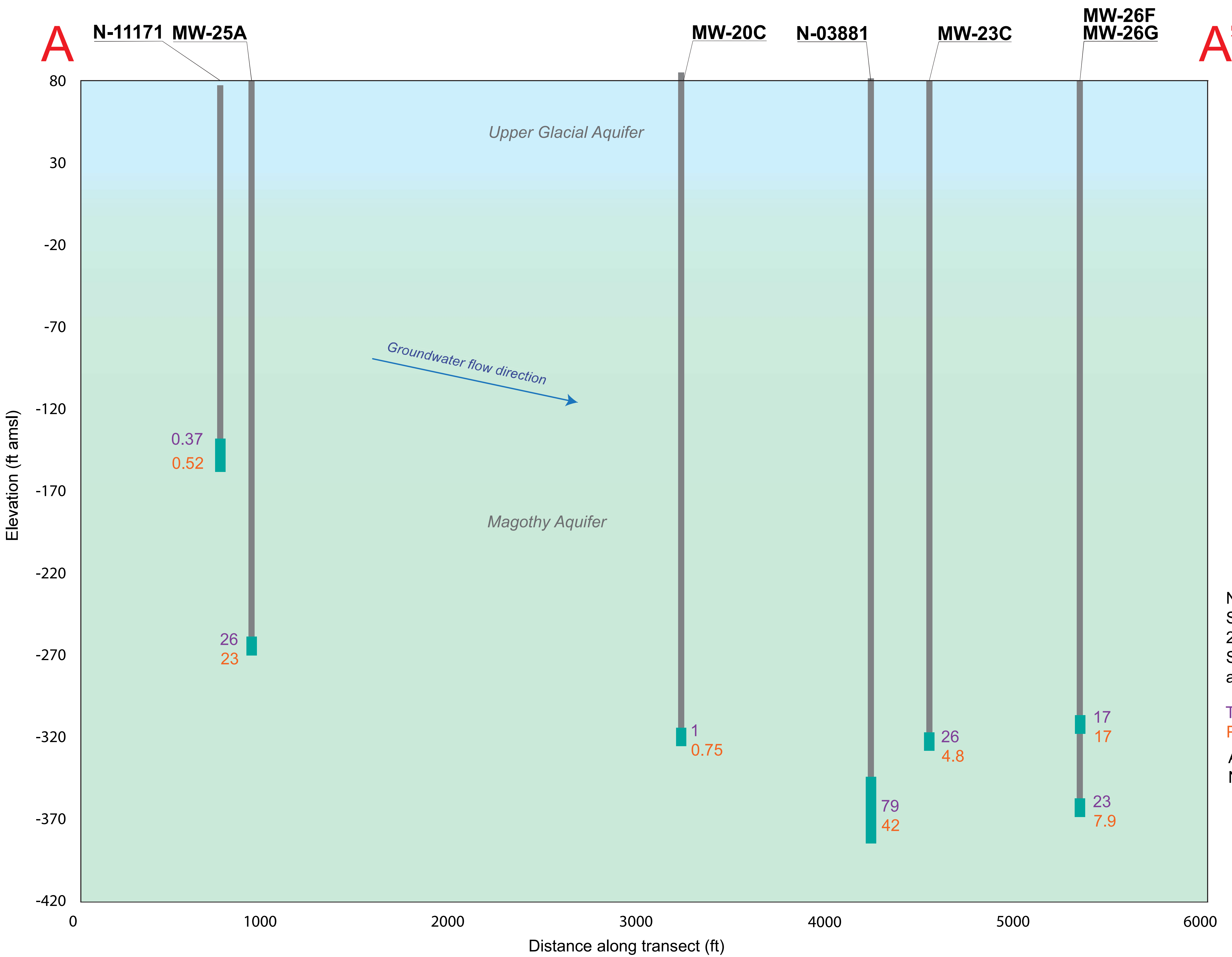
HDR APTIM
a Joint Venture

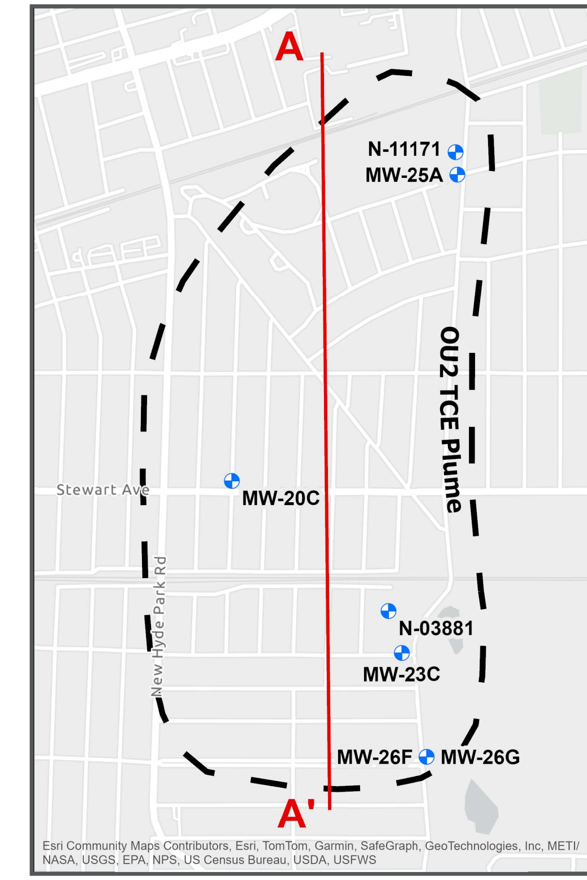
PHASE 5 TOTAL ETHENE PIE CHARTS- DECEMBER 2019

FULTON AVE SUPERFUND SITE OU2

FIGURE 4-3

PATH: \\NJ-MAHWAH\ACTIVEPROJECTS\6706\20000051\10042584\7.0_GIS_MODELS\7.2_WIP\MAP_DOCS\DRAFT\2023_RI\FIGURE_34_ETHENESPIECHARTS_WINTER2019_RI.MXD - USER: HROSADO - DATE: 6/17/2024





Notes:
Sampling results from August/September 2019 sampling of OU2 Plume wells.
Sampling results of Trichloroethene (TCE) and Tetrachloroethene (PCE) are shown.

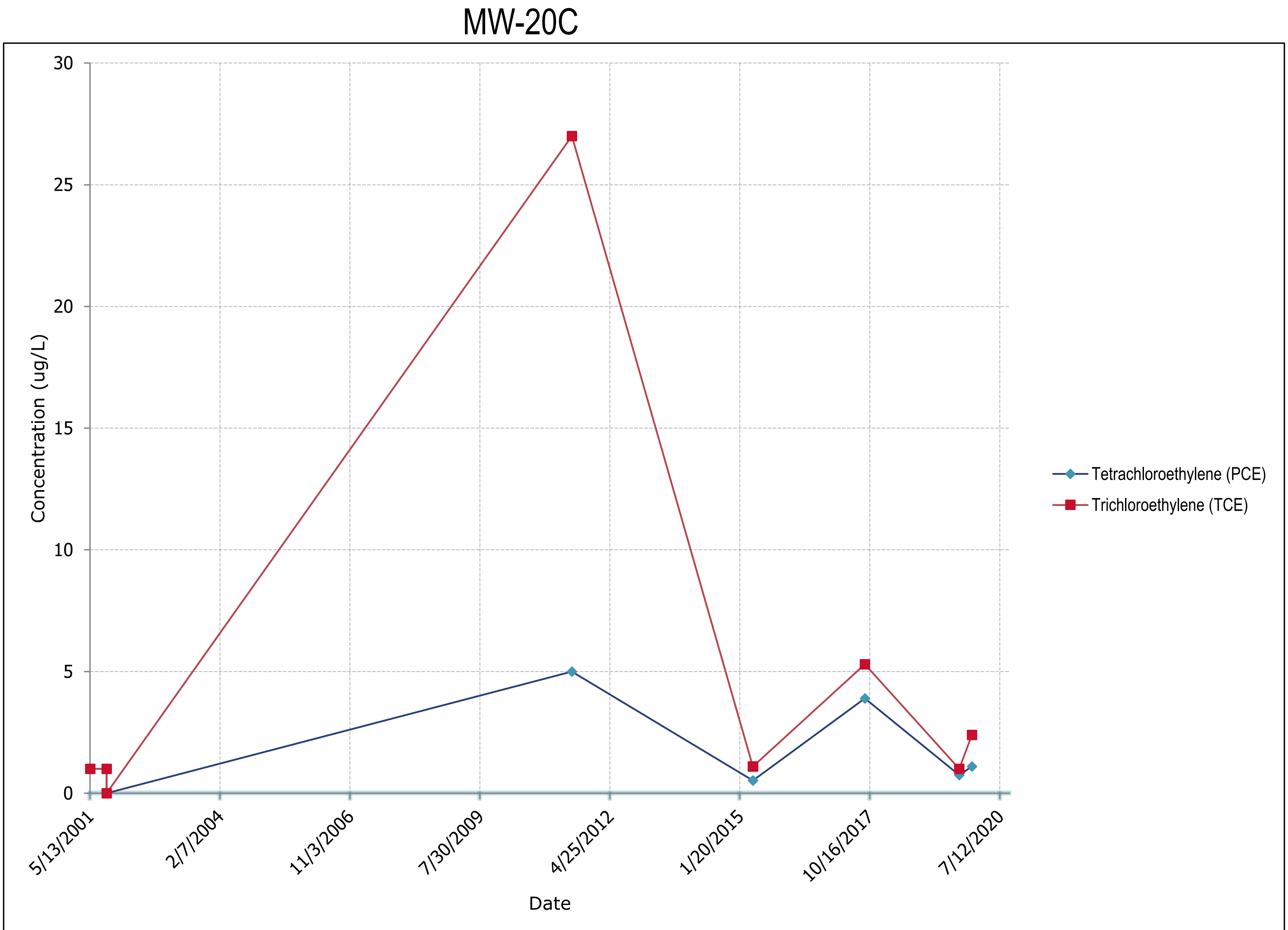
TCE Results (ug/l)
PCE Results (ug/l)

All wells are monitoring wells except for N-03881, which is a Public Water Supply well.

HDR APTIM
a Joint Venture

VERTICAL DISTRIBUTION OF CONTAMINANTS
FULTON AVE SUPERFUND SITE OU2
FIGURE 4-4

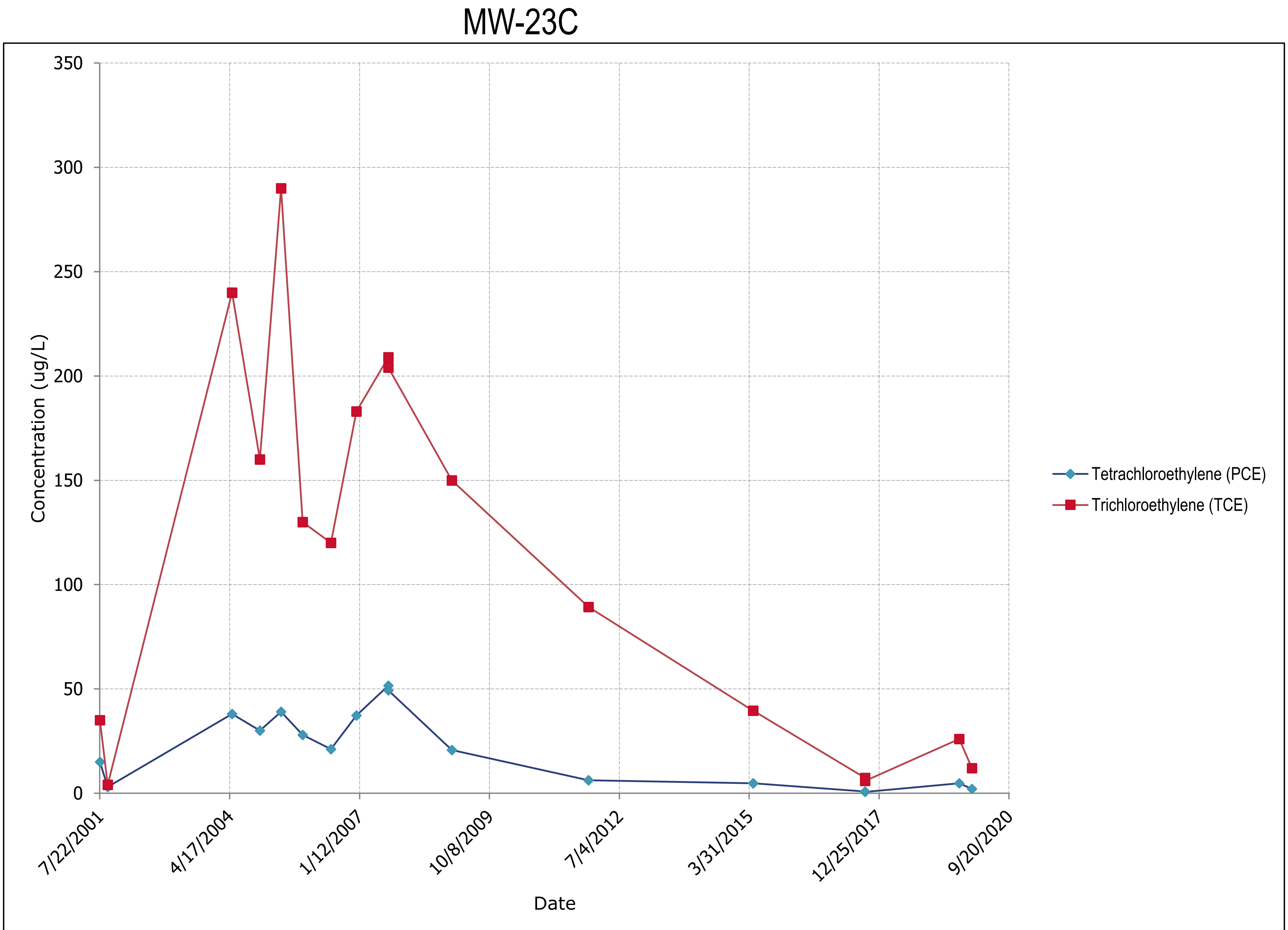
PATH: \\nj-mahwah\ActiveProjects\6706\20000051\10042584\7.0_GIS_Models\7.2_WIP\Map_Docs\Draft\2023_RI\Fulton X-Section.ai



HDR APTIM
a Joint Venture

PCE & TCE IN GROUNDWATER IN MONITORING WELL MW-20C -2001-2020
FULTON AVE SUPERFUND SITE OU2
FIGURE 4-5

PATH: \\nj-mahwah\ActiveProjects\6706\20000051\10042584\4.0_Data_Ref_Info\4.2_WIP\Analysis Outputs\VOCs_TrendCharts



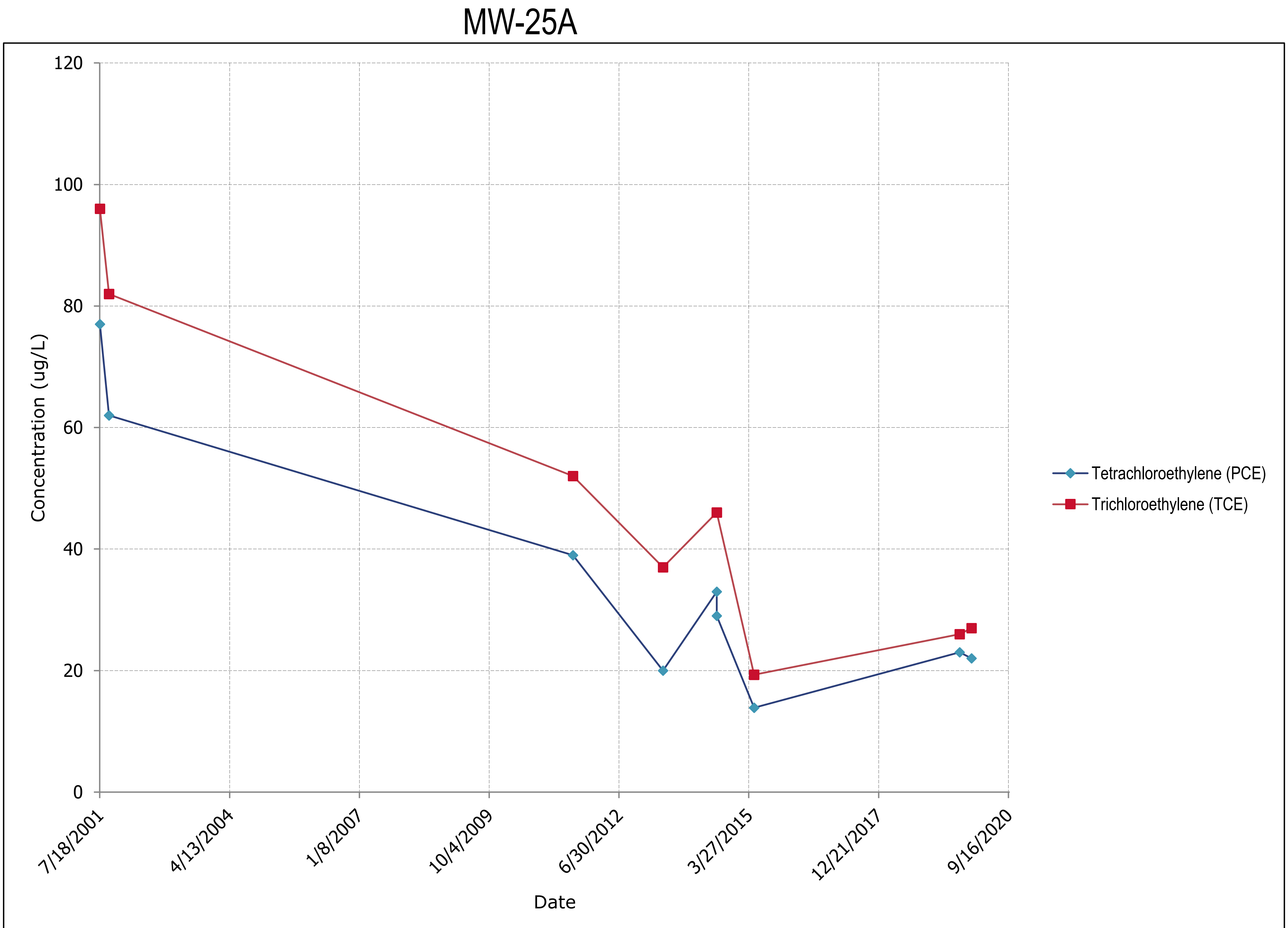
HDR APTIM
a Joint Venture

PCE & TCE IN GROUNDWATER IN MONITORING WELL MW-23C -2001-2020

FULTON AVE SUPERFUND SITE OU2

FIGURE 4-6

PATH: \\nj-mahwah\ActiveProjects\6706\20000051\10042584\4.0_Data_Ref_Info\4.2_WIP\Analysis Outputs\VOCs_TrendCharts

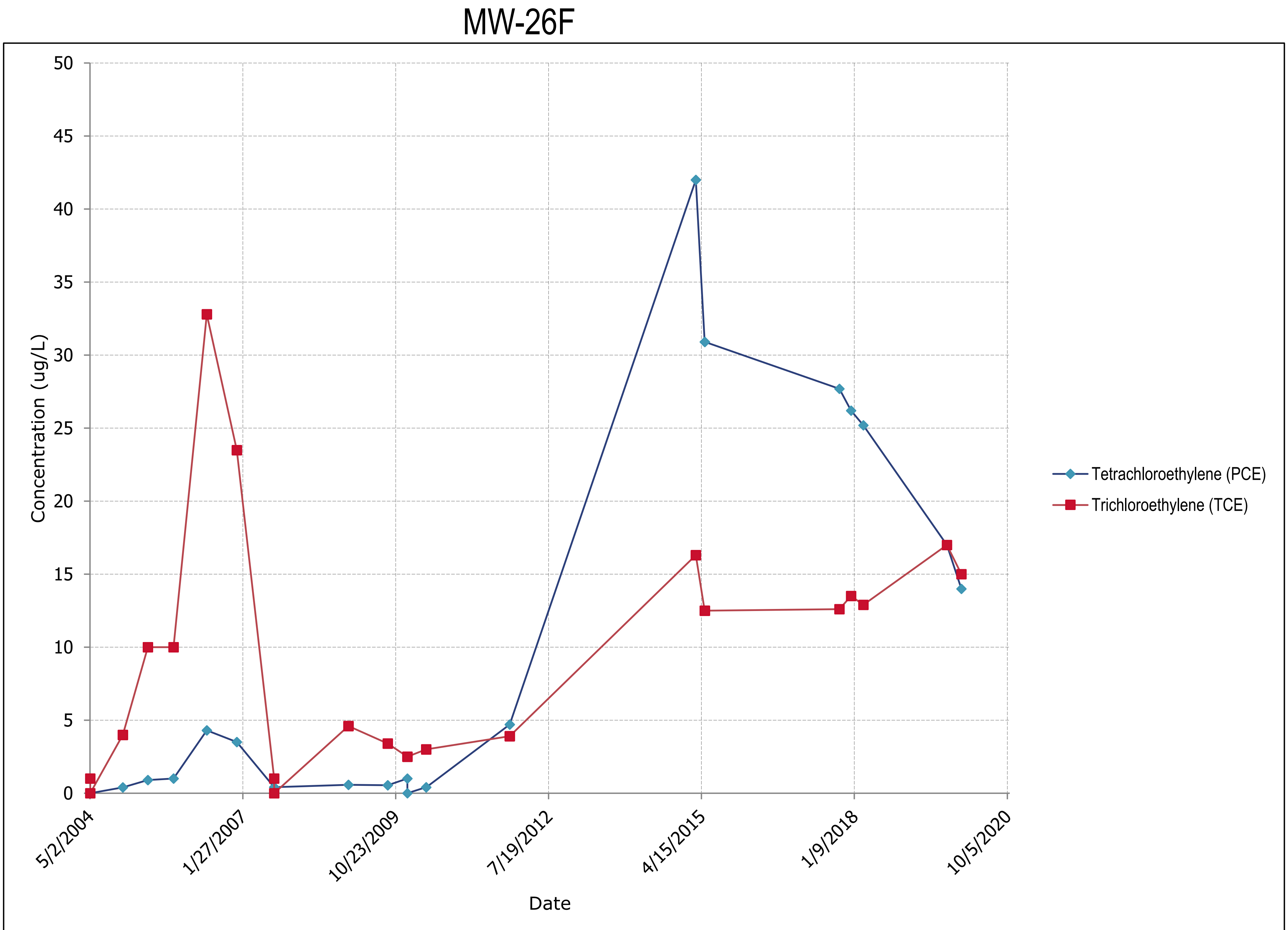


HDR APTIM
a Joint Venture

PCE & TCE IN GROUNDWATER IN MONITORING WELL MW-25A -2001-2020

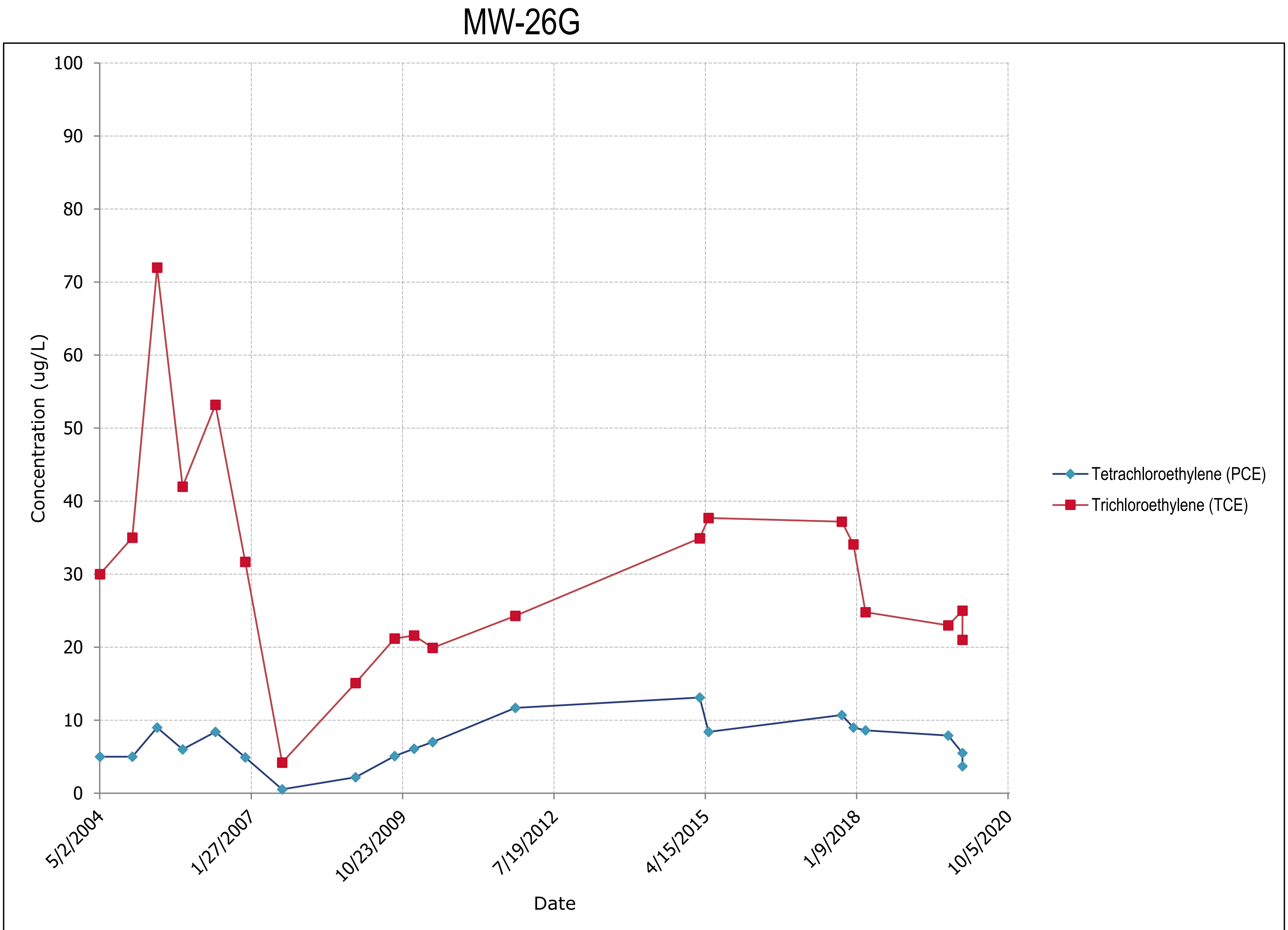
FULTON AVE SUPERFUND SITE OU2

FIGURE 4-7



HDR APTIM
a Joint Venture

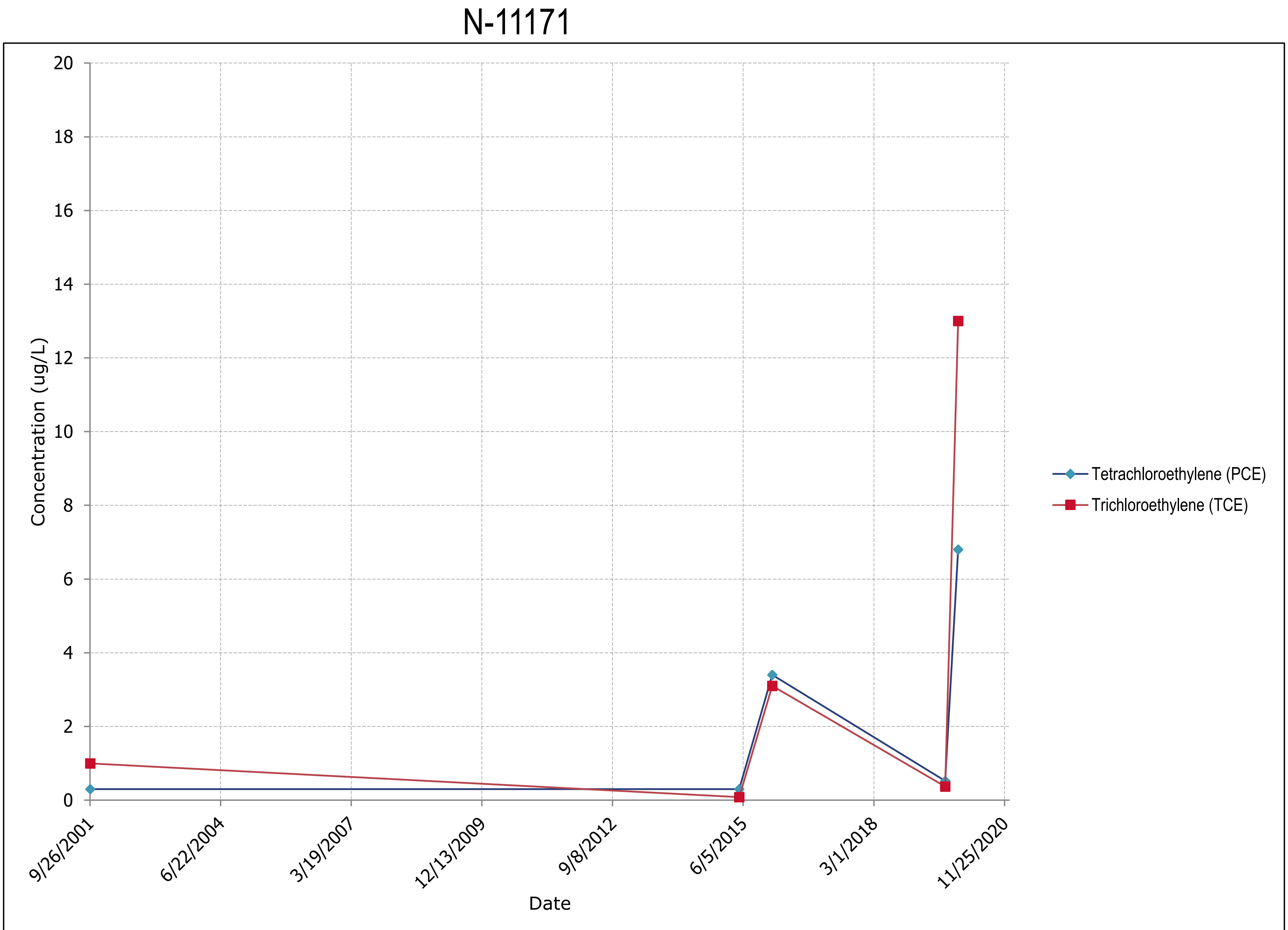
PCE & TCE IN GROUNDWATER IN MONITORING WELL MW-26F -2001-2020
FULTON AVE SUPERFUND SITE OU2
FIGURE 4-8



HDR APTIM
a Joint Venture

PATH: \\nj-mahwah\ActiveProjects\6706\20000051\10042584\4.0_Data_Ref_Info\4.2_WIP\Analysis Outputs\VOCs_TrendCharts

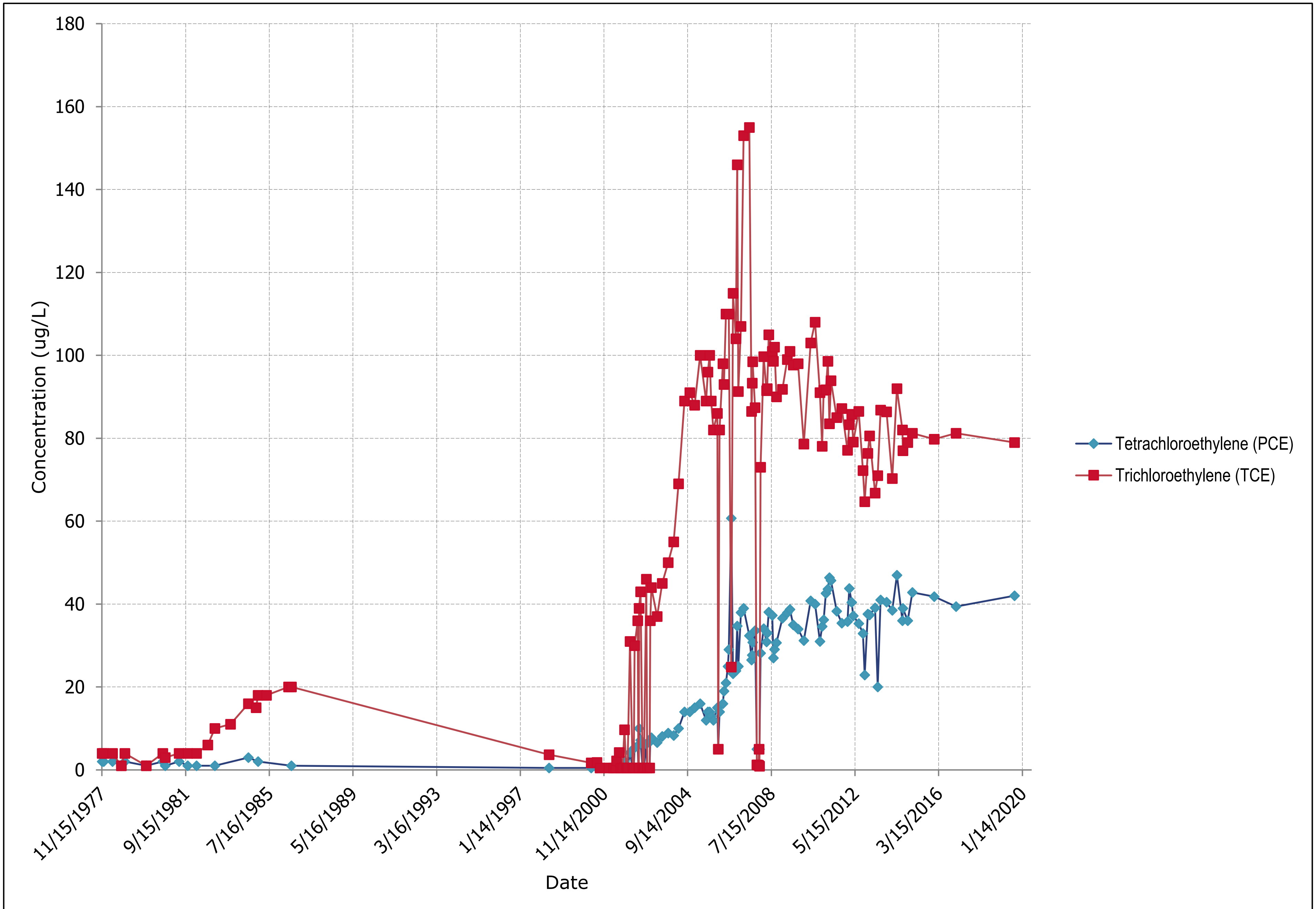
PCE & TCE IN GROUNDWATER IN MONITORING WELL MW-26G -2001-2020
FULTON AVE SUPERFUND SITE OU2
FIGURE 4-9



HDR APTIM
a Joint Venture

PCE & TCE IN GROUNDWATER IN MONITORING WELL N-11171 -2001-2020
FULTON AVE SUPERFUND SITE OU2
FIGURE 4-10

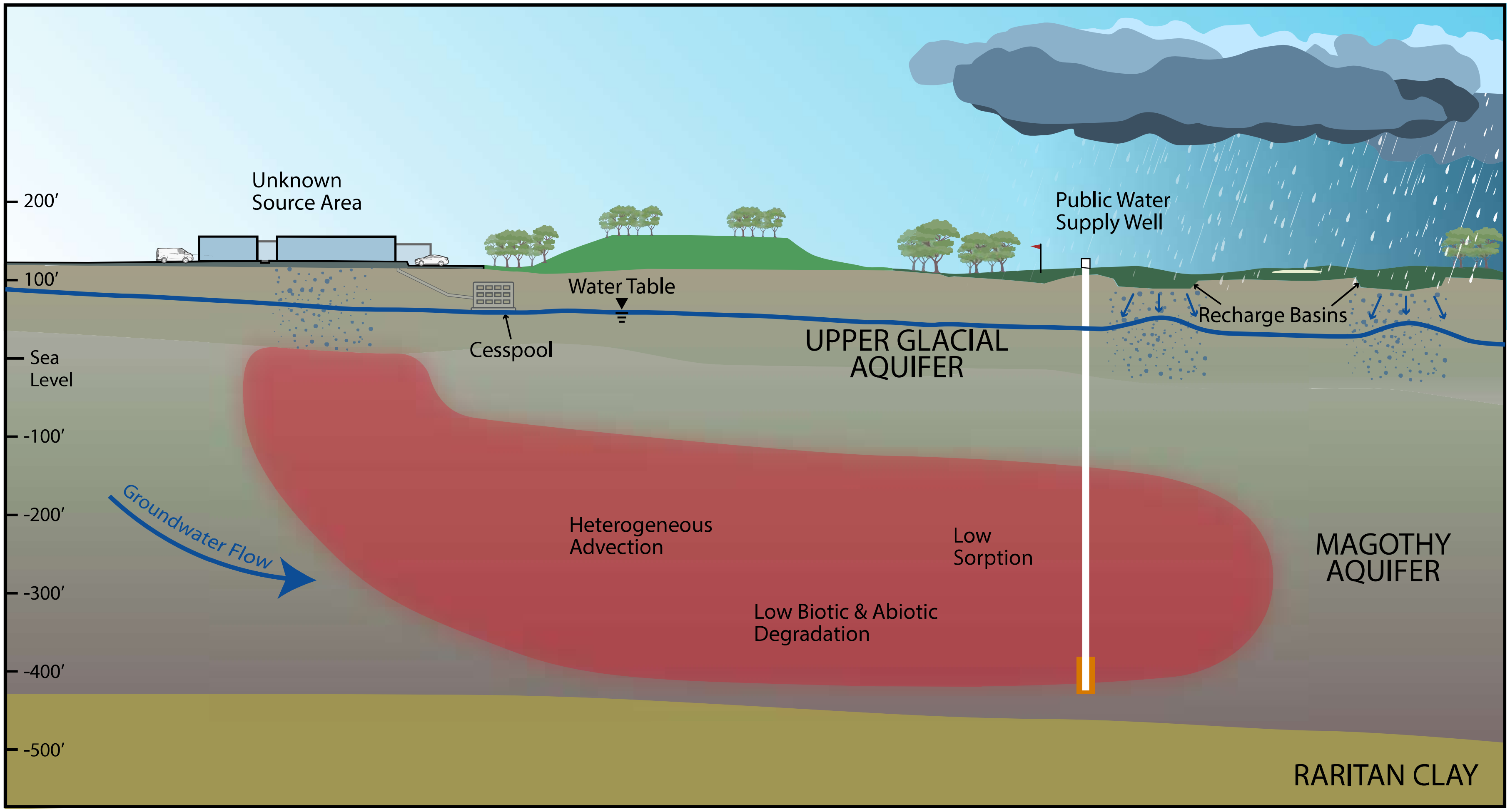
N-03881



HDR APTIM
a Joint Venture

PCE & TCE IN GROUNDWATER IN MONITORING WELL N-03881 -2001-2020
FULTON AVE SUPERFUND SITE OU2
FIGURE 4-11

PATH: \\nj-mahwah\ActiveProjects\6706\20000051\10042584\4.0_Data_Ref_Info\4.2_WIP\Analysis Outputs\VOCs_TrendCharts



HDR APTIM
a Joint Venture

CONCEPTUAL SITE MODEL

FULTON AVE SUPERFUND SITE OU2

FIGURE 6-1

PATH: \\nj-mahwah\ActiveProjects\6706\20000051\10042584\7.0_GIS_Models\7.2_WIP\Map_Docs\Draft\2023_RI\Fulton X-Section.ai