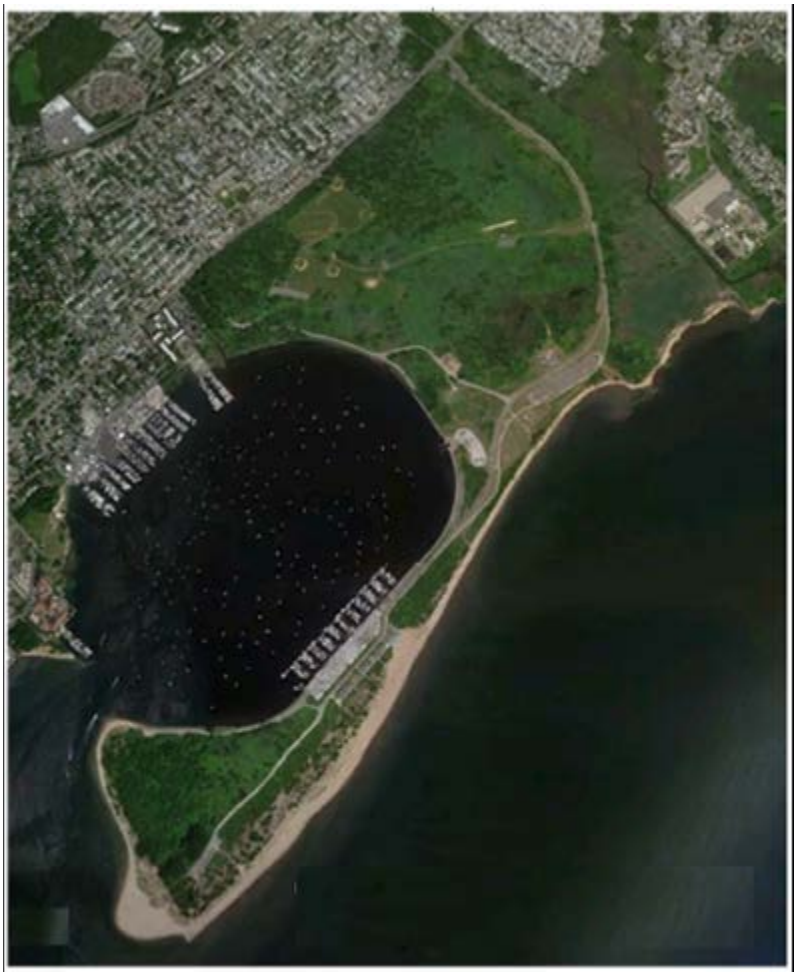


Draft Final Environmental Investigation Report for Great Kills Park Operable Unit 2

Gateway National Recreation Area, New York

Great Kills Park Site
EDL #5NER1580

July 8, 2019

Revision Log:

Revision #	Revision Date	Revision Description

Kathleen Cuzzolino
NPS Federal Government Lead

Signature, Date

By signing above, the signatory verifies that they understand and concur with the information and procedures, and recommendations presented herein.

Draft Final Environmental Investigation Report for Operable Unit 2

Great Kills Park Site, Operable Unit 2
Gateway National Recreation Area, New York
National Park Service

Document Date: **July 8, 2019**

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LIST OF ABBREVIATIONS AND ACRONYMS

AR	Administrative Record
ATSDR	U.S. Agency for Toxic Substances and Disease Registry
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
City	City of New York
COPC	chemicals of potential concern
COPEC	chemicals of potential ecological concern
CSM	conceptual site model
CST	contaminated sites team
°F	degrees Fahrenheit
DOHMH	City of New York Department of Health and Mental Hygiene
DPT	direct push technology
EE/CA	Engineering Evaluation and Cost Analysis
EIR	Environmental Investigation Report
ESV	Ecological Screening Value
ft	feet
GAO	U.S. Government Accountability Office
Gateway	Gateway National Recreation Area
GKP	Great Kills Park
GWS	gamma walkover survey
HMW	high molecular weight
HSA/RS	Historical Site Assessment/Records Search Summary Report
IDW	investigation-derived waste
in	inches
IRA	Interim Response Action
LMW	low molecular weight
LUW	land under water
MCL	Maximum Contaminant Level
MGD	million gallons per day
mg/kg	milligrams per kilogram
mR/hr	milliroentgens per hour
MSL	mean sea level
NA	not applicable
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service

NUREG	U.S. Nuclear Regulatory Commission Regulation
NYPD	New York City Police Department
NYSDEC	New State Department of Environmental Conservation
OU	operable unit
OU1	Operable Unit 1
OU2	Operable Unit 2
PA	Preliminary Assessment
PAHs	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls
PCE	tetrachloroethene
PID	photoionization detector
RAP	USDOE Radiological Assistance Program
RI	Remedial Investigation
ROPC	radionuclides of potential concern
ROPEC	radionuclides of potential ecological concern
ROW	Right of Way
RSL	Regional Screening Level
SAP	Sampling Analysis Plan
Site	Great Kills Park Site
SSSI CSRM	South Shore of Staten Island Coastal Storm Risk Management Project
SVOCs	semi-volatile organic compounds
TCRA	Time Critical Removal Action
TEF	Toxic Equivalency Factor
TEQ	Toxicity Equivalence
µg/l	micrograms per liter
U.S.	United States
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USCS	Unified Soil Classification System
USGS	U.S. Geologic Survey
USDOE	U.S. Department of Energy
USEPA	U.S. Environmental Protection Agency
VOCs	volatile organic compounds
WPCP	Water Pollution Control Plant

EXECUTIVE SUMMARY

This Environmental Investigation Report (EIR) presents the results of Phase 1 Remedial Investigation (RI) activities for Operable Unit 2 (OU2) at the Great Kills Park (GKP) Site (Site), which includes approximately 237 acres of the 523-acre park. GKP is located on Staten Island, NY and is managed by the National Park Service (NPS) as a part of the Staten Island Unit of Gateway National Recreation Area (Gateway). NPS performed the investigation activities within OU2 pursuant to its lead agency authority under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 United States Code (U.S.C.) §§ 9601 *et seq.*, and associated regulations, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300.

The purpose of Phase 1 RI sampling was to generate representative data of adequate quality for OU2 to refine the conceptual site model (CSM) and optimize the investigation approach for subsequent RI sampling. The specific goals of Phase 1 RI sampling were to better define the lateral and vertical extent of waste fill within OU2, evaluate whether historical operations in OU2 have resulted in releases that may pose a potential threat to human health or the environment, characterize the nature of contamination associated with potential releases, and generate data that supports the sample design for subsequent investigations within OU2. Sampling activities were completed as planned in October 2018 and the data collected achieved the objectives outlined in the Final Sampling Analysis Plan (SAP) for the Phase 1 RI for OU2 (NPS, 2018a).

Field activities effectively delineated the extent of waste fill at the Site. Within OU2, waste fill is thickest in the center, where it is approximately 37 feet thick near the former location of the Bay Terrace maintenance garage and incinerator. Waste fill is present in two areas at the Site, including a 171-acre area on the southwest side of Buffalo Street and a 48-acre area on the northeast side of Buffalo Street. Waste fill is present within 186 acres of OU2 and 31 acres of Operable Unit 1 (OU1); there are also 2 acres of waste fill outside of the Site boundary (i.e., outside of OU1 and OU2). The soil amendment containing sewage sludge overlies the waste fill from the ground surface to the top of the waste layer; although, the soil amendment may not be evident in areas of OU2 that were developed (e.g., recreational areas, along roads, and near sewer lines).

Phase 1 RI sampling determined that contaminants associated with the Bay Terrace Incinerator Operation are indicative of waste fill with a high proportion of incinerator residue, which was expected. The investigation results did not indicate additional releases beyond waste fill exhibiting a high proportion of incinerator residue, which was expected at the Bay Terrace Incinerator Operation. The underwater gamma radiation survey performed to investigate the Marine Unloading Operation identified radiological anomalies within the Great Kills Harbor that may have resulted from releases of radiological contamination during historical operations. In addition, a strong hydrocarbon odor and staining was evident at the support area for the Marine Unloading Operation, suggesting the possibility of a petroleum release during historical operations. The Phase 1 RI analytical results for soil, groundwater, sediment, and surface water indicate that metals, polychlorinated biphenyls (PCBs), dioxins/furans, pesticides, semi-volatile organic compounds (SVOCs)/polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs) and radionuclides are present in OU2 at levels that exceed both human health and ecological screening benchmarks and may pose a risk to human health and the environment.

A refined CSM was developed based on the results of the Phase 1 RI for OU2 (see Section 7.1) and specific recommendations were made to optimize the investigation approach for subsequent RI sampling within OU2 (see Section 7.2). Future investigations are recommended to evaluate petroleum hydrocarbons and radiological anomalies potentially related to the Marine Unloading Operation. In addition, future RI sampling for OU2 will involve the collection of additional data to complete the baseline risk assessment and fate and transport evaluation. Details related to the investigation approach for subsequent RI sampling will be presented in a future SAP for OU2.

1. INTRODUCTION

This Environmental Investigation Report (EIR) presents the results of Phase 1 Remedial Investigation (RI) activities for Operable Unit 2 (OU2) at the Great Kills Park (GKP) Site (Site), which includes approximately 237 acres of the 523-acre park. GKP is located on Staten Island, NY and is managed by the National Park Service (NPS) as a part of the Staten Island Unit of Gateway National Recreation Area (Gateway) (**Figure 1-1**). This report was prepared on behalf of NPS by the AECOM-Tidewater Inc. Joint Venture (AECOM-Tidewater JV), under contract with the United States (U.S.) Army Corps of Engineers (USACE), per Contract No. W912DR-13-D-0016, Delivery Order W912DR17F0383. Investigation activities within OU2 at GKP were undertaken pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 United States Code (U.S.C.) §§ 9601 *et seq.*, and its associated regulations, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300. The NPS has been delegated CERCLA response authority to respond to releases or threatened releases of hazardous substances on any facility under the jurisdiction, custody or control of NPS. NPS is the lead CERCLA agency for this and other response actions taken or to be taken at the Site. As was described in the Final Sampling and Analysis Plan (SAP) for the Phase 1 RI for OU2 (NPS, 2018a), sampling activities within OU2 were undertaken by NPS as the lead agency under CERCLA.

The Site consists of a 280-acre area at GKP in which waste disposal and sewage sludge management activities were performed from the mid-1920s to the late-1950s. In 2016, the NPS Contaminated Site Team (CST) accelerated RI activities at the Site to accommodate the South Shore of Staten Island Coastal Storm Risk Management Project (SSSI CSRM) that may be constructed within the northeastern portion of the Site. Specifically, NPS segregated the Site into two operable units (OUs) (i.e., Operable Unit 1 [OU1] [43 acres] and OU2 [237 acres]) with OU1 corresponding to the portion of the Site where the SSSI CSRM may be constructed. The purpose of accelerating the RI was to perform environmental sampling within OU1 so that the results could inform construction planning for the SSSI CSRM while generating comprehensive data of sufficient quality to support remedial decision-making under CERCLA. In 2017, NPS developed an EIR for OU1 (NPS, 2017a), which summarized the 2016 field activities and investigation results within OU1.

Investigations performed in 2016 confirmed that waste disposal and sewage sludge management activities resulted in contamination of environmental media. Contaminant sources at the Site include: (1) waste fill derived from historical waste disposal operations at GKP (e.g., refuse, incinerator residue, and coal ash), (2) radiological artifacts within waste fill, and (3) sewage sludge that was dried in the sludge drying beds, mixed with clay, and then used as a soil amendment (artificial topsoil) after the completion of waste disposal. Historical activities within OU2 included the operation of two unloaders adjacent to the Great Kills Harbor and the operation of the Bay Terrace maintenance garage and incinerator. OU2 represents an area that is five times larger than OU1 and encompasses additional historical operations (i.e., the Bay Terrace Incinerator Operation and the Marine Unloading Operation). Therefore, RI sampling is planned in phases, with subsequent investigations in OU2 being informed based on the results presented in this EIR.

1.1 PURPOSE AND OBJECTIVES

The purpose of this EIR is to document and present the results of Phase 1 RI activities completed within OU2. The purpose of this Phase 1 field sampling event is to generate representative data of adequate quality for OU2 to refine the conceptual site model (CSM) and optimize the investigation approach for

subsequent RI sampling. Specific goals of Phase 1 RI sampling were to better define the lateral and vertical extent of waste fill within OU2, evaluate whether historical operations in OU2 have resulted in releases that may pose a potential threat to human health or the environment, characterize the nature of contamination associated with potential releases, and generate data that supports the sample design for subsequent investigations within OU2. Sampling activities were completed as planned in October 2018 and the data collected achieved the objectives outlined in the Final SAP for the Phase 1 RI for OU2 (NPS, 2018a).

1.2 SITE DESCRIPTION

GKP is located at the intersection of Buffalo Street and Hylan Boulevard, Staten Island, New York and is within the Staten Island Unit of Gateway National Recreation Area. GKP is approximately 523 acres in size and is directly adjacent to the Great Kills Harbor (**Figure 1-2**). The Staten Island Unit is one of three units that comprise Gateway National Recreation Area: (1) the Jamaica Bay Unit in Brooklyn and Queens Counties, (2) the Staten Island Unit, and (3) the Sandy Hook Unit (northern shore of New Jersey) (**Figure 1-1**).

During previous investigations at the Site, radiological contamination was identified within the waste fill. The waste fill includes incinerator residue, coal ash, wood, glass, metal, food refuse, street sweepings, and excavation and construction materials. Sewage sludge is present across the Site as a soil amendment and is also present in former sludge drying beds. Hydraulic fill is less widespread and within the Site boundaries is primarily present underneath Buffalo Street. Based on the 2015 Time Critical Removal Action (TCRA) Report, several radionuclides, including radium-226, thorium-232, and uranium-238 were identified in discrete locations at the Site (Tidewater, 2015). In addition, the 2016 investigation of OU1 identified contamination from chemicals and radionuclides in environmental media and radiological artifacts in waste fill (NPS, 2017a).

The Site consists of two OUs (**Figure 1-2)**: OU1 is a 43-acre parcel situated within and along the northeastern portion of GKP; and OU2 includes all areas (approximately 237 acres) of the Site that are outside of OU1. In 2016, NPS established OU1 and accelerated the investigation of this area to inform construction planning for the SSSI CSRM, which may be sited within or adjacent to OU1 (NPS, 2017a). OU1 consists of former waste filled areas and a portion of the sludge drying beds. OU2 consists of waste filled areas, a portion of the sludge drying beds, the former Bay Terrace Incinerator Operation, and the former Marine Unloading Operation.

1.3 SITE HISTORY

This section presents the history of the Site from the late 1800s when the property primarily consisted of a near shore marine wetland; through the late 1920s to the mid-1950s when the land plan for the Marine Park was implemented by the City of New York (City) (i.e., resulting in the placement of the waste fill, sewage sludge and hydraulic fill), which raised the elevation and allowed the property to be developed as a City Park; to the mid-1970s when the City Park was transferred to NPS.

In 1865, John Jeremy Crooke purchased what is today largely the GKP property and surrounding area and as a result “Crooke’s Point” takes its name from Mr. Crooke (Staten Island Museum Bulletin, August, 1939). The property use during this time included farming, growing salt hay, fishing and boat building. The property was largely vacant, with few structures and consisted of near shore marine wetlands and creeks (Bass Creek, Mill Pond Creek, Flat Creek, Lockmans Creek, and Duck Creek) that drained from the upland (west of Hylan Boulevard) to Great Kills Harbor to the southeast (**Figure 1-3**).

Between 1894 and 1902, Crooke's Point and adjacent wetlands underwent significant erosion and loss of land (Staten Island Museum Bulletin, 1939, and G.W. Bromley and Co., 1917). Crooke's Point was initially comprised of 180 acres, but as a result of the erosion was reduced to a 30-acre island (Balch, 1923; G.W. Bromley and Co., 1917) (**Figure 1-4**). The sand from the erosion of the spit was re-deposited into Great Kills Harbor. The land plan for the Marine Park (a.k.a. Great Kills Park) was initiated in 1925. In 1926, the City constructed the Bay Terrace Burner House and Incinerator (Sanborn, 1937) (**Figure 1-5**). Between 1929 and 1930, the City acquired 18 parcels involving over 290 acres of upland. The State of New York granted to the City 445 acres in 1932 and 83 acres in 1934, for a total of approximately 529 acres of land under water (LUW). In 1936, the City acquired 94 acres of property (upland) by condemnation (New York City Department of Parks, Public Notice Purchase Private Property, October 25, 1935 and New York City Board of Estimate and Apportionment, July 15, 1936, Record Map of Great Kills Park, R-16, 1982). In 1940, the State of New York granted an additional 411 acres of LUW to the City. The 411-acre grant required the land be improved for the proposed public park within 5 years (New York State Report of Attorney General, November 26, 1940 re: Application of the City New York). The complete Marine Park area at that time was bounded by Fairlawn Avenue (on the southwest to west), Hylan Boulevard (on the northwest to north), and Emmet Avenue (on the north to the northeast) (**Figure 1-6**).

In addition to the hydraulic fill, the 1935 and 1936 New York City Department of Parks topographic maps for the Marine Park indicate waste fill and incinerator residue were disposed of in the vicinity of the Bay Terrace Incinerator. The New York City Department of Sanitation Oakwood Truck Fill commenced operations in 1934 (New York City Department of Parks Press Release, 1949). The exact location of the Oakwood Truck Fill is unknown; however, it is believed to be co-located with the Bay Terrace Garage and Incinerator (**Figure 1-7**). The Bay Terrace Incinerator was reportedly abandoned on or before 1941 (New York City Department of Parks, Press Release, 1941). The Oakwood Truck Fill ceased operations in 1948 (New York City Department of Parks Press Release, 1949).

Starting in 1944 to 1949, the City operated the Marine Unloading Plant(s) and Landfill. During 1944 through 1948, over 265 acres of low-lying wetland area (within the acquired property) and LUW were covered with over 15.1 million cubic yards of waste fill. In 1945, in anticipation of filling the area east of Hylan Boulevard, the City developed plans to reconstruct the existing manholes for the sanitary sewer located beneath both Mansion and Gratten Avenues and Bach Street described above. The reconstruction effort raised the elevations of the manholes by installing manhole extensions (in some cases over ten feet) to prevent the manholes from being buried by the waste fill (New York City Department of Parks, 1945). By 1949, the City park was opened (limited opening) to the public and was completely filled and graded (**Figure 1-8**).

The Oakwood Beach Water Pollution Control Plant (WPCP) was constructed by the City in 1954 and 1955, and it commenced treatment in 1956. The plant replaced a screening plant. The WPCP was designed to serve a population of 60,000 with a treatment capacity of 15 million gallons per day (MGD).

Between early 1955 and late 1959, 213,000 cubic yards of clay and 285,000 cubic yards of sewage sludge (presumably from the Oakwood Beach WPCP) were mixed together to create artificial topsoil (Wrenn, 1975) used to facilitate vegetative growth over the waste fill area. By 1966, sludge drying beds were established to the west of the Oakwood Beach WPCP.

On October 27, 1972, United States Congress approved Public Law 92-592 (a.k.a. Enabling Legislation) that established the Gateway National Recreation Area which included the Staten Island Unit and Great

Kills Park. The Enabling Legislation in part authorized the Secretary of Interior to acquire the land to create Gateway National Recreation Area "to preserve and protect for the use and enjoyment of present and future generations an area possessing outstanding natural and recreational features." In 1974, the City conveyed via deed to the United States of America for the use and development by NPS, the City owned properties (16,665 acres) within the Gateway Recreation Area including GKP (1,198.9 acres). The deed excluded 47.7 acres located along the northeast section of the GKP. This parcel was retained by the City and remains today owned by City.

In the mid-1970s, the Oakwood Beach WPCP initiated an upgrade of its facilities to increase its treatment capacity from 15 MGD to 40 MGD. As part of the upgrade, the sewage sludge drying beds were removed from service, the treatment plant was enlarged, a new Lower New York Bay outfall was installed, and an 8-foot diameter "West Branch" sewer interceptor to service western Staten Island was constructed beneath GKP within the Site from Fairlawn Avenue to the Oakwood Beach WPCP.

1.4 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

This section presents information regarding previous environmental investigations conducted at the Site. NPS initiated response actions under CERCLA after receiving notification in 2005 regarding elevated radiation levels detected during a flyover survey performed as part of a baseline radiological mapping effort conducted by the Counter Terrorism Bureau of the New York City Police Department (NYPD) and U.S. Department of Energy (USDOE) (U.S. Government Accountability Office [GAO]), 2006; Tidewater, 2015). Prior to 2005, Sidney M. Johnson and Associates (Johnson, 1985), on behalf of NPS conducted a structural engineering analysis of the bathhouse, sewer, and impacts due to erosion and issued its report in 1985. As part of this analysis, Johnson also conducted a field investigation to determine: 1) the limits of the waste fill; 2) the nature of the fill; and 3) the nature of leachate. The results of the 1985 field investigation are presented below followed by a summary of ongoing response actions that the NPS commenced in 2005 and thereafter. These investigations did not solely focus on OU2 and addressed Site areas as described below.

1.4.1 Sidney M. Johnson and Associates 1985 Field Investigation

As part of the field investigation, Johnson conducted a magnetometer survey and excavated 41 test pits. The magnetometer survey identified an area with ferrous metal (within OU2) west of the NPS Education Field Station. Johnson identified waste fill in the northwest quadrant of the Site, ranging in thickness from 8-feet to more than 15-feet thick. Johnson noted gray or red brown sand overlying the "black garbage fill", and in some areas red brown inorganic clay at 6-inches to 12-inches thick overlying "brown garbage fill." Johnson attributed the clay layer to the soil amendment efforts performed by the City. The "brown garbage fill" overlies the "black garbage fill" at all areas of the waste filled area except at the perimeter where sand is present. The presence of sand at the perimeter of the waste filled area is consistent with the City's efforts to "armor" and surround the waste filled area with hydraulic fill (sand). Johnson stated "Overall the bulk of the fill has the appearance of highly decomposed or incinerated material." Johnson found no drums, barrels, or evidence of toxic materials. Johnson noted a black semi-cemented soil underlying the waste fill that was composed of pre-existing material mixed with the waste fill and incinerator residue.

Johnson also collected four groundwater samples for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), and metals analyses. Only low concentrations of toluene (maximum concentration 20.3 micrograms per liter [µg/L]) and tetrachloroethene (PCE, 9.1 µg/L) were detected. The tap water Regional Screening Level (RSL) and the

Maximum Contaminant Level (MCL) are 1,100 µg/L. The tap water RSL for PCE is 11 µg/L and the MCL is 5 µg/L. All other analytes were either not detected or below their respective residential United States Environmental Protection Agency (USEPA) RSLs. Both toluene and PCE were detected in the equipment blank suggesting the sampling equipment may not have been properly decontaminated between sampling locations. With respect to the fill, Johnson collected three waste fill samples from depths of 6-feet to 8-feet and analyzed them for VOCs, SVOCs, pesticides, PCBs, and metals. The analytical results indicated VOCs, SVOCs, pesticides, and PCBs were not detected. Of the detected metals and inorganic elements, only antimony (35.2 milligrams per kilogram [mg/kg] to 82 mg/kg), arsenic (6.34 mg/kg to 7.83 mg/kg), and cyanide (4.28 mg/kg to 24.8 mg/kg) were detected above their respective residential RSLs of 31 mg/kg, 0.68 mg/kg, and 23.0 mg/kg, respectively.

1.4.2 Environmental Investigations and CERCLA Response Actions Conducted From 2005-2017

Between 2005 and 2017, NPS conducted a series of response actions to investigate the nature of the radiological contamination at the Site and to mitigate risk to human health and the environment. A chronological listing of previous investigations and activities is summarized below:

- On August 2, 2005, NYPD notified USEPA Region 2 that elevated gamma radiation levels had been identified at the Site. NYPD reported that the highest radiation reading of 1.5 milliroentgens per hour (mR/hr) was located near a parking lot for the model airplane field. (Michael Baker, 2007, Appendix D: USEPA Region 2 Bullet-Great Kills Park Radiation Response Investigation).
- On August 3, 2005, USEPA conducted a ground radiological survey/assessment confirming that the “fire break” area had above-background, but relatively low-level, radiation readings. This survey also identified the source of the readings as radium-226 via gamma spectroscopy. NPS further restricted access to the area by erecting a fence and allowing the area to re-vegetate (Michael Baker, 2007; Tidewater, 2015).
- In November 2006, NPS initiated a CERCLA response action and contracted Michael Baker Jr., to prepare a Preliminary Assessment (PA) for potential radiological contamination at the Site.
- On March 6, 2007, while the PA was in progress, a brush fire occurred at the Site (Michael Baker, 2007). Following the fire, NPS surveyed the burned area on March 15, 2007 and detected elevated radiation readings (Michael Baker, 2007; Tidewater, 2015). NYPD was notified and responded with USDOE Radiological Assistance Program (RAP) team. The highest gamma reading obtained by the RAP team was 0.2 mR/hr (Michael Baker, 2007). On March 21, 2007, the City of New York Department of Health and Mental Hygiene (DOHMH) conducted a survey and identified “a hot spot just off the road leading to the model airplane field. Readings at contact at the grass were 10 mR/hr and 0.5 mR/hr at 1 meter over the spot. Natural background readings for the area are 0.01 mR/hr.” (March 22, 2007, Letter from Gene Miskin, Director, Office of Radiological Health DOHMH to Dave Avrin, NPS. Included as Appendix E in Michael Baker, 2007).
- On March 30 and April 3, 2007, DOHMH conducted a limited radiological gamma survey of the public access areas including ball fields 1 through 5 and associated parking lot, the model airplane field and parking lot, fishing area (Harbor Beach) and access road, hiking trail, Sewerline Road,[1] Fire Road and the main park access road (Buffalo Street). The survey confirmed the

[1] Sewerline Road is referred to by NPS as Wetland Road. Wetland Road and Sewerline Road are the same.

location of three previously identified areas of radiological contamination and identified two additional areas (south of ball field 1 and east of the model airplane field parking lot). DOHMH concluded that while the detected radiation levels were many times above background, the levels were reduced to background three feet from the source. DOHMH recommended that a radiological contaminant assessment be conducted at the Site (Michael Baker, 2007). As a result of DOHMH findings, NPS installed additional fencing to isolate the identified areas (Tidewater, 2015).

- On May 25, 2007, the U.S. Agency for Toxic Substances and Disease Registry (ATSDR) completed a Health Consultation to evaluate potential hazards to public health posed by the radiological contamination at the Site. USEPA requested ATSDR develop a public health statement based on existing data. ATSDR concluded that the areas posed an "Indeterminate Public Health Hazard." ATSDR referred to its conclusions regarding past radiation exposures for the areas of concern as indeterminate because the conclusions were based on limited data and analyses. ATSDR also reported that past exposures were not expected to be a health hazard because the radioactivity readings "dropped" significantly three feet away from the peak readings, it was unlikely that anyone would remain on any of the identified hot spots for an extended period of time (i.e., three hours or more), and the elevated readings were limited to five distinct areas (ATSDR, 2007 and Tidewater, 2015).
- In August 2007, Michael Baker, Jr. Inc., on behalf of NPS completed and issued its PA report. The PA concluded the radiological contamination at the Site appeared to be concentrated in five locations and was comprised of radium-226 and its decay products. It further concluded that the radiological contaminants identified were not likely to pose an immediate health risk to park users because NPS closed public access to the five suspect areas with fencing. The PA recommended the identified contaminated radiological material be removed and disposed of, with follow-up confirmatory screening, and any future detections of radiological contamination be handled in a similar fashion (Michael Baker, 2007; Tidewater, 2015).
- In January 2009, Cabrera Services on behalf of NPS conducted an Interim Response Action (IRA) consisting of additional radiological surveys and removal of radiological materials. The IRA identified a total of fourteen hot spots. Seven of these hot spots were in the five areas previously identified and discussed above. The other seven areas were locations that had not been previously identified. Of the 14 areas, seven hot spots were prioritized for removal based on public accessibility and detected readings (e.g., highly accessible areas with the highest readings were prioritized over less accessible areas and/or those with lower readings). During the removals, gamma spectroscopy was performed and radium sources were identified. During excavation, two radium sources (e.g., a brachytherapy needle and tube) were recovered. As part of the IRA, a total of four drums of material were removed from the Site and disposed of at permitted and licensed facilities. One drum containing the two radium sources was disposed of at the U.S. Ecology facility (State of Washington Radioactive Materials License WN-I01902) in Richland, Washington. The three drums containing investigation-derived waste (IDW) were disposed at the Energy Solutions facility (State of Utah Radioactive Material License UT 2300249) in Clive, Utah. Cabrera Services completed the IRA and issued its report in November 2010 (Cabrera Services, 2010; and Tidewater, 2015). As a result of the discovery of the additional hot spots and the subsequent removal of two radium sources, NPS put up barricades and signs to

close off access to Wetland Road, the ballfields and Model Airplane field and stopped issuing permits for these activities.

- On October 14, 2010, NPS issued an Approval Memorandum to conduct an Engineering Evaluation and Cost Analysis (EE/CA) at the Site to evaluate non-time critical removal action alternatives (Tidewater, 2015).
- On February 2, 2012, NPS conducted fire protection activities, including cutting back vegetation in the area south of Wetland Road and east of Buffalo Street. The area was subsequently checked for radiation and three distinct hot spots were identified. Testing of the area by USACE confirmed the elevated readings and located a fourth elevated reading within the same area. Gamma spectroscopy determined that the source of the radioactivity was radium-226 (Tidewater, 2015).
- During June through August 2012, USACE at the request of NPS conducted a gamma walk-over survey (GWS) and dose rate survey of four additional areas including: 1) the multi-use path along Buffalo Street; 2) the trails around the Education Field Station; 3) Bulkhead Road; and 4) the Bulkhead Road fishing area. The results of the GWS and dose rate survey confirmed the absence of radiation hazards in the near surface soil (USACE, 2012).
- On July 31, 2012, NPS Northeast Regional Director signed an Action Memorandum approving the decision to conduct a TCRA at the Site. The EE/CA Approval Memorandum was put on hold to expedite the TCRA and the identification and removal of radioactive contamination that posed an immediate risk to human health and the environment (Tidewater, 2015).
- In June 2015, Tidewater, Inc. on behalf of NPS issued the Final Great Kills Park TCRA Completion Report. Activities conducted as part of the TCRA involved clearing of brush, trees, and Phragmites; installing security fencing along the perimeter of the waste filled area to prevent access; conducting drive-over and walk-over gamma surveys; installing 51 borings to delineate waste filled area; conducting a radiation dose assessment for firefighters, park rangers/law enforcement officers, maintenance workers, nearby residents, and trespassers; and the excavation and removal of 37 source areas including five areas that exceeded 2 mR/hr. As part of the radiation dose assessment study, soil samples were collected from various locations throughout the park for analysis via alpha and gamma spectroscopy and were determined to contain elevated levels of natural uranium and radium-226. During the excavation of areas with elevated radioactivity, radiological materials were identified as radium-226 and thorium-232 via alpha and gamma spectroscopy. As a result of the TCRA, 25 drums of waste were generated, transported, and disposed of at permitted and licensed facilities. Twenty-four (24) of the 25 drums were disposed of at the U.S. Ecology facility in Grand View, Idaho and one drum were disposed of at the Energy Solutions facility in Clive, Utah (Tidewater, 2015).
- In April 2016 through October 2016, NPS conducted a two-phased environmental investigation of the 43-acre OU1 area to further characterize Site-related contamination and to inform planning for the SSSI CSRM Project. Environmental media within OU1 were investigated for the presence of VOCs, SVOCs, polycyclic aromatic hydrocarbons (PAHs), PCBs, metals, including mercury, herbicides, pesticides, dioxins/furans, and radionuclides. The OU1 environmental investigation included installing borings and tests pits; collecting and analyzing surface and subsurface soil samples; installing and sampling temporary and permanent groundwater monitoring wells;

conducting a tidal study and aquifer slug tests; conducting a GWS of OU1 areas and dose rate measurements of radiological anomalies; and sampling and analysis of sediment and surface water samples collected from Oakwood Beach Creek. The OU1 environmental investigation determined that metals, PAHs, PCBs, dioxins/furans, and radionuclides were associated with waste fill and sewage sludge at levels that exceeded background and project screening benchmarks. The OU1 environmental investigation also confirmed that radiological artifacts are contained in waste fill, and that damaged radiological artifacts can result in isolated releases of radionuclides to adjacent soil (NPS, 2017a).

1.5 REPORT ORGANIZATION

This EIR follows the general outline of an RI in accordance with USEPA *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (USEPA, 1988). This EIR includes the following sections: 1. Introduction; 2. Study Area Investigation; 3. Physical Characteristics of the Study Area; 4. Nature and Extent of Contamination; 5. Fate and Transport; 6. Baseline Risk Assessment; 7. Summary and Recommendations; and 8. References.

The Appendices to this EIR include:

- Appendix A: Technical Memoranda Documenting Field Activities;
- Appendix B: Boring Logs;
- Appendix C: Gamma Scanning of Open Boreholes and Soil Cores;
- Appendix D: Groundwater Well Development Logs;
- Appendix E: Groundwater Purge and Sampling Logs;
- Appendix F: Sediment and Surface Water Sampling Logs;
- Appendix G: Chains of Custody;
- Appendix H: Eurofins Analytical Reports;
- Appendix I: ALS Analytical Reports; and
- Appendix J: Data Validation Reports.

2. STUDY AREA INVESTIGATION

The following section presents a summary of the study area investigation completed in 2018 during investigation activities for OU2.

2.1 FIELD INVESTIGATION ACTIVITIES ASSOCIATED WITH SITE CHARACTERIZATION

Phase 1 investigation activities within OU2 were conducted from October 15, 2018 to November 2, 2018. The following section provides a summary of the field investigations completed as part of Phase 1 characterization activities for OU2.

2.1.1 Contaminant Source Investigations

Historical operations at GKP, including waste disposal and sewage sludge management, may have resulted in sources and contaminant releases within OU2. Previous investigations and Site historical research identified the following primary contaminant sources within OU2: (1) waste fill derived from New York City Department of Sanitation's historical waste disposal operations at the Site (e.g., refuse, incinerator residue, and coal ash), (2) radiological artifacts incidentally contained in waste fill, and (3) sewage sludge that was dried in the sludge impoundment area and then used as a soil amendment (artificial topsoil) after the completion of waste disposal operations at GKP. Historical operations within OU2 also included the operation of two unloaders adjacent to the Great Kills Harbor (i.e., Marine Unloading Operation) and the operation of the Bay Terrace maintenance garage and incinerator (i.e., Bay Terrace Incinerator Operation). The following section summarizes activities conducted to support the investigation of contaminant sources within OU2.

2.1.1.1 Waste Fill

The Historical Site Assessment/Records Search Summary Report (HSA/RS) (NPS, 2018b) established waste fill as a source of contamination at the Site. The waste fill is known to consist primarily of refuse, incinerator residue, and coal ash. The method implemented during the field effort to identify the extent of waste fill involved visual observation of soil from OU2 through soil coring and test pitting.

Surface and subsurface soil samples were collected at eight locations using a direct push technology (DPT) drill rig to support the delineation of waste fill within OU2; these activities also supported collection and analysis of discrete samples for soil/vadose zone investigations discussed in Section 2.1.4. At each location, continuous cores of soil were collected from the ground surface to a sufficient depth to identify the top and bottom of the waste layer. The soil cores were inspected by a project geologist and lithological features of the cores were documented on soil boring logs. During inspections of the soil cores, waste fill was identified by observing pieces of debris that were less susceptible to decomposition, such as glass, masonry, ceramics, rubber, and metal, in the core. **Figure 2-1** presents a map of OU2 detailing the locations of all eight DPT soil borings. The results of geologic logging of the soil cores are included in the boring logs presented in **Appendix B**.

Information gained from visual observation of the soil cores from the eight DPT borings was compiled and combined with information from previous investigations, including the TCRA, to prioritize areas of OU2 for additional investigation to refine the delineation of waste fill. Test pits were focused along the suspected outer perimeter of the waste fill area to further delineate the extent and to observe the composition of the waste. In total, test pits were completed along 10 transects to better define the extent

of waste fill within OU2. **Figure 2-2** presents the locations of the test pits conducted to delineate the extent of waste fill within OU2. Details related to test pitting activities are presented in a technical memorandum provided in **Appendix A**.

2.1.1.2 Radiological Artifacts

Based on historical investigation activities, including the 2015 TCRA, radiological artifacts are present at the Site due to their association with waste fill. Radiological artifacts are incidental items in waste fill that contain radium, such as medical devices (brachytherapy), radioluminescent markers and dials, commercial products, and industrial applications (radiography). The investigation of radiological artifacts within OU2 involved radiological scans of each open borehole and an underwater gamma radiation survey performed within the Great Kills Harbor (see Section 2.1.1.4).

Each of the eight DPT soil boring locations were surveyed for gamma radiation by collecting gamma count rates at 1-foot intervals in each open borehole to determine whether radiological artifacts were present in subsurface soil near or immediately adjacent to the borehole. The location of each DPT soil boring surveyed for gamma radiation is presented in **Figure 2-1**. Radiological survey data from the open boreholes were recorded on the soil boring logs provided in **Appendix B**.

2.1.1.3 Sewage Sludge

The HSA/RS established that sewage sludge (i.e., a potential source of chemical and radiological contamination) was mixed with clay and the resulting mixture was used as a soil amendment at the ground surface throughout areas of OU2 containing waste fill to support revegetation. Sewage sludge also is present in the former sludge drying beds located in the eastern corner of OU2 near the Oakwood Beach WPCP. The extent of the soil amendment containing sewage sludge was investigated by logging lithological features of the eight DPT soil borings depicted on **Figure 2-1** to define the vertical extent of cover material overlying the waste fill. Historical records indicate that the soil amendment containing sewage sludge was placed over waste fill to serve as artificial topsoil and support revegetation. Therefore, for the purposes of estimating the extent of the soil amendment containing sewage, all material overlying waste fill is assumed to contain sewage sludge. The results of geologic logging of the soil cores are included in the boring logs presented in **Appendix B**.

2.1.1.4 Marine Unloading Operation

The Marine Unloading Operation, located in OU2, consisted of two unloaders powered by fuel oil fired boilers located on pile-supported foundations near the Great Kills Harbor bulkhead. From 1944 through 1948, Marine Unloading Operations transferred waste from scows/barges from other boroughs to be landfilled. The off-loaders transferred the waste from garbage barges into dump wagons. A tractor then pulled the dump wagon to an operation point on the landfill where the waste was dumped and compacted. In addition to the two unloaders, there was also an outbuilding for storage and maintenance of heavy equipment associated with the landfilling operations. This outbuilding was located within OU2 near Fairlawn Avenue and the confluence of the Hylan Boulevard Channel and Great Kills Harbor (2018). These operations are referred to collectively as the Marine Unloading Operation.

To investigate potential releases associated with the Marine Unloading Operation, two of the DPT borings (OU2-DPT-01 and OU2-DPT-03) were advanced through the bottom of the waste fill layer in the vicinity of the former location of the Marine Unloading Operation and associated infrastructure; surface and subsurface soil samples were collected at each location. One monitoring well with a 10-foot screen (MW010) was installed to support the collection of groundwater samples underlying the former location

of the unloaders. Soil and groundwater samples were analyzed for VOCs, SVOCs, PAHs, metals (including mercury), pesticides, PCBs, herbicides, dioxins and furans, and radionuclides. **Figure 2-1** presents the locations OU2-DPT-01, OU2-DPT-03, and MW010.

An underwater gamma radiation survey was also performed over portions of the bathymetric surface of the Great Kills Harbor to evaluate potential radiological impacts resulting from the Marine Unloading Operation. The survey focused on the area most likely to have been impacted by off-loading operations, which was established as a 100-foot buffer into the Great Kills Harbor adjacent to the location of the two unloaders that were installed and operated at GKP during historical landfilling activities (**see Figure 2-1**). Details related to the underwater gamma radiation survey within the Great Kills Harbor are presented in a technical memorandum provided in **Appendix A**.

2.1.1.5 Bay Terrace Incinerator Operation

The Bay Terrace Incinerator, located within OU2, was constructed in 1926 and was abandoned in 1941 (NPS, 2018b). The Bay Terrace Incinerator Operation included a burner house and a service garage for up to 20 sanitation trucks servicing Staten Island. Incinerator residue from the Bay Terrace Incinerator was disposed of at the Site. Oakwood Truck Filling Operations, which received trucked waste from Staten Island during the period from 1934 to 1948 (i.e., for disposal at the Site), were co-located with the Bay Terrace Incinerator. These operations are referred to collectively as the Bay Terrace Incinerator Operation.

To investigate potential releases associated with the Bay Terrace Incinerator Operation, two of the DPT borings (OU2-DPT-04 and OU2-DPT-05) were advanced through the bottom of the waste fill layer in the vicinity of the former location of the Bay Terrace Incinerator Operation; surface and subsurface soil samples were collected at each location. Additionally, because groundwater was observed above the Holocene clay layer (see Section 3.4), a nested well pair, each with 10-foot screens, was installed to support the collection of multi-depth groundwater samples underlying the former location of the Bay Terrace Incinerator Operation. The well pair included a shallow well screened above the Holocene (MW008WT) and a deep well screened below the Holocene within the Pleistocene glacial outwash (MW008I). Soil and groundwater samples were analyzed for VOCs, SVOCs, PAHs, metals (including mercury), pesticides, PCBs, herbicides, dioxins and furans, and radionuclides. **Figure 2-1** presents the locations OU2-DPT-04, OU2-DPT-05, MW008WT, and MW008I.

2.1.2 Surface Water and Sediment Investigations

Six co-located surface water and sediment samples were collected, including three samples (OU2-SW/SED-01, OU2-SW/SED-02, and REF-SW/SED-01) from the drainage channel that runs along northwest portion of OU2 along Hylan Boulevard (i.e., Hylan Boulevard Channel), two samples (OU2-SW/SED-03 and OU1-SW/SED-05) from the drainage channel that runs along Buffalo Street (i.e., Buffalo Street Channel); and one sample (OU2-SW/SED-04) from a wetland located near the intersection of Wetland Road and Buffalo Street. **Figure 2-1** presents the locations of the six co-located surface water and sediment samples. Surface water were analyzed for VOCs (SW 846 Method 8260C), SVOCs/PAHs (SW 846 Method 8270D/8270D-SIM), metals (SW 846 Method 6020A/7470A), pesticides (SW 846 Method 8081B), PCBs (SW 846 Method 8082A), herbicides (SW 846 Method 8151A), dioxins/furans (SW 846 Method 8290A), and radionuclides (total uranium [USEPA 200.8], radium-226/228 [USEPA 903/904] and gross alpha/beta [USEPA 900]). Sediment samples were analyzed for VOCs (SW 846 Method 8260C), SVOCs/PAHs (SW 846 Method 8270D/8270D-SIM), metals (SW 846 Method 6020A/7471B), pesticides (SW 846 Method 8081B), PCBs (SW 846 Method 8082A), herbicides (SW

846 Method 8151A), dioxins/furans (SW 846 Method 8290A), and radionuclides (uranium-238, radium-226, and thorium-232 [USEPA 901.1]). Surface water and sediment sampling logs are provided in **Appendix F**.

2.1.3 Geologic Investigations

The geologic investigation within OU2 involved the collection and logging of soil cores from eight DPT soil boring locations and four monitoring wells to better understand the geologic characteristics beneath the surface of OU2. Each core was logged using the Unified Soil Classification System (USCS) to define lithologic characteristics observed within the core. In addition, each of the cores from the eight DPT soil boring locations and the three monitoring well locations (i.e., four monitoring wells were installed at three locations) was evaluated for the presence of waste fill by observing pieces of debris that were less susceptible to decomposition, such as glass, masonry, ceramics, rubber, and metal. Each soil core was also field screened for VOCs and methane. **Figure 2-1** presents the locations of the eight DPT soil borings and four monitoring wells. Also, the results of geologic logging and field screening are included in the boring logs presented in **Appendix B**.

2.1.4 Soil and Vadose Zone Investigations

The investigation of soil and the vadose zone within OU2 involved collection of both surface and subsurface soil samples at each of the eight DPT sampling locations depicted on **Figure 2-1** to characterize the nature of contamination in surface and subsurface soil. The surface soil sample was collected from 0 to 6 inches and subsurface soil samples were collected for each 10-foot interval of the vadose zone. Within each 10-foot subsurface interval, the radiological sample was collected at the depth exhibiting the highest levels of gamma radiation, as determined by radiological scans of the soil core. Subsurface samples for chemical analysis were biased to coincide with the portion of each 10-foot subsurface interval that exhibited evidence of contamination within the soil core (e.g., based on visual observations, olfactory, elevated photoionization detector [PID] readings, etc.). A total of eight surface and 12 subsurface soil samples were collected from the sampling locations depicted on **Figure 2-1**. Soil samples were analyzed for VOCs (SW 846 Method 8260C), SVOCs/PAHs (SW 846 Method 8270D/8270D-SIM), metals (SW 846 Method 6020A/7471B), pesticides (SW 846 Method 8081B), PCBs (SW 846 Method 8082A), herbicides (SW 846 Method 8151A), dioxins/furans (SW 846 Method 8290A), and radionuclides (uranium-238, radium-226, and thorium-232 [USEPA 901.1]). **Table 2-1** provides location information for all DPT sampling locations.

2.1.5 Groundwater Investigations

The investigation of groundwater within OU2 was performed by collecting groundwater samples from permanent monitoring wells to assess the nature of contamination in groundwater at the Site. Four permanent monitoring wells were installed at the three locations depicted in **Figure 2-1** to characterize groundwater beneath OU2. MW008WT and MW008I were installed to (1) characterize the nature of groundwater contamination within the central portion of the waste-fill area within OU2; (2) characterize shallow groundwater underlying the Bay Terrace Incinerator Operation; and (3) evaluate differences in the nature of groundwater contamination within the waste fill (i.e., above Holocene clay layer) and below waste fill (i.e., below the Holocene within the Pleistocene glacial outwash). MW009 was installed to characterize the nature of shallow groundwater contamination downgradient of OU2, in between the central portion of the waste-fill area within OU2 and the Raritan Bay. Lastly, MW010 was installed to (1) characterize the nature of shallow groundwater contamination in between the central portion of the waste-fill area within OU2 and the Great Kills Harbor; and (2) characterize shallow groundwater underlying the

Marine Unloading Operation. **Table 2-1** provides location information and **Table 2-2** provides construction details for the four monitoring wells installed in OU2 during Phase 1 RI fieldwork. Groundwater samples were collected from each well and analyzed for VOCs (SW 846 Method 8260C), SVOCs/PAHs (SW 846 Method 8270D/8270D-SIM), metals (SW 846 Method 6020A/7470A), pesticides (SW 846 Method 8081B), PCBs (SW 846 Method 8082A), herbicides (SW 846 Method 8151A), dioxins/furans (SW 846 Method 8290A), and radionuclides (total uranium [USEPA 200.8], radium-226/228 [USEPA 903/904] and gross alpha/beta [USEPA 900]). Well development and purge logs are provided in **Appendix D and E**, respectively.

2.2 TECHNICAL MEMORANDA DOCUMENTING FIELD ACTIVITIES

Technical memoranda were developed to provide a more detailed summary of test pitting activities and the underwater gamma survey performed within the Great Kills Harbor, including descriptions of the data evaluation process. These technical memoranda are provided in **Appendix A**.

3. PHYSICAL CHARACTERISTICS OF THE STUDY AREA

The following section presents a summary of the physical characteristics of the study area, incorporating data obtained during the 2018 investigation activities for OU2.

3.1 SURFACE FEATURES

The current ground surface topography within OU2 reflects historical filling and grading activities and ranges from sea-level to approximately 35 feet above mean sea-level (MSL) within the central area of OU2. **Figure 3-1** presents topographic maps of the Site from 1936 (New York City Department of Parks, 1936) and present day and provides the OU1 and OU2 boundaries for reference. As shown in present day topography presented in **Figure 3-1**, OU2 slopes radially downward in all directions from the central portion of the investigation area, which corresponds to the area of the Site in which waste fill is the thickest. The surface features present in OU2 primarily include roads and paths, infrastructure associated with former recreation areas (e.g., ballfields and model airplane field), and manholes associated with the West Branch Interceptor and other sewer lines that traverse the Site. Seven former sludge drying beds are located in the eastern corner of the Site, with portions in OU1 and OU2. The sludge drying beds occupy approximately 13 acres, with each basin being approximately 2 acres in size. Throughout OU2, the ground surface is characterized by dense vegetation with mature trees and shrubs predominant along the northwestern portion of OU2 (i.e., near Hylan Boulevard). The eastern portion of OU2 is a low-lying area designated as a wetland, exhibiting a heavily vegetated ground surface that is dominated by Phragmites. **Figure 1-2** presents a map showing the surface features present within OU2.

3.2 METEOROLOGY

Information regarding the climate in the vicinity of GKP was obtained from the National Oceanic and Atmospheric Administration (NOAA) and the National Weather Service. The nearest weather station is located at the Newark Liberty International Airport. **Table 3-1** summarizes the mean monthly meteorological data including average temperatures, precipitation, and snowfall. These data were obtained for the years 1996 through 2015. The total average annual rainfall exceeds 40 inches per year.

3.3 SURFACE WATER HYDROLOGY

The streams, ponds, and groundwater of Staten Island primarily derive their flow from precipitation and in dry periods flowing streams are maintained by groundwater discharge (Soren, 1988). The major marine surface water features in the vicinity of the Site include the Raritan Bay and the Great Kills Harbor. The Site includes three man-made drainage channels, as follows:

- **Hylan Boulevard Channel.** A northeast to southwest (Hylan Boulevard) drainage channel that generally runs parallel to Hylan Boulevard along the northwestern and western edge of OU2. The Hylan Boulevard Channel extends from the intersection of Buffalo Street and Hylan Boulevard 3,800-feet to the southwest toward Fairlawn Avenue, and then turns to the east for 700-feet before discharging into Great Kills Harbor. This drainage channel is located along the north-northwest portion of the Site.
- **Buffalo Street Channel.** A northwest to southeast (Buffalo Street) drainage channel that receives drainage from the Willowbrook Parkway Right-of-Way (ROW) outside of GKP, extends beneath Hylan Boulevard, and drains parallel to Buffalo Street for approximately 2,680-feet. The channel then turns to the north for 660-feet, turns to the east where it is joined by Oakwood Beach Creek

(below), and then drains an additional 1,500-feet parallel to the Oakwood Beach WPCP floodwall before discharging into the Raritan Bay. Buffalo Street Channel is primarily present in OU1 but follows the curve of Buffalo Street and briefly flows through OU2.

- **Oakwood Beach Creek.** The Oakwood Beach Creek receives runoff from the Oakwood Beach drainage basin, and also local storm sewers that discharge into a branch of the creek (USACE, 2015). Its flow is ultimately discharged via the Buffalo Street Channel (described above) into the Raritan Bay. A portion of the Oakwood Beach Creek forms the north-northeast boundary of OU1 and adjacent Oakwood Beach WPCP.

These surface water bodies are tidally influenced near their discharge point to the Raritan Bay and the Great Kills Harbor. The eastern portion of OU2 and most of OU1 are low-lying areas that include wetlands. These low-lying areas are also designated as high-risk flood zones areas. **Figure 1-2** provides a summary of the surface water hydrology features present at the Site.

3.4 GEOLOGY

GKP is located within the Atlantic Coastal Plain Physiographic Province. The Atlantic Coastal Plain Physiographic Province is bordered to the north and west by the Piedmont Physiographic Province and on the south and east by the Atlantic Ocean. The northern Atlantic Coastal Plain is underlain by a wedge of unconsolidated sediments that generally thicken and dip to the east. The sedimentary rocks lie unconformably (erosional contact) on top of metamorphic, igneous, and consolidated sedimentary rocks. The metamorphic, igneous, and consolidated sedimentary rocks outcrop to the west (up-dip) and underlie the Piedmont Physiographic Province. The Coastal Plain sedimentary formations range in age from Jurassic (135 to 195 million years ago) to Holocene (10,000 years ago to the present).

The surficial geology of OU2 consists of “artificial fill” comprised of recent fill, hydraulic fill, and waste fill overlying the Holocene deposit and glacial deposits consisting of glacial till and glacial outwash. The surficial geological units unconformably (erosional contact) overlie the bedrock formations and these consists of the Cretaceous, Raritan Formation followed by the Precambrian to Cambrian, Staten Island Serpentine and Manhattan Schist.

Table 3-2 summarizes the geologic units present within OU2 along with boring data from the fieldwork described in Section 2.0. **Figure 2-2** provides a Site map of OU2 detailing the locations of two geologic cross-sections developed based on the geologic investigations completed during fieldwork; **Figures 3-2 and 3-3** present geologic cross sections A-A’ and B-B’, respectively.

Recent fill was identified principally in isolated areas along Hylan Boulevard. This includes areas with isolated dumping of construction debris (e.g., concrete, wood, etc.) and household waste as well as those areas where reworked glacial till was excavated for the Hylan Boulevard Channel. The excavated material was emplaced on the bank opposite Hylan Boulevard.

The waste fill consists of brown to black highly decomposed refuse comprised of incinerator residue (cinder-like material), coal ash, and organic material with scattered glass, metal, rubber, and wood debris (Johnson, 1985). Radiological artifacts and elevated levels of radioactivity (primarily radium-226) were identified within the waste fill (NPS, 2018b). Within OU2, the waste fill ranges in thickness from 4 feet thick to 37 feet thick. The waste fill is thickest under higher elevations and thins at elevations less than 5 feet. Waste fill was observed at the ground surface in three of the eight soil borings performed within OU2.

As shown in **Figures 3-2 and 3-3**, the waste fill was placed within OU2 over the Holocene deposit in the large low-lying area that extends from the glacial till margin located beneath Hylan Boulevard to the hydraulic fill that was placed from the bulkhead, along and beneath what is now the NPS Development/Beach Margin and the Buffalo Street Corridor Margin (see **Appendix A**). The extent and thickness of the waste fill is shown in **Figure 2-2**, which demonstrates that the waste fill is thickest under the central portion of the Site where the site elevations are also the highest. The extent of waste fill within OU2 is primarily based on test pit results, which are also presented in **Figure 2-2** (see **Appendix A** for a more detailed summary of testing pitting activities).

The soil amendment layer consists of a mixture of clay and sewage sludge that was emplaced over the waste fill area in the 1950s (NPS, 2018b). As shown in the geologic cross sections presented in **Figures 3-2 through 3-3**, the ground surface through a majority of OU2 is expected to contain the soil amendment containing sewage sludge. Where present in OU2, this surface cover ranges in thickness from 1 foot to 3 feet thick, with an average thickness of 1.8 feet. Based on the available records, this sewage sludge mixture was placed over waste fill and it is assumed that the areal extent of waste fill approximately coincides with the footprint in which the soil amendment containing sewage sludge was placed. Significant mixing is expected between the waste fill and the overlying soil amendment due to the manner in which the soil cover was placed and from ongoing fate and transport processes, such as tree falls, frost heave, and roots from on-Site vegetation, most notably Phragmites. Additionally, unlike OU1, significant earthwork has been performed throughout OU2 (i.e., construction of recreation areas, roads, paths, and sewer lines, etc.), which has altered the ground surface in a manner that makes it difficult to discern the soil amendment layer in certain areas of OU2.

The hydraulic fill consists of red to dark gray graded sand dredged from Great Kills Harbor (anchorage area) and navigation channels (NPS, 2018). In OU2, the hydraulic fill was installed from the bulkhead in a “curvilinear” narrow band beneath what is today the NPS Development/Beach Margin, utility corridor, and Buffalo Street toward Hylan Boulevard (NPS, 2018b). The hydraulic fill was specifically installed to provide firm foundation for roadways and other improvements as well as to contain the waste fill (NPS, 2018b). The hydraulic fill is present beneath and adjacent to Buffalo Street and ranges in thickness from 6 feet to over 15 feet thick. At the outer extent of the waste fill boundary, the transition from hydraulic fill was gradual, with feathered layers of waste fill and hydraulic fill being observed during test pitting. Additionally, historical records indicate that sewage sludge was commonly tilled into hydraulic fill to create artificial topsoil and observations during test pitting suggest that this practice may have been implemented at GKP (Scanlon, 1957).

The Holocene deposit underlies the areas overlain by waste fill and hydraulic fill. The Holocene deposit consists of dark gray silty clay to clayey silt with sand lenses. The Holocene deposit is indicative of marsh/meadow mat facies consisting of clay silt with organics with channel and open water facies consisting of gray fine to medium sand. The Holocene deposit is fairly uniform across the Site and ranges in thickness from 3 feet to 5 feet thick with an average thickness of 4 feet. The depth to the Holocene ranges from 6 feet to 37 feet below ground surface (bgs).

Underlying the Holocene deposit is the Pleistocene glacial outwash deposit. The glacial outwash deposit consists of melt water deposited, stratified red to brown, fine to coarse sand and gravel that extends from beneath the glacial till present beneath Hylan Boulevard, towards and beneath the shoreline and eastward beneath the Atlantic Ocean. The glacial outwash deposit underlies OU2 at depths ranging from approximately 10 feet bgs to over 42 feet bgs. The glacial outwash deposit beneath OU2 is over 46 feet

thick based on boring MW007I that penetrated the underlying Raritan Formation at 52 feet bgs (NPS, 2017).

The Pleistocene glacial till deposit consists of ice deposited, compact dark red-brown gravel to sand in a clay silt matrix. A thin margin of Pleistocene glacial till deposit extends onto the Site from the upland to the northwest to the east beneath Hylan Boulevard to the Hylan Boulevard Channel. The limit of the glacial till deposit is shown in **Figures 3-2 and 3-3.** The limit of the glacial till deposit is based on the topographic elevation change from the low-lying marsh (Holocene deposit) and the glacial till beneath the upland scarp underlying Hylan Boulevard shown in the 1936 topographic map presented in **Figure 3-1**.

The upper Raritan Formation unconformably (erosional contact) underlies the Pleistocene glacial outwash deposit within OU2. The Raritan Formation consists of a varicolored interbedded brown to tan to light gray to white, medium to fine sand (with a trace of silt) and clayey silt with mica (NPS, 2018b). The Raritan Formation contact was encountered at 52 feet bgs in boring MW007I. Beneath the Raritan Formation is the unconformable (erosional) contact with the Staten Island Serpentine, which occurs at an approximate depth of 250 feet to 270 feet bgs, followed by the Manhattan Schist which occurs at a depth of 260 feet to 370 feet bgs. (Perlmutter, 1953, Soren, 1988, and Rosenberg, 2013).

3.5 HYDROGEOLOGY

MW008WT, MW009WT, and MW010WT were installed in their planned locations, each with 10-foot screened intervals that span the groundwater surface. MW008I was screened below the Holocene deposit within the Pleistocene glacial outwash deposit. Free product was not detected in any of the any of the four wells that were installed and sampled during the Phase 1 RI for OU2. MW008WT and MW010WT were both screened within shallow groundwater that is in direct contact with waste fill, while MW009WT was screened within shallow groundwater that is outside of the waste fill boundary. MW008WT and MW008I were successfully installed as a nested well pair, with MW008WT being screened above the Holocene deposit and MW008I being screened below the Holocene deposit within the Pleistocene glacial outwash deposit. MW008WT was screened over an elevation of 13.93 feet to 3.93 feet above MSL and had a static water elevation of 7.93 feet above MSL. MW008I was screened over an elevation of -17.04 feet to -27.04 feet and had a static water elevation of 2.59 feet above MSL (see **Table 3-2**). The water level data support that the Holocene deposit serves as a confining to semi-confining layer between the shallow aquifer (i.e., within the waste fill) and the underlying regional aquifer (i.e., within the Pleistocene glacial outwash deposit). The groundwater elevations at MW008WT and MW008I indicate a downward gradient of approximately 0.18 foot/foot from the shallow aquifer to the regional aquifer.

The three water table wells were all screened above the Holocene, within the shallow aquifer at the Site. As shown in **Table 3-2**, the water level elevations at MW008WT, MW009WT, and MW010WT were 7.93 feet, 6.90 feet, and 4.57 feet above MSL. The highest water level elevation was measured at the center portion of the waste filled area. The waste filled area within OU2 is surrounded by surface water features, including drainage channels, the Great Kills Harbor, and the Raritan Bay. While additional monitoring wells and water level measurements are necessary to better characterize the site hydrogeology (i.e., tidal influence can confound the interpretation of water level data at the Site), the available information suggests that the shallow aquifer flows from the waste filled area radially towards these surface water features.

The regional aquifer (i.e., within the Pleistocene) flows from the northern corner of the Site to the south towards the coastline and harbor (United States Geologic Survey [USGS], 1981). The Site and GKP are located adjacent to and surrounded by saltwater surface water bodies, including Great Kills Harbor and

Raritan Bay. Fresh groundwater from the regional aquifer interacts with the denser lens of saline groundwater associated with adjacent marine water bodies.

The 2016 tidal study (NPS, 2017) determined that a majority of OU1 was tidally influenced; based on these findings, similar tidal influences likely occur in OU2, but additional investigations are required to characterize the degree of tidal influence within OU2. Also, the presence of the bulkhead along Great Kills Harbor likely influences shallow groundwater flow and may inhibit groundwater discharge from the Site into Great Kills Harbor. The vertical length of the steel sheet piling along the bulkhead ranges between 18-feet to 34-feet (Baker and Honig, 1982).

3.6 DEMOGRAPHY AND LAND USE

Most of OU2 is included in the portion of GKP that was closed to the public through the installation of security measures that include fencing and signage. As a result, the primary receptors based on current land use within OU2 include NPS and/or New York City workers requiring intermittent access to the Site, as well as unauthorized trespassers. Additionally, as shown in **Figure 1-2**, certain areas of the Site adjacent to the Great Kills Harbor are open to the public and are used for fishing. While most of OU2 remains closed, it is bordered to the southwest by portions of GKP that are open and used on a daily basis by park guests for recreational purposes that include walking, running, and biking.

Residential communities present within 200 feet of OU2 include communities west of Fairlawn Avenue and north of Hylan Boulevard. These residential areas are separated from OU2 by the Hylan Boulevard Channel and roads (i.e., Fairlawn Avenue and Hylan Boulevard). The closest school to the Site is Public School 053 Bay Terrace - The Barbara Esselborn School at 330 Durant Avenue, Staten Island. The school is located over 288 feet to the north and upgradient from the OU2. This school includes grades from pre-kindergarten through fifth grade and has approximately 780 students.

Exposure to Site contaminants is controlled by the closure of OU2, which is intended to prevent members of the public from occupying areas that may pose a risk. Exposure to OU2 groundwater through consumption is not anticipated because groundwater on Staten Island is not used as a potable water supply. All potable water is sourced from the municipal system supplied by reservoirs located in Westchester County, Putnam County, and Ulster County New York. Staten Island groundwater is used for other activities including irrigation, swimming pools, and automobile cleaning (e.g., carwash). The New York State Department of Environmental Conservation (NYSDEC) water withdrawal data indicate that there are four water withdrawal systems with capacities greater than or equal to 100,000 gallons per day located on Staten Island, including 1) Silver Lake Golf Course located 4.8 miles north of GKP, 2) Richmond County Country Club located 2.4 miles north of GKP, 3) Arthur Kill Generating Station located 4.2 miles northwest of GKP, and 4) South Shore Country Club located 4 miles west of GKP. These systems are all located several miles from GKP and in separate groundwater basins. Based on DOHMH water withdrawal data, 13 smaller water withdrawal systems were identified within the ZIP codes surrounding OU2 (NPS, 2018b). Twelve of the 13 water withdrawal systems are for residential use (e.g., lawn irrigation and pools), with the nearest being located over 2,000 feet to the northeast of OU2. OU2 is located immediately adjacent to the Raritan Bay and Site groundwater flows in a southeasterly direction towards the coastline and is not expected to impact water withdrawal systems identified in the vicinity of OU2.

3.7 ECOLOGY

Much of the vegetation within OU2 has been altered by human activities (filling activities). Over 465 plant species have been identified within Gateway, and of these NPS estimates that 33 to 50 percent are non-native species. **Table 3-3** presents the vegetation associations and communities present at GKP along with the underlying soil and vegetative assemblages. Much of Crooke's Point is covered with invasive vines, the removal of which is a target of an NPS partnership project with volunteers and the New York City Department of Parks and Recreation. Mudflats and vegetation associated with the North Atlantic Coast estuarine intertidal mudflat occupies a portion of the coast at GKP.

The bird community in the Staten Island Unit of Gateway is most varied at GKP, including Crooke's Point. Wintering horned larks, snow buntings (*Plectrophenax nivalis*), and Lapland longspurs (*Calcarius lapponicus*) occupy shoreline habitat; and purple sandpipers (*Calidris maritima*), ruddy turnstones (*Arenaria interpres*), and gulls visit jetties at Crooke's Point and north of the tidal flats at GKP (NPS, 2014). Fall bird migrants are numerous and include red-shouldered hawk (*Buteo lineatus*), rough-legged hawk, and northern harrier; as well as numerous warblers, vireos, orioles, and flycatchers. Shorebirds, wading birds, and waterfowl including herons, ibis, and egrets occupy seasonal ponds. Bank swallow (*Riparia riparia*) nests are present southeast of the parking lot.

Species present at GKP include waterfowl, wading birds, raptors and passerine species of birds. Open areas of beach grass provide habitat for amphibians and reptiles. Historically, diamond-backed terrapins (turtles) were found at the harbor on Crooke's Point and green frogs and Fowler's toads were found in shaded areas south of Hylan Boulevard. Small mammals likely present at OU2 include bats, mice, chipmunks, shrews, squirrels, and voles. OU2 generally provides less suitable habitat than other areas of GKP, such Crooke's Point, which contains diverse wildlife habitat and remains an important habitat for migrating birds and insects, particularly the Monarch butterfly (NPS, 2014). **Table 3-4** presents the New York State-listed endangered and threatened species found within GKP, principally Crooke's Point.

4. NATURE AND EXTENT OF CONTAMINATION

The following section provides a detailed discussion of the nature and extent of contamination based on the results of investigation activities described in Section 2.0 as well as the analytical results from sampling activities performed for surface soil, subsurface soil, groundwater, sediment, and surface water.

4.1 SOURCES

Contaminant sources within OU2 include, (1) waste fill derived from New York City Department of Sanitation's historical waste disposal operations at GKP (e.g., refuse, incinerator residue, and coal ash), (2) radiological artifacts incidentally contained in waste fill, and (3) sewage sludge that was used throughout OU2 as part of a soil amendment to facilitate revegetation and also present in the former sludge drying beds. Historical operations within OU2 also included the operation of two unloaders adjacent to the Great Kills Harbor and the operation of the Bay Terrace maintenance garage and incinerator.

4.1.1 Waste Fill

The results of DPT soil borings and test pitting activities were analyzed to better define the vertical and horizontal extent of waste fill within OU2. **Figure 2-2** presents a map depicting the lateral extent and thickness of waste fill at the Site. In addition, the geologic cross-sections presented in **Figures 3-2 and 3-3** show the distribution of waste fill underlying the Site along each transect. The investigation determined that a majority of OU2 is underlain by waste fill and that the waste fill is thickest in the center, where it is approximately 37 feet thick near the former location of the Bay Terrace maintenance garage and incinerator. Waste fill gradually tapers all directions and terminates at the following boundaries, (1) the Great Kills Harbor bulkhead to the southwest, (2) the Hylan Boulevard Channel to the west and northwest, and (3) the hydraulic fill placed underneath and around Buffalo St. along the northeast and southeast extent of OU2. A relatively small area of waste fill extends across the channel to Hylan Boulevard near the intersection with Justin Avenue. This area aligns with the historical location of the road that was built from Hylan Boulevard to the Bay Terrace maintenance garage and incinerator (see the 1940 aerial photograph presented in **Figure 1-7**). Waste fill is also present northeast of Buffalo street within OU1 and within the sludge drying beds, which are present in both OU1 and OU2. Test pitting completed within the OU2 allowed the field team to observe the transition between areas containing waste fill to areas without waste fill. These transitions are best characterized as a gradual tapering of the waste layer. Radiological and PID measurements collected during the completion of the test pits were not elevated above background levels.

Based on the delineation activities performed at the Site, the extent of waste fill is well defined in both OU1 and OU2. The data obtained from test pits and soil borings across the Site indicate that waste fill is present within 186 acres of OU2, with a maximum thickness of 37 feet. The waste thicknesses shown in **Figure 2-2** and the geologic cross-sections presented in **Figures 3-2 and 3-3** are based on the eight soil borings and four monitoring wells completed in OU2 along with comparisons of the ground surface topography between 1936 and 2014. Detailed volumetric estimates of waste fill in OU2 will be developed once additional soil borings are completed during subsequent phases of the RI. The nature of contamination associated with waste fill in OU2 is characterized by subsurface soil sampling results discussed in Section 4.2.2.

4.1.2 Radiological Artifacts

As discussed in Section 2.1.1.2, historical investigation activities within OU2 have confirmed that radiological artifacts are present due to their association with waste fill at the time in which waste disposal operations occurred at GKP. Radiological survey data from down hole gamma logging was evaluated to determine whether radiological sources were present in soil adjacent to each borehole conducted in OU2. Most downhole gamma logging measurements were within two standard deviations of the mean count rate and all measurements were within three standard deviations, suggesting that radioactive sources with significant activity levels were likely not present in soil near or immediately adjacent to the boring. Furthermore, no radiological artifacts were encountered during the OU2 Phase 1 investigation. The results indicate that while radiological artifacts are known to be present and potentially scattered throughout the waste fill within OU2, the probability of encountering an artifact immediately adjacent to a non-biased borehole is low, such that elevated readings were not observed in any of the eight DPT soil borings evaluated. The downhole gamma logging results are presented in **Appendix C**.

4.1.3 Sewage Sludge

As discussed in Section 2.1.1.3, a soil amendment containing sewage sludge was placed over waste fill to serve as artificial topsoil and support revegetation. Additionally, historical records indicate that sewage sludge was commonly tilled into hydraulic fill to create artificial topsoil and observations during test pitting suggest that this practice may have been implemented at GKP (Scanlon, 1957). As shown in the geologic cross sections presented in **Figures 3-2 through 3-3**, the ground surface through a majority of OU2 was characterized as the soil amendment containing sewage sludge. Where present, this surface cover ranges in thickness from 1 foot to 3 feet thick, with an average thickness of 1.8 feet. Based on the available records, this sewage sludge mixture was placed over waste fill and it is assumed that the areal extent of waste fill approximately coincides with the footprint in which the soil amendment containing sewage sludge was placed. The contacts between the soil amendment cover and waste fill were estimated based on evaluations of soil cores collected within OU2. Significant mixing is expected between the waste fill and the overlying soil amendment due to the manner in which the soil cover was placed and from ongoing fate and transport processes, such as tree falls, frost heave, and roots from on-Site vegetation, most notably Phragmites.

Additionally, the soil amendment containing sewage sludge was not observed at the ground surface along Wetland Road (i.e., waste fill was present at the ground surface). Since the available information supports that the soil amendment was placed over the entire site to support revegetation, it is suspected that historical earthwork performed during the installation of the West Branch Interceptor may have altered the present-day ground surface. As a result, the soil amendment is not shown along the portion of Geologic Cross-Section A-A' that runs along Wetland Road (see **Figure 3-2**).

The data obtained from test pits and soil borings indicate that the soil amendment is present within a majority of the soil borings performed in OU2 (i.e., five out of the eight borings), with a maximum thickness of 3 feet. The thickness of soil amendment containing sewage sludge presented in the geologic cross-sections shown on **Figures 3-2 and 3-3** are based on the eight soil borings completed in OU2 along with comparisons of the ground surface topography between 1936 and 2014. Detailed volumetric estimates of the soil amendment containing sewage sludge in OU2 will be developed once additional soil borings are completed during subsequent phases of the RI. The nature of contamination associated with sewage sludge is characterized by surface soil sampling results discussed in Section 4.2.1.

4.1.4 Marine Unloading Operation

An underwater gamma radiation survey was performed over an approximate 1-acre area of the bathymetric surface of the Great Kills Harbor. The results of the offshore survey are presented in **Figure 4-1** and additional details related to the survey and the data evaluation methodology are provided in **Appendix A**. The survey determined that conditions were comparable to the reference area throughout a majority of the survey area adjacent to the location of the two unloaders that historically operated at GKP. However, radiological anomalies were detected in several locations and may indicate potential radiological contamination is present in sediment. Altogether, 12 locations were identified as exhibiting elevated levels that may indicate radioactive material is present within the Marine Unloading Area of the Great Kills Harbor (see **Figure 4-1**).

To better understand these results, historical information related to key aspects of the Marine Unloading Operation were combined with a map of the 12 radiological anomalies identified within the Great Kills Harbor (see **Figure 4-2**). Additionally, side scan sonar data from a 2013 survey of the Great Kills Harbor were obtained and added to **Figure 4-2**. The historical information shows that five mooring dolphins, which would have stabilized the hopper barges during the unloading process, were present 40 feet offshore and centered on the Wellman Unloader, which operated a 10 cubic yard bucket. The Lambert Unloader operated a 3 cubic yard bucket and did not have mooring dolphins offshore. The available information suggests that the Wellman was the primary unloader used for the unloading operations at GKP. As shown in **Figure 4-2**, a majority of the radiological anomalies are located adjacent to the Wellman Unloader. The radiological artifacts historically encountered at the Site are heavier than water and would deposit on the sediment surface if they were lost during unloading operations. These results indicate that the Marine Unloading Operation may have resulted in releases of radiological contamination to sediment in the Great Kills Harbor. **Figure 4-2** includes construction details for the mooring platform and boom, which were designed to contain materials lost during the unloading process.

Additional investigations of the Marine Unloading Operation were performed on land within OU2 and included two DPT borings (OU2-DPT-01 and OU2-DPT-03) and the construction of a monitoring well, MW010WT. During fieldwork, waste fill was present in both DPT borings and was observed during the installation of MW010WT at thicknesses ranging between 6.5 feet and 9 feet. Additionally, during the geologic logging of the soil core at OU-DPT-01, a strong hydrocarbon odor was evident at around 10 feet bgs, which coincides to the top of the saturated interval, as observed in the soil core during geologic logging. The strong hydrocarbon odor suggests the possibility of a petroleum release during historic operations in the support area for the Marine Unloading Operation. The subsurface soil sample was collected at the bottom of the vadose zone, but the strong hydrocarbon odor was primarily present in the saturated interval, suggesting that future groundwater sampling may be required in this area to evaluate whether groundwater was impacted by a release of petroleum hydrocarbons.

The analytical results for soil and groundwater samples collected to evaluate the Marine Unloading Operation are discussed in Sections 4.2 and 4.3, respectively.

4.1.5 Bay Terrace Incinerator Operation

Investigations of the Bay Terrace Incinerator Operation included two DPT borings (OU2-DPT-04 and OU2-DPT-05) and the construction of two, co-located monitoring wells (MW008WT and MW008I). During the completion of the soil boring and monitoring wells, waste fill was observed from the ground surface to a depth of 37 feet bgs, which represents the thickest portion of the waste filled area at the Site. The soil cores collected to characterize the Bay Terrace Incinerator Operation contained waste fill with a

high proportion of incinerator residue. Overall, the observations of subsurface cores did not indicate additional releases, such as chlorinated solvents or petroleum hydrocarbons that were likely used at the service garage, at the Bay Terrace Incinerator Operation. This area was found to contain waste fill exhibiting a high proportion of incinerator residue, which was expected. The analytical results for soil and groundwater samples collected to evaluate the Bay Terrace Incinerator Operation are discussed in Sections 4.2 and 4.3, respectively.

4.2 SOIL AND VADOSE ZONE

The soil and vadose zone evaluation determined that several contaminants, including metals, organic chemicals, and radionuclides are present at concentrations that exceed human health and ecological screening benchmarks. The human health soil screening benchmarks for chemicals in surface and subsurface soil are USEPA RSLs (USEPA, 2018) corresponding to a target cancer risk of $1x10^{-6}$ and a target hazard quotient of 0.1, specifically for residential and industrial receptors. The human health soil screening benchmarks for radionuclides are based on soil screening levels for evaluating surface soil, as specified in U.S. Nuclear Regulatory Commission Regulation (NUREG) 1757, Volume 1 (U.S. NRC, 2006). NPS Ecological Screening Values (ESVs) (NPS, 2018c and 2018d) were used as ecological screening benchmarks for soil.

Some chemicals, including carcinogenic PAHs and dioxins/furans, exhibit similar toxicological properties that differ in the degree of toxicity. Therefore, to provide an appropriate evaluation of these chemicals, toxicity equivalence factors (TEF) were applied in accordance with USEPA's 2018 RSL User's Guide (USEPA, 2018) to adjust the measured concentrations to a toxicity equivalent concentration, which resulted in calculated Toxicity Equivalence (TEQ) for benzo(a)pyrene and dioxins/furans.

Tables 4-1 and 4-2 provide a statistical and a cross-tabbed data summary table for all chemicals and radionuclides evaluated as part of analyses of surface soil samples and **Tables 4-3 and 4-4** provide the same information for subsurface soil samples collected from the eight DPT sampling locations depicted on **Figure 2-1**, respectively. The statistical and cross-tabbed data summaries also provide an evaluation of the analytical results in relation to human health and ecological screening benchmarks. Site maps were prepared to graphically depict the analytical results for chemicals that exceeded human health and/or ecological screening benchmarks. **Figures 4-3 through 4-8** provide spider plot postings to graphically depict the surface and subsurface soil analytical results for analytes that exceeded screening benchmarks.

4.2.1 Surface Soil

The following section provides a summary of the analytical results for surface soil samples collected within OU2.

4.2.1.1 Metals

Metals exceeded human health and ecological screening benchmarks in all OU2 surface soil samples. **Figure 4-3** provides a graphical summary of all metals that exceeded screening benchmarks in surface soil. Aluminum, antimony, arsenic, cadmium, cobalt, copper, iron, lead, manganese, mercury, silver, thallium, and vanadium each exceeded the residential RSL; arsenic, iron, lead and mercury also exceeded the industrial RSL. The highest concentrations of arsenic, iron, and lead were detected in surface soil collected from OU2-DPT-04 and OU2-DPT-05, respectively, which were collected to evaluate the former location of the Bay Terrance Incinerator Operation. The highest concentration of mercury was detected in OU2-DPT-08, which was collected to characterize the portion of the sludge drying beds present within OU2. A total of 17 metals were detected in OU2 above ecological screening benchmarks, which are

shown graphically on **Figure 4-3**; beryllium was the only metal that did not exceed its established ecological screening benchmark.

4.2.1.2 Organics

Organic chemicals exceeded human health and ecological screening benchmarks in all OU2 samples. **Figure 4-4** provides a graphical summary of all organic chemicals that exceeded screening benchmarks in surface soil. Dioxin TEQ, benzo(a)pyrene TEQ, toxaphene, 4,4'-DDD, and Aroclor 1254 each exceeded the residential RSL; dioxin TEQ and Aroclor 1254 also exceeded the industrial RSL. The highest concentrations of dioxin TEQ and Aroclor 1254 were both detected in surface soil collected from OU2-DPT-08, which was collected to evaluate the portion of the sludge drying beds present within OU2. A total of 11 organic chemicals were detected in OU2 above ecological screening benchmarks, which are shown graphically on **Figure 4-4**.

4.2.1.3 Radionuclides

Radionuclides exceeded human health and ecological screening benchmarks in five of the eight samples collected from within OU2. **Figure 4-5** provides a graphical summary of all radionuclides that exceeded screening benchmarks in surface soil. Radium-226 exceeded human health screening benchmarks in five out of the eight surface soil samples, while thorium-232 exceeded human health screening benchmarks in only one out of eight surface soil samples. Radium-226 was the only radionuclide to exceed ecological screening benchmarks, with radium-226 being detected above the ecological screening benchmark in one surface soil sample, OU2-DPT-08, collected to evaluate the portion of the sludge drying beds present within OU2. Uranium-238 was not detected above either human health or ecological screening benchmarks in surface soil.

4.2.2 Subsurface Soil

The following section provides a summary of the analytical results for subsurface soil samples collected within OU2.

4.2.2.1 Metals

Metals exceeded human health and ecological screening benchmarks in all 12 subsurface soil samples within OU2. **Figure 4-6** provides a graphical summary of all metals that exceeded screening benchmarks in subsurface soil. Aluminum, antimony, arsenic, cadmium, cobalt, copper, iron, lead, manganese, mercury, thallium, vanadium and zinc each exceeded the residential RSL; antimony, arsenic, iron, lead and mercury also exceeded the industrial RSL. The highest concentrations of antimony and iron were detected in soil collected at 9 feet bgs at OU2-DPT-04 and 5 feet bgs at OU2-DPT-05, respectively. Both of these samples were collected to evaluate the former location of the Bay Terrance Incinerator Operation. The highest concentrations of arsenic and lead were detected in the same sample, which was collected at 5 feet bgs at OU2-DPT-06. The highest concentration of mercury was detected in soil collected at 2 feet bgs at OU2-DPT-08, which was collected to characterize the portion of the sludge drying beds present within OU2. A total of 17 metals were detected in OU2 above ecological screening benchmarks, which are shown graphically on **Figure 4-6**. As with surface soil, beryllium was the only metal that did not exceed its established ecological screening benchmark in subsurface soil.

4.2.2.2 Organics

Organic chemicals exceeded human health and ecological screening benchmarks in all 12 subsurface soil samples within OU2. **Figure 4-7** provides a graphical summary of all organic chemicals that exceeded

screening benchmarks in subsurface soil. Dioxin TEQ, benzo(a)pyrene TEQ (which includes several individual carcinogenic PAHs that also exceeded), 1,4-dichlorobenzene, Aroclor 1254, and Aroclor 1260 each exceeded the residential RSL; dioxin TEQ, benzo(a)pyrene TEQ, Aroclor 1254, and Aroclor 1260 also exceeded the industrial RSL. The highest concentration of dioxin TEQ was detected in soil collected at 14 feet bgs at OU2-DPT-06. The highest concentration of benzo(a)pyrene TEQ was detected in soil collected at 14 feet bgs at OU2-DPT-04, which was collected to evaluate the former location of the Bay Terrance Incinerator Operation. The highest concentrations of Aroclor 1254 and Aroclor 1260 were both detected at 2 feet bgs at OU2-DPT-08, which was collected to evaluate the portion of the sludge drying beds present within OU2. A total of 29 organic chemicals were detected in OU2 above ecological screening benchmarks, most of which are shown graphically on **Figure 4-7**. Due to the large number of PAHs exceeding ecological screening benchmarks and to make the visual presentation of this data more useful, **Figure 4-7** only presents exceedances of high molecular weight (HMW) and low molecular weight (LMW) PAHs, which together encompass 16 individual PAHs.

4.2.2.3 Radionuclides

Radionuclides exceeded human health and ecological screening benchmarks in all 12 subsurface soil samples within OU2. **Figure 4-8** provides a graphical summary of all radionuclides that exceeded screening benchmarks in subsurface soil. Radium-226 exceeded human health screening benchmarks in all 12 subsurface soil samples, while thorium-232 exceeded human health screening benchmarks in only five out of 12 subsurface soil samples. Radium-226 was the only radionuclide to exceed ecological screening benchmarks, with radium-226 being detected above the ecological screening benchmark in two subsurface soil samples, OU2-DPT-03 and OU2-DPT-07. Uranium-238 was not detected above either human health or ecological screening benchmarks in subsurface soil.

4.3 GROUNDWATER

The groundwater evaluation determined that several contaminants, including metals, organic chemicals, and radionuclides are present at concentrations that exceed human health screening benchmarks. MW008WT, MW009WT, and MW010WT were installed in their planned locations, each with 10-foot screened intervals that span the groundwater surface. MW008I was screened below the Holocene deposit within the Pleistocene glacial outwash deposit. Free product was not detected in any of the four wells that were installed and sampled during the Phase 1 RI for OU2. MW008WT and MW010WT were both screened within shallow groundwater that is in direct contact with waste fill, while MW009WT was screened within shallow groundwater that is outside of the waste fill boundary. MW008I was screened below the Holocene deposit and is hydraulically separated from the shallow aquifer.

The evaluation of groundwater is based on both federal MCLs for drinking water and USEPA RSLs for tap water (November 2018) (USEPA, 2018). Consumption of groundwater underlying the Site is not a complete exposure pathway, but comparisons to these conservative screening benchmarks still provide useful context for evaluating the OU2 groundwater sample dataset.

Some chemicals, including carcinogenic PAHs and dioxins/furans, exhibit similar toxicological properties that differ in the degree of toxicity. Therefore, to provide an appropriate evaluation of these chemicals, TEFs were applied in accordance with USEPA's 2018 RSL User's Guide (USEPA, 2018) to adjust the measured concentrations to a toxicity equivalence concentration, which resulted in calculated TEQs for benzo(a)pyrene and dioxins/furans.

Table 4-5 provides a statistical summary for all chemicals and radionuclides evaluated as part of OU2 sampling for groundwater. **Table 4-5** also provides an evaluation of the number of results that exceed groundwater screening benchmarks, which include federal MCLs for drinking water and USEPA RSLs for tap water. **Table 4-6** provides a cross-tabbed summary of all analytical results for groundwater, screened against federal MCLs for drinking water and USEPA RSLs for tap water (November 2018). **Figure 4-9** graphically depicts the analytical results for all analytes that exceeded groundwater screening benchmarks.

4.3.1.1 Metals

As shown in **Tables 4-5 and 4-6**, a variety of metals were detected in OU2 groundwater at concentrations that exceeded tapwater RSLs and federal MCLs. Arsenic and lead each exceeded the federal MCL in at least one groundwater sample within OU2. Antimony, arsenic, barium, cobalt, iron, lead, and manganese each exceeded the tapwater RSL in at least one sample. **Figure 4-9** provides a map of OU2 with spider plot tables for each instance in which a detected metal exceeded the federal MCL and/or tapwater RSL.

Metals analysis was performed for both filtered (i.e., dissolved) and unfiltered samples (i.e., total) from each of the four monitoring wells that were installed during the Phase 1 RI for OU2. Filtered and unfiltered samples generally exhibited similar concentrations and the results were, on average, within 6% (i.e., filtered vs. unfiltered) for the metals that were detected above screening benchmarks. The exception to this was arsenic, iron, and lead in MW010WT, which were present at higher concentrations in the unfiltered sample (see **Figure 4-9**). MW010WT is a low-yield monitoring well that was pumped dry during development. In fact, MW010WT was such a low-yield monitoring well, that a sample could only be collected using a bailer deployed over several days to obtain the necessary sample volume (i.e., in accordance with the OU2 Phase 1 RI SAP [NPS, 2018a]). The water collected from MW010WT was significantly more turbid than the groundwater samples obtained from the other three wells. As a result, elevated concentrations of arsenic, iron, and lead in MW010WT are most likely attributable to suspended particles present in the groundwater that was collected for the unfiltered sample.

As discussed in Section 3.5, the Holocene deposit serves as a confining to semi-confining layer between the shallow aquifer (i.e., within the waste fill) and the underlying regional aquifer (i.e., within the Pleistocene glacial outwash deposit). The groundwater elevations at MW008WT and MW008I indicate a downward gradient of approximately 0.18 feet/feet from the shallow aquifer to the regional aquifer. The metals results show that arsenic, barium, and iron were present at higher concentrations in MW008WT (i.e., higher than in the MW008I), suggesting that vertical migration may be responsible for elevated concentrations of these metals in the regional aquifer (see **Figure 4-9**). Conversely, manganese concentrations were higher in MW008I, suggesting that manganese may be associated with naturally occurring conditions in the regional aquifer (i.e., within the Pleistocene glacial outwash deposit).

4.3.1.2 Organics

As shown in **Tables 4-5 and 4-6**, no organic chemicals exceeded federal MCLs in OU2 groundwater; however, dioxin TEQ, alpha-BHC, benzo(a)pyrene TEQ, bis(2-chloroethyl)ether, and chloroform were detected in OU2 groundwater at concentrations that exceed tapwater RSLs in at least one sample. **Figure 4-9** provides a map of OU2 with spider plot tables for each instance in which an organic chemical exceeded tapwater RSLs. In general, the highest concentrations of organic chemicals were detected in MW010WT, where the maximum detected concentrations of dioxin TEQ, benzo(a)pyrene TEQ, bis(2-chloroethyl)ether, and chloroform were observed.

4.3.1.3 Radionuclides

As shown in **Tables 4-5 and 4-6**, gross alpha, gross beta, radium-226/228, and total uranium were detected in OU2 groundwater, but below the federal MCLs. The only noteworthy observation related to radionuclides in groundwater was that the highest concentration of radium-226/228 was observed in MW008WT, and was generally three to four times higher than in other monitoring wells. However, the radium-226/228 concentrations did not exceed the federal MCL in any monitoring well sampled within OU2.

4.4 SEDIMENT

The sediment evaluation determined that several contaminants, including metals, organic chemicals, and radionuclides are present at concentrations that exceed human health and ecological screening benchmarks.

The human health soil screening benchmarks for chemicals in sediment are USEPA RSLs (USEPA, 2018) corresponding to a target cancer risk of $1x10^{-6}$ and a target hazard quotient of 0.1, specifically for residential and industrial receptors. The human health soil screening benchmarks for radionuclides are based on soil screening levels for evaluating surface soil, as specified in NUREG 1757, Volume 1 (U.S. NRC, 2006). NPS ESVs (NPS, 2018c and 2018d) were used as ecological screening benchmarks for sediment.

Some chemicals, including carcinogenic PAHs and dioxins/furans, exhibit similar toxicological properties that differ in the degree of toxicity. Therefore, to provide an appropriate evaluation of these chemicals, TEFs were applied in accordance with USEPA's 2018 RSL User's Guide (USEPA, 2018) to adjust the measured concentrations to a toxicity equivalence concentration, which resulted in calculated TEQs for benzo(a)pyrene and dioxins/furans.

Tables 4-7 and 4-8 provide a statistical and a cross-tabbed data summary table for all chemicals and radionuclides evaluated as part of analyses of sediment samples from the six sediment sampling locations depicted on **Figure 2-1**, respectively. The statistical and cross-tabbed data summaries also provide an evaluation of the analytical results in relation to human health and ecological screening benchmarks. Site maps were prepared to graphically depict the analytical results for chemicals that exceeded human health and/or ecological screening benchmarks. **Figures 4-10 through 4-12** provide spider plot postings to graphically depict the sediment analytical results for analytes that exceeded screening benchmarks.

4.4.1.1 Metals

Metals exceeded human health and ecological screening benchmarks in all sediment samples within OU2. **Figure 4-10** provides a graphical summary of all metals that exceeded screening benchmarks in sediment. Aluminum, arsenic, cobalt, iron, and thallium each exceeded the residential RSL; arsenic also exceeded the industrial RSL. The highest concentration of arsenic was detected in sediment collected from OU2-SED-02, which was collected to evaluate the Hylan Boulevard Channel. A total of 11 metals were detected in OU2 above ecological screening benchmarks, including antimony, arsenic, cadmium, chromium, copper, iron, lead, mercury, nickel, silver, and zinc, which are shown graphically on **Figure 4-10**. Overall, the list of metals exceeding human health and ecological screening benchmarks were fairly consistent between the six samples that were collected during the Phase 1 RI for OU2.

4.4.1.2 Organics

Organic chemicals exceeded human health and ecological screening benchmarks in all sediment samples within OU2. **Figure 4-11** provides a graphical summary of all organic chemicals that exceeded screening benchmarks in sediment. Dioxin TEQ, benzo(a)pyrene TEQ (including several PAHs that contribute to benzo(a)pyrene TEQ), and 4,4'-DDD each exceeded the residential RSL; dioxin TEQ also exceeded the industrial RSL. The highest concentrations of dioxin TEQ was detected in sediment from OU2-SED-02, which was collected to evaluate the Hylan Boulevard Channel. A total of 34 organic chemicals were detected in sediment above ecological screening benchmarks, which are shown graphically on **Figure 4-11**. Due to the large number of PAHs exceeding ecological screening benchmarks and to make the visual presentation of this data more useful, **Figure 4-11** only presents exceedances of HMW and LMW PAHs, which together encompass 16 individual PAHs.

4.4.1.3 Radionuclides

Radionuclides exceeded human health screening benchmarks in two of the six samples collected during the Phase 1 RI for OU2; radionuclides did not exceed ecological screening benchmarks in sediment. **Figure 4-12** provides a graphical summary of the radionuclides that exceeded human health screening benchmarks in sediment. Radium-226 was the only radionuclide to exceed human health screening benchmarks, with radium-226 being detected above the ecological screening benchmark in two sediment samples, REF-SED-01 and OU2-SED-02, which were collected from the Hylan Boulevard Channel.

4.5 SURFACE WATER

The surface water evaluation determined that several contaminants, including metals, organic chemicals, and radionuclides are present at concentrations that are elevated above human health and ecological screening benchmarks. The human health screening benchmarks for surface water are based on both federal MCLs for drinking water and USEPA RSLs for tap water (November 2018) (USEPA, 2018). Consumption of surface water at the Site is not a complete exposure pathway, but comparisons to these conservative screening benchmarks still provide useful context for evaluating the OU2 dataset. NPS ESVs (NPS, 2018c and 2018d) were used as ecological screening benchmarks for surface water.

Some chemicals, including carcinogenic PAHs and dioxins/furans, exhibit similar toxicological properties that differ in the degree of toxicity. Therefore, to provide an appropriate evaluation of these chemicals, TEFs were applied in accordance with USEPA's 2018 RSL User's Guide (USEPA, 2018) to adjust the measured concentrations to a toxicity equivalence concentration, which resulted in calculated TEQs for benzo(a)pyrene and dioxins/furans.

Table 4-9 provides a statistical summary for all chemicals and radionuclides evaluated as part of OU2 sampling for groundwater. **Table 4-9** also provides an evaluation of the number of results that exceed surface water screening benchmarks, which include federal MCLs for drinking water, USEPA RSLs for tap water, and NPS ESVs. **Table 4-10** provides a cross-tabbed summary of all analytical results for surface water, screened against federal MCLs for drinking water, USEPA RSLs for tap water (November 2018), and NPS ESVs. **Figure 4-13** graphically depicts the analytical results for all analytes that exceeded surface water screening benchmarks.

4.5.1.1 Metals

As shown in **Tables 4-9 and 4-10**, a variety of metals were detected in OU2 surface water at concentrations that exceed tapwater RSLs, but no metal was detected above its federal MCL in surface water. Antimony, arsenic, cobalt, iron, and manganese each exceeded the tapwater RSL in at least one

sample. **Figure 4-13** provides a map of OU2 with spider plot tables for each instance in which a detected metal exceeded tapwater RSLs. The highest concentrations of arsenic, cobalt, iron, and manganese were all detected in the same sample, OU2-SW-02, which was collected to characterize the Hylan Boulevard Channel. A total of 14 metals were detected in OU2 above ecological screening benchmarks, including aluminum, arsenic, barium, cadmium, calcium, copper, iron, lead, magnesium, manganese, mercury, nickel, silver, and zinc, which are shown graphically on **Figure 4-13**.

4.5.1.2 Organics

As shown in **Tables 4-9 and 4-10**, no organic chemicals exceeded federal MCLs in OU2 surface water; however, heptachlor and naphthalene were each detected in OU2 surface water in one sample (i.e., heptachlor in OU1-SW-05 and naphthalene at REF-SW-01) at a concentration that exceeds tapwater RSLs. **Figure 4-13** provides a map of OU2 with spider plot tables for each instance in which an organic chemical exceeded tapwater RSLs. 4,4'-DDT, endosulfan I, and heptachlor were detected in surface water above ecological screening benchmarks; the locations of each exceedance are shown graphically on **Figure 4-13**.

4.5.1.3 Radionuclides

Radionuclides exceeded human health and ecological screening benchmarks in four of the six surface water samples collected during the Phase 1 RI for OU2. **Figure 4-13** provides a graphical summary of the radionuclides that exceeded screening benchmarks in surface water. Radium-228 and the Radium 226/228 exceeded the federal drinking water MCL in one sample, REF-SW-01 (note: both exceedances are attributable to the same Radium-228 result); this result is also the only occurrence where radium-228 exceeded ecological screening benchmarks in surface water. Radium-226 exceeded ecological screening benchmarks in three surface water samples, which are shown graphically in **Figure 4-13**. As shown in **Tables 4-9 and 4-10**, gross alpha, gross beta, and total uranium were detected in OU2 surface water, but below human health and ecological screening benchmarks.

5. FATE AND TRANSPORT

Evaluation of contaminant fate and transport was not a goal of the OU2 Phase 1 RI. Rather, the specific goals of the OU2 Phase 1 RI were to better define the lateral and vertical extent of waste fill within OU2, evaluate whether historical operations in OU2 have resulted in releases that may pose a potential threat to human health or the environment, characterize the nature of contamination associated with potential releases, and generate data that supports the sample design for subsequent investigations within OU2. Subsequent investigations of OU2 will include additional data collection that will support the evaluation of contaminant fate and transport within OU2.

Upon completion of all phases of the OU2 RI, NPS's approach under CERCLA is to combine the investigation results for OU1 and OU2 into a single, Site-wide RI Report, which will include a comprehensive characterization of contaminant fate and transport, including persistence and potential migration pathways for contaminants at the Site.

6. BASELINE RISK ASSESSMENT

Conducting a baseline risk assessment was not part of the OU2 Phase 1 RI. Rather, the specific goals of the OU2 Phase 1 RI were to better define the lateral and vertical extent of waste fill within OU2, evaluate whether historical operations in OU2 have resulted in releases that may pose a potential threat to human health or the environment, characterize the nature of contamination associated with potential releases, and generate data that supports the sample design for subsequent investigations within OU2. Subsequent investigations of OU2 will include additional data collection designed to support a baseline risk assessment.

Upon completion of all phases of the OU2 RI, NPS's approach under CERCLA is to combine the investigation results for OU1 and OU2 into a single, Site-wide RI Report, which will include a comprehensive characterization of risks to both human health and the environment.

7. SUMMARY AND RECOMMENDATIONS

The purpose of the OU2 Phase 1 RI was to generate representative data of adequate quality to refine the CSM and optimize the investigation approach for subsequent RI sampling. The specific goals were to better define the lateral and vertical extent of waste fill within OU2, evaluate whether historical operations in OU2 have resulted in releases that may pose a potential threat to human health or the environment, characterize the nature of contamination associated with potential releases, and generate data that supports the sample design for subsequent investigations within OU2. Based on the completion of the field activities described in this report and the resulting datasets, the sampling objectives of the OU2 Phase 1 RI were successfully achieved. The following section provides a summary of technical findings in the form of an updated CSM and provides recommendations to optimize the investigation approach for subsequent RI sampling, which will be presented in a future SAP for OU2.

7.1 CONCEPTUAL SITE MODEL

An updated graphical CSM of the Site is presented in **Figure 7-1** and the key technical features of the CSM are discussed in the sections below.

7.1.1 Sources

Contaminant sources within OU2 include, (1) waste fill derived from New York City Department of Sanitation's historical waste disposal operations at GKP (e.g., refuse, incinerator residue, and coal ash), (2) radiological artifacts incidentally contained in waste fill, and (3) sewage sludge that was used throughout OU2 as part of a soil amendment to facilitate revegetation and also present in the former sludge drying beds. Historical operations within OU2 also included the Bay Terrace Incinerator Operation and the Marine Unloading Operation.

7.1.1.1 Marine Unloading Operation

The investigation results for the Marine Unloading Operation determined that waste fill was present in both the offloading and support areas and is consistent with other areas of OU2. The underwater gamma radiation survey performed over portions of the bathymetric surface of the Great Kills Harbor identified 12 radiological anomalies within the investigation area (see **Figure 4-1**). The conceptual model of historical unloading operations presented in **Figure 4-2** suggests that these anomalies may have resulted from releases of radiological contamination during Marine Unloading Operations. Future investigations of these radiological anomalies may be appropriate to identify the source and assess whether historical operations at the Site resulted in releases of radiological contamination to the Great Kills Harbor.

In addition, a strong hydrocarbon odor was evident in OU2-DPT-01, which was collected to characterize the support area for the Marine Unloading Operation. The hydrocarbon odor and staining were observed to start at 10 feet bgs, which coincides to the top of the saturated interval. The strong hydrocarbon odor suggests the possibility of a petroleum release during historic operations in the support area for the Marine Unloading Operation. Future groundwater investigation may be appropriate in this area.

7.1.1.2 Bay Terrace Incinerator Operation

The results of the OU2 Phase 1 RI indicate that the contaminants associated with the Bay Terrace Incinerator Operation are indicative of waste fill with a high proportion of incinerator residue. The

investigation results did not indicate additional releases (i.e., beyond waste fill) at the Bay Terrace Incinerator Operation.

7.1.2 Surface Water Hydrology

The major marine surface water features in the vicinity of the Site include the Raritan Bay and the Great Kills Harbor. The Site includes three man-made drainage channels, including the Hylan Boulevard Channel, the Buffalo Street Channel, and the Oakwood Beach Creek. While the Hylan Boulevard Channel ultimately discharges to the Great Kills Harbor, significant sediment deposition was observed within the channel during sampling activities. This depositional area was present downstream of OU2-SW/SED-02 (see **Figure 7-1**) and was observed to significantly restrict and/or block flow altogether, depending on the stage of the channel. The Hylan Boulevard Channel and the Buffalo Street Channel are hydraulically connected through two culverts that run underneath Buffalo Street near the main entrance to GKP. The Buffalo Street Channel is routed along Buffalo Street until it bends to the northeast, where it merges with the Oakwood Beach Creek. The combined flow of the Oakwood Beach Creek and the Buffalo Street Channel discharges to the Raritan Bay. Contaminants within surface and subsurface soil may be transported to site surface water through erosion from surface runoff and sloughing of surface and subsurface soil into the three man-made drainage channels at the Site (i.e., the Hylan Boulevard Channel, the Buffalo Street Channel, and the Oakwood Beach Creek).

7.1.3 Geology/Hydrogeology

The surficial geology of OU2 is primarily waste fill overlying the Holocene deposit. The Holocene deposit consists of dark gray silty clay to clayey silt with sand lenses. Underlying the Holocene deposit is the Pleistocene glacial outwash deposit, which consists of fine to coarse sand and gravel. Underlying OU2, groundwater is present in two aquifers, (1) a shallow, unconfined aquifer that overlies the Holocene deposit and is in direct contact with waste fill and (2) the underlying regional aquifer within the Pleistocene glacial outwash deposit. The Holocene deposit serves as a confining to semi-confining layer between the two aquifers and there is a downward hydraulic gradient of approximately 0.18 foot/foot from the shallow aquifer to the regional aquifer (see **Figure 7-1**).

Site contaminants present within the shallow aquifer may migrate through the Holocene deposit and into the regional aquifer in the Pleistocene glacial outwash deposit. Additionally, shallow groundwater within OU2 likely flows radially towards surface water features, including the Great Kills Harbor, the Raritan Bay, the Hylan Boulevard Channel, the Buffalo Street Channel, the Oakwood Beach Creek, and Site wetlands.

7.1.4 Extent of Contamination

As shown in **Figure 7-1**, waste fill is present at the site in two areas, one on the OU2 side of Buffalo Street and the other on the OU1 side of Buffalo Street. The areal estimates for the extent are shown on **Figure 7-1** and are as follows:

- Extent of waste fill on the OU2 side of Buffalo Street: 177 acres
- Extent of waste fill on the OU1 side of Buffalo Street: 50 acres
- Extent of waste fill within the OU2 boundary: 191 acres
- Extent of waste fill within OU1 boundary: 31 acres
- Extent of waste fill outside of the OU1 and OU2 boundaries: 2 acres

Within OU2, waste fill is thickest in the center, where it is approximately 37 feet thick near the former location of the Bay Terrace maintenance garage and incinerator. Waste fill gradually tapers all directions

and terminates at the following boundaries, (1) the Great Kills Harbor bulkhead to the southwest, (2) the Hylan Boulevard Channel to the west and northwest, and (3) the hydraulic fill placed underneath and around Buffalo Street along the northeast and southeast extent of OU2. The soil amendment containing sewage sludge overlies the waste fill, from the ground surface to the top of the waste layer, although the soil amendment may not be present in areas of OU2 that were developed (e.g., recreational areas, along roads, and near sewer lines). Radiological artifacts are also present throughout the waste fill; however, due to shielding from overlying soil, the prevalence of buried artifacts is difficult to quantify.

7.1.5 Nature of Contamination

The SAP for the Phase 1 RI for OU2 (NPS, 2018a) defined the human health and ecological benchmarks used to determine whether potential chemical and/or radiological contamination is present in environmental media. Section 4.0 of this report provides a detailed description of the analytical results for soil, groundwater, sediment, and surface water in relation to these screening benchmarks. Chemicals and radionuclides that exceed human health screening benchmarks are considered chemicals of potential concern (COPCs) and radionuclides of potential concern (ROPCs), respectively. Chemicals and radionuclides that exceed ecological screening benchmarks are considered chemicals of potential ecological concern (COPECs) and radionuclides of potential ecological concern (ROPECs), respectively. Environmental investigations performed during subsequent phases of the RI for OU2 should include all analyte groups for which COPCs/ROPCs and/or COPECs/ROPECs were identified.

7.1.5.1 COPCs/ROPCs

Table 7-1 provides a summary of COPCs/ROPCs across all media. The following summary provides a breakdown of the number of COPCs/ROPCs exceeding human screening benchmarks within each analyte group by media:

Analyte Group:	Surface Soil:	Subsurface Soil:	Groundwater:	Sediment:	Surface Water:
Herbicides	0	0	0	0	0
Metals	13	13	7	5	5
PCBs	1	2	0	0	0
Dioxins/Furans	2	2	1	1	0
Pesticides	2	0	1	1	1
SVOCs/PAHs	2	8	2	5	1
VOCs	0	0	1	0	0
Rad	2	2	0	1	0
Total	22	27	12	13	8

As shown above, COPCs/ROPCs were observed for all analyte groups except herbicides.

7.1.5.2 COPECs/ROPECs

Table 7-2 provides a summary of COPECs/ROPECs across all media. The following summary provides a breakdown of the number of COPECs/ROPECs exceeding ecological benchmarks within each analyte group by media:

Analyte Group	Surface Soil	Subsurface Soil	Groundwater	Sediment	Surface Water
Herbicides	0	0	0	0	0
Metals	17	17	0	11	14
PCBs	1	2	0	0	0
Dioxins/Furans	2	2	0	2	0
Pesticides	5	7	0	8	3

SVOCs/PAHs	3	17	0	21	0
VOCs	0	1	0	3	0
Rad	1	1	0	0	2
Total	28	46	0	45	17

As shown above, COPECs/ROPECs were observed for all analyte groups except herbicides.

7.2 RECOMMENDATIONS

Based on the results of the OU2 Phase 1 RI, the following recommendations will be considered during the development of a future SAP to complete the RI for OU2:

- **Radiological Anomalies Associated with the Marine Unloading Operation:** Additional investigations are recommended to evaluate the source of the radiological anomalies identified within the Great Kills Harbor and assess whether they are related to the Marine Unloading Operation.
- **Petroleum Hydrocarbons at the Support Area for Marine Unloading Operation:** Additional investigations are recommended to evaluate the hydrocarbon odor and staining observed in OU2-DPT-01 and assess whether groundwater was impacted by a release of petroleum hydrocarbons.
- **Bay Terrace Incinerator Operation:** The contaminants associated with the Bay Terrace Incinerator Operation are indicative of waste fill containing a high proportion of incinerator residue, which was expected. Additional investigations of the Bay Terrace Incinerator Operation are not recommended.
- **Evaluation of Both Aquifers Underlying OU2:** Two aquifers are present within OU2, (1) a shallow, unconfined aquifer that overlies the Holocene deposit and is in direct contact with waste fill and (2) the underlying regional aquifer within the Pleistocene glacial outwash deposit. Future groundwater investigations should focus on evaluating contamination within the shallow aquifer because it is direct contact with waste fill and may discharge to surface water. Additional nested well pairs are also recommended to evaluate the regional aquifer due to the downward vertical hydraulic gradient across the Holocene deposit.
- **Unfiltered Groundwater Samples:** Filtered and unfiltered samples collected for metals and radionuclides generally exhibited similar concentrations and the results were, on average, within 6% (i.e., filtered vs. unfiltered) for the contaminants detected above screening benchmarks. Since future groundwater sampling will likely be performed using permanent monitoring wells, it is recommended that only unfiltered samples be collected during future groundwater investigations.
- **Refined Analytical Approach:** Herbicides did not exceed human health or ecological screening benchmarks. Consideration should be given to eliminating herbicides from the analytical approach during future RI sampling.
- **Reduced Sampling Density.** In 2016, unbiased surface and subsurface soil samples were collected at 50 locations and 13 monitoring wells were installed and sampled within OU1, which is a significantly smaller area than OU2 (i.e., OU1 is 43 acres and OU2 is 237 acres). The RI sampling approach within OU1 corresponds to a sampling density of approximately 1.2 soil sampling locations per acre and 0.3 monitoring wells per acre. The OU2 Phase 1 analytical results support that the nature of contamination is fairly consistent throughout the Site. Therefore, a

reduced sampling density (i.e., as compared to OU1) will be considered during planning for future investigations within OU2.

- **Site and OU Boundaries:** Based on the extent of contamination presented in Section 7.1.3 and **Figure 7-1**, there are approximately 12 acres and 51 acres of OU1 and OU2 that do not contain waste fill, respectively. This is primarily attributable to the presence of hydraulic fill underneath and adjacent to Buffalo Street. In addition, there two acres at GKP that contain waste fill, but are currently outside of the OU1 and OU2 boundaries. It is recommended that the OU1 and OU2 boundaries be expanded to include all areas at GKP that contain waste fill. Modified boundaries for OU1 and OU2 will be presented in a future SAP for OU2.

In addition to the future investigations discussed above for the Marine Unloading Operation, the next phases of RI sampling for OU2 will involve the collection of additional data to complete the baseline risk assessment and fate and transport evaluation, which are required to complete the RI. Details related to the investigation approach for subsequent RI sampling will be presented in a future SAP for OU2.

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FIGURES



Map source: National Park Service (www.nps.gov)
Accessed 9/1/2016.

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Gateway National Recreation Area

Gateway National Recreation Area and Geographic Unit Locations

Great Kills Park, Staten Island, NY | February 2017

Figure 1-1. Gateway National Recreation Area and Geographic Unit Locations



Figure 1-2. Map of the Great Kills Park Site

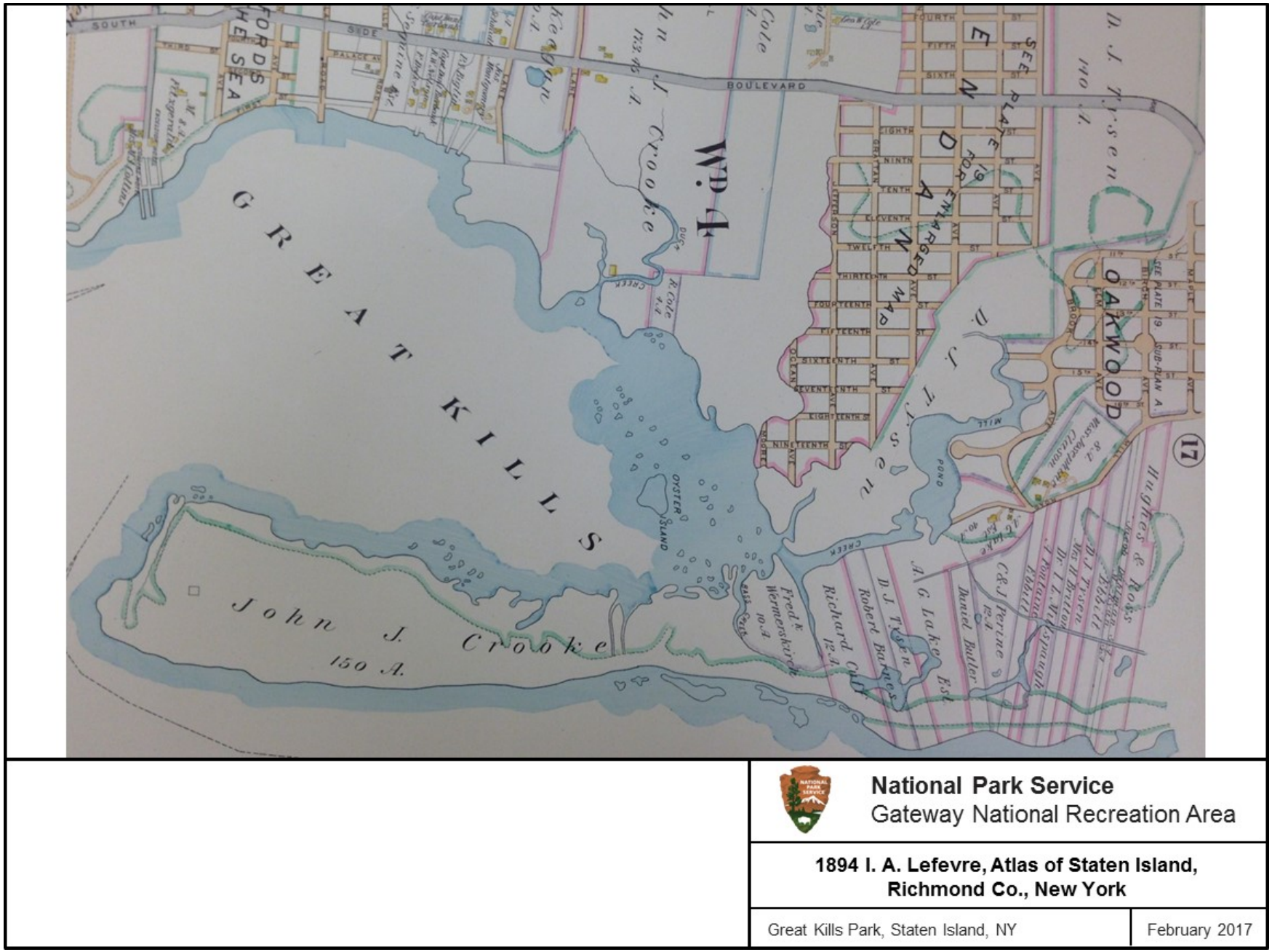


Figure 1-3. 1894 I.A. Lefevre, Atlas of Staten Island, Richmond County, New York

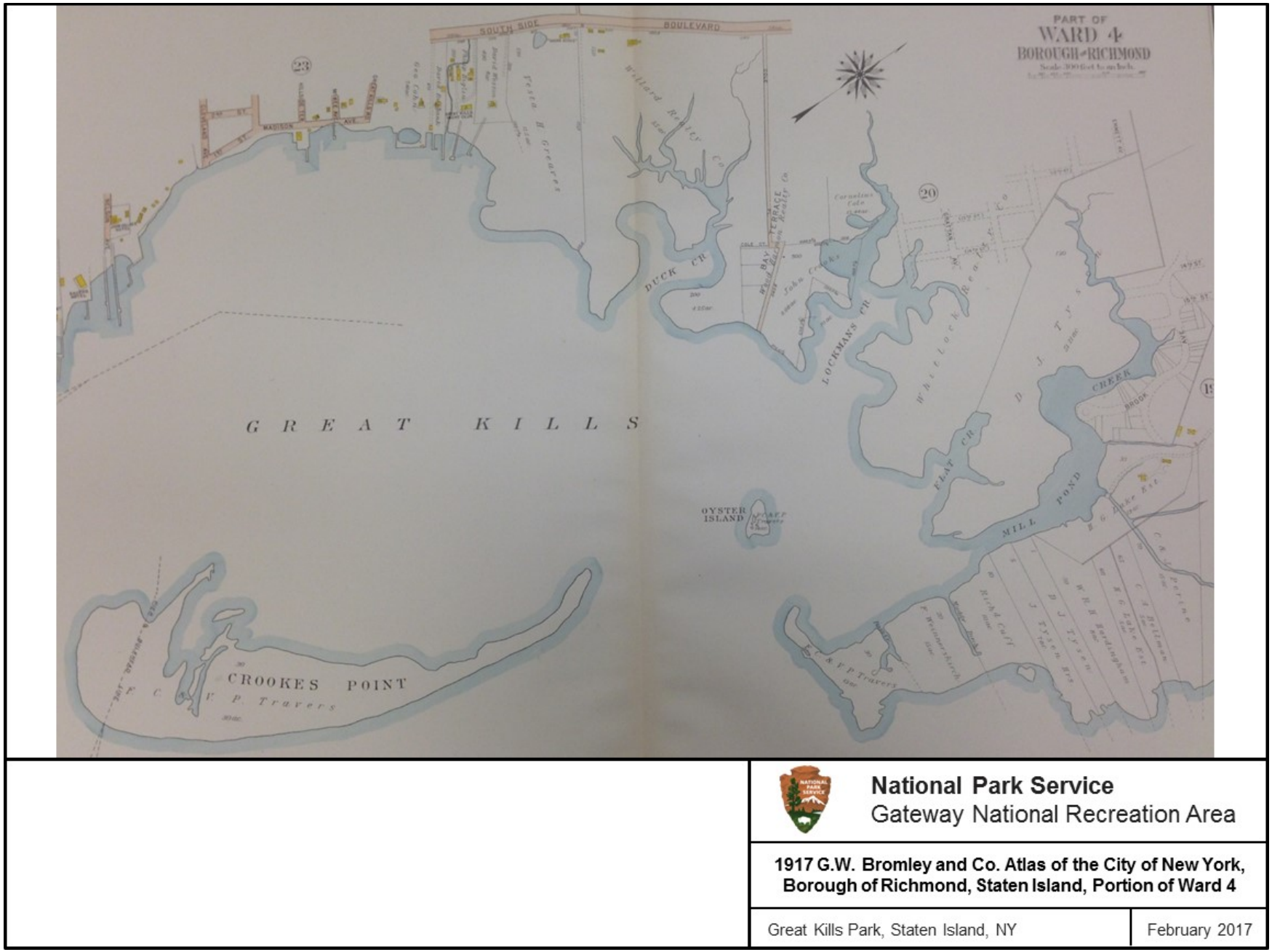


Figure 1-4. 1917 G.W. Bromley and Co. Atlas of City of New York, Borough of Richmond, Staten Island

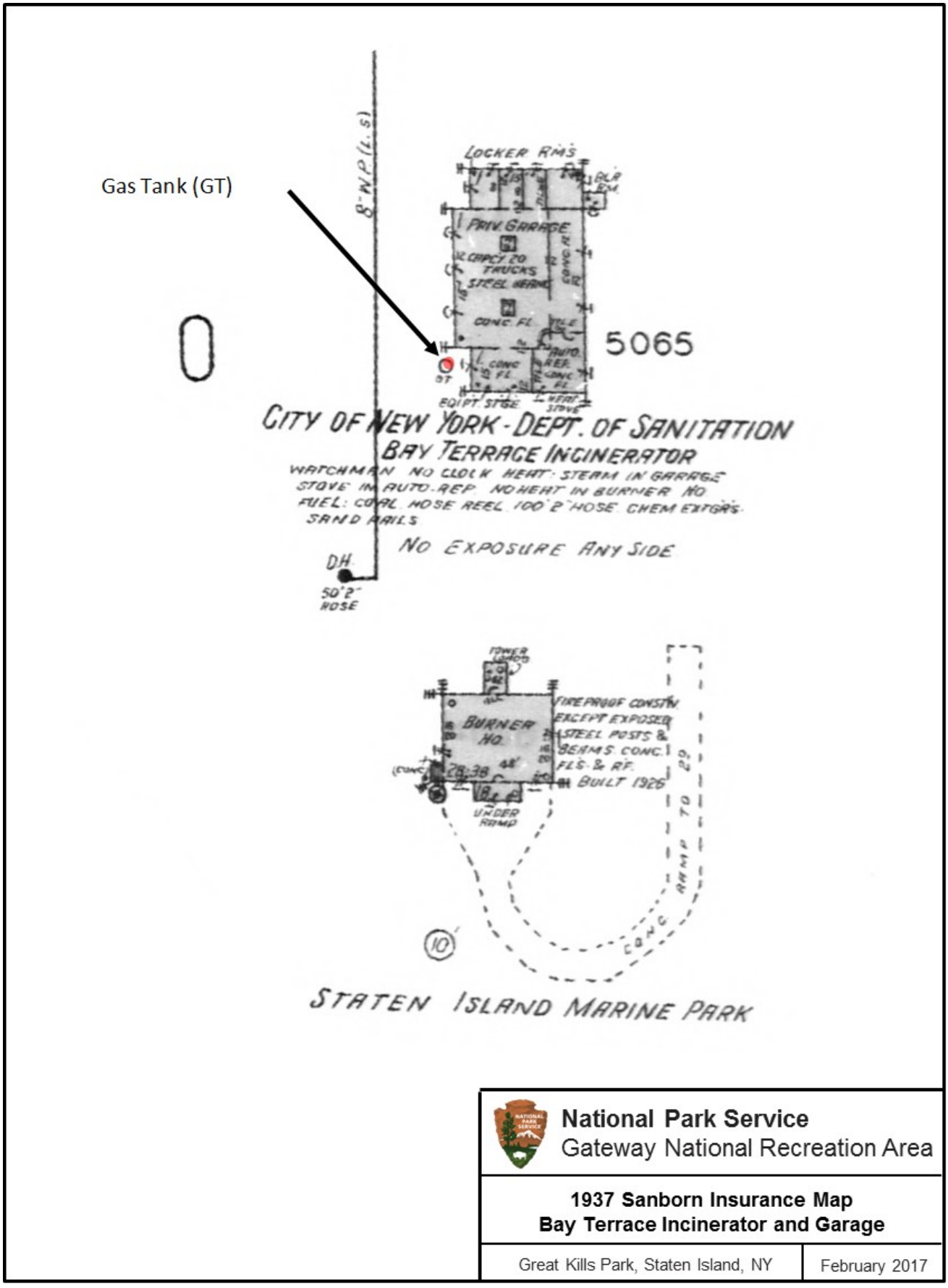


Figure 1-5. 1937 Sanborn Insurance Map, Bay Terrace Incinerator and Garage

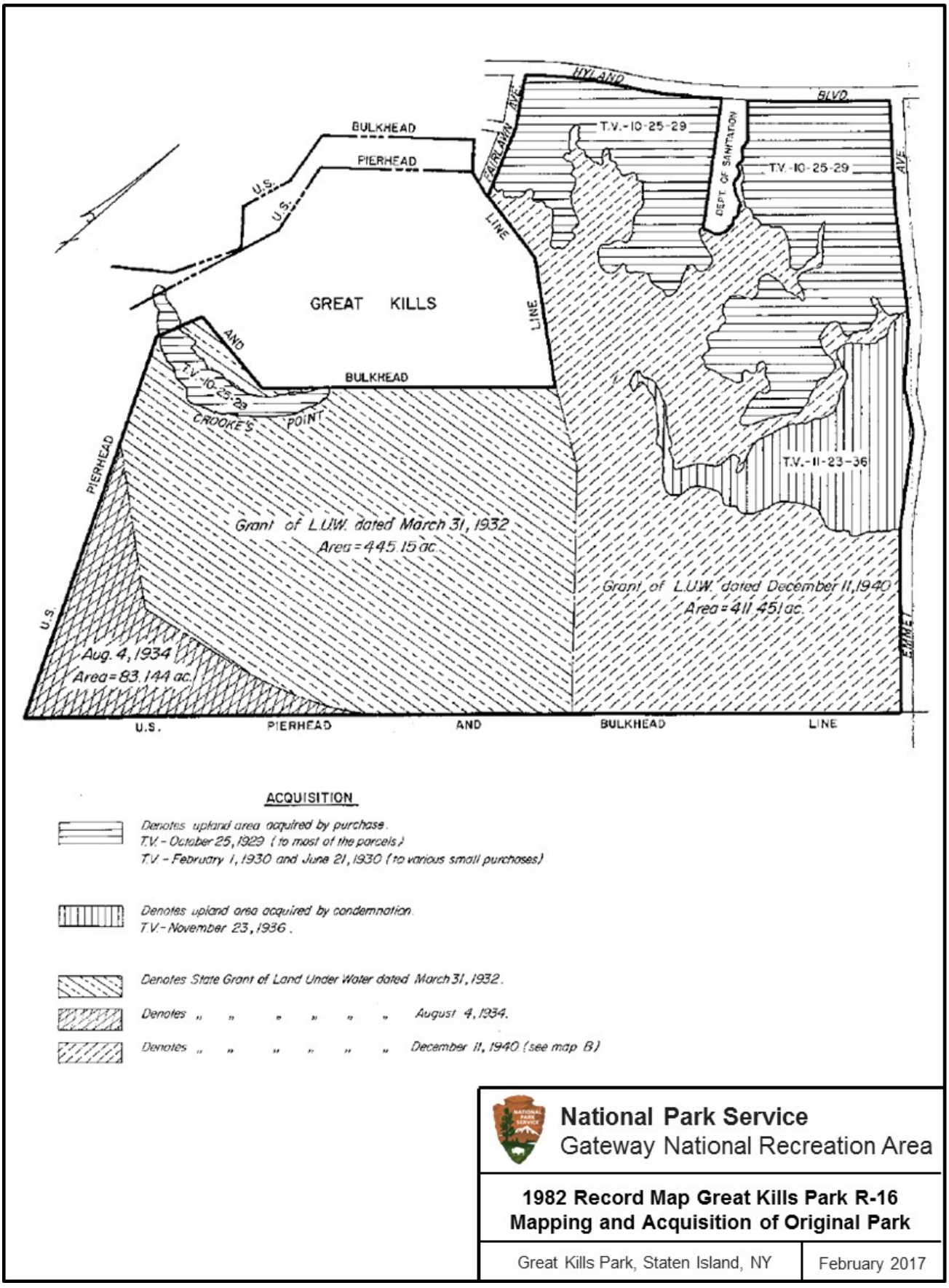


Figure 1-6. 1982 Record Map, Great Kills Park R-16 Mapping and Acquisition of Original Park

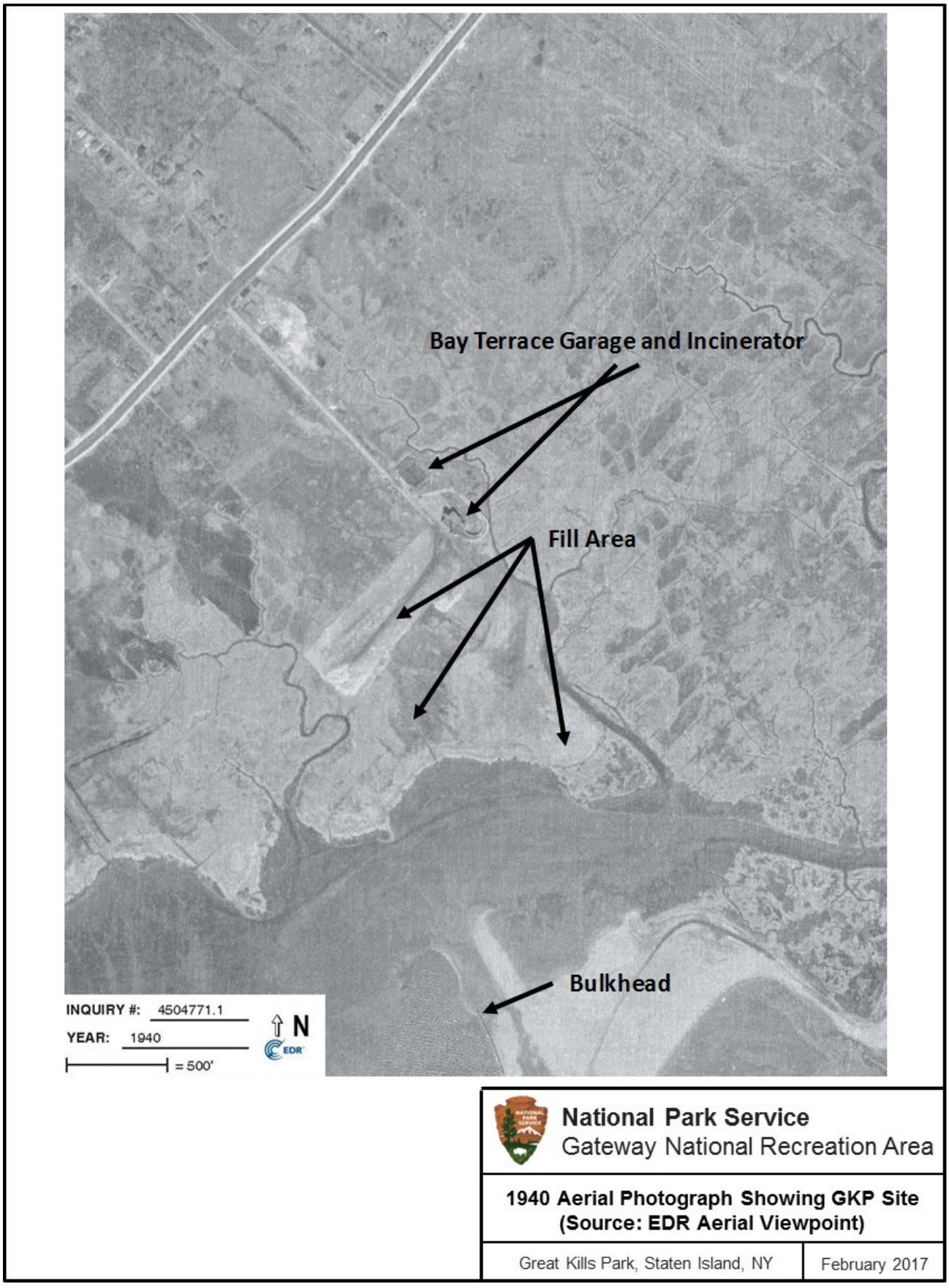


Figure 1-7. 1940 Aerial Photograph Showing GKP Site

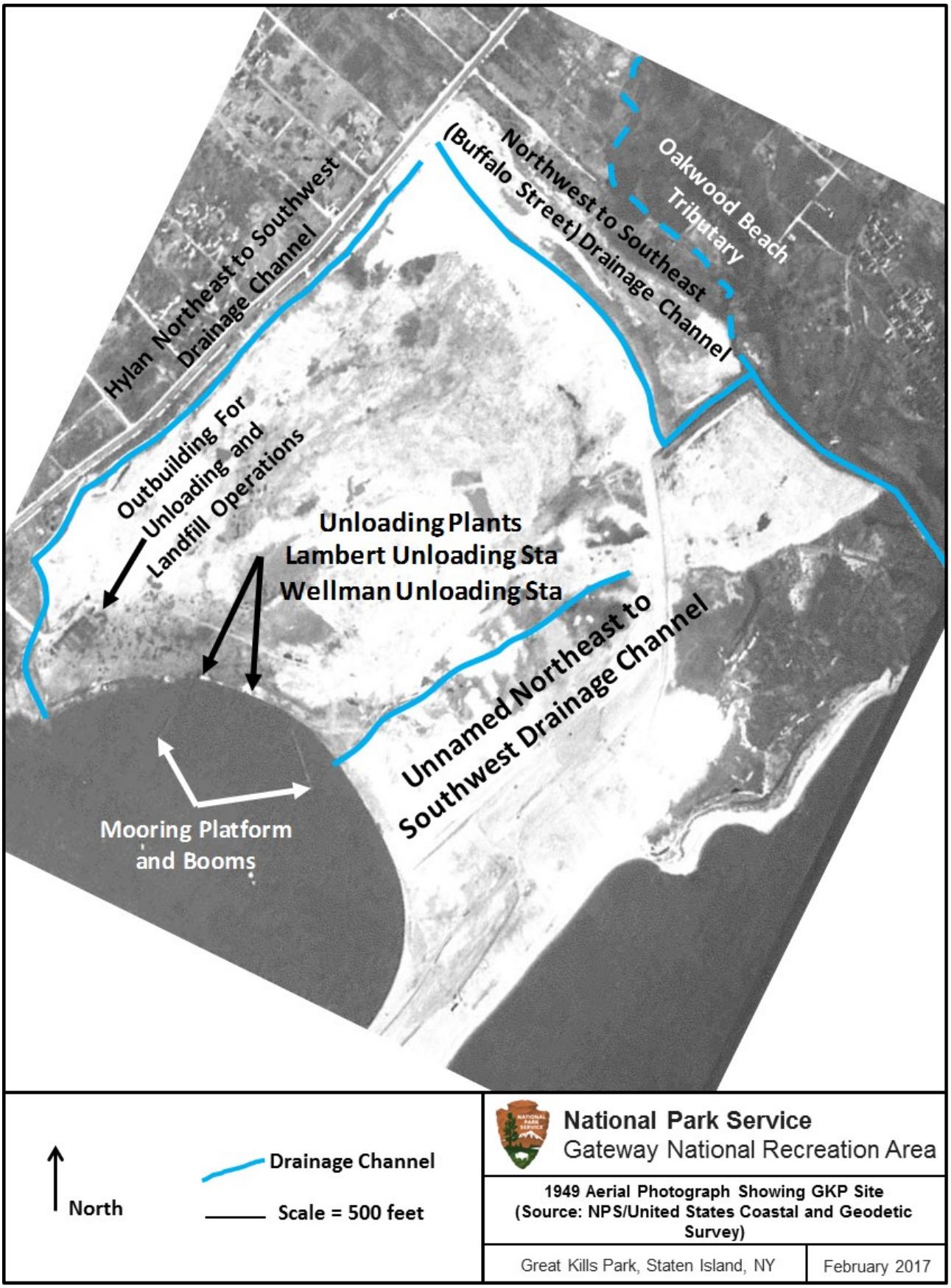


Figure 1-8. 1949 Aerial Photograph Showing GKP Site



Figure 2-1. Map of Soil, Groundwater, Surface Water, and Sediment Sampling Location for the OU2 Phase 1 RI

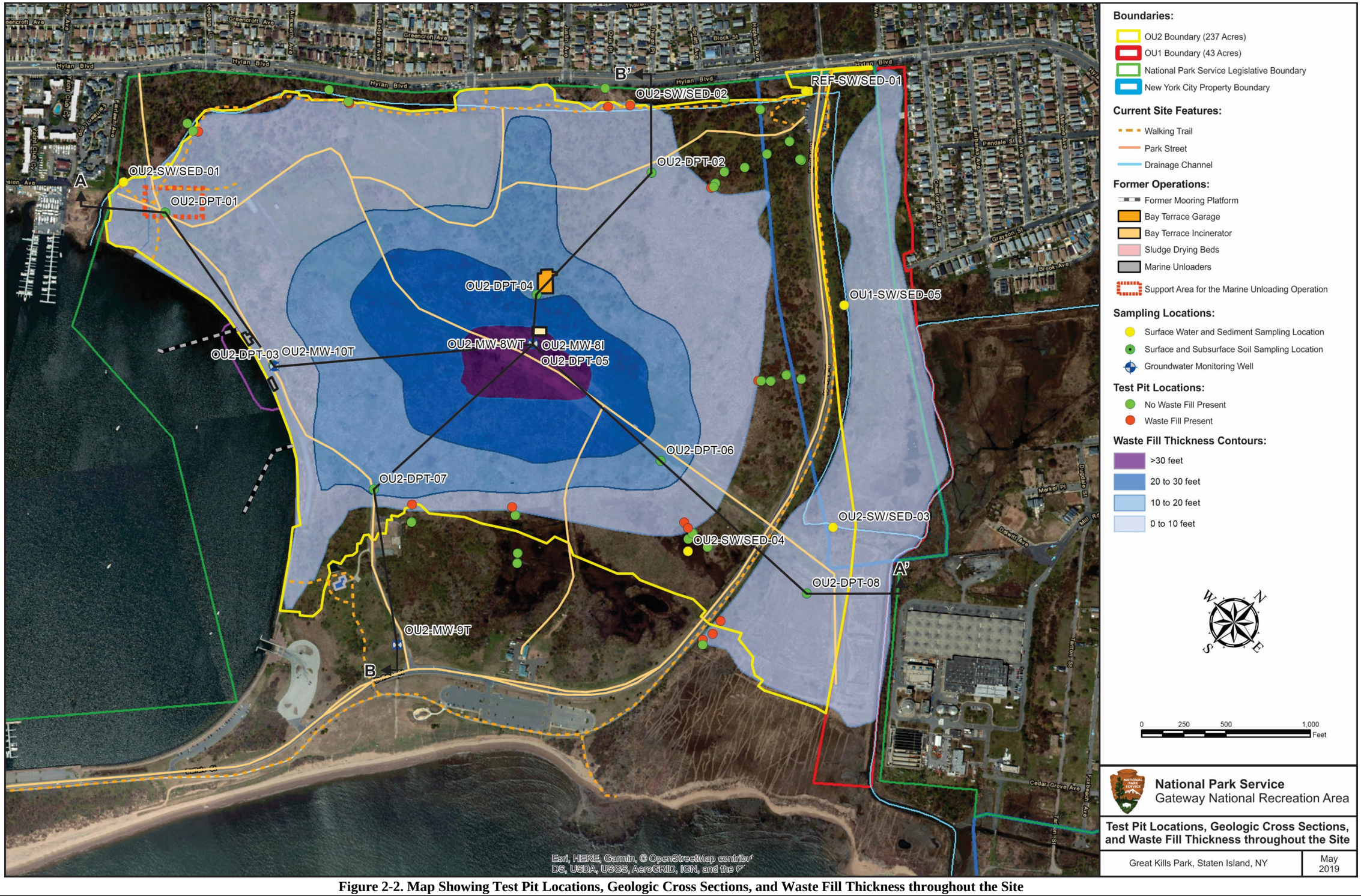


Figure 2-2. Map Showing Test Pit Locations, Geologic Cross Sections, and Waste Fill Thickness throughout the Site

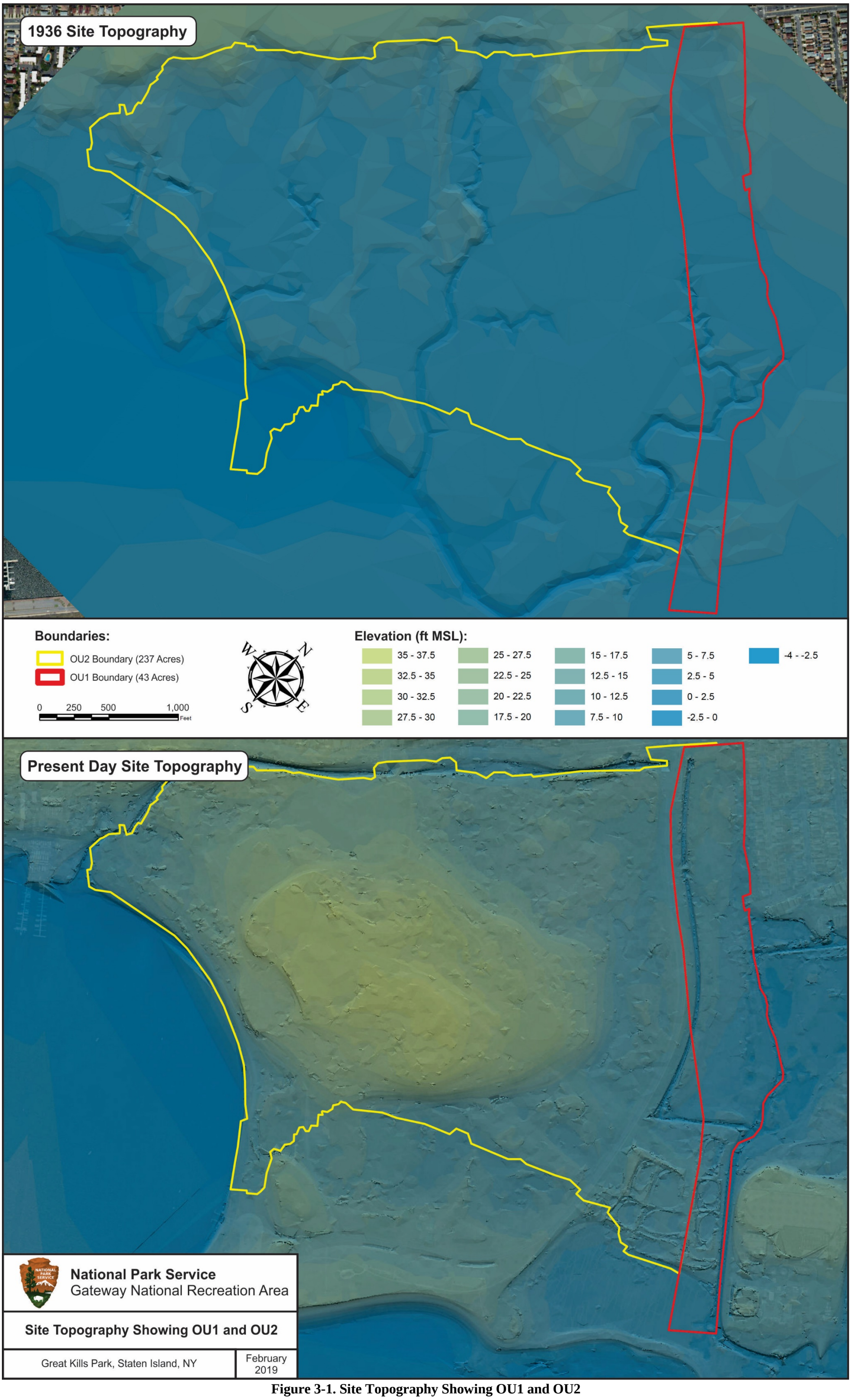


Figure 3-1. Site Topography Showing OU1 and OU2

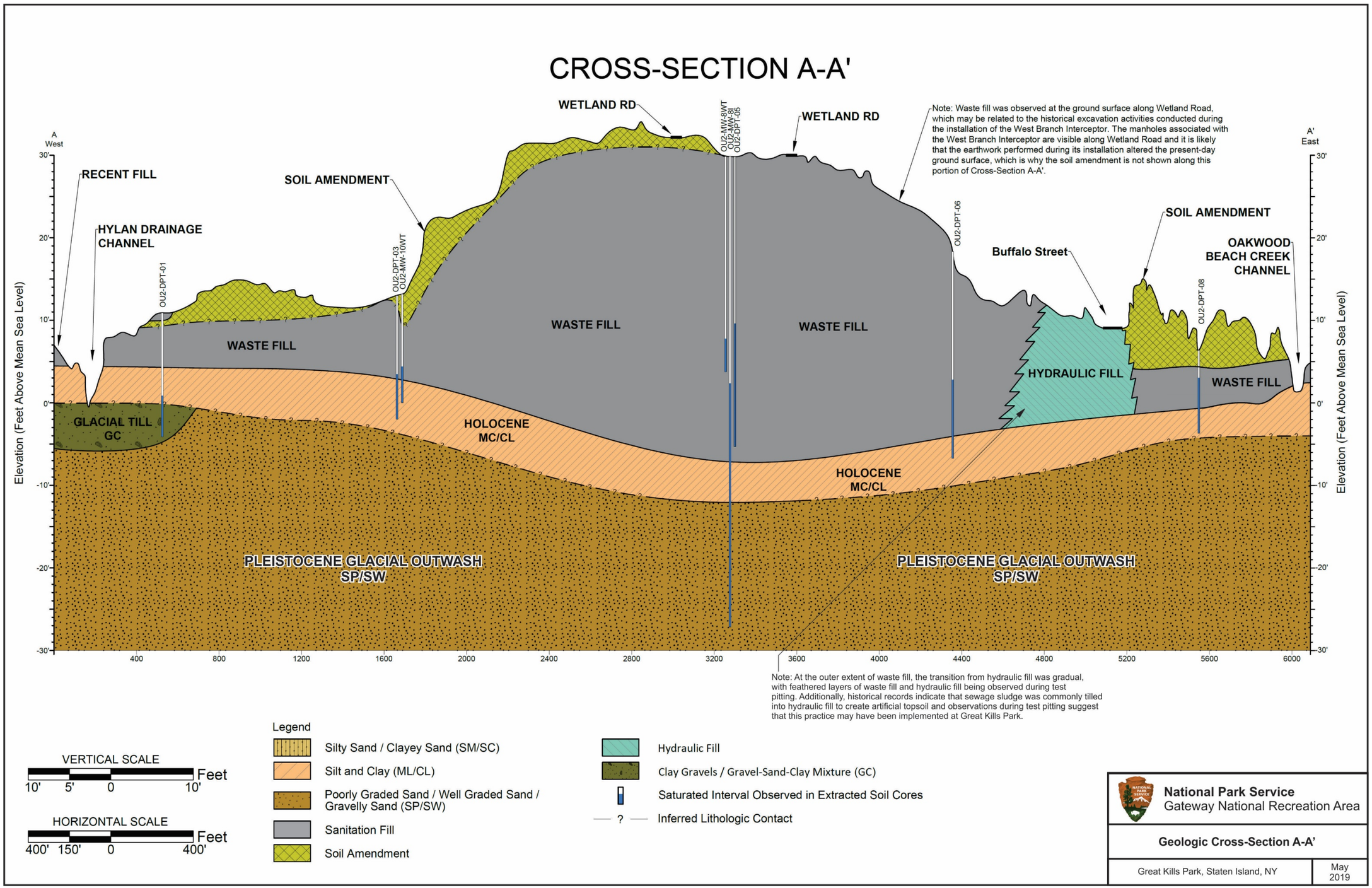
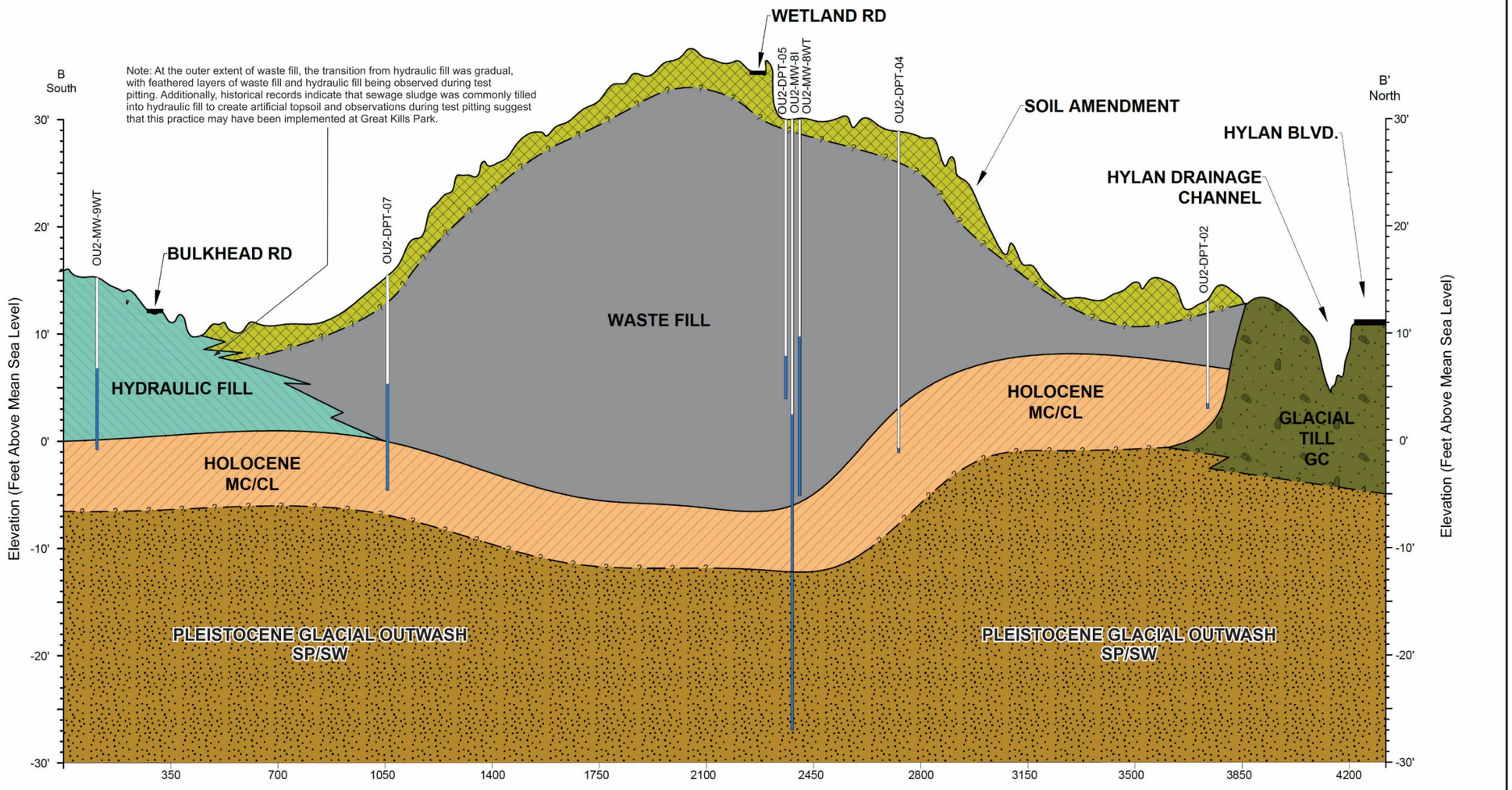


Figure 3-2. OU 1 Geologic Cross Section A-A'

CROSS-SECTION B-B'



VERTICAL SCALE
10' 5' 0 10' Feet

HORIZONTAL SCALE
350' 125' 0 350' Feet

Legend

- Silty Sand / Clayey Sand (SM/SC)
- Silt and Clay (ML/CL)
- Poorly Graded Sand / Well Graded Sand /Gravelly Sand (SP/SW)
- Sanitation Fill
- Soil Amendment
- Hydraulic Fill
- Clay Gravels / Gravel-Sand-Clay Mixture (GC)
- Saturated Interval Observed in Extracted Soil Cores
- ? Inferred Lithologic Contact

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Geologic Cross-Section B-B'

Great Kills Park, Staten Island, NY | May 2019

Figure 3-3. OU 1 Geologic Cross Section B-B'

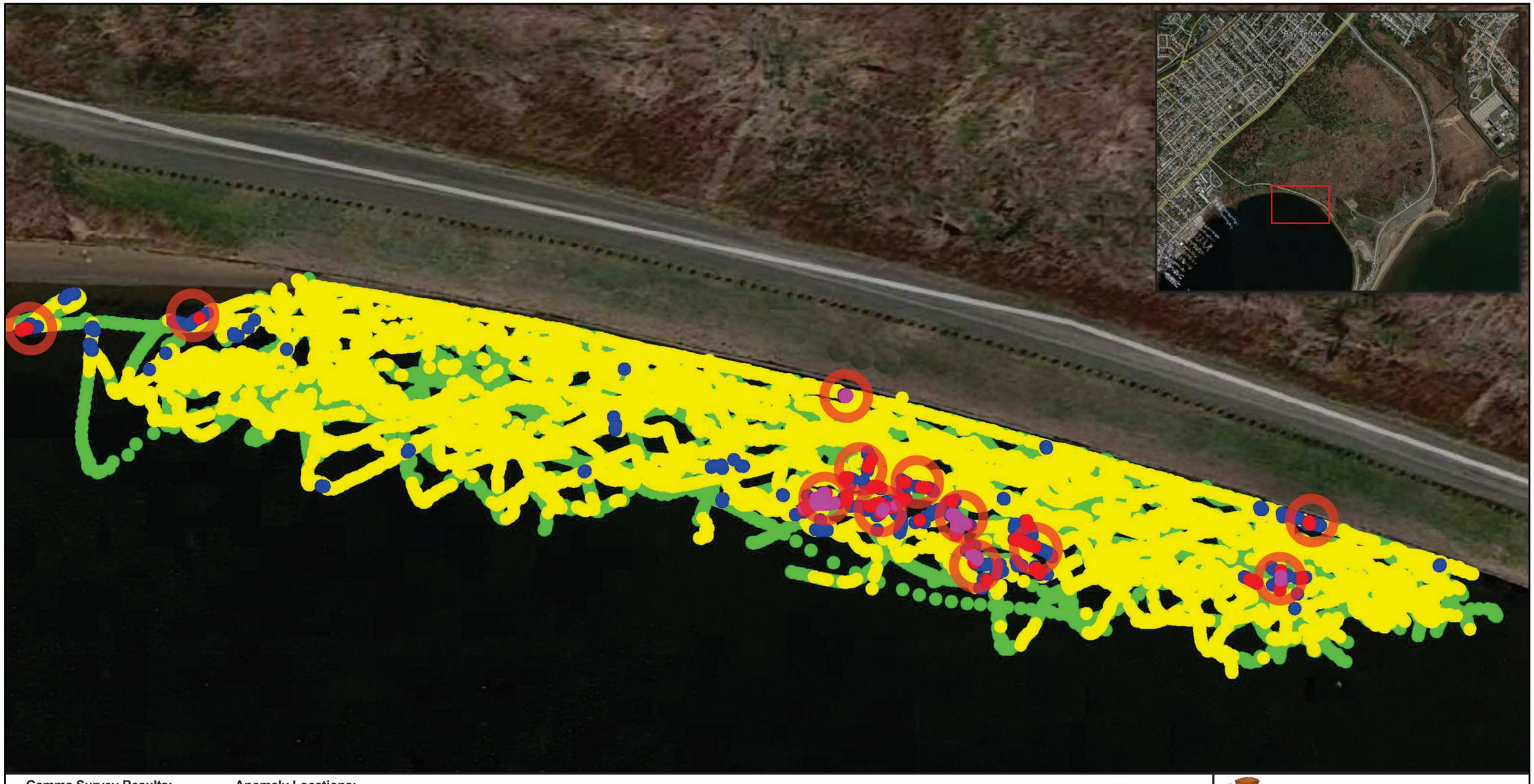
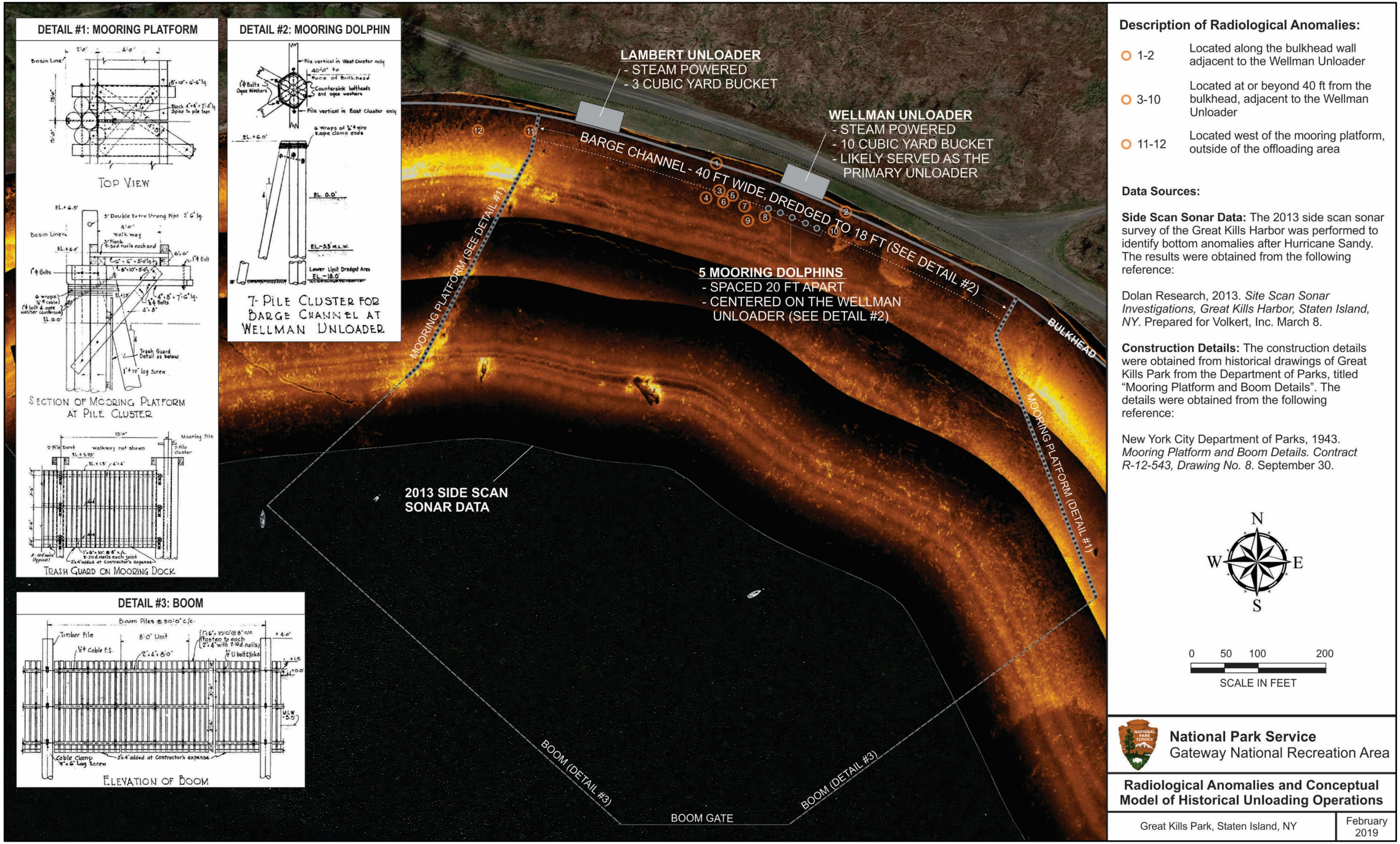


Figure 4-1. Results of the Underwater Gamma Survey of the Great Kills Harbor



Description of Radiological Anomalies:

1-2	Located along the bulkhead wall adjacent to the Wellman Unloader
3-10	Located at or beyond 40 ft from the bulkhead, adjacent to the Wellman Unloader
11-12	Located west of the mooring platform, outside of the offloading area

Data Sources:

Side Scan Sonar Data: The 2013 side scan sonar survey of the Great Kills Harbor was performed to identify bottom anomalies after Hurricane Sandy. The results were obtained from the following reference:

Dolan Research, 2013. *Site Scan Sonar Investigations, Great Kills Harbor, Staten Island, NY*. Prepared for Volkert, Inc. March 8.

Construction Details: The construction details were obtained from historical drawings of Great Kills Park from the Department of Parks, titled "Mooring Platform and Boom Details". The details were obtained from the following reference:

New York City Department of Parks, 1943. *Mooring Platform and Boom Details. Contract R-12-543, Drawing No. 8*. September 30.

N
W
E
S

0 50 100 200
SCALE IN FEET

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Gateway National Recreation Area

Radiological Anomalies and Conceptual Model of Historical Unloading Operations

Great Kills Park, Staten Island, NY | February 2019

Figure 4-2. Radiological Anomalies and Conceptual Model of Historical Unloading Operations



Figure 4-3. Metals Exceeding Screening Benchmarks in Surface Soil

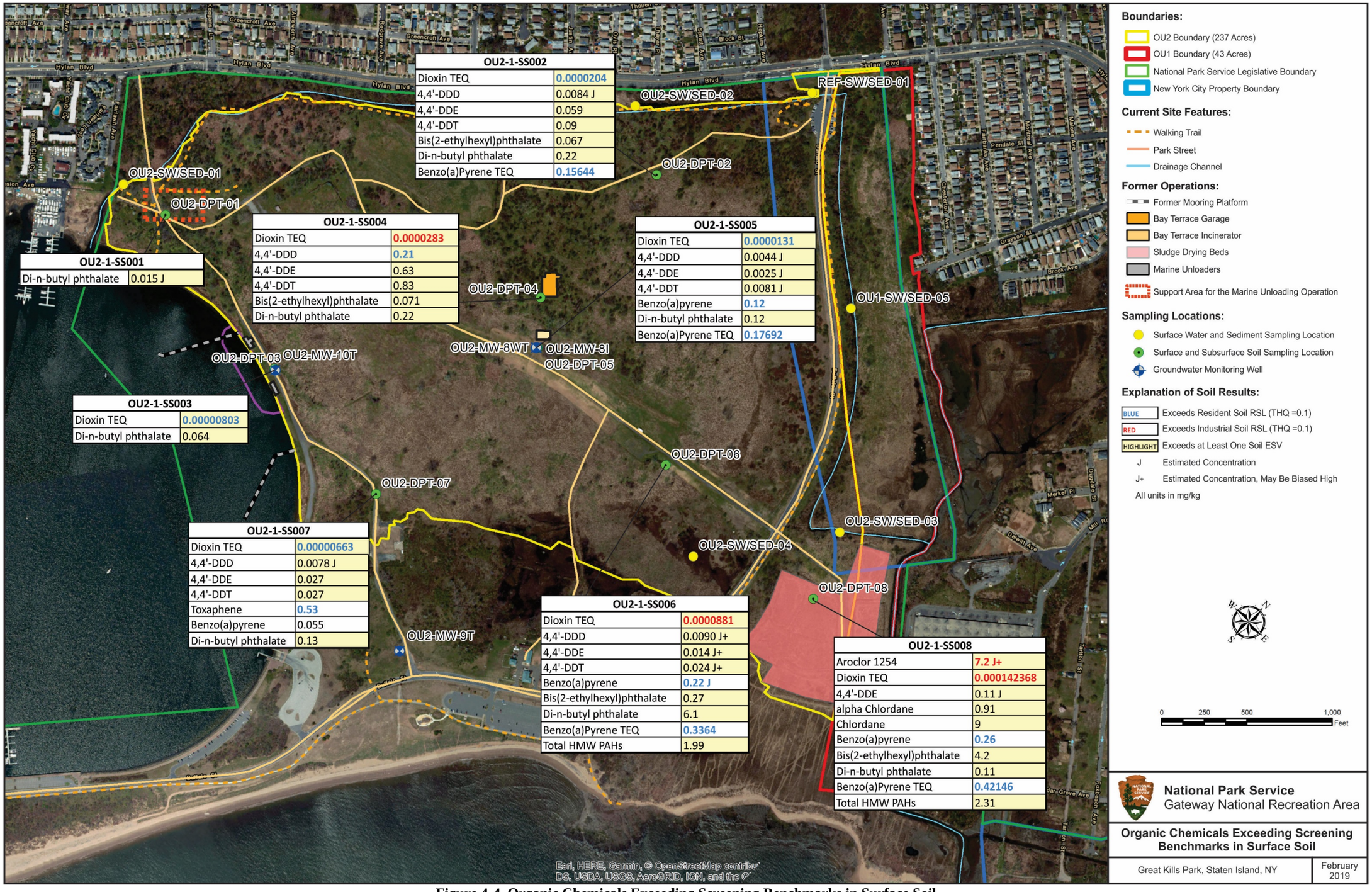


Figure 4-4. Organic Chemicals Exceeding Screening Benchmarks in Surface Soil



Figure 4-5. Radionuclides Exceeding Screening Benchmarks in Surface Soil

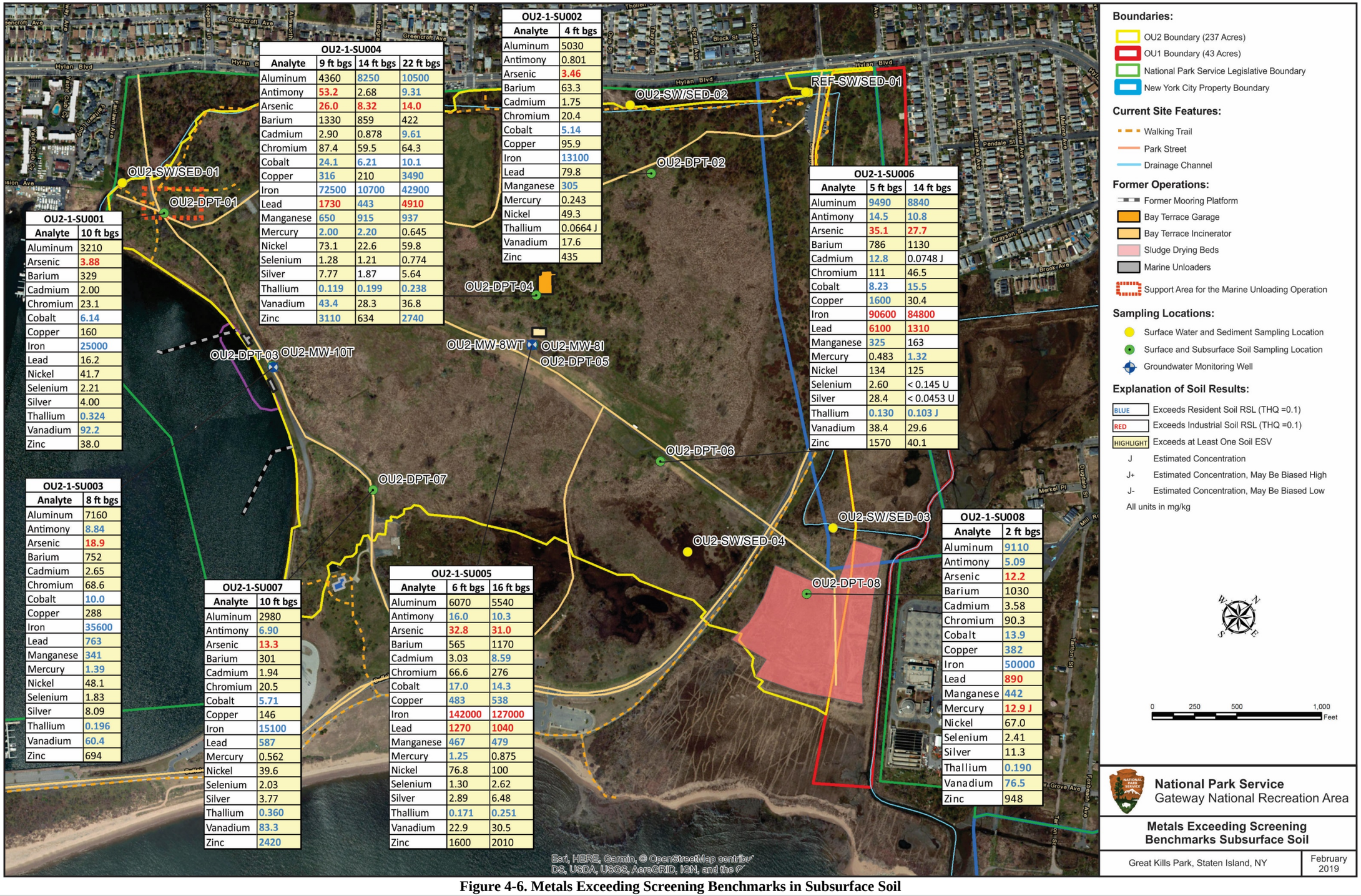


Figure 4-6. Metals Exceeding Screening Benchmarks in Subsurface Soil

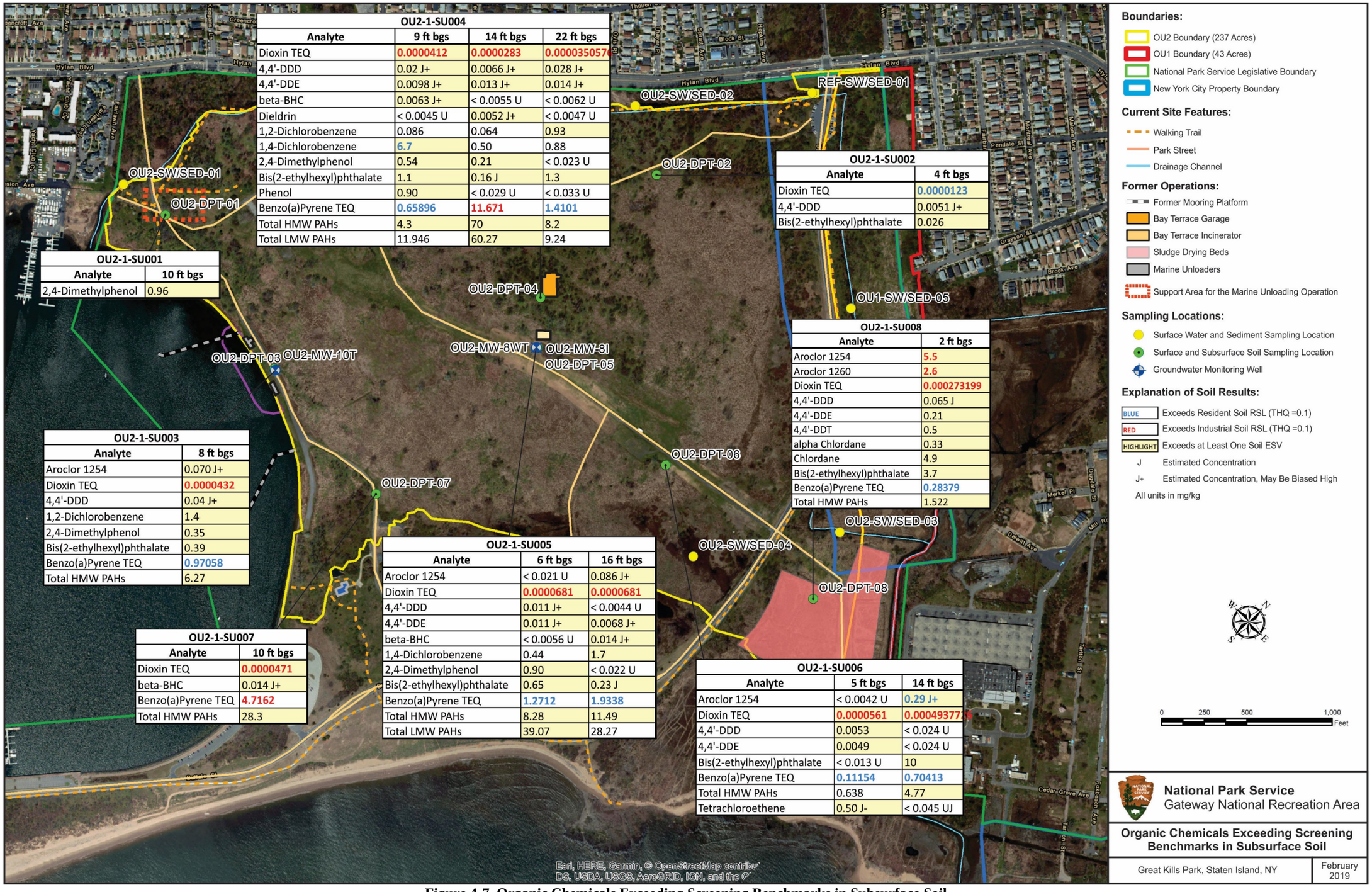
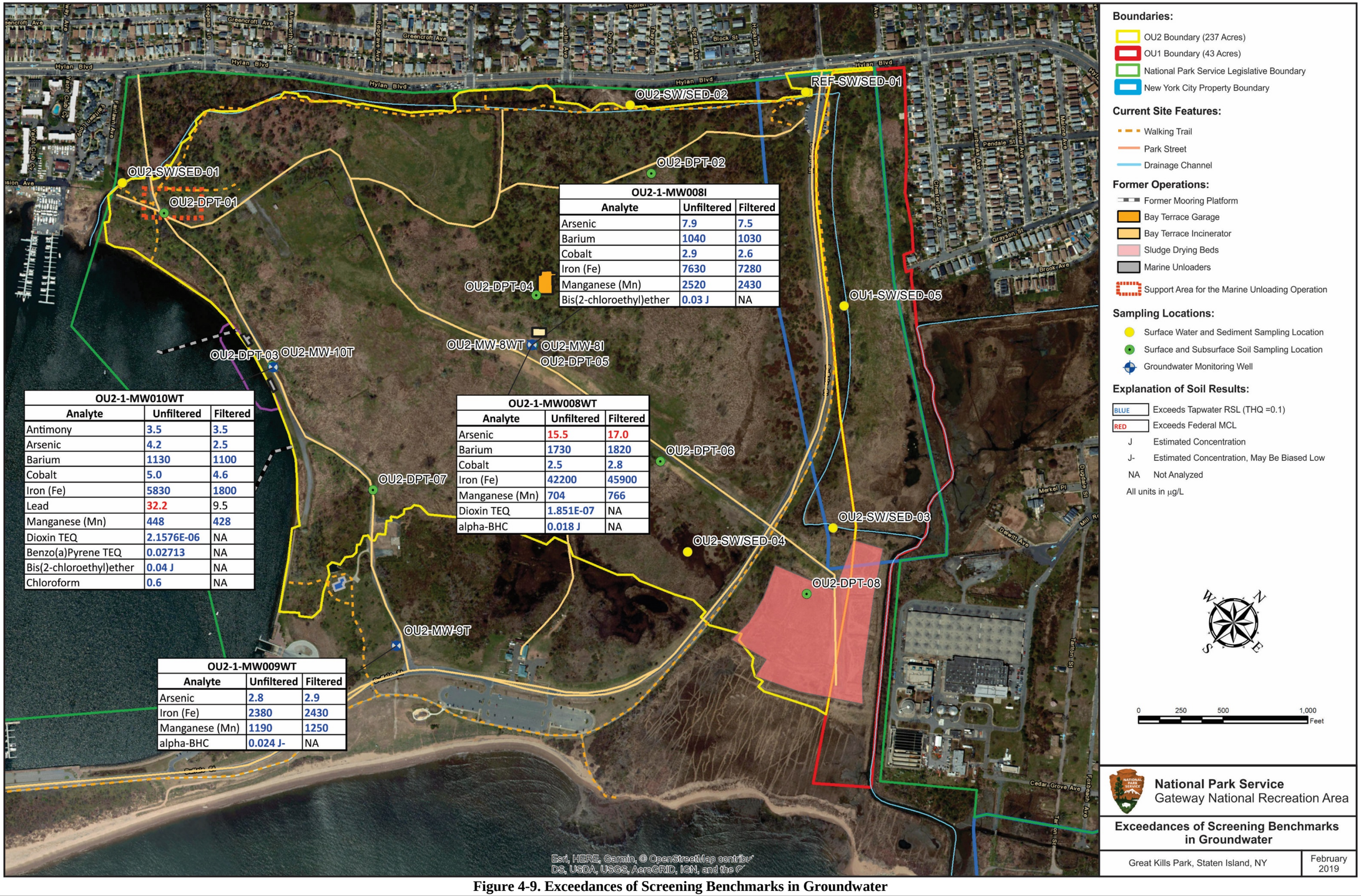


Figure 4-7. Organic Chemicals Exceeding Screening Benchmarks in Subsurface Soil



Figure 4-8. Radionuclides Exceeding Screening Benchmarks in Subsurface Soil



OU2-1-MW008I

Analyte	Unfiltered	Filtered
Arsenic	7.9	7.5
Barium	1040	1030
Cobalt	2.9	2.6
Iron (Fe)	7630	7280
Manganese (Mn)	2520	2430
Bis(2-chloroethyl)ether	0.03 J	NA

OU2-1-MW010WT

Analyte	Unfiltered	Filtered
Antimony	3.5	3.5
Arsenic	4.2	2.5
Barium	1130	1100
Cobalt	5.0	4.6
Iron (Fe)	5830	1800
Lead	32.2	9.5
Manganese (Mn)	448	428
Dioxin TEQ	2.1576E-06	NA
Benzo(a)Pyrene TEQ	0.02713	NA
Bis(2-chloroethyl)ether	0.04 J	NA
Chloroform	0.6	NA

OU2-1-MW008WT

Analyte	Unfiltered	Filtered
Arsenic	15.5	17.0
Barium	1730	1820
Cobalt	2.5	2.8
Iron (Fe)	42200	45900
Manganese (Mn)	704	766
Dioxin TEQ	1.851E-07	NA
alpha-BHC	0.018 J	NA

OU2-1-MW009WT

Analyte	Unfiltered	Filtered
Arsenic	2.8	2.9
Iron (Fe)	2380	2430
Manganese (Mn)	1190	1250
alpha-BHC	0.024 J-	NA

Boundaries:

- OU2 Boundary (237 Acres)
- OU1 Boundary (43 Acres)
- National Park Service Legislative Boundary
- New York City Property Boundary

Current Site Features:

- Walking Trail
- Park Street
- Drainage Channel

Former Operations:

- Former Mooring Platform
- Bay Terrace Garage
- Bay Terrace Incinerator
- Sludge Drying Beds
- Marine Unloaders
- Support Area for the Marine Unloading Operation

Sampling Locations:

- Surface Water and Sediment Sampling Location
- Surface and Subsurface Soil Sampling Location
- Groundwater Monitoring Well

Explanation of Soil Results:

- BLUE — Exceeds Tapwater RSL (THQ =0.1)
- RED — Exceeds Federal MCL
- J — Estimated Concentration
- J- — Estimated Concentration, May Be Biased Low
- NA — Not Analyzed

All units in µg/L

0 250 500 1,000 Feet

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Gateway National Recreation Area

Exceedances of Screening Benchmarks in Groundwater

Great Kills Park, Staten Island, NY | February 2019

Figure 4-9. Exceedances of Screening Benchmarks in Groundwater



Figure 4-10. Metals Exceeding Screening Benchmarks in Sediment

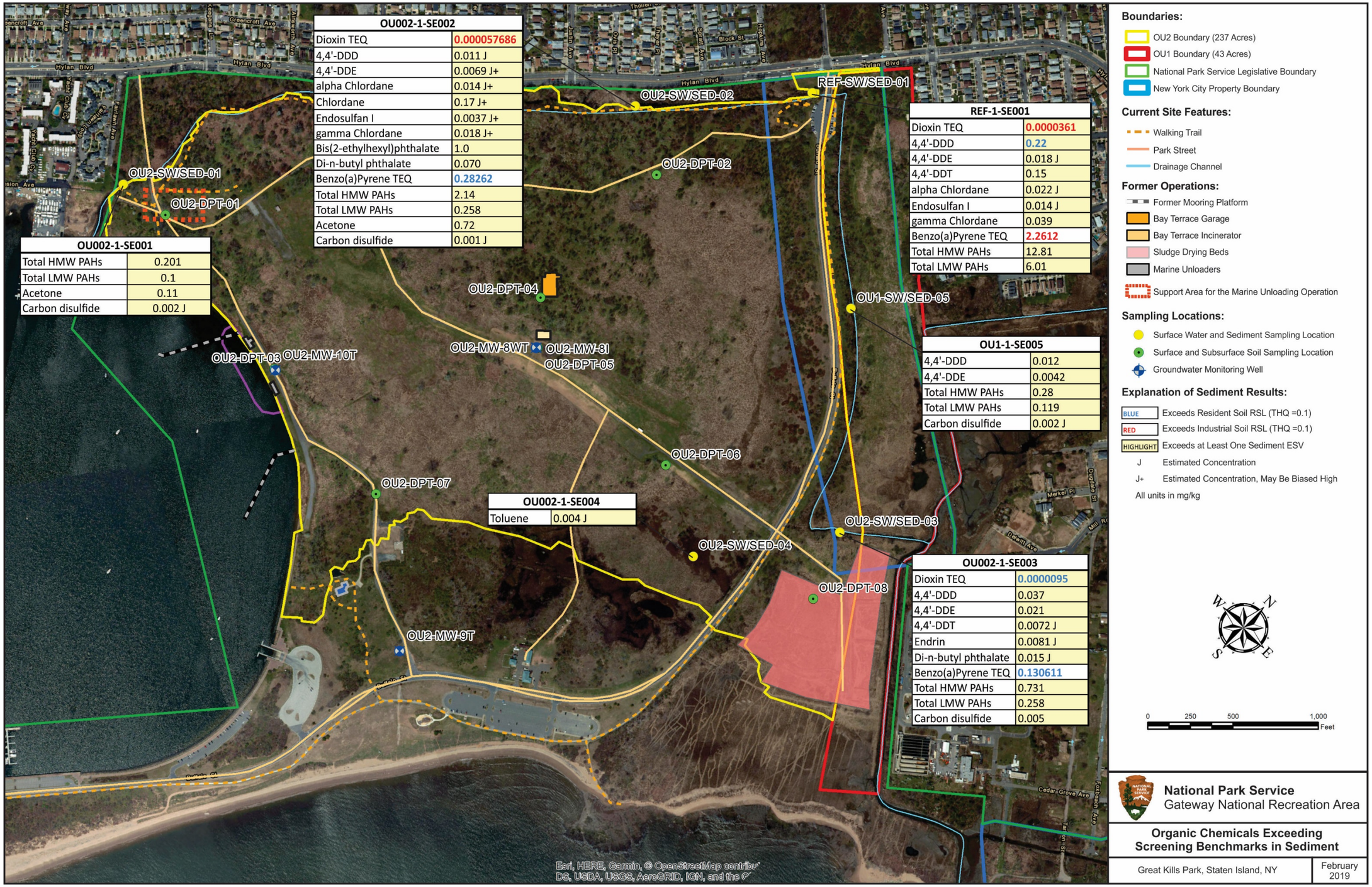


Figure 4-11. Organic Chemicals Exceeding Screening Benchmarks in Sediment



Figure 4-12. Radionuclides Exceeding Screening Benchmarks in Sediment



Figure 4-13. Exceedances of Screening Benchmarks in Surface Water

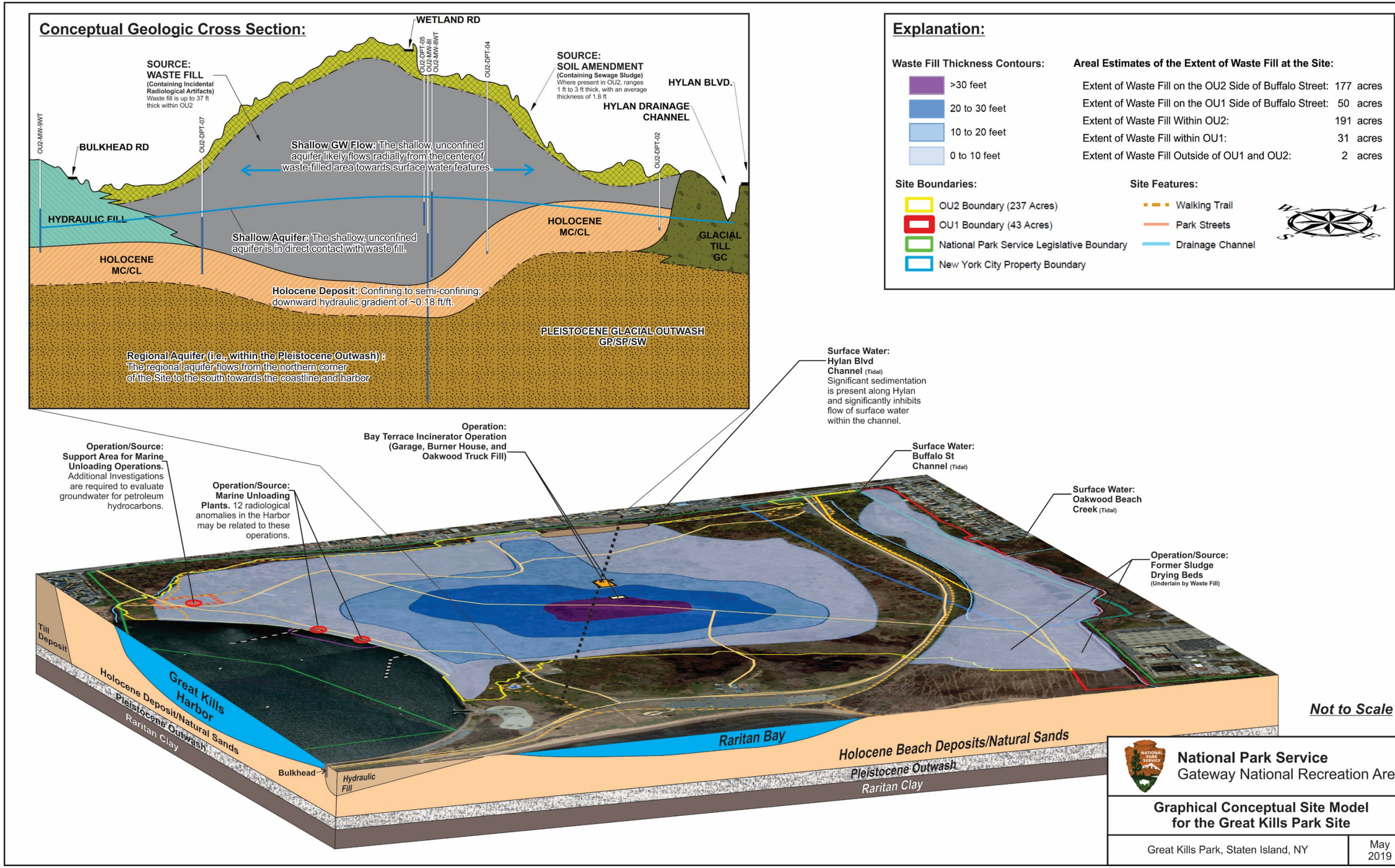


Figure 7-1. Graphical Conceptual Site Model for the Great Kills Park Site

TABLES

Table 2-1. Surveying Results for Sampling Locations

Location Type	Location ID	Easting	Northing	Top of Casing Elevation (ft MSL)	Ground Surface Elevation (ft MSL)
Monitoring Well	OU2-MW008I	948598.575	139691.369	32.67	29.96
Monitoring Well	OU2-MW008WT	948597.212	139687.602	32.68	29.93
Monitoring Well	OU2-MW009WT	949279.762	137857.154	17.99	15.30
Monitoring Well	OU2-MW010WT	947601.889	138518.421	16.13	13.36
Soil Boring/Surface Soil	OU2-DPT-01	946501.299	138713.709	NA	11.03
Soil Boring/Surface Soil	OU2-DPT-02	948387.16	140908.43	NA	12.99
Soil Boring/Surface Soil	OU2-DPT-03	947593.192	138519.185	NA	13.14
Soil Boring/Surface Soil	OU2-DPT-04	948409.529	139915.508	NA	28.92
Soil Boring/Surface Soil	OU2-DPT-05	948604.750	139694.108	NA	29.87
Soil Boring/Surface Soil	OU2-DPT-06	949624.527	139733.224	NA	18.48
Soil Boring/Surface Soil	OU2-DPT-07	948534.597	138417.285	NA	15.60
Soil Boring/Surface Soil	OU2-DPT-08	950793.107	139784.423	NA	6.44
Surface Water/Sediment	REF-SW/SED-01	948699.407	141893.649	NA	2.87
Surface Water/Sediment	OU2-SW/SED-01	946199.545	138667.437	NA	1.21
Surface Water/Sediment	OU2-SW/SED-02	948014.593	141106.826	NA	5.44
Surface Water/Sediment	OU2-SW/SED-03	950627.672	140171.078	NA	1.13
Surface Water/Sediment	OU2-SW/SED-04	950115.969	139466.033	NA	8.70
Surface Water/Sediment	OU1-SW/SED-05	949751.339	141151.952	NA	1.75

Notes:
ft MSL = feet above mean sea level
NA = not applicable

Table 2-2. Construction Details for Monitoring Wells

Location ID	Easting	Northing	Top of Casing Elevation (ft MSL)	Ground Surface Elevation (ft MSL)	Screen Depth (ft bgs)		Screen Elevation (ft MSL)		Total Depth (ft bgs)	Water Level	
					Top	Bottom	Top	Bottom		Depth (ft btoc)	Elevation (ft MSL)
OU2-MW008I	948598.575	139691.369	32.67	29.96	47	57	-17.04	-27.04	57	30.08	2.59
OU2-MW008WT	948597.212	139687.602	32.68	29.93	16	26	13.93	3.93	26	24.75	7.93
OU2-MW009WT	949279.762	137857.154	17.99	15.30	6	16	9.30	-0.70	16	11.09	6.90
OU2-MW010WT	947601.889	138518.421	16.13	13.36	3	13	10.36	0.36	13	11.56	4.57

Notes:
ft MSL = feet above mean sea level
ft bgs = feet below ground surface
ft btoc = fee below top of casing

Table 3-1. Summary of Mean Monthly Meteorological Data Near GKP

Parameter	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Average Temp. (°F)	32.2	34.6	42.7	54.0	63.7	73.0	78.5	76.7	69.1	57.3	47.3	37.9	NA
Average Precipitation (in)	3.5	2.9	3.9	4.1	3.9	4.7	4.3	4.2	4.1	4.0	3.2	4.1	47
Average Snowfall (in)	9.7	12.2	5.5	0.6	0.0	0.0	0.0	0.0	0.0	0.3	1.0	8.0	37

Notes:
°F = degrees Fahrenheit
in = inches

Table 3-2. Summary of OU2 Site-Specific Geologic Rock Units

	Unit and Age	Description	OU2 Boring and Test Pitting Data
Surficial Deposits	Recent Fill	Recent fill consists of isolated areas filled with reworked glacial till (excavated from Hylan Boulevard Channel) or areas filed with construction debris (concrete, wood, etc.) and household trash.	Reworked glacial till (fill) is present along the bank of the Hylan Boulevard Channel, opposite Hylan Boulevard. Construction and household debris is present in scattered isolated piles between Hylan Boulevard Channel and Hylan Boulevard.
	Cover Layer - Sewage Sludge/Clay-Silt Sand Undifferentiated	Soil Amendment "Cover Layer" consists of red to brown clay-silty sand. (Not readily observed in developed areas of OU2).	The absence of a soil amendment layer in certain areas of OU2 is likely due to: surface activities; bioturbation; and soil profile weathering.
	Waste Fill	Waste fill, consists of brown to black heterogeneous mixture of highly decomposed refuse (organic material) with incinerator residue (slag/cinder-like material), coal ash (pieces of coal) with scattered porcelain, brick, glass, metal, rubber, and wood debris.	Waste fill ranges in thickness from 4 ft thick to 37 ft thick. The waste is thickest under higher elevations and thins at elevations less than 5 ft. The waste fill is exposed at the surface largely throughout the OU2 Site, however at certain areas, it occurs at depths, ranging to 6 ft bgs where it is overlain by hydraulic fill.
	Hydraulic Fill	Hydraulic fill graded gray to brown sand.	Hydraulic fill is present beneath and adjacent to Buffalo Street where it is thickest – over 15 ft thick. It thins rapidly toward the waste fill. There are areas where the hydraulic fill was used to cover the waste fill. At these areas the fill is less than 6 ft thick.
	Holocene 10,000 years to present	Marsh/estuarine deposit consisting of plastic dark gray silty clay to clayey silt with black organics (e.g., peat, meadow mat, and small shells) and fine to medium gray sand.	The Holocene deposit ranges in thickness from 3 to 5 ft thick with an average thickness of 4 ft. The depth to the Holocene deposit ranges from 6 ft to 37 ft bgs.
	Pleistocene Outwash Deposit/Till Deposit 3 Ma to 10,000 years	Glacial outwash deposit consists melt water deposited stratified red to brown fine to coarse sand and gravel. Highly permeable.	The glacial outwash deposit underlies OU2 and the Holocene deposit at depths ranging from approximately 10 ft bgs to over 42 ft bgs. MW007I penetrated the underlying Raritan Formation, at 52 bgs indicating the outwash deposit beneath the OU2 site is over 46 ft thick.
		Glacial till deposit consist of ice deposited compact dark red-brown gravel to sand in a clay silt matrix.	The glacial till deposit underlies the upland area/margin adjacent to Hylan Boulevard, Hylan Boulevard Channel, and Buffalo Street intersection with Hylan Boulevard. Based on background wells (BG-MW001 through BG-MW004) the glacial till deposit is 16.5 to 22 ft thick and overlies the glacial outwash deposit.
Bedrock Formations	Raritan Formation Upper Cretaceous 85 Ma to 65 Ma	Raritan Formation Undivided – The mostly clayey formation consists of a varicolored interbedded brown to tan to light gray to white medium to fine sand with a clayey silt (with mica).	The Raritan Formation was encountered in boring MW007I at 52 ft bgs. None of the borings or test pits in OU2 encountered the Raritan Formation because all were too shallow.
	Staten Island Serpentine/Manhattan Schist Upper Proterozoic (Precambrian to Cambrian) >590 Ma	Staten Island Serpentine – greenish brown metamorphic ultramafic crystalline rock. Present in northeast corner of GKP near intersection of Buffalo Street and Hylan Road.	The Staten Island Serpentine is inferred at a depth of approximately 270 ft below MSL (Perlmutter, 1953 and Soren, 1988).
		Manhattan Schist consisting of dark-gray micaceous metamorphic rock.	The Manhattan Schist is inferred at a depth of over 300 ft below MSL (Perlmutter, 1953 and Soren, 1988).

Table 3-3. Summary of Vegetation Associations and Communities Identified at GKP

	Community	Underlying Soil	Vegetation Community Occurrence and Description
Backdune Association	The North Atlantic Coast Backdune Grassland Community	Fine sand, coarse sand, gravelly fine sand, or (less commonly) loamy sand derived from various natural and non-natural sediments, including landfills capped with sand, sandy dredge fill, eolian and marine sediments, and sandy fill mixed with demolished construction debris.	Vegetation is variable and depends on landscape setting and land-use history. It is dominated by gray clubawn grass (*Corynephorus canescens*) in more disturbed settings and by little bluestem (*Schizachyrium scoparium*).
	Northern Tall Maritime Shrubland Community	Coarse to fine sand originating from marine sediments, eolian deposition, or dredge fill.	Characterized with very dense vegetation and often occurs inland of northern bayberry dune shrubland in sheltered settings.
Maritime Forest Associations	Successional Maritime Forest Community	Poorly drained to excessively drained, coarse to fine sands originating from marine- or eolian-derived sand or sandy dredge fill.	Occurs on stabilized backdunes, generally leeward of secondary maritime dunes or in protected hollows and is found farther inland in association with Tall Maritime Shrubland Community. This community is characterized as having a somewhat open tree canopy (to 50 ft [15 meters] tall) of successional maritime forest strongly dominated by black cherry with common hackberry. Associated canopy species include red maple, American holly, white poplar, black locust, and lesser amounts of eastern red cedar, Japanese black pine, and eastern cottonwood (*Populus deltoides*).
Human-Modified Vegetation Associations	Early Successional Woodland/Forest Community	Coarse sand formed from sandy dredge fill.	Consists of successional shrubland or open woodland or forest with northern hardwoods occurring in various settings following disturbance such as clearing, fragmentation, and deposition of fill material. Often occurs in a mosaic with other disturbed or successional communities, such as successional maritime forest and reed/grass tidal marsh, or even with paved areas. In the forests or woodlands, the open canopy is composed of a mix of early-successional species, including white popular, quaking aspen (*Populus tremuloides*), gray birch *(Betula populifolia*), and black cherry. The shrubland expression of this community is characterized by a dense layer of tall shrubs that are strongly dominated by white poplar, with northern bayberry and black cherry.
	Little Bluestem Old Field Community	Coarse sand to sandy loam and well-drained to somewhat poorly drained soils formed in sandy dredge fill and loamy fill over sandy sediments.	Occurs in disturbed areas and is generally maintained by mowing. Adjacent communities include northern tall maritime shrubland, northern bayberry dune shrubland, northeastern old field, and North Atlantic Coast backdune grassland, as well as parking lots and airstrips. This successional vegetation is dominated and characterized by little bluestem. Associated species include weeping lovegrass (*Eragrostis curvula*), purple lovegrass (*E. spectabilis*), gray clubawn grass, or a host of other grass or forb species.
	Northeastern Old Field Community	Coarse sand and sandy loam to mucky peat.	Extremely variable assortment of sites, from mowed fields to disturbed maritime dunes often dominated by common wormwood (*Artemisia vulgaris*) with a variety of grasses and forbs.
	Reed/Grass Tidal Marsh Community	Coarse to fine sand or (less often) mucky peat or mucky, fine, sandy loam. Soils can be derived from eolian sands or dredge fill.	Occurs adjacent to and commonly intermingled with mid-Atlantic maritime salt shrub and a range of tidal wetland habitats. Characterized by dense stands of Phragmites, which tends to grow in colonies of tall, stout, leafy plants, often to the exclusion of all other vascular plant species.

Table 3-4. Summary of Rare Animals and Plants

Common Name	Scientific Name	Subgroup	Distribution Status	Year Last Documented	State Protection Status
Mocha Emerald	*Somatochlora linearis*	Dragonflies	Historically Confirmed	1926	
Rambur's Forktail	*Ischnura ramburii*	Damselflies	Recently Confirmed	2007	
Dune Sandspur	*Cenchrus tribuloides*	Grasses	Recently Confirmed	1998	Threatened
Fairy Wand	*Chamaelirium luteum*	Other Flowering Plants	Historically Confirmed	1905	Endangered
Fringed Boneset	*Eupatorium torreyanum*	Asters Goldenrods and Daisies	Recently Confirmed	2008	Threatened
Great Plains Flatsedge	*Cyperus lupulinus ssp. lupulinus*	Sedges	Recently Confirmed	1997	Threatened
Hyssop-skullcap	*Scutellaria integrifolia*	Other Flowering Plants	Historically Confirmed	1909	Endangered
Oakes' Evening-primrose	*Oenothera oakesiana*	Other Flowering Plants	Recently Confirmed	1992	Threatened
Persimmon	*Diospyros virginiana*	Other Flowering Plants	Recently Confirmed	2006	Threatened
Primrose-leaf Violet	*Viola primulifolia*	Other Flowering Plants	Recently Confirmed	1997	Threatened
Rose-pink	*Sabatia angularis*	Other Flowering Plants	Recently Confirmed	2003	Endangered
Southern Wood Violet	Viola hirsutula	Other Flowering Plants	Possible but not Confirmed	1908	Endangered
Trinerved White Boneset	Eupatorium album var. subvenosum	Asters Goldenrods and Daisies	Recently Confirmed	1992	Threatened

Table 4-1. Surface Soil Statistical Summary

Analyte Group	Analyte	Unit	# Samples	# Detects	Frequency of Detection	Min	Max	Average	Standard Deviation	Soil ESV - Birds and Mammals		Soil ESV - Plants and Invertebrates		Soil RSL - Resident (THQ = 0.1)		Soil RSL - Industrial (THQ = 0.1)	
										Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances
Herbicides	2,4,5-T	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	63	0	820	0
Herbicides	2,4,5-TP (Silvex)	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	0.109	0	51	0	660	0
Herbicides	2,4-D	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	70	0	960	0
Herbicides	2,4-DB	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	190	0	2500	0
Herbicides	2,4-DP (Dichloroprop)	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
Herbicides	Dalapon	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	190	0	2500	0
Herbicides	Dicamba	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	190	0	2500	0
Herbicides	Dinoseb	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	6.3	0	82	0
Herbicides	MCPA (2-Methyl-4-chlorophenoxy acetic acid)	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	3.2	0	41	0
Herbicides	MCPP (2-(2-Methyl-4-chlorophenoxy) propanoic acid)	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	6.3	0	82	0
Metals	Aluminum	mg/kg	8	8	1.00	3770	12900	6520	3010	NE	0	50	8	7700	2	110000	0
Metals	Antimony	mg/kg	8	8	1.00	0.214	10.3	3.85	3.49	0.248	7	5	3	3.1	4	47	0
Metals	Arsenic	mg/kg	8	8	1.00	3.81	137	28.0	45.7	0.25	8	6.8	5	0.68	8	3	8
Metals	Barium	mg/kg	8	8	1.00	14.7	1040	318	373	17.2	7	110	5	1500	0	22000	0
Metals	Beryllium	mg/kg	8	8	1.00	0.198	0.723	0.400	0.173	2.42	0	2.5	0	16	0	230	0
Metals	Cadmium	mg/kg	8	8	1.00	0.0954	9.82	2.51	3.33	0.27	6	4	2	7.1	1	98	0
Metals	Calcium	mg/kg	8	8	1.00	1730	118000	24100	39300	NE	0	NE	0	NE	0	NE	0
Metals	Chromium	mg/kg	8	8	1.00	9.2	152	51.2	46.5	23	5	0.34	8	NE	0	NE	0
Metals	Cobalt	mg/kg	8	8	1.00	3.76	21	9.38	6.48	76	0	13	3	2.3	8	35	0
Metals	Copper	mg/kg	8	8	1.00	43	1560	423	508	14	8	50	6	310	4	4700	0
Metals	Iron	mg/kg	8	8	1.00	8290	130000	41800	38900	NE	0	NE	0	5500	8	82000	1
Metals	Lead	mg/kg	8	8	1.00	12.4	3000	696	977	0.94	8	50	7	400	5	800	2
Metals	Magnesium	mg/kg	8	8	1.00	1450	73100	14700	24400	NE	0	NE	0	NE	0	NE	0
Metals	Manganese	mg/kg	8	8	1.00	98.6	518	260	144	322	3	220	4	180	4	2600	0
Metals	Mercury	mg/kg	8	7	0.875	0.0418	12.9	2.87	4.61	0.013	7	0.05	6	1.1	3	4.6	1
Metals	Nickel	mg/kg	8	8	1.00	9.8	88.6	44.2	31.4	10	7	30	5	150	0	2200	0
Metals	Potassium	mg/kg	8	8	1.00	590	1900	1010	434	NE	0	NE	0	NE	0	NE	0
Metals	Selenium	mg/kg	8	7	0.875	0.166	7.26	1.58	2.55	0.331	5	0.52	4	39	0	580	0
Metals	Silver	mg/kg	8	8	1.00	0.0772	60.7	9.47	20.9	2.6	2	2	3	39	1	580	0
Metals	Sodium	mg/kg	8	8	1.00	121	481	292	138	NE	0	NE	0	NE	0	NE	0
Metals	Thallium	mg/kg	8	7	0.875	0.0614	0.24	0.104	0.0619	0.027	7	0.05	7	0.078	5	1.2	0
Metals	Vanadium	mg/kg	8	8	1.00	15.9	129	37.0	37.9	0.714	8	2	8	39	1	580	0
Metals	Zinc	mg/kg	8	8	1.00	25.5	1020	397	319	12	8	6.62	8	2300	0	35000	0
PCBs	Aroclor 1016	mg/kg	8	0	0.00	NA	NA	NA	NA	1.1	0	NE	0	0.41	0	5.1	0
PCBs	Aroclor 1221	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.2	0	0.83	0
PCBs	Aroclor 1232	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.17	0	0.72	0
PCBs	Aroclor 1242	mg/kg	8	0	0.00	NA	NA	NA	NA	0.041	0	NE	0	0.23	0	0.95	0
PCBs	Aroclor 1248	mg/kg	8	0	0.00	NA	NA	NA	NA	0.0073	0	NE	0	0.23	0	0.95	0
PCBs	Aroclor 1254	mg/kg	8	1	0.125	7.2	7.2	7.20	NA	0.041	1	160	0	0.12	1	0.97	1
PCBs	Aroclor 1260	mg/kg	8	5	0.625	0.0091	0.2	0.0691	0.0795	0.88	0	NE	0	0.24	0	0.99	0
PCBs	Aroclor 1262	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
PCBs	Aroclor 1268	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
PCBs	Total PCBs	mg/kg	8	6	0.750	0.0091	7.2	1.26	2.91	NE	0	40	0	NE	0	NE	0
Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	mg/kg	8	8	1.00	0.0000127	0.000764	0.000291	0.000279	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	mg/kg	8	8	1.00	0.0000566	0.00484	0.000985	0.00165	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	mg/kg	8	8	1.00	0.000000877	0.0000582	0.0000138	0.0000191	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	mg/kg	8	8	1.00	0.000000648	0.0000856	0.0000203	0.0000288	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	mg/kg	8	8	1.00	0.000000947	0.0000335	0.00000821	0.0000118	NE	0	NE	0	NE	0	NE	0

Table 4-1. Surface Soil Statistical Summary

Analyte Group	Analyte	Unit	# Samples	# Detects	Frequency of Detection	Min	Max	Average	Standard Deviation	Soil ESV - Birds and Mammals		Soil ESV - Plants and Invertebrates		Soil RSL - Resident (THQ = 0.1)		Soil RSL - Industrial (THQ = 0.1)	
										Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances
Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	mg/kg	8	8	1.00	0.000000737	0.0000527	0.0000162	0.0000191	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	mg/kg	8	8	1.00	0.00000213	0.000156	0.0000409	0.0000592	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	mg/kg	8	6	0.750	0.00000079	0.0000132	0.00000447	0.00000463	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	mg/kg	8	8	1.00	0.00000196	0.0000708	0.0000180	0.0000253	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	mg/kg	8	8	1.00	0.000000319	0.0000403	0.0000109	0.0000135	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	mg/kg	8	6	0.750	0.000000696	0.0000172	0.00000441	0.00000641	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	mg/kg	8	8	1.00	0.000000912	0.0000472	0.0000157	0.0000177	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	mg/kg	8	8	1.00	0.000000496	0.0000372	0.0000137	0.0000139	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	2,3,7,8-TCDD	mg/kg	8	7	0.875	0.000000232	0.00000553	0.00000174	0.00000188	2.9e-007	5	5	0	4.8e-006	1	2.2e-005	0
Dioxins/Furans	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	mg/kg	8	8	1.00	0.000000239	0.0000872	0.0000149	0.0000295	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	Octachlorodibenzofuran (OCDF)	mg/kg	8	8	1.00	0.000023	0.00169	0.000385	0.000546	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	Octachlorodibenzo-p-dioxin (OCDD)	mg/kg	8	8	1.00	0.000652	0.0468	0.00896	0.0156	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	Dioxin TEQ	mg/kg	8	8	1.00	0.00000252	0.000142368	0.0000387	0.0000501	2.9e-007	8	5	0	4.8e-006	7	2.2e-005	3
Pesticides	4,4'-DDD	mg/kg	8	5	0.625	0.0044	0.21	0.0479	0.0906	0.002	5	NE	0	0.19	1	2.5	0
Pesticides	4,4'-DDE	mg/kg	8	6	0.750	0.0025	0.63	0.140	0.243	0.002	6	NE	0	2	0	9.3	0
Pesticides	4,4'-DDT	mg/kg	8	5	0.625	0.0081	0.83	0.196	0.356	0.002	5	4.1	0	1.9	0	8.5	0
Pesticides	Aldrin	mg/kg	8	0	0.00	NA	NA	NA	NA	0.037	0	0.00332	0	0.039	0	0.18	0
Pesticides	alpha Chlordane	mg/kg	8	3	0.375	0.0004	0.91	0.305	0.524	0.27	1	2.2	0	NE	0	NE	0
Pesticides	alpha-BHC	mg/kg	8	1	0.125	0.00022	0.00022	0.000220	NA	0.07	0	NE	0	0.086	0	0.36	0
Pesticides	beta-BHC	mg/kg	8	1	0.125	0.0011	0.0011	0.00110	NA	0.27	0	0.00398	0	0.3	0	1.3	0
Pesticides	Chlordane	mg/kg	8	1	0.125	9	9	9.00	NA	1.8	1	0.224	1	NE	0	NE	0
Pesticides	delta-BHC	mg/kg	8	0	0.00	NA	NA	NA	NA	0.07	0	NE	0	NE	0	NE	0
Pesticides	Dieldrin	mg/kg	8	1	0.125	0.00088	0.00088	0.000880	NA	0.0045	0	10	0	0.034	0	0.14	0
Pesticides	Endosulfan I	mg/kg	8	2	0.250	0.00094	0.32	0.160	0.226	0.56	0	NE	0	NE	0	NE	0
Pesticides	Endosulfan II	mg/kg	8	0	0.00	NA	NA	NA	NA	0.56	0	NE	0	NE	0	NE	0
Pesticides	Endosulfan sulfate	mg/kg	8	1	0.125	0.003	0.003	0.00300	NA	0.56	0	NE	0	NE	0	NE	0
Pesticides	Endrin	mg/kg	8	0	0.00	NA	NA	NA	NA	0.0014	0	0.0034	0	1.9	0	25	0
Pesticides	Endrin aldehyde	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
Pesticides	Endrin ketone	mg/kg	8	1	0.125	0.0036	0.0036	0.00360	NA	NE	0	NE	0	NE	0	NE	0
Pesticides	gamma Chlordane	mg/kg	8	4	0.500	0.00081	0.74	0.186	0.369	2.2	0	2.2	0	NE	0	NE	0
Pesticides	gamma-BHC (Lindane)	mg/kg	8	0	0.00	NA	NA	NA	NA	0.0095	0	0.005	0	0.57	0	2.5	0
Pesticides	Heptachlor	mg/kg	8	0	0.00	NA	NA	NA	NA	0.059	0	0.4	0	0.13	0	0.63	0
Pesticides	Heptachlor epoxide	mg/kg	8	1	0.125	0.00025	0.00025	0.000250	NA	NE	0	NE	0	0.07	0	0.33	0
Pesticides	Methoxychlor	mg/kg	8	0	0.00	NA	NA	NA	NA	5.1	0	NE	0	32	0	410	0
Pesticides	Toxaphene	mg/kg	8	1	0.125	0.53	0.53	0.530	NA	4.1	0	NE	0	0.49	1	2.1	0
SVOCs/PAHs	1,2,4-Trichlorobenzene	mg/kg	8	0	0.00	NA	NA	NA	NA	0.27	0	1.2	0	5.8	0	26	0
SVOCs/PAHs	1,2-Dichlorobenzene	mg/kg	8	2	0.250	0.03	0.037	0.0335	0.00495	0.92	0	20	0	180	0	930	0
SVOCs/PAHs	1,3-Dichlorobenzene	mg/kg	8	0	0.00	NA	NA	NA	NA	0.74	0	20	0	NE	0	NE	0
SVOCs/PAHs	1,4-Dichlorobenzene	mg/kg	8	5	0.625	0.025	0.069	0.0496	0.0223	0.89	0	1.2	0	2.6	0	11	0
SVOCs/PAHs	1,4-Dioxane	mg/kg	8	4	0.500	0.001	0.003	0.00150	0.00100	1.83	0	NE	0	5.3	0	24	0
SVOCs/PAHs	2,4,5-Trichlorophenol	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	4	0	630	0	8200	0
SVOCs/PAHs	2,4,6-Trichlorophenol	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	10	0	6.3	0	82	0
SVOCs/PAHs	2,4-Dichlorophenol	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	19	0	250	0
SVOCs/PAHs	2,4-Dimethylphenol	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	0.01	0	130	0	1600	0
SVOCs/PAHs	2,4-Dinitrophenol	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	20	0	13	0	160	0
SVOCs/PAHs	2,4-Dinitrotoluene	mg/kg	8	0	0.00	NA	NA	NA	NA	14	0	6	0	1.7	0	7.4	0
SVOCs/PAHs	2,6-Dinitrotoluene	mg/kg	8	0	0.00	NA	NA	NA	NA	4	0	30	0	0.36	0	1.5	0
SVOCs/PAHs	2-Chloronaphthalene	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	480	0	6000	0

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										Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances
SVOCs/PAHs	2-Chlorophenol	mg/kg	8	0	0.00	NA	NA	NA	NA	0.39	0	NE	0	39	0	580	0
SVOCs/PAHs	2-Methylnaphthalene	mg/kg	8	6	0.750	0.014	0.095	0.0465	0.0305	16	0	NE	0	24	0	300	0
SVOCs/PAHs	2-Methylphenol	mg/kg	8	0	0.00	NA	NA	NA	NA	580	0	0.67	0	320	0	4100	0
SVOCs/PAHs	2-Nitroaniline	mg/kg	8	0	0.00	NA	NA	NA	NA	5.3	0	NE	0	63	0	800	0
SVOCs/PAHs	2-Nitrophenol	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	7	0	NE	0	NE	0
SVOCs/PAHs	3,3-Dichlorobenzidine	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	1.2	0	5.1	0
SVOCs/PAHs	3-Nitroaniline	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
SVOCs/PAHs	4,6-Dinitro-2-methylphenol	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.51	0	6.6	0
SVOCs/PAHs	4-Bromophenyl-phenylether	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
SVOCs/PAHs	4-Chloro-3-methylphenol	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	630	0	8200	0
SVOCs/PAHs	4-Chloroaniline	mg/kg	8	1	0.125	0.21	0.21	0.210	NA	NE	0	1	0	2.7	0	11	0
SVOCs/PAHs	4-Chlorophenyl-phenylether	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
SVOCs/PAHs	4-Methylphenol	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	630	0	8200	0
SVOCs/PAHs	4-Nitroaniline	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	25	0	110	0
SVOCs/PAHs	4-Nitrophenol	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	7	0	NE	0	NE	0
SVOCs/PAHs	Acenaphthene	mg/kg	8	8	1.00	0.002	0.008	0.00375	0.00231	130	0	0.25	0	360	0	4500	0
SVOCs/PAHs	Acenaphthylene	mg/kg	8	8	1.00	0.006	0.022	0.0129	0.00485	120	0	NE	0	NE	0	NE	0
SVOCs/PAHs	Aniline	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	44	0	400	0
SVOCs/PAHs	Anthracene	mg/kg	8	8	1.00	0.011	0.053	0.0259	0.0162	210	0	6.8	0	1800	0	23000	0
SVOCs/PAHs	Benzo(a)anthracene	mg/kg	8	8	1.00	0.045	0.19	0.0916	0.0562	0.73	0	18	0	1.1	0	21	0
SVOCs/PAHs	Benzo(a)pyrene	mg/kg	8	8	1.00	0.047	0.26	0.116	0.0808	1.98	0	NE	0	0.11	3	2.1	0
SVOCs/PAHs	Benzo(a)Pyrene TEQ	mg/kg	8	8	1.00	0.076254	0.42146	0.182	0.128	NE	0	NE	0	0.11	4	2.1	0
SVOCs/PAHs	Benzo(b)fluoranthene	mg/kg	8	8	1.00	0.1	0.83	0.279	0.258	44	0	18	0	1.1	0	21	0
SVOCs/PAHs	Benzo(g,h,i)perylene	mg/kg	8	8	1.00	0.031	0.13	0.0608	0.0352	25	0	NE	0	NE	0	NE	0
SVOCs/PAHs	Benzo(k)fluoranthene	mg/kg	8	7	0.875	0.039	0.21	0.0801	0.0622	71	0	NE	0	11	0	210	0
SVOCs/PAHs	Benzyl Alcohol	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	630	0	8200	0
SVOCs/PAHs	Bis(2-chloro-1-methylethyl) ether	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	310	0	4700	0
SVOCs/PAHs	Bis(2-chloroethoxy)methane	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	19	0	250	0
SVOCs/PAHs	Bis(2-chloroethyl)ether	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.23	0	1	0
SVOCs/PAHs	Bis(2-ethylhexyl)phthalate	mg/kg	8	4	0.500	0.067	4.2	1.15	2.03	0.02	4	NE	0	39	0	160	0
SVOCs/PAHs	Carbazole	mg/kg	8	1	0.125	0.035	0.035	0.0350	NA	79	0	NE	0	NE	0	NE	0
SVOCs/PAHs	Chrysene	mg/kg	8	8	1.00	0.062	0.46	0.161	0.144	3.1	0	NE	0	110	0	2100	0
SVOCs/PAHs	Dibenz(a,h)anthracene	mg/kg	8	8	1.00	0.011	0.047	0.0215	0.0129	14	0	NE	0	0.11	0	2.1	0
SVOCs/PAHs	Dibenzofuran	mg/kg	8	1	0.125	0.036	0.036	0.0360	NA	NE	0	6.1	0	7.3	0	100	0
SVOCs/PAHs	Diethyl phthalate	mg/kg	8	0	0.00	NA	NA	NA	NA	3600	0	100	0	5100	0	66000	0
SVOCs/PAHs	Dimethyl phthalate	mg/kg	8	0	0.00	NA	NA	NA	NA	38	0	10	0	NE	0	NE	0
SVOCs/PAHs	Di-n-butyl phthalate	mg/kg	8	8	1.00	0.015	6.1	0.872	2.11	0.011	8	160	0	630	0	8200	0
SVOCs/PAHs	Di-n-octyl phthalate	mg/kg	8	0	0.00	NA	NA	NA	NA	0.91	0	NE	0	63	0	820	0
SVOCs/PAHs	Fluoranthene	mg/kg	8	8	1.00	0.078	0.41	0.172	0.117	22	0	10	0	240	0	3000	0
SVOCs/PAHs	Fluorene	mg/kg	8	8	1.00	0.002	0.013	0.00588	0.00439	250	0	3.7	0	240	0	3000	0
SVOCs/PAHs	Hexachlorobenzene	mg/kg	8	0	0.00	NA	NA	NA	NA	0.079	0	10	0	0.21	0	0.96	0
SVOCs/PAHs	Hexachlorobutadiene	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	1.2	0	5.3	0
SVOCs/PAHs	hexachlorocyclopentadiene	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	10	0	0.18	0	0.75	0
SVOCs/PAHs	Hexachloroethane	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	1.8	0	8	0
SVOCs/PAHs	Indeno(1,2,3-cd)pyrene	mg/kg	8	8	1.00	0.033	0.15	0.0648	0.0405	71	0	NE	0	1.1	0	21	0
SVOCs/PAHs	Isophorone	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	570	0	2400	0
SVOCs/PAHs	Naphthalene	mg/kg	8	8	1.00	0.004	0.23	0.0846	0.0793	3.4	0	1	0	3.8	0	17	0
SVOCs/PAHs	Nitrobenzene	mg/kg	8	0	0.00	NA	NA	NA	NA	4.8	0	2.2	0	5.1	0	22	0

Table 4-1. Surface Soil Statistical Summary

Analyte Group	Analyte	Unit	# Samples	# Detects	Frequency of Detection	Min	Max	Average	Standard Deviation	Soil ESV - Birds and Mammals		Soil ESV - Plants and Invertebrates		Soil RSL - Resident (THQ = 0.1)		Soil RSL - Industrial (THQ = 0.1)	
										Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances
SVOCs/PAHs	n-Nitroso-di-n-propylamine	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.078	0	0.33	0
SVOCs/PAHs	n-Nitrosodiphenylamine	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	20	0	110	0	470	0
SVOCs/PAHs	Pentachlorophenol	mg/kg	8	0	0.00	NA	NA	NA	NA	0.36	0	3	0	1	0	4	0
SVOCs/PAHs	Phenanthrene	mg/kg	8	8	1.00	0.025	0.21	0.0911	0.0669	11	0	5.5	0	NE	0	NE	0
SVOCs/PAHs	Phenol	mg/kg	8	0	0.00	NA	NA	NA	NA	37	0	0.79	0	1900	0	25000	0
SVOCs/PAHs	Pyrene	mg/kg	8	8	1.00	0.069	0.37	0.164	0.117	23	0	10	0	180	0	2300	0
SVOCs/PAHs	Pyridine	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	7.8	0	120	0
SVOCs/PAHs	Total HMW PAHs	mg/kg	8	8	1.00	0.428	2.31	1.01	0.732	1.1	2	18	0	NE	0	NE	0
SVOCs/PAHs	Total LMW PAHs	mg/kg	8	6	0.750	0.197	1.008	0.517	0.305	100	0	29	0	NE	0	NE	0
VOCs	1,1,1-Trichloroethane	mg/kg	8	0	0.00	NA	NA	NA	NA	260	0	NE	0	810	0	3600	0
VOCs	1,1,2,2-Tetrachloroethane	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.6	0	2.7	0
VOCs	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	670	0	2800	0
VOCs	1,1,2-Trichloroethane	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.15	0	0.63	0
VOCs	1,1-Dichloroethane	mg/kg	8	0	0.00	NA	NA	NA	NA	210	0	NE	0	3.6	0	16	0
VOCs	1,1-Dichloroethene	mg/kg	8	0	0.00	NA	NA	NA	NA	11	0	NE	0	23	0	100	0
VOCs	1,2,4-Trichlorobenzene	mg/kg	8	0	0.00	NA	NA	NA	NA	0.27	0	1.2	0	5.8	0	26	0
VOCs	1,2-Dibromo-3-chloropropane	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.0053	0	0.064	0
VOCs	1,2-Dibromoethane	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.036	0	0.16	0
VOCs	1,2-Dichlorobenzene	mg/kg	8	0	0.00	NA	NA	NA	NA	0.92	0	20	0	180	0	930	0
VOCs	1,2-Dichloroethane	mg/kg	8	0	0.00	NA	NA	NA	NA	0.85	0	NE	0	0.46	0	2	0
VOCs	1,2-Dichloropropane	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	700	0	1.6	0	6.6	0
VOCs	1,3-Dichlorobenzene	mg/kg	8	0	0.00	NA	NA	NA	NA	0.74	0	20	0	NE	0	NE	0
VOCs	1,4-Dichlorobenzene	mg/kg	8	0	0.00	NA	NA	NA	NA	0.89	0	1.2	0	2.6	0	11	0
VOCs	2-Butanone	mg/kg	8	0	0.00	NA	NA	NA	NA	350	0	NE	0	2700	0	19000	0
VOCs	2-Hexanone	mg/kg	8	0	0.00	NA	NA	NA	NA	0.36	0	NE	0	20	0	130	0
VOCs	4-Methyl-2-pentanone	mg/kg	8	0	0.00	NA	NA	NA	NA	9.7	0	NE	0	3300	0	14000	0
VOCs	Acetone	mg/kg	8	3	0.375	0.009	0.033	0.0217	0.0121	1.2	0	NE	0	6100	0	67000	0
VOCs	Benzene	mg/kg	8	0	0.00	NA	NA	NA	NA	24	0	NE	0	1.2	0	5.1	0
VOCs	Bromodichloromethane	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.29	0	1.3	0
VOCs	Bromoform	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	19	0	86	0
VOCs	Bromomethane	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.68	0	3	0
VOCs	Carbon disulfide	mg/kg	8	0	0.00	NA	NA	NA	NA	0.81	0	NE	0	77	0	350	0
VOCs	Carbon tetrachloride	mg/kg	8	0	0.00	NA	NA	NA	NA	58.6	0	NE	0	0.65	0	2.9	0
VOCs	Chlorobenzene	mg/kg	8	0	0.00	NA	NA	NA	NA	43	0	2.4	0	28	0	130	0
VOCs	Chloroethane	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	1400	0	5700	0
VOCs	Chloroform	mg/kg	8	0	0.00	NA	NA	NA	NA	8	0	NE	0	0.32	0	1.4	0
VOCs	Chloromethane	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	11	0	46	0
VOCs	cis-1,2-Dichloroethene	mg/kg	8	0	0.00	NA	NA	NA	NA	89.6	0	NE	0	16	0	230	0
VOCs	cis-1,3-Dichloropropene	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
VOCs	cyclohexane	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	650	0	2700	0
VOCs	Cyclohexanone	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	2800	0	13000	0
VOCs	Dibromochloromethane	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	8.3	0	39	0
VOCs	Dichlorodifluoromethane	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	8.7	0	37	0
VOCs	Ethylbenzene	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	5.8	0	25	0
VOCs	Isopropylbenzene	mg/kg	8	1	0.125	0.0008	0.0008	0.000800	NA	NE	0	NE	0	190	0	990	0
VOCs	Methyl acetate	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	7800	0	120000	0
VOCs	Methyl Tertiary Butyl Ether	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	47	0	210	0
VOCs	methylcyclohexane	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0

Table 4-1. Surface Soil Statistical Summary

Analyte Group	Analyte	Unit	# Samples	# Detects	Frequency of Detection	Min	Max	Average	Standard Deviation	Soil ESV - Birds and Mammals		Soil ESV - Plants and Invertebrates		Soil RSL - Resident (THQ = 0.1)		Soil RSL - Industrial (THQ = 0.1)	
										Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances
VOCs	Methylene chloride	mg/kg	8	0	0.00	NA	NA	NA	NA	2.6	0	1600	0	35	0	320	0
VOCs	Styrene	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	1.2	0	600	0	3500	0
VOCs	Tetrachloroethene	mg/kg	8	0	0.00	NA	NA	NA	NA	0.18	0	10	0	8.1	0	39	0
VOCs	Toluene	mg/kg	8	0	0.00	NA	NA	NA	NA	23	0	200	0	490	0	4700	0
VOCs	trans-1,2-Dichloroethene	mg/kg	8	0	0.00	NA	NA	NA	NA	89.6	0	NE	0	160	0	2300	0
VOCs	trans-1,3-Dichloropropene	mg/kg	8	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
VOCs	Trichloroethene	mg/kg	8	0	0.00	NA	NA	NA	NA	1.387	0	NE	0	0.41	0	1.9	0
VOCs	Trichlorofluoromethane	mg/kg	8	0	0.00	NA	NA	NA	NA	52	0	NE	0	2300	0	35000	0
VOCs	Vinyl chloride	mg/kg	8	0	0.00	NA	NA	NA	NA	0.12	0	NE	0	0.059	0	1.7	0
VOCs	Xylenes (total)	mg/kg	8	0	0.00	NA	NA	NA	NA	1.4	0	10	0	58	0	250	0
Rad	Thorium-232 (via Ac-228)[1]	pci/g	8	7	0.875	0.23	1.64	0.723	0.454	6.2	0	NE	0	1.1	1	NE	0
Rad	Radium-226 (via Bi-214)[1]	pci/g	8	8	1.00	0.193	1.83	0.785	0.589	1.5	1	NE	0	0.6	5	NE	0
Rad	Uranium-238 (via Pa-234m)[1,2]	pci/g	8	0	0.00	NA	NA	NA	NA	400	0	NE	0	14	0	NE	0

NA - not applicable

NE - not established

mg/kg - milligrams per kilogram

pci/g - picocuries per gram

1 - The human health soil screening benchmarks for radionuclides are based on soil screening levels specified in NUREG 1757, Volume 1 (U.S. NRC, 2006).

2 - Pa-234m is reported as Pa-234 in the analytical reports presented in Appendix I.

Table 4-2. Surface Soil Analytical Results

Analyte Group	Chemical Name	CAS #	Units	Screening Benchmarks				OU2-1-SS001	OU2-1-SS002	OU2-1-SS003	OU2-1-SS004	OU2-1-SS005	OU2-1-SS006	OU2-1-SS007	OU2-1-SS008
				Soil ESV - Plants and Invertebrates	Soil ESV - Birds and Mammals	Soil RSL - Resident (THQ = 0.1)	Soil RSL - Industrial (THQ = 0.1)	10/23/2018	10/24/2018	10/23/2018	10/24/2018	10/23/2018	10/24/2018	10/23/2018	10/24/2018
								0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs
Herbicides	2,4,5-T	93-76-5	mg/kg	NE	NE	63	820	< 0.00086 U	< 0.0056 U	< 0.00094 U	< 0.0052 U	< 0.00096 U	< 0.0056 U	< 0.00087 U	< 0.019 U
Herbicides	2,4,5-TP (Silvex)	93-72-1	mg/kg	0.109	NE	51	660	< 0.00079 U	< 0.0051 U	< 0.00086 U	< 0.0048 U	< 0.00088 U	< 0.0051 U	< 0.00080 U	< 0.017 U
Herbicides	2,4-D	94-75-7	mg/kg	NE	NE	70	960	< 0.013 U	< 0.081 U	< 0.014 U	< 0.077 U	< 0.014 U	< 0.082 U	< 0.013 U	< 0.28 U
Herbicides	2,4-DB	94-82-6	mg/kg	NE	NE	190	2500	< 0.01 U	< 0.066 U	< 0.011 U	< 0.063 U	< 0.011 U	< 0.067 U	< 0.01 U	< 0.23 U
Herbicides	2,4-DP (Dichloroprop)	120-36-5	mg/kg	NE	NE	NE	NE	< 0.0095 U	< 0.061 U	< 0.01 U	< 0.058 U	< 0.011 U	< 0.061 U	< 0.0096 U	< 0.21 U
Herbicides	Dalapon	75-99-0	mg/kg	NE	NE	190	2500	< 0.046 U	< 0.3 U	< 0.05 U	< 0.28 U	< 0.051 U	R	< 0.047 U	< 1 U
Herbicides	Dicamba	1918-00-9	mg/kg	NE	NE	190	2500	< 0.0042 U	< 0.027 U	< 0.0046 U	< 0.026 U	< 0.0047 U	R	< 0.0042 U	< 0.093 U
Herbicides	Dinoseb	88-85-7	mg/kg	NE	NE	6.3	82	< 0.0095 U	< 0.061 U	< 0.01 U	< 0.058 U	< 0.011 U	R	< 0.0096 U	< 0.21 U
Herbicides	MCPA (2-Methyl-4-chlorophenoxy acetic acid)	94-74-6	mg/kg	NE	NE	3.2	41	< 0.8 U	< 5.2 U	< 0.87 U	< 4.9 U	< 0.89 U	R	< 0.81 U	< 18 U
Herbicides	MCPP (2-(2-Methyl-4-chlorophenoxy) propanoic acid)	93-65-2	mg/kg	NE	NE	6.3	82	< 4 U	< 26 U	< 4.3 U	< 24 U	< 4.4 U	R	< 4 U	< 88 U
Metals	Aluminum	7429-90-5	mg/kg	50	NE	7700	110000	4670	6200	3770	5660	8760	5980 J+	4200	12900
Metals	Antimony	7440-36-0	mg/kg	5	0.248	3.1	47	0.214 J	5.06	0.673	6.47	2.21	10.3 J-	0.972	4.90
Metals	Arsenic	7440-38-2	mg/kg	6.8	0.25	0.68	3	3.81	40.8	4.84	137	9.62	15.6 J+	6.96	5.71
Metals	Barium	7440-39-3	mg/kg	110	17.2	1500	22000	14.7	250	30.0	259	147	739 J-	63.9	1040
Metals	Beryllium	7440-41-7	mg/kg	2.5	2.42	16	230	0.198	0.480	0.238	0.389	0.455	0.473	0.245	0.723
Metals	Cadmium	7440-43-9	mg/kg	4	0.27	7.1	98	0.0954 J	1.34	0.220	1.95	1.22	4.93 J-	0.523	9.82
Metals	Calcium (Ca)	7440-70-2	mg/kg	NE	NE	NE	NE	118000	3290	24100	4180	1730	6010 J	28200	6990
Metals	Chromium	7440-47-3	mg/kg	0.34	23	NE	NE	9.20	50.2	12.8	40.7	66.5 J	62.5 J-	15.5	152
Metals	Cobalt	7440-48-4	mg/kg	13	76	2.3	35	3.86	10.5	3.98	21.0	13.8	13.9	4.24	3.76
Metals	Copper	7440-50-8	mg/kg	50	14	310	4700	44.6	381	43.0	260	312	693 J	92.7	1560
Metals	Iron (Fe)	7439-89-6	mg/kg	NE	NE	5500	82000	8290	33700	11900	130000	44400 J	45300 J+	15500	45300
Metals	Lead	7439-92-1	mg/kg	50	0.94	400	800	12.4	425	50.5	478	3000 J	814 J-	99.2	692
Metals	Magnesium (Mg)	7439-95-4	mg/kg	NE	NE	NE	NE	73100	2900	15200	2290	3610	1450 J+	16900	2450
Metals	Manganese (Mn)	7439-96-5	mg/kg	220	322	180	2600	154	264	162	518	372 J	355 J+	159	98.6
Metals	Mercury	7439-97-6	mg/kg	0.05	0.013	1.1	4.6	< 0.0325 U	3.42	0.0418 J	0.460	0.496	2.59	0.158	12.9
Metals	Nickel	7440-02-0	mg/kg	30	10	150	2200	9.80	56.4	11.5	66.7	88.6	75.0 J-	14.3	30.9
Metals	Potassium (K)	7440-09-7	mg/kg	NE	NE	NE	NE	590	1180	630	812	1290	861	821	1900
Metals	Selenium	7782-49-2	mg/kg	0.52	0.331	39	580	< 0.106 U	1.28	0.166 J	0.523	0.390 J	1.24	0.209 J	7.26
Metals	Silver	7440-22-4	mg/kg	2	2.6	39	580	0.0772 J	1.67	0.194	2.33	1.49	8.83	0.432	60.7
Metals	Sodium (Na)	7440-23-5	mg/kg	NE	NE	NE	NE	481	125 J	238	406	121 J	400	200	363 J
Metals	Thallium	7440-28-0	mg/kg	0.05	0.027	0.078	1.2	0.0614 J	0.0781 J	< 0.0369 U	0.0825 J	0.0861 J	0.112 J-	0.0699 J	0.240
Metals	Vanadium	7440-62-2	mg/kg	2	0.714	39	580	16.7	31.6	15.9	129	22.4	29.7 J	16.0	34.3
Metals	Zinc	7440-66-6	mg/kg	6.62	12	2300	35000	25.5	424	66.2	528	507	1020 J-	180	425
PCBs	Aroclor 1016	12674-11-2	mg/kg	NE	1.1	0.41	5.1	< 0.0038 U	< 0.025 U	< 0.0041 U	< 0.093 U	< 0.0042 U	< 0.024 U	< 0.038 U	< 1.7 U
PCBs	Aroclor 1221	11104-28-2	mg/kg	NE	NE	0.2	0.83	< 0.0048 U	< 0.031 U	< 0.0053 U	< 0.12 U	< 0.0054 U	< 0.031 U	< 0.049 U	< 2.1 U
PCBs	Aroclor 1232	11141-16-5	mg/kg	NE	NE	0.17	0.72	< 0.0084 U	< 0.055 U	< 0.0091 U	< 0.21 U	< 0.0093 U	< 0.054 U	< 0.085 U	< 3.7 U
PCBs	Aroclor 1242	53469-21-9	mg/kg	NE	0.041	0.23	0.95	< 0.0034 U	< 0.023 U	< 0.0038 U	< 0.085 U	< 0.0039 U	< 0.022 U	< 0.035 U	< 1.5 U
PCBs	Aroclor 1248	12672-29-6	mg/kg	NE	0.0073	0.23	0.95	< 0.0034 U	< 0.023 U	< 0.0038 U	< 0.085 U	< 0.0039 U	< 0.022 U	< 0.035 U	< 1.5 U
PCBs	Aroclor 1254	11097-69-1	mg/kg	160	0.041	0.12	0.97	< 0.0034 U	< 0.023 U	< 0.0038 U	< 0.085 U	< 0.0039 U	< 0.022 U	< 0.035 U	7.2 J+
PCBs	Aroclor 1260	11096-82-5	mg/kg	NE	0.88	0.24	0.99	0.0093 J	0.085 J+	0.0091 J	< 0.13 U	0.042 J	0.20 J+	< 0.052 U	< 2.3 U
PCBs	Aroclor 1262	37324-23-5	mg/kg	NE	NE	NE	NE	< 0.0034 U	< 0.023 U	< 0.0038 U	< 0.085 U	< 0.0039 U	< 0.022 U	< 0.035 U	< 1.5 U
PCBs	Aroclor 1268	11100-14-4	mg/kg	NE	NE	NE	NE	< 0.0034 U	< 0.023 U	< 0.0038 U	< 0.085 U	< 0.0039 U	< 0.022 U	< 0.035 U	< 1.5 U
PCBs	Total PCBs	CALC-PCB	mg/kg	40	NE	NE	NE	0.0093	0.085	0.0091	< 0.21 U	0.042	0.2	< 0.085 U	7.2
Dioxin/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	67562-39-4	mg/kg	NE	NE	NE	NE	0.0000127	0.000302	0.0000579	0.000354	0.000171	0.000623 J+	0.0000427	0.000764
Dioxin/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	35822-46-9	mg/kg	NE	NE	NE	NE	0.0000566	0.000247	0.000256	0.000375	0.000251	0.00174	0.000112	0.00484
Dioxin/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	55673-89-7	mg/kg	NE	NE	NE	NE	0.000000877 J	0.0000107	0.00000370 J	0.00000954	0.00000377 J	0.0000210	0.00000232 J	0.0000582
Dioxin/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	70648-26-9	mg/kg	NE	NE	NE	NE	0.000000648 J	0.0000147	0.00000184 J	0.0000163	0.00000513 J	0.0000355	0.00000295 J	0.0000856
Dioxin/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	39227-28-6	mg/kg	NE	NE	NE	NE	0.000000947 J	0.00000352 J	0.00000215 J	0.00000393 J	0.00000153 J	0.0000189	0.00000121 J	0.0000335
Dioxin/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	57117-44-9	mg/kg	NE	NE	NE	NE	0.000000737 J	0.0000161	0.00000182 J	0.0000112	0.00000682 J	0.0000379	0.00000239 J	0.0000527
Dioxin/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	57653-85-7	mg/kg	NE	NE	NE	NE	0.00000213 J	0.0000141	0.00000838	0.0000197	0.00000949	0.000113	0.00000432 J	0.000156
Dioxin/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	72918-21-9	mg/kg	NE	NE	NE	NE	< 0.000000265 U	0.00000505 J	0.000000790 J	0.00000464 J	0.00000201 J	0.0000132	0.00000112 J	< 0.000000567 U
Dioxin/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	19408-74-3	mg/kg	NE	NE	NE	NE	0.00000196 J	0.00000760	0.00000415 J	0.00000927	0.00000443 J	0.0000433	0.00000275 J	0.0000708
Dioxin/Furans	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	57117-41-6	mg/kg	NE	NE	NE	NE	0.000000319 J	0.0000108	0.000000612 J	0.0000136	0.00000312 J	0.0000169	0.00000183 J	0.0000403
Dioxin/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	40321-76-4	mg/kg	NE	NE	NE	NE	0.000000696 J	< 0.000000441 U	0.00000140 J	0.00000444 J	0.00000182 J	0.0000172 J	0.000000879 J	< 0.000000727 U
Dioxin/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	60851-34-5	mg/kg	NE	NE	NE	NE	0.000000912 J	0.0000133	0.00000236 J	0.0000139	0.00000556 J	0.0000389	0.00000313 J	0.0000472
Dioxin/Furans	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	57117-31-4	mg/kg	NE	NE	NE	NE	0.000000496 J	0.0000137	0.00000105 J	0.0000134	0.00000593	0.0000323	0.00000541	0.0000372

Table 4-2. Surface Soil Analytical Results

Analyte Group	Chemical Name	CAS #	Units	Screening Benchmarks				OU2-1-SS001	OU2-1-SS002	OU2-1-SS003	OU2-1-SS004	OU2-1-SS005	OU2-1-SS006	OU2-1-SS007	OU2-1-SS008
				Soil ESV - Plants and Invertebrates	Soil ESV - Birds and Mammals	Soil RSL - Resident (THQ = 0.1)	Soil RSL - Industrial (THQ = 0.1)	10/23/2018	10/24/2018	10/23/2018	10/24/2018	10/23/2018	10/24/2018	10/23/2018	10/24/2018
								0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs
Dioxin/Furans	2,3,7,8-TCDD	1746-01-6	mg/kg	5	0.00000029	0.0000048	0.000022	< 0.000000141 U	0.00000146 J	0.000000261 J	0.00000191	0.000000391 J	0.00000241	0.000000232 J	0.00000553
Dioxin/Furans	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	51207-31-9	mg/kg	NE	NE	NE	NE	0.000000239 J	0.00000627	0.000000717 J	0.0000105	0.00000198	0.0000111	0.00000153	0.0000872
Dioxin/Furans	Octachlorodibenzofuran (OCDF)	39001-02-0	mg/kg	NE	NE	NE	NE	0.0000230	0.000264	0.000189	0.000262	0.000141	0.000473	0.0000413	0.00169
Dioxin/Furans	Octachlorodibenzo-p-dioxin (OCDD)	3268-87-9	mg/kg	NE	NE	NE	NE	0.000652	0.00240	0.00193	0.00377	0.00446	0.0106 J+	0.00105	0.0468
Dioxin/Furans	Dioxin TEQ	CALC-TEQ	mg/kg	5	0.00000029	0.0000048	0.000022	0.00000252	0.0000204	0.00000803	0.0000283	0.0000131	0.0000881	0.00000663	0.000142368
Pesticides	4,4'-DDD	72-54-8	mg/kg	NE	0.002	0.19	2.5	< 0.00035 U	0.0084 J	< 0.00038 U	0.21	0.0044 J	0.0090 J+	0.0078 J	< 0.076 U
Pesticides	4,4'-DDE	72-55-9	mg/kg	NE	0.002	2	9.3	< 0.00035 U	0.059	< 0.00038 U	0.63	0.0025 J	0.014 J+	0.027	0.11 J
Pesticides	4,4'-DDT	50-29-3	mg/kg	4.1	0.002	1.9	8.5	< 0.00084 U	0.09	< 0.00090 U	0.83	0.0081 J	0.024 J+	0.027	< 0.18 U
Pesticides	Aldrin	309-00-2	mg/kg	0.00332	0.037	0.039	0.18	< 0.00018 U	< 0.0012 U	< 0.00019 U	< 0.0043 U	< 0.00020 U	< 0.0012 U	< 0.00091 U	< 0.039 U
Pesticides	alpha Chlordane	5103-71-9	mg/kg	2.2	0.27	NE	NE	< 0.00018 U	0.0033 J	< 0.00019 U	< 0.0043 U	0.00040 J	< 0.0012 U	< 0.00091 U	0.91
Pesticides	alpha-BHC	319-84-6	mg/kg	NE	0.07	0.086	0.36	< 0.00018 U	< 0.0012 U	< 0.00019 U	< 0.0043 U	0.00022 J	< 0.0012 U	< 0.00091 U	< 0.039 U
Pesticides	beta-BHC	319-85-7	mg/kg	0.00398	0.27	0.3	1.3	< 0.00047 U	< 0.0030 U	< 0.00050 U	< 0.011 U	0.0011 J	< 0.0030 U	< 0.0023 U	< 0.1 U
Pesticides	Chlordane	57-74-9	mg/kg	0.224	1.8	NE	NE	< 0.0042 U	< 0.027 U	< 0.0046 U	< 0.1 U	< 0.0047 U	< 0.027 U	< 0.021 U	9
Pesticides	delta-BHC	319-86-8	mg/kg	NE	0.07	NE	NE	< 0.00048 U	< 0.0031 U	< 0.00051 U	< 0.011 U	< 0.00053 U	< 0.0031 U	< 0.0024 U	< 0.1 U
Pesticides	Dieldrin	60-57-1	mg/kg	10	0.0045	0.034	0.14	< 0.00035 U	< 0.0022 U	< 0.00038 U	< 0.0084 U	0.00088 J	< 0.0022 U	< 0.0018 U	< 0.076 U
Pesticides	Endosulfan I	959-98-8	mg/kg	NE	0.56	NE	NE	< 0.00023 U	< 0.0015 U	< 0.00025 U	< 0.0056 U	0.00094 J	< 0.0015 U	< 0.0012 U	0.32
Pesticides	Endosulfan II	33213-65-9	mg/kg	NE	0.56	NE	NE	< 0.0012 U	< 0.0075 U	< 0.0013 U	< 0.028 U	< 0.0013 U	R	< 0.0059 U	< 0.25 U
Pesticides	Endosulfan sulfate	1031-07-8	mg/kg	NE	0.56	NE	NE	< 0.00035 U	< 0.0022 U	< 0.00038 U	< 0.0084 U	< 0.00043 U	< 0.0022 U	0.0030 J	< 0.076 U
Pesticides	Endrin	72-20-8	mg/kg	0.0034	0.0014	1.9	25	< 0.00072 U	< 0.0046 U	< 0.00078 U	< 0.017 U	< 0.00080 U	< 0.0046 U	< 0.0036 U	< 0.16 U
Pesticides	Endrin aldehyde	7421-93-4	mg/kg	NE	NE	NE	NE	< 0.00035 U	< 0.0022 U	< 0.00038 U	< 0.0084 U	< 0.00039 U	< 0.0022 U	< 0.0018 U	< 0.076 U
Pesticides	Endrin ketone	53494-70-5	mg/kg	NE	NE	NE	NE	< 0.00064 U	< 0.0041 U	< 0.00069 U	< 0.015 U	< 0.00070 U	< 0.0041 U	0.0036 J	< 0.14 U
Pesticides	gamma Chlordane	5566-34-7	mg/kg	2.2	2.2	NE	NE	< 0.00027 U	0.0036 J	< 0.00029 U	< 0.0063 U	0.00081 J	< 0.0017 U	0.0013 J	0.74
Pesticides	gamma-BHC (Lindane)	58-89-9	mg/kg	0.005	0.0095	0.57	2.5	< 0.00022 U	< 0.0014 U	< 0.00024 U	< 0.0053 U	< 0.00025 U	< 0.0014 U	< 0.0011 U	< 0.048 U
Pesticides	Heptachlor	76-44-8	mg/kg	0.4	0.059	0.13	0.63	< 0.00033 U	< 0.0021 U	< 0.00035 U	< 0.0079 U	< 0.00036 U	< 0.0021 U	< 0.0017 U	< 0.071 U
Pesticides	Heptachlor epoxide	1024-57-3	mg/kg	NE	NE	0.07	0.33	< 0.00018 U	< 0.0012 U	< 0.00019 U	< 0.0043 U	0.00025 J	< 0.0012 U	< 0.00091 U	< 0.039 U
Pesticides	Methoxychlor	72-43-5	mg/kg	NE	5.1	32	410	< 0.0019 U	< 0.012 U	< 0.0021 U	< 0.046 U	< 0.0021 U	< 0.012 U	< 0.0096 U	< 0.42 U
Pesticides	Toxaphene	8001-35-2	mg/kg	NE	4.1	0.49	2.1	< 0.015 U	< 0.095 U	< 0.016 U	< 0.35 U	< 0.016 U	< 0.095 U	0.53	< 3.2 U
SVOCs/PAHs	1,2,4-Trichlorobenzene	120-82-1	mg/kg	1.2	0.27	5.8	26	< 0.018 U	< 0.023 U	< 0.019 U	< 0.021 U	< 0.019 U	< 0.022 U	< 0.018 U	< 0.038 U
SVOCs/PAHs	1,2-Dichlorobenzene	95-50-1	mg/kg	20	0.92	180	930	< 0.021 U	< 0.027 U	< 0.023 U	0.030 J	0.037 J	< 0.027 U	< 0.021 U	< 0.046 U
SVOCs/PAHs	1,3-Dichlorobenzene	541-73-1	mg/kg	20	0.74	NE	NE	< 0.018 U	< 0.023 U	< 0.019 U	< 0.021 U	< 0.019 U	< 0.022 U	< 0.018 U	< 0.038 U
SVOCs/PAHs	1,4-Dichlorobenzene	106-46-7	mg/kg	1.2	0.89	2.6	11	< 0.018 U	0.026 J	< 0.019 U	0.068	0.025 J	0.069	< 0.018 U	0.060 J
SVOCs/PAHs	1,4-Dioxane	123-91-1	mg/kg	NE	1.83	5.3	24	0.001 J-	< 0.0009 UJ	0.001 J-	< 0.0009 UJ	0.003 J	< 0.0009 UJ	0.001 J-	< 0.002 UJ
SVOCs/PAHs	2,4,5-Trichlorophenol	95-95-4	mg/kg	4	NE	630	8200	< 0.021 U	< 0.027 U	< 0.023 U	< 0.026 U	< 0.023 U	< 0.027 U	< 0.021 U	< 0.046 U
SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	mg/kg	10	NE	6.3	82	< 0.021 U	< 0.027 U	< 0.023 U	< 0.026 U	< 0.023 U	< 0.027 U	< 0.021 U	< 0.046 U
SVOCs/PAHs	2,4-Dichlorophenol	120-83-2	mg/kg	NE	NE	19	250	< 0.018 U	< 0.023 U	< 0.019 U	< 0.021 U	< 0.019 U	< 0.022 U	< 0.018 U	< 0.038 U
SVOCs/PAHs	2,4-Dimethylphenol	105-67-9	mg/kg	0.01	NE	130	1600	< 0.018 U	< 0.023 U	< 0.019 U	< 0.021 U	< 0.019 U	< 0.022 U	< 0.018 U	< 0.038 U
SVOCs/PAHs	2,4-Dinitrophenol	51-28-5	mg/kg	20	NE	13	160	< 0.39 U	< 0.50 U	< 0.42 U	< 0.47 U	< 0.43 U	< 0.49 U	< 0.39 U	< 0.85 U
SVOCs/PAHs	2,4-Dinitrotoluene	121-14-2	mg/kg	6	14	1.7	7.4	< 0.070 U	< 0.091 U	< 0.076 U	< 0.085 U	< 0.078 U	< 0.090 U	< 0.071 U	< 0.15 U
SVOCs/PAHs	2,6-Dinitrotoluene	606-20-2	mg/kg	30	4	0.36	1.5	< 0.021 U	< 0.027 U	< 0.023 U	< 0.026 U	< 0.023 U	< 0.027 U	< 0.021 U	< 0.046 U
SVOCs/PAHs	2-Chloronaphthalene	91-58-7	mg/kg	NE	NE	480	6000	< 0.007 U	< 0.009 U	< 0.008 U	< 0.009 U	< 0.008 U	< 0.009 U	< 0.007 U	< 0.015 U
SVOCs/PAHs	2-Chlorophenol	95-57-8	mg/kg	NE	0.39	39	580	< 0.018 U	< 0.023 U	< 0.019 U	< 0.021 U	< 0.019 U	< 0.022 U	< 0.018 U	< 0.038 U
SVOCs/PAHs	2-Methylnaphthalene	91-57-6	mg/kg	NE	16	24	300	< 0.011 U	0.029 J	0.014 J	0.035 J	0.034 J	0.072 J	< 0.011 U	0.095 J
SVOCs/PAHs	2-Methylphenol	95-48-7	mg/kg	0.67	580	320	4100	< 0.028 U	< 0.036 U	< 0.030 U	< 0.034 U	< 0.031 U	< 0.036 U	< 0.028 U	< 0.062 U
SVOCs/PAHs	2-Nitroaniline	88-74-4	mg/kg	NE	5.3	63	800	< 0.021 U	< 0.027 U	< 0.023 U	< 0.026 U	< 0.023 U	< 0.027 U	< 0.021 U	< 0.046 U
SVOCs/PAHs	2-Nitrophenol	88-75-5	mg/kg	7	NE	NE	NE	< 0.018 U	< 0.023 U	< 0.019 U	< 0.021 U	< 0.019 U	< 0.022 U	< 0.018 U	< 0.038 U
SVOCs/PAHs	3,3-Dichlorobenzidine	91-94-1	mg/kg	NE	NE	1.2	5.1	< 0.11 U	< 0.14 U	< 0.11 U	< 0.13 U	< 0.12 U	< 0.13 U	< 0.11 U	< 0.23 U
SVOCs/PAHs	3-Nitroaniline	99-09-2	mg/kg	NE	NE	NE	NE	< 0.070 U	< 0.091 U	< 0.076 U	< 0.085 U	< 0.078 U	R	< 0.071 U	< 0.15 U
SVOCs/PAHs	4,6-Dinitro-2-methylphenol	534-52-1	mg/kg	NE	NE	0.51	6.6	< 0.18 U	< 0.23 U	< 0.19 U	< 0.21 U	< 0.19 U	< 0.22 U	< 0.18 U	< 0.38 U
SVOCs/PAHs	4-Bromophenyl-phenylether	101-55-3	mg/kg	NE	NE	NE	NE	< 0.021 U	< 0.027 U	< 0.023 U	< 0.026 U	< 0.023 U	< 0.027 U	< 0.021 U	< 0.046 U
SVOCs/PAHs	4-Chloro-3-methylphenol	59-50-7	mg/kg	NE	NE	630	8200	< 0.018 U	< 0.023 U	< 0.019 U	< 0.021 U	< 0.019 U	< 0.022 U	< 0.018 U	< 0.038 U
SVOCs/PAHs	4-Chloroaniline	106-47-8	mg/kg	1	NE	2.7	11	< 0.035 U	< 0.046 U	< 0.038 U	< 0.043 U	< 0.039 U	< 0.045 U	< 0.036 U	0.21 J
SVOCs/PAHs	4-Chlorophenyl-phenylether	7005-72-3	mg/kg	NE	NE	NE	NE	< 0.018 U	< 0.023 U	< 0.019 U	< 0.021 U	< 0.019 U	< 0.022 U	< 0.018 U	< 0.038 U
SVOCs/PAHs	4-Methylphenol	106-44-5	mg/kg	NE	NE	630	8200	< 0.021 U	< 0.027 U	< 0.023 U	< 0.026 U	< 0.023 U	< 0.027 U	< 0.021 U	< 0.046 U
SVOCs/PAHs	4-Nitroaniline	100-01-6	mg/kg	NE	NE	25	110	< 0.070 U	< 0.091 U	< 0.076 U	< 0.085 U	< 0.078 U	R	< 0.071 U	< 0.15 U
SVOCs/PAHs	4-Nitrophenol	100-02-7	mg/kg	7	NE	NE	NE	< 0.18 U	< 0.23 U	< 0.19 U	< 0.21 U	< 0.19 U	< 0.22 U	< 0.18 U	< 0.38 U
SVOCs/PAHs	Acenaphthene	83-32-9	mg/kg	0.25	130	360	4500	0.002 J	0.002 J	0.002	0.003 J	0.005	0.008 J	0.002 J	0.006 J

Table 4-2. Surface Soil Analytical Results

Analyte Group	Chemical Name	CAS #	Units	Screening Benchmarks				OU2-1-SS001	OU2-1-SS002	OU2-1-SS003	OU2-1-SS004	OU2-1-SS005	OU2-1-SS006	OU2-1-SS007	OU2-1-SS008
				Soil ESV - Plants and Invertebrates	Soil ESV - Birds and Mammals	Soil RSL - Resident (THQ = 0.1)	Soil RSL - Industrial (THQ = 0.1)	10/23/2018	10/24/2018	10/23/2018	10/24/2018	10/23/2018	10/24/2018	10/23/2018	10/24/2018
								0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs
SVOCs/PAHs	Acenaphthylene	208-96-8	mg/kg	NE	120	NE	NE	0.011	0.010	0.011	0.006	0.014	0.017 J	0.022	0.012
SVOCs/PAHs	Aniline	62-53-3	mg/kg	NE	NE	44	400	< 0.18 U	< 0.23 U	< 0.19 U	< 0.21 U	< 0.19 U	R	< 0.18 U	< 0.38 U
SVOCs/PAHs	Anthracene	120-12-7	mg/kg	6.8	210	1800	23000	0.012	0.015 J	0.018	0.011 J	0.023	0.048 J	0.027	0.053 J
SVOCs/PAHs	Benzo(a)anthracene	56-55-3	mg/kg	18	0.73	1.1	21	0.051	0.092	0.045	0.048	0.10	0.19 J	0.047	0.16
SVOCs/PAHs	Benzo(a)pyrene	50-32-8	mg/kg	NE	1.98	0.11	2.1	0.065	0.10	0.047	0.063	0.12	0.22 J	0.055	0.26
SVOCs/PAHs	Benzo(a)Pyrene TEQ	CALC-BaP PAHs	mg/kg	NE	NE	0.11	2.1	0.100003	0.15644	0.076254	0.100107	0.17692	0.3364	0.089402	0.42146
SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	mg/kg	18	44	1.1	21	0.12	0.23	0.10	0.15	0.19	0.50 J	0.11	0.83
SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	mg/kg	NE	25	NE	NE	0.042	0.045	0.031	0.039	0.058	0.10 J	0.041	0.13
SVOCs/PAHs	Benzo(k)fluoranthene	207-08-9	mg/kg	NE	71	11	210	0.044	0.11	0.039	0.052	0.062	0.21 J	0.044	< 0.002 U
SVOCs/PAHs	Benzyl Alcohol	100-51-6	mg/kg	NE	NE	630	8200	< 0.18 U	< 0.23 U	< 0.19 U	< 0.21 U	< 0.19 U	< 0.22 U	< 0.18 U	< 0.38 U
SVOCs/PAHs	Bis(2-chloro-1-methylethyl) ether	108-60-1	mg/kg	NE	NE	310	4700	< 0.018 UJ	< 0.023 U	< 0.019 UJ	< 0.021 U	< 0.019 U	< 0.022 U	< 0.018 UJ	< 0.038 U
SVOCs/PAHs	Bis(2-chloroethoxy)methane	111-91-1	mg/kg	NE	NE	19	250	< 0.018 U	< 0.023 U	< 0.019 U	< 0.021 U	< 0.019 U	< 0.022 U	< 0.018 U	< 0.038 U
SVOCs/PAHs	Bis(2-chloroethyl)ether	111-44-4	mg/kg	NE	NE	0.23	1	< 0.025 U	< 0.032 U	< 0.027 U	< 0.030 U	< 0.027 U	< 0.031 U	< 0.025 U	< 0.054 U
SVOCs/PAHs	Bis(2-ethylhexyl)phthalate	117-81-7	mg/kg	NE	0.02	39	160	< 0.011 U	0.067	< 0.011 U	0.071	< 0.012 U	0.27	< 0.011 U	4.2
SVOCs/PAHs	Carbazole	86-74-8	mg/kg	NE	79	NE	NE	< 0.018 U	< 0.023 U	< 0.019 U	< 0.021 U	< 0.019 U	0.035 J	< 0.018 U	< 0.038 U
SVOCs/PAHs	Chrysene	218-01-9	mg/kg	NE	3.1	110	2100	0.063	0.14	0.064	0.087	0.11	0.30 J	0.062	0.46
SVOCs/PAHs	Dibenz(a,h)anthracene	53-70-3	mg/kg	NE	14	0.11	2.1	0.013	0.018	0.011	0.013	0.021	0.035 J	0.014	0.047
SVOCs/PAHs	Dibenzofuran	132-64-9	mg/kg	6.1	NE	7.3	100	< 0.018 U	< 0.023 U	< 0.019 U	< 0.021 U	< 0.019 U	0.036 J	< 0.018 U	< 0.038 U
SVOCs/PAHs	Diethyl phthalate	84-66-2	mg/kg	100	3600	5100	66000	< 0.070 U	< 0.091 U	< 0.076 U	< 0.085 U	< 0.078 U	< 0.090 U	< 0.071 U	< 0.15 U
SVOCs/PAHs	Dimethyl phthalate	131-11-3	mg/kg	10	38	NE	NE	< 0.070 U	< 0.091 U	< 0.076 U	< 0.085 U	< 0.078 U	< 0.090 U	< 0.071 U	< 0.15 U
SVOCs/PAHs	Di-n-butyl phthalate	84-74-2	mg/kg	160	0.011	630	8200	0.015 J	0.22	0.064	0.22	0.12	6.1	0.13	0.11
SVOCs/PAHs	Di-n-octyl phthalate	117-84-0	mg/kg	NE	0.91	63	820	< 0.070 U	< 0.091 U	< 0.076 U	< 0.085 U	< 0.078 U	< 0.090 U	< 0.071 U	< 0.15 U
SVOCs/PAHs	Fluoranthene	206-44-0	mg/kg	10	22	240	3000	0.084	0.19	0.082	0.10	0.16	0.41 J	0.078	0.27
SVOCs/PAHs	Fluorene	86-73-7	mg/kg	3.7	250	240	3000	0.002 J	0.004 J	0.003	0.004 J	0.007	0.013 J	0.002	0.012 J
SVOCs/PAHs	Hexachlorobenzene	118-74-1	mg/kg	10	0.079	0.21	0.96	< 0.004 U	< 0.005 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.008 U
SVOCs/PAHs	Hexachlorobutadiene	87-68-3	mg/kg	NE	NE	1.2	5.3	< 0.021 U	< 0.027 U	< 0.023 U	< 0.026 U	< 0.023 U	< 0.027 U	< 0.021 U	< 0.046 U
SVOCs/PAHs	hexachlorocyclopentadiene	77-47-4	mg/kg	10	NE	0.18	0.75	< 0.18 U	< 0.23 U	< 0.19 U	< 0.21 U	< 0.19 U	R	< 0.18 U	< 0.38 U
SVOCs/PAHs	Hexachloroethane	67-72-1	mg/kg	NE	NE	1.8	8	< 0.035 U	< 0.046 U	< 0.038 U	< 0.043 U	< 0.039 U	< 0.045 U	< 0.036 U	< 0.077 U
SVOCs/PAHs	Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	NE	71	1.1	21	0.044	0.050	0.033	0.037	0.062	0.10 J	0.042	0.15
SVOCs/PAHs	Isophorone	78-59-1	mg/kg	NE	NE	570	2400	< 0.018 U	< 0.023 U	< 0.019 U	< 0.021 U	< 0.019 U	< 0.022 U	< 0.018 U	< 0.038 U
SVOCs/PAHs	Naphthalene	91-20-3	mg/kg	1	3.4	3.8	17	0.004	0.060 J	0.017	0.087 J	0.15	0.23 J	0.009	0.12 J
SVOCs/PAHs	Nitrobenzene	98-95-3	mg/kg	2.2	4.8	5.1	22	< 0.028 U	< 0.036 U	< 0.030 U	< 0.034 U	< 0.031 U	< 0.036 U	< 0.028 U	< 0.062 U
SVOCs/PAHs	n-Nitroso-di-n-propylamine	621-64-7	mg/kg	NE	NE	0.078	0.33	< 0.021 U	< 0.027 U	< 0.023 U	< 0.026 U	< 0.023 U	< 0.027 U	< 0.021 U	< 0.046 U
SVOCs/PAHs	n-Nitrosodiphenylamine	86-30-6	mg/kg	20	NE	110	470	< 0.018 U	< 0.023 U	< 0.019 U	< 0.021 U	< 0.019 U	< 0.022 U	< 0.018 U	< 0.038 U
SVOCs/PAHs	Pentachlorophenol	87-86-5	mg/kg	3	0.36	1	4	< 0.039 U	< 0.050 U	< 0.042 U	< 0.047 U	< 0.043 U	< 0.049 U	< 0.039 U	< 0.085 U
SVOCs/PAHs	Phenanthrene	85-01-8	mg/kg	5.5	11	NE	NE	0.025	0.064 J	0.050	0.059 J	0.088	0.21 J	0.053	0.18 J
SVOCs/PAHs	Phenol	108-95-2	mg/kg	0.79	37	1900	25000	< 0.025 U	< 0.032 U	< 0.027 U	< 0.030 U	< 0.027 U	< 0.031 U	< 0.025 U	< 0.054 U
SVOCs/PAHs	Pyrene	129-00-0	mg/kg	10	23	180	2300	0.075	0.15	0.069	0.081	0.15	0.37 J	0.097	0.32
SVOCs/PAHs	Pyridine	110-86-1	mg/kg	NE	NE	7.8	120	< 0.070 UJ	< 0.091 U	< 0.076 UJ	< 0.085 U	< 0.078 U	< 0.090 U	< 0.071 UJ	< 0.15 U
SVOCs/PAHs	Total HMW PAHs	CALC-HMW PAHs	mg/kg	18	1.1	NE	NE	0.504	0.917	0.428	0.557	0.851	1.99	0.498	2.31
SVOCs/PAHs	Total LMW PAHs	CALC-LMW PAHs	mg/kg	29	100	NE	NE	< 0.011	0.374	0.197	0.305	0.470	1.008	< 0.011	0.748
VOCs	1,1,1-Trichloroethane	71-55-6	mg/kg	NE	260	810	3600	< 0.0004 U	< 0.0008 UJ	< 0.0006 U	< 0.0008 UJ	< 0.0005 U	< 0.0009 U	< 0.0005 U	< 0.002 U
VOCs	1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	NE	NE	0.6	2.7	< 0.0003 U	< 0.0005 UJ	< 0.0004 U	< 0.0005 UJ	< 0.0004 U	< 0.0006 U	< 0.0004 U	< 0.001 U
VOCs	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	76-13-1	mg/kg	NE	NE	670	2800	< 0.0004 U	< 0.0008 UJ	< 0.0006 U	< 0.0008 UJ	< 0.0005 U	< 0.0009 U	< 0.0005 U	< 0.002 U
VOCs	1,1,2-Trichloroethane	79-00-5	mg/kg	NE	NE	0.15	0.63	< 0.0004 U	< 0.0007 UJ	< 0.0005 U	< 0.0006 UJ	< 0.0004 U	< 0.0007 U	< 0.0005 U	< 0.001 U
VOCs	1,1-Dichloroethane	75-34-3	mg/kg	NE	210	3.6	16	< 0.0004 U	< 0.0007 UJ	< 0.0005 U	< 0.0006 UJ	< 0.0004 U	< 0.0007 U	< 0.0005 U	< 0.001 U
VOCs	1,1-Dichloroethene	75-35-4	mg/kg	NE	11	23	100	< 0.0004 U	< 0.0007 UJ	< 0.0005 U	< 0.0006 UJ	< 0.0004 U	< 0.0007 U	< 0.0005 U	< 0.001 U
VOCs	1,2,4-Trichlorobenzene	120-82-1	mg/kg	1.2	0.27	5.8	26	< 0.004 U	< 0.007 UJ	< 0.005 U	< 0.006 UJ	< 0.004 U	< 0.007 UJ	< 0.005 U	< 0.015 U
VOCs	1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	NE	NE	0.0053	0.064	< 0.0003 U	< 0.0005 UJ	< 0.0004 U	< 0.0005 UJ	< 0.0004 U	< 0.0006 U	< 0.0004 U	< 0.001 U
VOCs	1,2-Dibromoethane	106-93-4	mg/kg	NE	NE	0.036	0.16	< 0.0003 U	< 0.0005 UJ	< 0.0004 U	< 0.0005 UJ	< 0.0004 U	< 0.0006 U	< 0.0004 U	< 0.001 U
VOCs	1,2-Dichlorobenzene	95-50-1	mg/kg	20	0.92	180	930	< 0.0004 U	< 0.0007 UJ	< 0.0005 U	< 0.0006 UJ	< 0.0004 U	< 0.0007 UJ	< 0.0005 U	< 0.001 U
VOCs	1,2-Dichloroethane	107-06-2	mg/kg	NE	0.85	0.46	2	< 0.0004 U	< 0.0008 UJ	< 0.0006 U	< 0.0008 UJ	< 0.0005 U	< 0.0009 U	< 0.0005 U	< 0.002 U
VOCs	1,2-Dichloropropane	78-87-5	mg/kg	700	NE	1.6	6.6	< 0.0004 U	< 0.0007 UJ	< 0.0005 U	< 0.0006 UJ	< 0.0004 U	< 0.0007 U	< 0.0005 U	< 0.001 U
VOCs	1,3-Dichlorobenzene	541-73-1	mg/kg	20	0.74	NE	NE	< 0.0004 U	< 0.0007 UJ	< 0.0005 U	< 0.0006 UJ	< 0.0004 U	< 0.0007 U	< 0.0005 U	< 0.001 U
VOCs	1,4-Dichlorobenzene	106-46-7	mg/kg	1.2	0.89	2.6	11	< 0.0003 U	< 0.0005 UJ	< 0.0004 U	< 0.0005 UJ	< 0.0004 U	< 0.0006 U	< 0.0004 U	< 0.001 U
VOCs	2-Butanone	78-93-3	mg/kg	NE	350	2700	19000	< 0.0007 U	< 0.001 UJ	< 0.001 U	< 0.001 UJ	< 0.0009 U	< 0.001 U	< 0.0009 U	< 0.003 U

Table 4-2. Surface Soil Analytical Results

Analyte Group	Chemical Name	CAS #	Units	Screening Benchmarks: Soil ESV - Plants and Invertebrates	Screening Benchmarks: Soil ESV - Birds and Mammals	Screening Benchmarks: Soil RSL - Resident (THQ = 0.1)	Screening Benchmarks: Soil RSL - Industrial (THQ = 0.1)	OU2-1-SS001 10/23/2018 0 - 0.5 ft bgs	OU2-1-SS002 10/24/2018 0 - 0.5 ft bgs	OU2-1-SS003 10/23/2018 0 - 0.5 ft bgs	OU2-1-SS004 10/24/2018 0 - 0.5 ft bgs	OU2-1-SS005 10/23/2018 0 - 0.5 ft bgs	OU2-1-SS006 10/24/2018 0 - 0.5 ft bgs	OU2-1-SS007 10/23/2018 0 - 0.5 ft bgs	OU2-1-SS008 10/24/2018 0 - 0.5 ft bgs
VOCs	2-Hexanone	591-78-6	mg/kg	NE	0.36	20	130	< 0.0007 U	< 0.001 UJ	< 0.001 U	< 0.001 UJ	< 0.0009 U	< 0.001 U	< 0.0009 U	< 0.003 U
VOCs	4-Methyl-2-pentanone	108-10-1	mg/kg	NE	9.7	3300	14000	< 0.0007 U	< 0.001 UJ	< 0.001 U	< 0.001 UJ	< 0.0009 U	< 0.001 U	< 0.0009 U	< 0.003 U
VOCs	Acetone	67-64-1	mg/kg	NE	1.2	6100	67000	< 0.004 U	< 0.008 UJ	< 0.006 U	0.009 J+	< 0.005 U	0.033 J+	< 0.005 U	0.023 J+
VOCs	Benzene	71-43-2	mg/kg	NE	24	1.2	5.1	< 0.0004 U	< 0.0007 UJ	< 0.0005 U	< 0.0006 UJ	< 0.0004 U	< 0.0007 U	< 0.0005 U	< 0.001 U
VOCs	Bromodichloromethane	75-27-4	mg/kg	NE	NE	0.29	1.3	< 0.0003 U	< 0.0005 UJ	< 0.0004 U	< 0.0005 UJ	< 0.0004 U	< 0.0006 U	< 0.0004 U	< 0.001 U
VOCs	Bromoform	75-25-2	mg/kg	NE	NE	19	86	< 0.004 U	< 0.007 UJ	< 0.005 U	< 0.006 UJ	< 0.004 U	< 0.007 UJ	< 0.005 U	< 0.015 U
VOCs	Bromomethane	74-83-9	mg/kg	NE	NE	0.68	3	< 0.0005 U	< 0.0009 UJ	< 0.0007 U	< 0.0009 UJ	< 0.0006 U	< 0.001 U	< 0.0006 U	< 0.002 U
VOCs	Carbon disulfide	75-15-0	mg/kg	NE	0.81	77	350	< 0.0004 U	< 0.0008 UJ	< 0.0006 U	< 0.0008 UJ	< 0.0005 U	< 0.0009 U	< 0.0005 U	< 0.002 U
VOCs	Carbon tetrachloride	56-23-5	mg/kg	NE	58.6	0.65	2.9	< 0.0004 U	< 0.0007 UJ	< 0.0005 U	< 0.0006 UJ	< 0.0004 U	< 0.0007 U	< 0.0005 U	< 0.001 U
VOCs	Chlorobenzene	108-90-7	mg/kg	2.4	43	28	130	< 0.0004 U	< 0.0007 UJ	< 0.0005 U	< 0.0006 UJ	< 0.0004 U	< 0.0007 U	< 0.0005 U	< 0.001 U
VOCs	Chloroethane	75-00-3	mg/kg	NE	NE	1400	5700	< 0.0007 U	< 0.001 UJ	< 0.001 U	< 0.001 UJ	< 0.0009 U	< 0.001 U	< 0.0009 U	< 0.003 U
VOCs	Chloroform	67-66-3	mg/kg	NE	8	0.32	1.4	< 0.0004 U	< 0.0008 UJ	< 0.0006 U	< 0.0008 UJ	< 0.0005 U	< 0.0009 U	< 0.0005 U	< 0.002 U
VOCs	Chloromethane	74-87-3	mg/kg	NE	NE	11	46	< 0.0004 U	< 0.0008 UJ	< 0.0006 U	< 0.0008 UJ	< 0.0005 U	< 0.0009 U	< 0.0005 U	< 0.002 U
VOCs	cis-1,2-Dichloroethene	156-59-2	mg/kg	NE	89.6	16	230	< 0.0004 U	< 0.0007 UJ	< 0.0005 U	< 0.0006 UJ	< 0.0004 U	< 0.0007 U	< 0.0005 U	< 0.001 U
VOCs	cis-1,3-Dichloropropene	10061-01-5	mg/kg	NE	NE	NE	NE	< 0.0003 U	< 0.0005 UJ	< 0.0004 U	< 0.0005 UJ	< 0.0004 U	< 0.0006 UJ	< 0.0004 U	< 0.001 U
VOCs	cyclohexane	110-82-7	mg/kg	NE	NE	650	2700	< 0.0004 U	< 0.0007 UJ	< 0.0005 U	< 0.0006 UJ	< 0.0004 U	< 0.0007 U	< 0.0005 U	< 0.001 U
VOCs	Cyclohexanone	108-94-1	mg/kg	NE	NE	2800	13000	< 0.018 U	< 0.033 UJ	< 0.024 U	< 0.032 UJ	< 0.022 U	< 0.036 U	< 0.023 U	< 0.074 U
VOCs	Dibromochloromethane	124-48-1	mg/kg	NE	NE	8.3	39	< 0.0003 U	< 0.0005 UJ	< 0.0004 U	< 0.0005 UJ	< 0.0004 U	< 0.0006 U	< 0.0004 U	< 0.001 U
VOCs	Dichlorodifluoromethane	75-71-8	mg/kg	NE	NE	8.7	37	< 0.0004 U	< 0.0008 UJ	< 0.0006 U	< 0.0008 UJ	< 0.0005 U	< 0.0009 U	< 0.0005 U	< 0.002 U
VOCs	Ethylbenzene	100-41-4	mg/kg	NE	NE	5.8	25	< 0.0003 U	< 0.0005 UJ	< 0.0004 U	< 0.0005 UJ	< 0.0004 U	< 0.0006 U	< 0.0004 U	< 0.001 U
VOCs	Isopropylbenzene	98-82-8	mg/kg	NE	NE	190	990	< 0.0003 U	< 0.0005 UJ	< 0.0004 U	< 0.0005 UJ	0.0008 J	< 0.0006 U	< 0.0004 U	< 0.001 U
VOCs	Methyl acetate	79-20-9	mg/kg	NE	NE	7800	120000	< 0.0007 U	< 0.001 UJ	< 0.001 U	< 0.001 UJ	< 0.0009 U	< 0.001 U	< 0.0009 U	< 0.003 U
VOCs	Methyl Tertiary Butyl Ether	1634-04-4	mg/kg	NE	NE	47	210	< 0.0004 U	< 0.0007 UJ	< 0.0005 U	< 0.0006 UJ	< 0.0004 U	< 0.0007 U	< 0.0005 U	< 0.001 U
VOCs	methylcyclohexane	108-87-2	mg/kg	NE	NE	NE	NE	< 0.0004 U	< 0.0008 UJ	< 0.0006 U	< 0.0008 UJ	< 0.0005 U	< 0.0009 U	< 0.0005 U	< 0.002 U
VOCs	Methylene chloride	75-09-2	mg/kg	1600	2.6	35	320	< 0.001 U	< 0.003 UJ	< 0.002 U	< 0.003 UJ	< 0.002 U	< 0.003 U	< 0.002 U	< 0.006 U
VOCs	Styrene	100-42-5	mg/kg	1.2	NE	600	3500	< 0.0002 U	< 0.0004 UJ	< 0.0003 U	< 0.0004 UJ	< 0.0003 U	< 0.0004 UJ	< 0.0003 U	< 0.0009 U
VOCs	Tetrachloroethene	127-18-4	mg/kg	10	0.18	8.1	39	< 0.0004 U	< 0.0007 UJ	< 0.0005 U	< 0.0006 UJ	< 0.0004 U	< 0.0007 U	< 0.0005 U	< 0.001 U
VOCs	Toluene	108-88-3	mg/kg	200	23	490	4700	< 0.0004 U	< 0.0008 UJ	< 0.0006 U	< 0.0008 UJ	< 0.0005 U	< 0.0009 U	< 0.0005 U	< 0.002 U
VOCs	trans-1,2-Dichloroethene	156-60-5	mg/kg	NE	89.6	160	2300	< 0.0004 U	< 0.0007 UJ	< 0.0005 U	< 0.0006 UJ	< 0.0004 U	< 0.0007 U	< 0.0005 U	< 0.001 U
VOCs	trans-1,3-Dichloropropene	10061-02-6	mg/kg	NE	NE	NE	NE	< 0.0002 U	< 0.0004 UJ	< 0.0003 U	< 0.0004 UJ	< 0.0003 U	< 0.0004 UJ	< 0.0003 U	< 0.0009 U
VOCs	Trichloroethene	79-01-6	mg/kg	NE	1.387	0.41	1.9	< 0.0004 U	< 0.0007 UJ	< 0.0005 U	< 0.0006 UJ	< 0.0004 U	< 0.0007 U	< 0.0005 U	< 0.001 U
VOCs	Trichlorofluoromethane	75-69-4	mg/kg	NE	52	2300	35000	< 0.0005 U	< 0.0009 UJ	< 0.0007 U	< 0.0009 UJ	< 0.0006 U	< 0.001 U	< 0.0006 U	< 0.002 U
VOCs	Vinyl chloride	75-01-4	mg/kg	NE	0.12	0.059	1.7	< 0.0004 U	< 0.0008 UJ	< 0.0006 U	< 0.0008 UJ	< 0.0005 U	< 0.0009 U	< 0.0005 U	< 0.002 U
VOCs	Xylenes (total)	1330-20-7	mg/kg	10	1.4	58	250	< 0.0007 U	< 0.001 UJ	< 0.001 U	< 0.001 UJ	< 0.0009 U	< 0.001 U	< 0.0009 U	< 0.003 U
Rad	Thorium-232 (via Ac-228)[1]	14331-83-0	pci/g	NE	6.2	1.1	NE	0.23 J-	0.72 J+	0.34	0.78	0.69	1.64 J+	< 0.3 UJ	0.66 J+
Rad	Radium-226 (via Bi-214)[1]	14733-03-0	pci/g	NE	1.5	0.6	NE	0.193 J-	0.76 J+	0.27	0.71 J	0.70	1.49 J+	0.33 J-	1.83 J+
Rad	Uranium-238 (via Pa-234m)[1,2]	15100-28-4	pci/g	NE	400	14	NE	< 0.25 UJ	< 0.26 U	< 0.42 U	< 0.17 U	< 0.24 U	< 0.151 U	< 0.32 UJ	< 0.19 U

Notes:

For samples with duplicates, the maximum result of the duplicate and standard sample was reported.

BLUE	Exceeds Resident Soil RSL (THQ = 0.1)
RED	Exceeds Industrial Soil RSL (THQ = 0.1)
HIGHLIGHT	Exceeds Soil ESV(s)

NE = not established

U = not detected above method detection limit

UJ = not detected above method detection limit; method detection limit estimated

J = estimated value, unknown bias

J+ = estimated value, may be biased high

J- = estimated value, may be biased low

R = data rejected during validation

1 - The human health soil screening benchmarks for radionuclides are based on soil screening levels specified in NUREG 1757, Volume 1 (U.S. NRC, 2006).

2 - Pa-234m is reported as Pa-234 in the analytical reports presented in Appendix I.

Table 4-3. Subsurface Soil Statistical Summary

Analyte Group	Analyte	Unit	# Samples	# Detects	Frequency of Detection	Min	Max	Average	Standard Deviation	Soil ESV - Birds and Mammals		Soil ESV - Plants and Invertebrates		Soil RSL - Resident (THQ = 0.1)		Soil RSL - Industrial (THQ = 0.1)	
										Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances
Herbicides	2,4,5-T	mg/kg	12	2	0.167	0.067	0.16	0.114	0.0658	NE	0	NE	0	63	0	820	0
Herbicides	2,4,5-TP (Silvex)	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	0.109	0	51	0	660	0
Herbicides	2,4-D	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	70	0	960	0
Herbicides	2,4-DB	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	190	0	2500	0
Herbicides	2,4-DP (Dichloroprop)	mg/kg	12	1	0.0833	1.7	1.7	1.70	NA	NE	0	NE	0	NE	0	NE	0
Herbicides	Dalapon	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	190	0	2500	0
Herbicides	Dicamba	mg/kg	12	1	0.0833	0.44	0.44	0.440	NA	NE	0	NE	0	190	0	2500	0
Herbicides	Dinoseb	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	6.3	0	82	0
Herbicides	MCPA (2-Methyl-4-chlorophenoxy acetic acid)	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	3.2	0	41	0
Herbicides	MCPP (2-(2-Methyl-4-chlorophenoxy) propanoic acid)	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	6.3	0	82	0
Metals	Aluminum	mg/kg	12	12	1.00	2980	10500	6710	2550	NE	0	50	12	7700	5	110000	0
Metals	Antimony	mg/kg	12	12	1.00	0.147	53.2	11.5	14.0	0.248	11	5	9	3.1	9	47	1
Metals	Arsenic	mg/kg	12	12	1.00	3.46	35.1	18.9	11.3	0.25	12	6.8	10	0.68	12	3	12
Metals	Barium	mg/kg	12	12	1.00	63.3	1330	728	397	17.2	12	110	11	1500	0	22000	0
Metals	Beryllium	mg/kg	12	12	1.00	0.307	0.933	0.509	0.189	2.42	0	2.5	0	16	0	230	0
Metals	Cadmium	mg/kg	12	12	1.00	0.0748	12.8	4.15	3.96	0.27	11	4	3	7.1	3	98	0
Metals	Calcium	mg/kg	12	12	1.00	893	64300	21200	17700	NE	0	NE	0	NE	0	NE	0
Metals	Chromium	mg/kg	12	12	1.00	20.4	276	77.8	68.7	23	10	0.34	12	NE	0	NE	0
Metals	Cobalt	mg/kg	12	12	1.00	5.14	24.1	11.4	5.75	76	0	13	5	2.3	12	35	0
Metals	Copper	mg/kg	12	12	1.00	30.4	3490	645	986	14	12	50	11	310	6	4700	0
Metals	Iron	mg/kg	12	12	1.00	10700	142000	59100	44500	NE	0	NE	0	5500	12	82000	4
Metals	Lead	mg/kg	12	12	1.00	16.2	6100	1590	1910	0.94	12	50	11	400	10	800	7
Metals	Magnesium	mg/kg	12	12	1.00	735	6850	2970	1800	NE	0	NE	0	NE	0	NE	0
Metals	Manganese	mg/kg	12	12	1.00	118	937	439	276	322	8	220	9	180	9	2600	0
Metals	Mercury	mg/kg	12	11	0.917	0.243	12.9	2.17	3.61	0.013	11	0.05	11	1.1	6	4.6	1
Metals	Nickel	mg/kg	12	12	1.00	22.6	134	69.8	34.5	10	12	30	11	150	0	2200	0
Metals	Potassium	mg/kg	12	12	1.00	378	6210	1830	1750	NE	0	NE	0	NE	0	NE	0
Metals	Selenium	mg/kg	12	11	0.917	0.169	2.62	1.68	0.795	0.331	10	0.52	10	39	0	580	0
Metals	Silver	mg/kg	12	11	0.917	0.221	28.4	7.31	7.67	2.6	9	2	9	39	0	580	0
Metals	Sodium	mg/kg	12	12	1.00	81.7	1980	705	573	NE	0	NE	0	NE	0	NE	0
Metals	Thallium	mg/kg	12	12	1.00	0.0664	0.36	0.196	0.0876	0.027	12	0.05	12	0.078	11	1.2	0
Metals	Thorium	mg/kg	12	6	0.500	8.82	60.8	34.9	23.9	NE	0	NE	0	NE	0	NE	0
Metals	Uranium	mg/kg	12	12	1.00	0.343	1.38	0.622	0.276	NE	0	NE	0	NE	0	NE	0
Metals	Vanadium	mg/kg	12	12	1.00	17.6	92.2	46.7	25.2	0.714	12	2	12	39	5	580	0
Metals	Zinc	mg/kg	12	12	1.00	38	3110	1350	1050	12	12	6.62	12	2300	3	35000	0
PCBs	Aroclor 1016	mg/kg	12	0	0.00	NA	NA	NA	NA	1.1	0	NE	0	0.41	0	5.1	0
PCBs	Aroclor 1221	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.2	0	0.83	0
PCBs	Aroclor 1232	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.17	0	0.72	0
PCBs	Aroclor 1242	mg/kg	12	0	0.00	NA	NA	NA	NA	0.041	0	NE	0	0.23	0	0.95	0
PCBs	Aroclor 1248	mg/kg	12	0	0.00	NA	NA	NA	NA	0.0073	0	NE	0	0.23	0	0.95	0
PCBs	Aroclor 1254	mg/kg	12	4	0.333	0.07	5.5	1.49	2.68	0.041	4	160	0	0.12	2	0.97	1
PCBs	Aroclor 1260	mg/kg	12	11	0.917	0.028	2.6	0.327	0.755	0.88	1	NE	0	0.24	1	0.99	1
PCBs	Aroclor 1262	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
PCBs	Aroclor 1268	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
PCBs	Total PCBs	mg/kg	12	11	0.917	0.028	8.1	0.867	2.40	NE	0	40	0	NE	0	NE	0
Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	mg/kg	12	12	1.00	9.07E-07	0.0012	0.000648	0.000336	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	mg/kg	12	12	1.00	0.0000121	0.00774	0.00136	0.00206	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	mg/kg	12	11	0.917	0.00000454	0.0000701	0.0000225	0.0000194	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	mg/kg	12	11	0.917	0.00000341	0.00012	0.0000315	0.0000314	NE	0	NE	0	NE	0	NE	0

Table 4-3. Subsurface Soil Statistical Summary

Analyte Group	Analyte	Unit	# Samples	# Detects	Frequency of Detection	Min	Max	Average	Standard Deviation	Soil ESV - Birds and Mammals		Soil ESV - Plants and Invertebrates		Soil RSL - Resident (THQ = 0.1)		Soil RSL - Industrial (THQ = 0.1)	
										Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances
Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	mg/kg	12	11	0.917	7.45E-07	0.0000985	0.0000179	0.0000326	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	mg/kg	12	11	0.917	0.00000367	0.0000748	0.0000377	0.0000196	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	mg/kg	12	11	0.917	0.0000104	0.00103	0.000149	0.000306	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	mg/kg	12	11	0.917	0.00000154	0.0000244	0.00000925	0.00000631	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	mg/kg	12	11	0.917	0.00000276	0.000666	0.0000797	0.000197	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	mg/kg	12	11	0.917	0.00000105	0.0000385	0.0000131	0.0000100	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	mg/kg	12	11	0.917	7.72E-07	0.000247	0.0000307	0.0000728	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	mg/kg	12	11	0.917	0.00000429	0.0000762	0.0000317	0.0000185	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	mg/kg	12	11	0.917	0.0000052	0.0000738	0.0000294	0.0000193	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	2,3,7,8-TCDD	mg/kg	12	11	0.917	1.65E-07	0.0000132	0.00000344	0.00000434	2.9e-007	10	5	0	4.8e-006	2	2.2e-005	0
Dioxins/Furans	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	mg/kg	12	10	0.833	0.00000147	0.0000694	0.0000177	0.0000210	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	Octachlorodibenzofuran (OCDF)	mg/kg	12	12	1.00	8.41E-07	0.00211	0.000586	0.000526	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	Octachlorodibenzo-p-dioxin (OCDD)	mg/kg	12	12	1.00	0.00241	0.0554	0.00974	0.0145	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	Dioxin TEQ	mg/kg	12	12	1.00	8.53E-07	0.00049377	0.0000973	0.000143	2.9e-007	12	5	0	4.8e-006	11	2.2e-005	10
Pesticides	4,4'-DDD	mg/kg	12	8	0.667	0.0051	0.065	0.0226	0.0212	0.002	8	NE	0	0.19	0	2.5	0
Pesticides	4,4'-DDE	mg/kg	12	8	0.667	0.0011	0.21	0.0338	0.0713	0.002	7	NE	0	2	0	9.3	0
Pesticides	4,4'-DDT	mg/kg	12	3	0.250	0.002	0.5	0.168	0.288	0.002	1	4.1	0	1.9	0	8.5	0
Pesticides	Aldrin	mg/kg	12	0	0.00	NA	NA	NA	NA	0.037	0	0.00332	0	0.039	0	0.18	0
Pesticides	alpha Chlordane	mg/kg	12	1	0.0833	0.33	0.33	0.330	NA	0.27	1	2.2	0	NE	0	NE	0
Pesticides	alpha-BHC	mg/kg	12	1	0.0833	0.00084	0.00084	0.000840	NA	0.07	0	NE	0	0.086	0	0.36	0
Pesticides	beta-BHC	mg/kg	12	4	0.333	0.0038	0.014	0.00953	0.00527	0.27	0	0.00398	3	0.3	0	1.3	0
Pesticides	Chlordane	mg/kg	12	1	0.0833	4.9	4.9	4.90	NA	1.8	1	0.224	1	NE	0	NE	0
Pesticides	delta-BHC	mg/kg	12	3	0.250	0.007	0.011	0.00920	0.00203	0.07	0	NE	0	NE	0	NE	0
Pesticides	Dieldrin	mg/kg	12	1	0.0833	0.0052	0.0052	0.00520	NA	0.0045	1	10	0	0.034	0	0.14	0
Pesticides	Endosulfan I	mg/kg	12	1	0.0833	0.17	0.17	0.170	NA	0.56	0	NE	0	NE	0	NE	0
Pesticides	Endosulfan II	mg/kg	12	0	0.00	NA	NA	NA	NA	0.56	0	NE	0	NE	0	NE	0
Pesticides	Endosulfan sulfate	mg/kg	12	2	0.167	0.0055	0.029	0.0173	0.0166	0.56	0	NE	0	NE	0	NE	0
Pesticides	Endrin	mg/kg	12	1	0.0833	0.0011	0.0011	0.00110	NA	0.0014	0	0.0034	0	1.9	0	25	0
Pesticides	Endrin aldehyde	mg/kg	12	2	0.167	0.01	0.054	0.0320	0.0311	NE	0	NE	0	NE	0	NE	0
Pesticides	Endrin ketone	mg/kg	12	2	0.167	0.0022	0.24	0.121	0.168	NE	0	NE	0	NE	0	NE	0
Pesticides	gamma Chlordane	mg/kg	12	5	0.417	0.0005	0.36	0.0766	0.158	2.2	0	2.2	0	NE	0	NE	0
Pesticides	gamma-BHC (Lindane)	mg/kg	12	0	0.00	NA	NA	NA	NA	0.0095	0	0.005	0	0.57	0	2.5	0
Pesticides	Heptachlor	mg/kg	12	0	0.00	NA	NA	NA	NA	0.059	0	0.4	0	0.13	0	0.63	0
Pesticides	Heptachlor epoxide	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.07	0	0.33	0
Pesticides	Methoxychlor	mg/kg	12	0	0.00	NA	NA	NA	NA	5.1	0	NE	0	32	0	410	0
Pesticides	Toxaphene	mg/kg	12	0	0.00	NA	NA	NA	NA	4.1	0	NE	0	0.49	0	2.1	0
SVOCs/PAHs	1,2,4-Trichlorobenzene	mg/kg	12	1	0.0833	0.056	0.056	0.0560	NA	0.27	0	1.2	0	5.8	0	26	0
SVOCs/PAHs	1,2-Dichlorobenzene	mg/kg	12	8	0.667	0.047	1.4	0.463	0.525	0.92	2	20	0	180	0	930	0
SVOCs/PAHs	1,3-Dichlorobenzene	mg/kg	12	1	0.0833	0.057	0.057	0.0570	NA	0.74	0	20	0	NE	0	NE	0
SVOCs/PAHs	1,4-Dichlorobenzene	mg/kg	12	12	1.00	0.027	6.7	0.995	1.86	0.89	2	1.2	2	2.6	1	11	0
SVOCs/PAHs	1,4-Dioxane	mg/kg	12	8	0.667	0.002	0.017	0.0115	0.00487	1.83	0	NE	0	5.3	0	24	0
SVOCs/PAHs	2,4,5-Trichlorophenol	mg/kg	12	1	0.0833	0.17	0.17	0.170	NA	NE	0	4	0	630	0	8200	0
SVOCs/PAHs	2,4,6-Trichlorophenol	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	10	0	6.3	0	82	0
SVOCs/PAHs	2,4-Dichlorophenol	mg/kg	12	1	0.0833	0.073	0.073	0.0730	NA	NE	0	NE	0	19	0	250	0
SVOCs/PAHs	2,4-Dimethylphenol	mg/kg	12	5	0.417	0.21	0.96	0.592	0.331	NE	0	0.01	5	130	0	1600	0
SVOCs/PAHs	2,4-Dinitrophenol	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	20	0	13	0	160	0
SVOCs/PAHs	2,4-Dinitrotoluene	mg/kg	12	0	0.00	NA	NA	NA	NA	14	0	6	0	1.7	0	7.4	0
SVOCs/PAHs	2,6-Dinitrotoluene	mg/kg	12	0	0.00	NA	NA	NA	NA	4	0	30	0	0.36	0	1.5	0
SVOCs/PAHs	2-Chloronaphthalene	mg/kg	12	2	0.167	0.071	0.47	0.271	0.282	NE	0	NE	0	480	0	6000	0

Table 4-3. Subsurface Soil Statistical Summary

Analyte Group	Analyte	Unit	# Samples	# Detects	Frequency of Detection	Min	Max	Average	Standard Deviation	Soil ESV - Birds and Mammals		Soil ESV - Plants and Invertebrates		Soil RSL - Resident (THQ = 0.1)		Soil RSL - Industrial (THQ = 0.1)	
										Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances
SVOCs/PAHs	2-Chlorophenol	mg/kg	12	0	0.00	NA	NA	NA	NA	0.39	0	NE	0	39	0	580	0
SVOCs/PAHs	2-Methylnaphthalene	mg/kg	12	11	0.917	0.019	10	1.91	2.83	16	0	NE	0	24	0	300	0
SVOCs/PAHs	2-Methylphenol	mg/kg	12	5	0.417	0.098	0.29	0.222	0.0874	580	0	0.67	0	320	0	4100	0
SVOCs/PAHs	2-Nitroaniline	mg/kg	12	0	0.00	NA	NA	NA	NA	5.3	0	NE	0	63	0	800	0
SVOCs/PAHs	2-Nitrophenol	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	7	0	NE	0	NE	0
SVOCs/PAHs	3,3-Dichlorobenzidine	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	1.2	0	5.1	0
SVOCs/PAHs	3-Nitroaniline	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
SVOCs/PAHs	4,6-Dinitro-2-methylphenol	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.51	0	6.6	0
SVOCs/PAHs	4-Bromophenyl-phenylether	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
SVOCs/PAHs	4-Chloro-3-methylphenol	mg/kg	12	1	0.0833	0.072	0.072	0.0720	NA	NE	0	NE	0	630	0	8200	0
SVOCs/PAHs	4-Chloroaniline	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	1	0	2.7	0	11	0
SVOCs/PAHs	4-Chlorophenyl-phenylether	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
SVOCs/PAHs	4-Methylphenol	mg/kg	12	8	0.667	0.37	12	3.96	3.94	NE	0	NE	0	630	0	8200	0
SVOCs/PAHs	4-Nitroaniline	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	25	0	110	0
SVOCs/PAHs	4-Nitrophenol	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	7	0	NE	0	NE	0
SVOCs/PAHs	Acenaphthene	mg/kg	12	12	1.00	0.002	5.1	0.816	1.39	130	0	0.25	9	360	0	4500	0
SVOCs/PAHs	Acenaphthylene	mg/kg	12	12	1.00	0.006	0.62	0.162	0.188	120	0	NE	0	NE	0	NE	0
SVOCs/PAHs	Aniline	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	44	0	400	0
SVOCs/PAHs	Anthracene	mg/kg	12	11	0.917	0.009	4.1	0.929	1.21	210	0	6.8	0	1800	0	23000	0
SVOCs/PAHs	Benzo(a)anthracene	mg/kg	12	12	1.00	0.014	11	1.74	3.09	0.73	6	18	0	1.1	5	21	0
SVOCs/PAHs	Benzo(a)pyrene	mg/kg	12	11	0.917	0.041	8	1.47	2.35	1.98	2	NE	0	0.11	9	2.1	2
SVOCs/PAHs	Benzo(a)Pyrene TEQ	mg/kg	12	12	1.00	0.001436	11.671	1.98	3.31	NE	0	NE	0	0.11	10	2.1	2
SVOCs/PAHs	Benzo(b)fluoranthene	mg/kg	12	11	0.917	0.086	10	2.02	2.89	44	0	18	0	1.1	5	21	0
SVOCs/PAHs	Benzo(g,h,i)perylene	mg/kg	12	11	0.917	0.026	2.7	0.584	0.795	25	0	NE	0	NE	0	NE	0
SVOCs/PAHs	Benzo(k)fluoranthene	mg/kg	12	10	0.833	0.027	4.1	0.907	1.28	71	0	NE	0	11	0	210	0
SVOCs/PAHs	Benzyl Alcohol	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	630	0	8200	0
SVOCs/PAHs	Bis(2-chloro-1-methylethyl) ether	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	310	0	4700	0
SVOCs/PAHs	Bis(2-chloroethoxy)methane	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	19	0	250	0
SVOCs/PAHs	Bis(2-chloroethyl)ether	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.23	0	1	0
SVOCs/PAHs	Bis(2-ethylhexyl)phthalate	mg/kg	12	9	0.750	0.026	10	1.95	3.22	0.02	9	NE	0	39	0	160	0
SVOCs/PAHs	CARBAZOLE	mg/kg	12	7	0.583	0.12	0.68	0.330	0.206	79	0	NE	0	NE	0	NE	0
SVOCs/PAHs	Chrysene	mg/kg	12	12	1.00	0.036	10	1.78	2.83	3.1	2	NE	0	110	0	2100	0
SVOCs/PAHs	Dibenz(a,h)anthracene	mg/kg	12	11	0.917	0.01	1.2	0.228	0.347	14	0	NE	0	0.11	5	2.1	0
SVOCs/PAHs	Dibenzofuran	mg/kg	12	10	0.833	0.094	4.3	0.782	1.26	NE	0	6.1	0	7.3	0	100	0
SVOCs/PAHs	Diethyl phthalate	mg/kg	12	3	0.250	0.19	3.5	1.30	1.90	3600	0	100	0	5100	0	66000	0
SVOCs/PAHs	Dimethyl phthalate	mg/kg	12	2	0.167	0.14	0.16	0.150	0.0141	38	0	10	0	NE	0	NE	0
SVOCs/PAHs	Di-n-butyl phthalate	mg/kg	12	11	0.917	0.074	25	3.06	7.30	0.011	11	160	0	630	0	8200	0
SVOCs/PAHs	Di-n-octyl phthalate	mg/kg	12	0	0.00	NA	NA	NA	NA	0.91	0	NE	0	63	0	820	0
SVOCs/PAHs	Fluoranthene	mg/kg	12	12	1.00	0.067	24	4.19	6.91	22	1	10	2	240	0	3000	0
SVOCs/PAHs	Fluorene	mg/kg	12	12	1.00	0.003	4.7	1.01	1.34	250	0	3.7	1	240	0	3000	0
SVOCs/PAHs	Hexachlorobenzene	mg/kg	12	0	0.00	NA	NA	NA	NA	0.079	0	10	0	0.21	0	0.96	0
SVOCs/PAHs	Hexachlorobutadiene	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	1.2	0	5.3	0
SVOCs/PAHs	hexachlorocyclopentadiene	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	10	0	0.18	0	0.75	0
SVOCs/PAHs	Hexachloroethane	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	1.8	0	8	0
SVOCs/PAHs	Indeno(1,2,3-cd)pyrene	mg/kg	12	11	0.917	0.026	3.2	0.622	0.931	71	0	NE	0	1.1	2	21	0
SVOCs/PAHs	Isophorone	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	570	0	2400	0
SVOCs/PAHs	Naphthalene	mg/kg	12	12	1.00	0.098	14	4.93	5.15	3.4	5	1	8	3.8	5	17	0
SVOCs/PAHs	Nitrobenzene	mg/kg	12	0	0.00	NA	NA	NA	NA	4.8	0	2.2	0	5.1	0	22	0
SVOCs/PAHs	n-Nitroso-di-n-propylamine	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.078	0	0.33	0

Table 4-3. Subsurface Soil Statistical Summary

Analyte Group	Analyte	Unit	# Samples	# Detects	Frequency of Detection	Min	Max	Average	Standard Deviation	Soil ESV - Birds and Mammals		Soil ESV - Plants and Invertebrates		Soil RSL - Resident (THQ = 0.1)		Soil RSL - Industrial (THQ = 0.1)	
										Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances
SVOCs/PAHs	n-Nitrosodiphenylamine	mg/kg	12	3	0.250	0.28	0.57	0.393	0.155	NE	0	20	0	110	0	470	0
SVOCs/PAHs	Pentachlorophenol	mg/kg	12	0	0.00	NA	NA	NA	NA	0.36	0	3	0	1	0	4	0
SVOCs/PAHs	Phenanthrene	mg/kg	12	11	0.917	0.057	14	2.99	3.97	11	1	5.5	1	NE	0	NE	0
SVOCs/PAHs	Phenol	mg/kg	12	7	0.583	0.078	0.9	0.514	0.298	37	0	0.79	1	1900	0	25000	0
SVOCs/PAHs	Pyrene	mg/kg	12	12	1.00	0.053	21	3.44	5.93	23	0	10	1	180	0	2300	0
SVOCs/PAHs	Pyridine	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	7.8	0	120	0
SVOCs/PAHs	Total HMW PAHs	mg/kg	12	12	1.00	0.22	70	12.0	19.8	1.1	9	18	2	NE	0	NE	0
SVOCs/PAHs	Total LMW PAHs	mg/kg	12	12	1.00	0.363	60.27	16.5	18.2	100	0	29	2	NE	0	NE	0
VOCs	1,1,1-Trichloroethane	mg/kg	12	0	0.00	NA	NA	NA	NA	260	0	NE	0	810	0	3600	0
VOCs	1,1,2,2-Tetrachloroethane	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.6	0	2.7	0
VOCs	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	670	0	2800	0
VOCs	1,1,2-Trichloroethane	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.15	0	0.63	0
VOCs	1,1-Dichloroethane	mg/kg	12	0	0.00	NA	NA	NA	NA	210	0	NE	0	3.6	0	16	0
VOCs	1,1-Dichloroethene	mg/kg	12	0	0.00	NA	NA	NA	NA	11	0	NE	0	23	0	100	0
VOCs	1,2,4-Trichlorobenzene	mg/kg	12	0	0.00	NA	NA	NA	NA	0.27	0	1.2	0	5.8	0	26	0
VOCs	1,2-Dibromo-3-chloropropane	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.0053	0	0.064	0
VOCs	1,2-Dibromoethane	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.036	0	0.16	0
VOCs	1,2-Dichlorobenzene	mg/kg	12	3	0.250	0.04	0.18	0.0953	0.0745	0.92	0	20	0	180	0	930	0
VOCs	1,2-Dichloroethane	mg/kg	12	0	0.00	NA	NA	NA	NA	0.85	0	NE	0	0.46	0	2	0
VOCs	1,2-Dichloropropane	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	700	0	1.6	0	6.6	0
VOCs	1,3-Dichlorobenzene	mg/kg	12	0	0.00	NA	NA	NA	NA	0.74	0	20	0	NE	0	NE	0
VOCs	1,4-Dichlorobenzene	mg/kg	12	8	0.667	0.001	0.2	0.0628	0.0634	0.89	0	1.2	0	2.6	0	11	0
VOCs	2-Butanone	mg/kg	12	9	0.750	0.055	0.46	0.184	0.146	350	0	NE	0	2700	0	19000	0
VOCs	2-Hexanone	mg/kg	12	0	0.00	NA	NA	NA	NA	0.36	0	NE	0	20	0	130	0
VOCs	4-Methyl-2-pentanone	mg/kg	12	0	0.00	NA	NA	NA	NA	9.7	0	NE	0	3300	0	14000	0
VOCs	Acetone	mg/kg	12	5	0.417	0.23	0.91	0.538	0.253	1.2	0	NE	0	6100	0	67000	0
VOCs	Benzene	mg/kg	12	6	0.500	0.002	0.16	0.0777	0.0689	24	0	NE	0	1.2	0	5.1	0
VOCs	Bromodichloromethane	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.29	0	1.3	0
VOCs	Bromoform	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	19	0	86	0
VOCs	Bromomethane	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.68	0	3	0
VOCs	Carbon disulfide	mg/kg	12	6	0.500	0.002	0.1	0.0447	0.0375	0.81	0	NE	0	77	0	350	0
VOCs	Carbon tetrachloride	mg/kg	12	0	0.00	NA	NA	NA	NA	58.6	0	NE	0	0.65	0	2.9	0
VOCs	Chlorobenzene	mg/kg	12	2	0.167	0.085	0.11	0.0975	0.0177	43	0	2.4	0	28	0	130	0
VOCs	Chloroethane	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	1400	0	5700	0
VOCs	Chloroform	mg/kg	12	0	0.00	NA	NA	NA	NA	8	0	NE	0	0.32	0	1.4	0
VOCs	Chloromethane	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	11	0	46	0
VOCs	cis-1,2-Dichloroethene	mg/kg	12	4	0.333	0.001	0.094	0.0588	0.0440	89.6	0	NE	0	16	0	230	0
VOCs	cis-1,3-Dichloropropene	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
VOCs	cyclohexane	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	650	0	2700	0
VOCs	Cyclohexanone	mg/kg	12	2	0.167	2.1	2.4	2.25	0.212	NE	0	NE	0	2800	0	13000	0
VOCs	Dibromochloromethane	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	8.3	0	39	0
VOCs	Dichlorodifluoromethane	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	8.7	0	37	0
VOCs	Ethylbenzene	mg/kg	12	5	0.417	0.001	0.18	0.0890	0.0722	NE	0	NE	0	5.8	0	25	0
VOCs	Isopropylbenzene	mg/kg	12	5	0.417	0.03	0.2	0.0724	0.0723	NE	0	NE	0	190	0	990	0
VOCs	Methyl acetate	mg/kg	12	8	0.667	0.005	6.9	1.16	2.34	NE	0	NE	0	7800	0	120000	0
VOCs	Methyl Tertiary Butyl Ether	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	47	0	210	0
VOCs	methylcyclohexane	mg/kg	12	1	0.0833	0.076	0.076	0.0760	NA	NE	0	NE	0	NE	0	NE	0
VOCs	Methylene chloride	mg/kg	12	0	0.00	NA	NA	NA	NA	2.6	0	1600	0	35	0	320	0
VOCs	Styrene	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	1.2	0	600	0	3500	0

Table 4-3. Subsurface Soil Statistical Summary

Analyte Group	Analyte	Unit	# Samples	# Detects	Frequency of Detection	Min	Max	Average	Standard Deviation	Soil ESV - Birds and Mammals		Soil ESV - Plants and Invertebrates		Soil RSL - Resident (THQ = 0.1)		Soil RSL - Industrial (THQ = 0.1)	
										Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances
VOCs	Tetrachloroethene	mg/kg	12	2	0.167	0.099	0.5	0.300	0.284	0.18	1	10	0	8.1	0	39	0
VOCs	Toluene	mg/kg	12	8	0.667	0.001	0.46	0.164	0.160	23	0	200	0	490	0	4700	0
VOCs	trans-1,2-Dichloroethene	mg/kg	12	0	0.00	NA	NA	NA	NA	89.6	0	NE	0	160	0	2300	0
VOCs	trans-1,3-Dichloropropene	mg/kg	12	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
VOCs	Trichloroethene	mg/kg	12	0	0.00	NA	NA	NA	NA	1.387	0	NE	0	0.41	0	1.9	0
VOCs	Trichlorofluoromethane	mg/kg	12	0	0.00	NA	NA	NA	NA	52	0	NE	0	2300	0	35000	0
VOCs	Vinyl chloride	mg/kg	12	0	0.00	NA	NA	NA	NA	0.12	0	NE	0	0.059	0	1.7	0
VOCs	Xylenes (total)	mg/kg	12	7	0.583	0.007	0.83	0.365	0.332	1.4	0	10	0	58	0	250	0
Rad	Thorium-232 (via Ac-228)[1]	pci/g	12	12	1.00	0.7	2.37	1.13	0.468	6.2	0	NE	0	1.1	5	NE	0
Rad	Radium-226 (via Bi-214)[1]	pci/g	12	12	1.00	0.69	2.41	1.16	0.470	1.5	2	NE	0	0.6	12	NE	0
Rad	Uranium-238 (via Pa-234m)[1,2]	pci/g	12	0	0.00	NA	NA	NA	NA	400	0	NE	0	14	0	NE	0

NA - not applicable

NE - not established

mg/kg - milligrams per kilogram

pci/g - picocuries per gram

1 - The human health soil screening benchmarks for radionuclides are based on soil screening levels specified in NUREG 1757, Volume 1 (U.S. NRC, 2006).

2 - Pa-234m is reported as Pa-234 in the analytical reports presented in Appendix I.

Table 4-4. Subsurface Soil Analytical Results

Analyte Group	Chemical Name	CAS #	Units	Screening Benchmarks				OU2-1-SU001-10	OU2-1-SU002-04	OU2-1-SU003-08	OU2-1-SU004-09	OU2-1-SU004-14	OU2-1-SU004-22	OU2-1-SU005-06	OU2-1-SU005-16	OU2-1-SU006-05	OU2-1-SU006-14	OU2-1-SU007-10	OU2-1-SU008-02
				Soil ESV - Plants and Invertebrates	Soil ESV - Birds and Mammals	Soil RSL - Resident (THQ = 0.1)	Soil RSL - Industrial (THQ = 0.1)	10/29/2018	10/25/2018	10/29/2018	10/25/2018	10/25/2018	10/25/2018	10/26/2018	10/26/2018	10/26/2018	10/26/2018	10/29/2018	10/26/2018
								10 ft bgs	4 ft bgs	8 ft bgs	9 ft bgs	14 ft bgs	22 ft bgs	6 ft bgs	16 ft bgs	5 ft bgs	14 ft bgs	10 ft bgs	2 ft bgs
Herbicides	2,4,5-T	93-76-5	mg/kg	NE	NE	63	820	< 0.0094 U	< 0.00087 U	0.067 J+	< 0.056 U	< 0.051 U	< 0.058 U	< 0.21 U	< 0.22 U	< 0.0052 U	0.16 J	< 0.0056 U	< 0.018 U
Herbicides	2,4,5-TP (Silvex)	93-72-1	mg/kg	0.109	NE	51	660	< 0.0086 U	< 0.00080 U	< 0.02 U	< 0.051 U	< 0.047 U	< 0.053 U	< 0.19 U	< 0.2 U	< 0.0047 U	< 0.11 U	< 0.0051 U	< 0.017 U
Herbicides	2,4-D	94-75-7	mg/kg	NE	NE	70	960	< 0.14 U	< 0.013 U	< 0.32 U	< 0.82 U	< 0.75 U	< 0.85 U	< 3.1 U	< 3.2 U	< 0.076 U	< 1.8 U	< 0.082 U	< 0.27 U
Herbicides	2,4-DB	94-82-6	mg/kg	NE	NE	190	2500	< 0.11 U	< 0.01 U	< 0.27 U	< 0.67 U	< 0.77 U	< 0.69 U	< 2.5 U	< 2.6 U	< 0.062 U	< 1.4 U	< 0.067 U	< 0.22 U
Herbicides	2,4-DP (Dichloroprop)	120-36-5	mg/kg	NE	NE	NE	NE	< 0.1 U	< 0.0096 U	< 0.24 U	< 0.62 U	< 0.56 U	< 0.64 U	< 2.3 U	< 2.4 U	< 0.057 U	1.7 J	< 0.062 U	< 0.2 U
Herbicides	Dalapon	75-99-0	mg/kg	NE	NE	190	2500	< 0.5 U	< 0.047 U	< 1.2 U	< 3 U	< 2.8 U	< 3.1 U	< 11 U	< 12 U	< 0.28 U	< 6.5 U	< 0.3 U	< 0.98 U
Herbicides	Dicamba	1918-00-9	mg/kg	NE	NE	190	2500	< 0.046 U	< 0.0043 U	0.44 J+	< 0.27 U	< 0.25 U	< 0.28 U	< 1 U	< 1.1 U	< 0.025 U	< 0.59 U	< 0.027 U	< 0.089 U
Herbicides	Dinoseb	88-85-7	mg/kg	NE	NE	6.3	82	< 0.1 U	< 0.0096 U	< 0.26 U	< 0.62 U	< 0.56 U	< 0.64 U	< 2.3 U	< 2.4 U	< 0.057 U	< 1.3 U	< 0.062 U	< 0.2 U
Herbicides	MCPA (2-Methyl-4-chlorophenoxy acetic acid)	94-74-6	mg/kg	NE	NE	3.2	41	< 8.7 U	< 0.81 U	< 21 U	< 52 U	< 48 U	< 54 U	< 200 U	< 200 U	< 4.8 U	< 110 U	< 5.2 U	< 17 U
Herbicides	MCPP (2-(2-Methyl-4-chlorophenoxy) propanoic acid)	93-65-2	mg/kg	NE	NE	6.3	82	< 44 U	< 4 U	< 100 U	< 260 U	< 240 U	< 270 U	< 980 U	< 1000 U	< 24 U	< 560 U	< 26 U	< 85 U
Metals	Aluminum	7429-90-5	mg/kg	50	NE	7700	110000	3210	5030	7160	4360	8250	10500	6070	5540	9490	8840	2980	9110
Metals	Antimony	7440-36-0	mg/kg	5	0.248	3.1	47	0.147 J	0.801	8.84	53.2	2.68	9.31	16.0	10.3	14.5	10.8	6.90	5.09
Metals	Arsenic	7440-38-2	mg/kg	6.8	0.25	0.68	3	3.88	3.46	18.9	26.0	8.32	14.0	32.8	31.0	35.1	27.7	13.3	12.2
Metals	Barium	7440-39-3	mg/kg	110	17.2	1500	22000	329	63.3	752	1330	859	422	565	1170	786	1130	301	1030
Metals	Beryllium	7440-41-7	mg/kg	2.5	2.42	16	230	0.382	0.307	0.751	0.409	0.367	0.474	0.361	0.476	0.659	0.594	0.394	0.933
Metals	Cadmium	7440-43-9	mg/kg	4	0.27	7.1	98	2.00	1.75	2.65	2.90	0.878	9.61	3.03	8.59	12.8	0.0748 J	1.94	3.58
Metals	Calcium (Ca)	7440-70-2	mg/kg	NE	NE	NE	NE	1060	893	20200	28200	11000	64300	28800	36600	8400	18900	9610	25900
Metals	Chromium	7440-47-3	mg/kg	0.34	23	NE	NE	23.1	20.4	68.6	87.4	59.5	64.3	66.6	276	111	46.5	20.5	90.3
Metals	Cobalt	7440-48-4	mg/kg	13	76	2.3	35	6.14	5.14	10.0	24.1	6.21	10.1	17.0	14.3	8.23	15.5	5.71	13.9
Metals	Copper	7440-50-8	mg/kg	50	14	310	4700	160	95.9	288	316	210	3490	483	538	1600	30.4	146	382
Metals	Iron (Fe)	7439-89-6	mg/kg	NE	NE	5500	82000	25000	13100	35600	72500	10700	42900	142000	127000	90600	84800	15100	50000
Metals	Lead	7439-92-1	mg/kg	50	0.94	400	800	16.2	79.8	763	1730	443	4910	1270	1040	6100	1310	587	890
Metals	Magnesium (Mg)	7439-95-4	mg/kg	NE	NE	NE	NE	805	2340	2330	1940	5820	6850	2560	2550	3770	2920	735	3050
Metals	Manganese (Mn)	7439-96-5	mg/kg	220	322	180	2600	128	305	341	650	915	937	467	479	325	163	118	442
Metals	Mercury	7439-97-6	mg/kg	0.05	0.013	1.1	4.6	< 0.0352 U	0.243	1.39	2.00	2.20	0.645	1.25	0.875	0.483	1.32	0.562	12.9 J
Metals	Nickel	7440-02-0	mg/kg	30	10	150	2200	41.7	49.3	48.1	73.1	22.6	59.8	76.8	100	134	125	39.6	67.0
Metals	Potassium (K)	7440-09-7	mg/kg	NE	NE	NE	NE	427	1180	1710	758	4420	6210	794	1340	1250	1250	378	2230
Metals	Selenium	7782-49-2	mg/kg	0.52	0.331	39	580	2.21	0.169 J	1.83	1.28	1.21	0.774	1.30	2.62	2.60	< 0.145 U	2.03	2.41
Metals	Silver	7440-22-4	mg/kg	2	2.6	39	580	4.00	0.221	8.09	7.77	1.87	5.64	2.89	6.48	28.4	< 0.0453 U	3.77	11.3
Metals	Sodium (Na)	7440-23-5	mg/kg	NE	NE	NE	NE	221	81.7 J	1470	575	540	884	711	959	749	106 J	180 J	1980
Metals	Thallium	7440-28-0	mg/kg	0.05	0.027	0.078	1.2	0.324	0.0664 J	0.196	0.119	0.199	0.238	0.171	0.251	0.130	0.103 J	0.360	0.190
Metals	Thorium	7440-29-1	mg/kg	NE	NE	NE	NE	13.6 J	< 7.41 U	17.7 J	56.3 J	< 9.04 U	< 46.1 U	60.8 J	52.3 J	< 39.3 U	< 46.7 U	8.82 J	< 65.1 U
Metals	Uranium	7440-61-1	mg/kg	NE	NE	NE	NE	0.447	0.514	0.631	0.343	0.627	0.699	0.451	0.588	0.542 J	1.38	0.397	0.847
Metals	Vanadium	7440-62-2	mg/kg	2	0.714	39	580	92.2	17.6	60.4	43.4	28.3	36.8	22.9	30.5	38.4	29.6	83.3	76.5
Metals	Zinc	7440-66-6	mg/kg	6.62	12	2300	35000	38.0	435	694	3110	634	2740	1600	2010	1570	40.1	2420	948
PCBs	Aroclor 1016	12674-11-2	mg/kg	NE	1.1	0.41	5.1	< 0.0041 U	< 0.0038 U	< 0.024 U	< 0.024 U	< 0.023 U	< 0.025 U	< 0.023 U	< 0.024 U	< 0.0045 U	< 0.053 U	< 0.025 U	< 0.40 U
PCBs	Aroclor 1221	11104-28-2	mg/kg	NE	NE	0.2	0.83	< 0.0052 U	< 0.0048 U	< 0.031 U	< 0.031 U	< 0.029 U	< 0.032 U	< 0.029 U	< 0.031 U	< 0.0058 U	< 0.067 U	< 0.032 U	< 0.51 U
PCBs	Aroclor 1232	11141-16-5	mg/kg	NE	NE	0.17	0.72	< 0.0090 U	< 0.0084 U	< 0.054 U	< 0.054 U	< 0.050 U	< 0.056 U	< 0.051 U	< 0.054 U	< 0.010 U	< 0.12 U	< 0.055 U	< 0.89 U
PCBs	Aroclor 1242	53469-21-9	mg/kg	NE	0.041	0.23	0.95	< 0.0037 U	< 0.0035 U	< 0.022 U	< 0.022 U	< 0.021 U	< 0.023 U	< 0.021 U	< 0.022 U	< 0.0042 U	< 0.048 U	< 0.023 U	< 0.37 U
PCBs	Aroclor 1248	12672-29-6	mg/kg	NE	0.0073	0.23	0.95	< 0.0037 U	< 0.0035 U	< 0.022 U	< 0.022 U	< 0.021 U	< 0.023 U	< 0.021 U	< 0.022 U	< 0.0042 U	< 0.048 U	< 0.023 U	< 0.37 U
PCBs	Aroclor 1254	11097-69-1	mg/kg	160	0.041	0.12	0.97	< 0.0037 U	< 0.0035 U	0.070 J+	< 0.022 U	< 0.021 U	< 0.023 U	< 0.021 U	0.086 J+	< 0.0042 U	0.29 J+	< 0.023 U	5.5
PCBs	Aroclor 1260	11096-82-5	mg/kg	NE	0.88	0.24	0.99	< 0.0055 U	0.028 J+	0.14 J+	0.084 J+	0.063 J+	0.17 J+	0.14	0.097 J+	0.028	0.15 J+	0.094 J+	2.6
PCBs	Aroclor 1262	37324-23-5	mg/kg	NE	NE	NE	NE	< 0.0037 U	< 0.0035 U	< 0.022 U	< 0.022 U	< 0.021 U	< 0.023 U	< 0.021 U	< 0.022 U	< 0.0042 U	< 0.048 U	< 0.023 U	< 0.37 U
PCBs	Aroclor 1268	11100-14-4	mg/kg	NE	NE	NE	NE	< 0.0037 U	< 0.0035 U	< 0.022 U	< 0.022 U	< 0.021 U	< 0.023 U	< 0.021 U	< 0.022 U	< 0.0042 U	< 0.048 U	< 0.023 U	< 0.37 U
PCBs	Total PCBs	CALC-PCB	mg/kg	40	NE	NE	NE	< 0.0090 U	0.028	0.21	0.084	0.063	0.17	0.14	0.183	0.028	0.44	0.094	8.1
Dioxin/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	67562-39-4	mg/kg	NE	NE	NE	NE	0.000000907 J	0.000248	0.000677	0.000322 J-	0.000878 J-	0.000539 J-	0.000813 J-	0.000786 J-	0.000796 J-	0.00120 J-	0.000546	0.000974
Dioxin/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	35822-46-9	mg/kg	NE	NE	NE	NE	0.0000121	0.000310	0.000899	0.000971 J-	0.000222 J-	0.000800 J-	0.00130 J-	0.00127 J-	0.00115 J-	0.00135 J-	0.000258	0.00774
Dioxin/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	55673-89-7	mg/kg	NE	NE	NE	NE	< 0.000000277 U	0.00000454 J	0.00000993	0.0000261 J-	0.00000803 J-	0.0000113 J-	0.0000434 J-	0.0000252 J-	0.0000171 J-	0.0000238 J-	0.00000811	0.0000701
Dioxin/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	70648-26-9	mg/kg	NE	NE	NE	NE	< 0.000000277 U	0.00000341 J	0.0000162	0.0000132 J-	0.0000183 J-	0.0000151 J-	0.0000327 J-	0.0000384 J-	0.0000285 J-	0.0000392 J-	0.0000219	0.000120
Dioxin/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	39227-28-6	mg/kg	NE	NE	NE	NE	< 0.000000277 U	0.000000745 J	0.00000281 J	0.00000355 J-	0.00000145 J-	0.00000257 J-	0.00000693 J-	0.00000747 J-	0.00000572 J-	0.0000985 J-	0.00000201 J	0.0000653
Dioxin/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	57117-44-9	mg/kg	NE	NE	NE	NE	< 0.000000277 U	0.00000367 J	0.0000152	0.0000539 J-	0.0000201 J-	0.0000391 J-	0.0000404 J-	0.0000446 J-	0.0000448 J-	0.0000470 J-	0.0000316	0.0000748
Dioxin/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	57653-85-7	mg/kg	NE	NE	NE	NE	< 0.000000277 U	0.0000104	0.0000351	0.0000245 J-	0.0000137 J-	0.0000272 J-	0.0000669 J-	0.0000504 J-	0.0000388 J-	0.00103 J-	0.0000155	0.000326
Dioxin/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	72918-21-9	mg/kg	NE	NE	NE	NE	< 0.000000277 U	0.00000154 J	0.00000718	0.0000118 J-	0.00000348 J-	0.00000303 J-	0.00000919 J-	0.0000111 J-	0.00000927 J-	0.0000136 J-	0.00000718	0.0000244
Dioxin/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	19408-74-3	mg/kg	NE	NE	NE	NE	< 0.000000277 U	0.00000276 J	0.0000125	0.00000769 J-	0.00000417 J-	0.00000983 J-	0.0000253 J-	0.0000227 J-	0.0000146 J-	0.000666 J-	0.00000526 J	0.000106
Dioxin/Furans	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	57117-41-6	mg/kg	NE	NE	NE	NE	< 0.000000277 U	0.00000105 J	0.00000521 J	0.0000165 J-	0.00000521 J-	0.00000719 J-	0.0000139 J-	0.0000141 J-	0.0000109 J-	0.0000129 J-	0.0000191	0.0000385
Dioxin/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	40321-76-4	mg/kg	NE	NE	NE	NE	< 0.000000355 U	0.000000772 J	0.00000461 J	0.00000319 J-	0.00000280 J-	0.00000255 J-	0.00000955 J-	0.0000110 J-	0.00000604 J-	0.000247 J-	0.00000497 J	0.0000454 J
Dioxin/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	60851-34-5	mg/kg	NE	NE	NE	NE	< 0.000000277 U	0.00000429 J	0.0000176	0.0000394 J-	0.0000238 J-	0.0000217 J-	0.0000418 J-	0.0000337 J-	0.0000271 J-	0.0000398 J-	0.0000230	0.0000762
Dioxin/Furans	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	57117-31-4	mg/kg	NE	NE	NE	NE	< 0.000000277 U	0.00000520 J	0.0000250	0.0000153 J-	0.0000132 J-	0.0000150 J-	0.0000281 J-	0.0000319 J-	0.0000269 J-	0.0000400 J-	0.0000486	0.0000738
Dioxin/Furans	2,3,7,8-TCDD	1746-01-6	mg/kg	5	0.00000029	0.0000048	0.000022	< 0.000000147 U	0.000000165 J	0.00000124 J	0.000000991 J-	0.000000452 J-	0.00000122 J-	0.00000271 J-	0.00000259 J-	0.00000172 J-	0.0000107 J-	0.00000280	0.0000132 J
Dioxin/Furans	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	51207-31-9	mg/kg	NE	NE	NE	NE	< 0.000000167 U	0.00000147	0.00000748	0.00000929 J-	0.00000363 J-	< 0.000000212 UJ	0.0000119 J-	0.00000820 J-	0.0000126 J-	0.0000136 J-	0.0000395	0.0000694
Dioxin/Furans	Octachlorodibenzofuran (OCDF)	39001-02-0	mg/kg	NE	NE	NE	NE	0.000000841 J	0.0000524	0.0000411	0.000629 J-	0.000257 J-	0.000403 J-	0.0000756 J-	0.0000587 J-	0.0000386 J-	0.0000712 J-	0.0000251	0.00211
Dioxin/Furans	Octachlorodibenzo-p-dioxin (OCDD)	3268-87-9	mg/kg	NE	NE	NE	NE	0.00241	0.00391	0.00783	0.00747 J-	0.00298 J-	0.00365 J-	0.00555 J-	0.00635 J-	0.00700 J-	0.00988 J-	0.00448	0.0554
Dioxin/Furans	Dioxin TEQ	CALC-TEQ	mg/kg	5	0.00000029	0.0000048	0.000022	0.000000853	0.0000123	0.0000432	0.0000412	0.0000283	0.0000350576	0.0000681	0.0000681	0.0000561	0.0004937726	0.0000471	0.000273199
Pesticides	4,4'-DDD	72-54-8	mg/kg	NE	0.002	0.19	2.5	< 0.00038 U	0.0051 J+	0.04 J+	0.02 J+	0.0066 J+	0.028 J+	0.011 J+	< 0.0044 U	0.0053	< 0.024 U	< 0.0023 U	0.065 J
Pesticides	4,4'-DDE	72-55-9	mg/kg	NE	0.002	2	9.3	< 0.00038 U	0.0011 J+	< 0.022 U	0.0098 J+	0.013 J+	0.014 J+	0.011 J+	0.0068 J+	0.0049	< 0.024 U	< 0.0023 U	0.21
Pesticides	4,4'-DDT	50-29-3	mg/kg	4.1	0.002	1.9	8.5	< 0.00090 U	0.0020 J+	< 0.053 U	< 0.011 U	< 0.0099 U	< 0.011 U	< 0.01 U	< 0.011 U	0.0020 J	< 0.058 U	< 0.0054 U	0.5
Pesticides	Aldrin	309-00-2	mg/kg	0.00332	0.037	0.039	0.18	< 0.00019 U	< 0.00018 U	< 0.011 U	< 0.0023 U	< 0.0021 U	< 0.0024 U	< 0.0022 U	< 0.0023 U	< 0.00022 U	< 0.013 U	< 0.0012 U	< 0.0075 U
Pesticides	alpha Chlordane	5103-71-9	mg/kg	2.2	0.27	NE	NE	< 0.00019 U	< 0.00018 U	< 0.011 U	< 0.0023 U	< 0.0021 U	< 0.0024 U	< 0.0022 U	< 0.0023 U	< 0.00022 U	< 0.013 U	< 0.0012 U	0.33
Pesticides	alpha-BHC	319-84-6	mg/kg	NE	0.07	0.086	0.36	< 0.00019 U	< 0.00018 U	< 0.011 U	< 0.0023 U	< 0.0021 U	< 0.0024 U	< 0.0022 U	< 0.0023 U	0.00084 J	< 0.013 U	< 0.0012 U	< 0.0075 U
Pesticides	beta-BHC	319-85-7	mg/kg	0.00398	0.27	0.3	1.3	< 0.00050 U	< 0.00047 U	< 0.03 U	0.0063 J+	< 0.0055 U	< 0.0062 U	< 0.0056 U	0.014 J+	0.0038	< 0.037 U	0.014 J+	< 0.019 U
Pesticides	Chlordane	57-74-9	mg/kg	0.224	1.8	NE	NE	< 0.0046 U	< 0.0043 U	< 0.27 U	< 0.054 U	< 0.05 U	< 0.056 U	< 0.051 U	< 0.054 U	< 0.0051 U	< 0.29 U	< 0.027 U	4.9
Pesticides	delta-BHC	319-86-8	mg/kg	NE	0.07	NE	NE	< 0.00051 U	< 0.00048 U	< 0.03 U	0.0096 J+	< 0.0056 U	0.0070 J+	< 0.0058 U	0.011 J+	< 0.00057 U	< 0.033 U	< 0.0093 U	< 0.02 U
Pesticides	Dieldrin	60-57-1	mg/kg	10	0.0045	0.034	0.14	< 0.00038 U	< 0.00035 U	< 0.022 U	< 0.0045 U	0.0052 J+	< 0.0047 U	< 0.0042 U	< 0.0044 U	< 0.00042 U	< 0.024 U	< 0.0023 U	< 0.1 U
Pesticides	Endosulfan I	959-98-8	mg/kg	NE	0.56	NE	NE	< 0.00025 U	< 0.00023 U	< 0.015 U	< 0.0030 U	< 0.0028 U	< 0.0031 U	< 0.0028 U	< 0.0029 U	< 0.00028 U	< 0.016 U	< 0.0015 U	0.17
Pesticides	Endosulfan II	33213-65-9	mg/kg	NE	0.56	NE	NE	< 0.0013 U	< 0.0012 U	< 0.074 U	< 0.015 U	< 0.014 U	< 0.016 U	< 0.014 U	< 0.015 U	< 0.0014 U	< 0.081 U	< 0.0075 U	< 0.049 U
Pesticides	Endosulfan sulfate	1031-07-8	mg/kg	NE	0.56	NE	NE	< 0.00038 U	< 0.00035 U	< 0.022 U	< 0.0045 U	< 0.0041 U	< 0.0047 U	0.0055 J+	< 0.0044 U	< 0.00084 U	< 0.024 U	< 0.0023 U	0.029 J

Table 4-4. Subsurface Soil Analytical Results

Analyte Group	Chemical Name	CAS #	Units	Screening Benchmarks				OU2-1-SU001-10	OU2-1-SU002-04	OU2-1-SU003-08	OU2-1-SU004-09	OU2-1-SU004-14	OU2-1-SU004-22	OU2-1-SU005-06	OU2-1-SU005-16	OU2-1-SU006-05	OU2-1-SU006-14	OU2-1-SU007-10	OU2-1-SU008-02
				Soil ESV - Plants and Invertebrates	Soil ESV - Birds and Mammals	Soil RSL - Resident (THQ = 0.1)	Soil RSL - Industrial (THQ = 0.1)	10/29/2018	10/25/2018	10/29/2018	10/25/2018	10/25/2018	10/25/2018	10/26/2018	10/26/2018	10/26/2018	10/26/2018	10/29/2018	10/26/2018
								10 ft bgs	4 ft bgs	8 ft bgs	9 ft bgs	14 ft bgs	22 ft bgs	6 ft bgs	16 ft bgs	5 ft bgs	14 ft bgs	10 ft bgs	2 ft bgs
Pesticides	Endrin	72-20-8	mg/kg	0.0034	0.0014	1.9	25	< 0.00077 U	< 0.00072 U	< 0.046 U	< 0.0092 U	< 0.0085 U	< 0.0096 U	< 0.0087 U	< 0.0091 U	0.0011 J	< 0.05 U	< 0.0046 U	< 0.03 U
Pesticides	Endrin aldehyde	7421-93-4	mg/kg	NE	NE	NE	NE	< 0.00038 U	< 0.00035 U	< 0.022 U	< 0.0045 U	< 0.0041 U	< 0.0047 U	0.01 J+	< 0.0044 U	< 0.00042 U	< 0.024 U	< 0.0023 U	0.054 J
Pesticides	Endrin ketone	53494-70-5	mg/kg	NE	NE	NE	NE	< 0.00068 U	< 0.00064 U	< 0.04 U	< 0.0081 U	< 0.0075 U	< 0.0085 U	< 0.0077 U	< 0.0080 U	0.0022 J	< 0.044 U	< 0.0043 U	0.24
Pesticides	gamma Chlordane	5566-34-7	mg/kg	2.2	2.2	NE	NE	< 0.00028 U	< 0.00027 U	< 0.017 U	0.0092 J+	0.0053 J+	< 0.0035 U	0.0078 J+	< 0.0061 U	0.00050 J	< 0.018 U	< 0.0017 U	0.36
Pesticides	gamma-BHC (Lindane)	58-89-9	mg/kg	0.005	0.0095	0.57	2.5	< 0.00024 U	< 0.00022 U	< 0.014 U	< 0.0029 U	< 0.0026 U	< 0.0030 U	< 0.0027 U	< 0.0028 U	< 0.00027 U	< 0.015 U	< 0.0014 U	< 0.0093 U
Pesticides	Heptachlor	76-44-8	mg/kg	0.4	0.059	0.13	0.63	< 0.00035 U	< 0.00033 U	< 0.021 U	< 0.0042 U	< 0.0039 U	< 0.0071 U	< 0.0040 U	< 0.0041 U	< 0.00039 U	< 0.023 U	< 0.0021 U	< 0.014 U
Pesticides	Heptachlor epoxide	1024-57-3	mg/kg	NE	NE	0.07	0.33	< 0.00019 U	< 0.00018 U	< 0.011 U	< 0.0023 U	< 0.0021 U	< 0.0024 U	< 0.0022 U	< 0.0036 U	< 0.00022 U	< 0.013 U	< 0.0012 U	< 0.0075 U
Pesticides	Methoxychlor	72-43-5	mg/kg	NE	5.1	32	410	< 0.0021 U	< 0.0019 U	< 0.12 U	< 0.024 U	< 0.023 U	< 0.025 U	< 0.023 U	< 0.024 U	< 0.0023 U	< 0.13 U	< 0.012 U	< 0.079 U
Pesticides	Toxaphene	8001-35-2	mg/kg	NE	4.1	0.49	2.1	< 0.016 U	< 0.015 U	< 0.94 U	< 0.19 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.018 U	< 1 U	< 0.096 U	< 0.62 U
SVOCs/PAHs	1,2,4-Trichlorobenzene	120-82-1	mg/kg	1.2	0.27	5.8	26	< 0.019 U	< 0.018 U	< 0.022 U	< 0.023 U	< 0.021 U	< 0.023 U	< 0.021 U	< 0.022 U	< 0.021 U	< 0.25 U	< 0.023 U	0.056 J
SVOCs/PAHs	1,2-Dichlorobenzene	95-50-1	mg/kg	20	0.92	180	930	< 0.023 U	< 0.021 U	1.4	0.086	0.064	0.93	0.25	0.86	0.068	< 0.29 U	< 0.027 U	0.047 J
SVOCs/PAHs	1,3-Dichlorobenzene	541-73-1	mg/kg	20	0.74	NE	NE	< 0.019 U	< 0.018 U	< 0.022 U	< 0.023 U	< 0.021 U	< 0.023 U	< 0.021 U	< 0.022 U	< 0.021 U	< 0.25 U	< 0.023 U	0.057 J
SVOCs/PAHs	1,4-Dichlorobenzene	106-46-7	mg/kg	1.2	0.89	2.6	11	0.098	0.027 J	0.69	6.7	0.50	0.88	0.44	1.7	0.16	0.48 J	0.13	0.14
SVOCs/PAHs	1,4-Dioxane	123-91-1	mg/kg	NE	1.83	5.3	24	< 0.008 UJ	0.002 J-	< 0.009 UJ	0.014 J-	0.014 J-	0.015 J-	0.011 J-	0.017 J-	0.007 J-	< 0.01 UJ	< 0.009 UJ	0.012
SVOCs/PAHs	2,4,5-Trichlorophenol	95-95-4	mg/kg	4	NE	630	8200	< 0.023 U	< 0.021 U	< 0.027 U	< 0.027 U	< 0.025 U	< 0.028 U	< 0.025 U	< 0.027 U	< 0.025 U	< 0.29 U	< 0.027 U	0.17
SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	mg/kg	10	NE	6.3	82	< 0.023 U	< 0.021 U	< 0.027 U	< 0.027 U	< 0.025 U	< 0.028 U	< 0.025 U	< 0.027 U	< 0.025 U	< 0.29 U	< 0.027 U	< 0.045 U
SVOCs/PAHs	2,4-Dichlorophenol	120-83-2	mg/kg	NE	NE	19	250	< 0.019 U	< 0.018 U	0.073	< 0.023 U	< 0.021 U	< 0.023 U	< 0.021 U	< 0.022 U	< 0.021 U	< 0.25 U	< 0.023 U	< 0.037 U
SVOCs/PAHs	2,4-Dimethylphenol	105-67-9	mg/kg	0.01	NE	130	1600	0.96	< 0.018 U	0.35	0.54	0.21	< 0.023 U	0.90	< 0.022 U	< 0.021 U	< 0.25 U	< 0.023 U	< 0.037 U
SVOCs/PAHs	2,4-Dinitrophenol	51-28-5	mg/kg	20	NE	13	160	< 0.42 U	< 0.39 U	< 0.49 U	< 0.50 U	< 0.46 U	< 0.51 U	< 0.47 U	< 0.49 U	< 0.46 U	< 5.4 U	< 0.50 U	< 0.82 U
SVOCs/PAHs	2,4-Dinitrotoluene	121-14-2	mg/kg	6	14	1.7	7.4	< 0.076 U	< 0.070 U	< 0.089 U	< 0.091 U	< 0.083 U	< 0.093 U	< 0.085 U	< 0.089 U	< 0.084 U	< 0.98 U	< 0.091 U	< 0.15 U
SVOCs/PAHs	2,6-Dinitrotoluene	606-20-2	mg/kg	30	4	0.36	1.5	< 0.023 U	< 0.021 U	< 0.027 U	< 0.027 U	< 0.025 U	< 0.028 U	< 0.025 U	< 0.027 U	< 0.025 U	< 0.29 U	< 0.027 U	< 0.045 U
SVOCs/PAHs	2-Chloronaphthalene	91-58-7	mg/kg	NE	NE	480	6000	< 0.008 U	< 0.007 U	< 0.009 U	< 0.009 U	< 0.008 U	< 0.009 U	0.47	< 0.009 U	< 0.008 U	< 0.098 U	0.071	< 0.015 U
SVOCs/PAHs	2-Chlorophenol	95-57-8	mg/kg	NE	0.39	39	580	< 0.019 U	< 0.018 U	< 0.022 U	< 0.023 U	< 0.021 U	< 0.023 U	< 0.021 U	< 0.022 U	< 0.021 U	< 0.25 U	< 0.023 U	< 0.037 U
SVOCs/PAHs	2-Methylnaphthalene	91-57-6	mg/kg	NE	16	24	300	< 0.011 U	0.019 J	1.7	1.7	1.9	1.1	10	2.9	0.15	0.92	0.54	0.12
SVOCs/PAHs	2-Methylphenol	95-48-7	mg/kg	0.67	580	320	4100	< 0.030 U	< 0.028 U	0.29	0.28	0.098	< 0.037 U	0.28	0.16	< 0.034 U	< 0.39 U	< 0.037 U	< 0.059 U
SVOCs/PAHs	2-Nitroaniline	88-74-4	mg/kg	NE	5.3	63	800	< 0.023 U	< 0.021 U	< 0.027 U	< 0.027 U	< 0.025 U	< 0.028 U	< 0.025 U	< 0.027 U	< 0.025 U	< 0.29 U	< 0.027 U	< 0.045 U
SVOCs/PAHs	2-Nitrophenol	88-75-5	mg/kg	7	NE	NE	NE	< 0.019 U	< 0.018 U	< 0.022 U	< 0.023 U	< 0.021 U	< 0.023 U	< 0.021 U	< 0.022 U	< 0.021 U	< 0.25 U	< 0.023 U	< 0.037 U
SVOCs/PAHs	3,3-Dichlorobenzidine	91-94-1	mg/kg	NE	NE	1.2	5.1	< 0.11 U	< 0.11 U	< 0.13 U	< 0.14 U	< 0.13 U	< 0.14 U	< 0.13 U	< 0.13 U	< 0.13 U	< 1.5 U	< 0.14 U	< 0.22 U
SVOCs/PAHs	3-Nitroaniline	99-09-2	mg/kg	NE	NE	NE	NE	< 0.076 U	< 0.070 U	< 0.089 U	< 0.091 U	< 0.083 U	< 0.093 U	< 0.085 U	< 0.089 U	< 0.084 U	< 0.98 U	< 0.091 U	< 0.15 U
SVOCs/PAHs	4,6-Dinitro-2-methylphenol	534-52-1	mg/kg	NE	NE	0.51	6.6	< 0.19 U	< 0.18 U	< 0.22 U	< 0.23 U	< 0.21 U	< 0.23 U	< 0.21 U	< 0.22 U	< 0.21 U	< 2.5 U	< 0.23 U	< 0.37 U
SVOCs/PAHs	4-Bromophenyl-phenylether	101-55-3	mg/kg	NE	NE	NE	NE	< 0.023 U	< 0.021 U	< 0.027 U	< 0.027 U	< 0.025 U	< 0.028 U	< 0.025 U	< 0.027 U	< 0.025 U	< 0.29 U	< 0.027 U	< 0.045 U
SVOCs/PAHs	4-Chloro-3-methylphenol	59-50-7	mg/kg	NE	NE	630	8200	< 0.019 U	< 0.018 U	< 0.022 U	< 0.023 U	< 0.021 U	< 0.023 U	< 0.021 U	< 0.022 U	< 0.021 U	< 0.25 U	0.072	< 0.037 U
SVOCs/PAHs	4-Chloroaniline	106-47-8	mg/kg	1	NE	2.7	11	< 0.038 U	< 0.035 U	< 0.045 U	< 0.045 U	< 0.042 U	< 0.047 U	< 0.042 U	< 0.044 U	< 0.042 U	< 0.49 U	< 0.046 U	< 0.074 U
SVOCs/PAHs	4-Chlorophenyl-phenylether	7005-72-3	mg/kg	NE	NE	NE	NE	< 0.019 U	< 0.018 U	< 0.022 U	< 0.023 U	< 0.021 U	< 0.023 U	< 0.021 U	< 0.022 U	< 0.021 U	< 0.25 U	< 0.023 U	< 0.037 U
SVOCs/PAHs	4-Methylphenol	106-44-5	mg/kg	NE	NE	630	8200	< 0.023 U	< 0.021 U	12	7.4	< 0.025 U	1.2	2.7	4.2	0.37	2.8	0.98	< 0.045 U
SVOCs/PAHs	4-Nitroaniline	100-01-6	mg/kg	NE	NE	25	110	< 0.076 U	< 0.070 U	< 0.089 U	< 0.091 U	< 0.083 U	< 0.093 U	< 0.085 U	< 0.089 U	< 0.084 U	< 0.98 U	< 0.091 U	< 0.15 U
SVOCs/PAHs	4-Nitrophenol	100-02-7	mg/kg	7	NE	NE	NE	< 0.19 U	< 0.18 U	< 0.22 U	< 0.23 U	< 0.21 U	< 0.23 U	< 0.21 U	< 0.22 U	< 0.21 U	< 2.5 U	< 0.23 U	< 0.37 U
SVOCs/PAHs	Acenaphthene	83-32-9	mg/kg	0.25	130	360	4500	0.59 J-	0.002 J	0.42	0.40	0.85	0.29	5.1	0.95	0.015	0.65	0.52	0.005
SVOCs/PAHs	Acenaphthylene	208-96-8	mg/kg	NE	120	NE	NE	0.43 J-	0.006	0.052	0.076	0.62	0.18	0.17	0.22	0.019	0.039	0.11	0.020
SVOCs/PAHs	Aniline	62-53-3	mg/kg	NE	NE	44	400	< 0.19 U	< 0.18 U	< 0.22 U	< 0.23 U	< 0.21 U	< 0.23 U	< 0.21 U	< 0.22 U	< 0.21 U	< 2.5 U	< 0.23 U	< 0.37 U
SVOCs/PAHs	Anthracene	120-12-7	mg/kg	6.8	210	1800	23000	< 0.008 U	0.009	0.65	0.36	4.1	0.45	1.3	1.0	0.025	0.39	1.9	0.031
SVOCs/PAHs	Benzo(a)anthracene	56-55-3	mg/kg	18	0.73	1.1	21	0.014 J-	0.036	0.81	0.58	11	1.3	1.2	1.5	0.065	0.56	3.7	0.12
SVOCs/PAHs	Benzo(a)pyrene	50-32-8	mg/kg	NE	1.98	0.11	2.1	< 0.008 U	0.041	0.65	0.42	8.0	0.91	0.83	1.3	0.064	0.50	3.3	0.17
SVOCs/PAHs	Benzo(a)Pyrene TEQ	CALC-BaP PAHs	mg/kg	NE	NE	0.11	2.1	0.001436	0.06612	0.97058	0.65896	11.671	1.4101	1.2712	1.9338	0.11154	0.70413	4.7162	0.28379
SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	mg/kg	18	44	1.1	21	< 0.008 U	0.086	0.95	0.74	10	1.6	1.2	1.7	0.15	0.79	4.4	0.63
SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	mg/kg	NE	25	NE	NE	< 0.008 U	0.026	0.33	0.18	2.7	0.38	0.49	0.73	0.059	0.13	1.3	0.096
SVOCs/PAHs	Benzo(k)fluoranthene	207-08-9	mg/kg	NE	71	11	210	< 0.008 U	0.027	0.46	0.23	4.1	0.58	0.40	0.60	0.043	0.43	2.2	< 0.001 U
SVOCs/PAHs	Benzyl Alcohol	100-51-6	mg/kg	NE	NE	630	8200	< 0.19 U	< 0.18 U	< 0.22 U	< 0.23 U	< 0.21 U	< 0.23 U	< 0.21 U	< 0.22 U	< 0.21 U	< 2.5 U	< 0.23 U	< 0.37 U
SVOCs/PAHs	Bis(2-chloro-1-methylethyl) ether	108-60-1	mg/kg	NE	NE	310	4700	< 0.019 U	< 0.018 UJ	< 0.022 U	< 0.023 UJ	< 0.021 UJ	< 0.023 UJ	< 0.021 UJ	< 0.022 UJ	< 0.021 UJ	< 0.25 UJ	< 0.023 U	< 0.037 UJ
SVOCs/PAHs	Bis(2-chloroethoxy)methane	111-91-1	mg/kg	NE	NE	19	250	< 0.019 U	< 0.018 U	< 0.022 U	< 0.023 U	< 0.021 U	< 0.023 U	< 0.021 U	< 0.022 U	< 0.021 U	< 0.25 U	< 0.023 U	< 0.037 U
SVOCs/PAHs	Bis(2-chloroethyl)ether	111-44-4	mg/kg	NE	NE	0.23	1	< 0.027 U	< 0.025 U	< 0.031 U	< 0.032 U	< 0.029 U	< 0.033 U	< 0.030 U	< 0.031 U	< 0.030 U	< 0.34 U	< 0.032 U	< 0.052 U
SVOCs/PAHs	Bis(2-ethylhexyl)phthalate	117-81-7	mg/kg	NE	0.02	39	160	< 0.11 U	0.026	0.39	1.1	0.16 J	1.3	0.65	0.23 J	< 0.013 U	10	< 0.14 U	3.7
SVOCs/PAHs	CARBAZOLE	86-74-8	mg/kg	NE	79	NE	NE	< 0.019 U	< 0.018 U	0.27	0.12	0.68	0.16	0.22	0.32	< 0.021 U	< 0.25 U	0.54	< 0.037 U
SVOCs/PAHs	Chrysene	218-01-9	mg/kg	NE	3.1	110	2100	0.036 J-	0.050	0.98	0.66	10	1.3	1.2	1.8	0.11	0.83	4.2	0.19
SVOCs/PAHs	Dibenz(a,h)anthracene	53-70-3	mg/kg	NE	14	0.11	2.1	< 0.008 U	0.01	0.11	0.085	1.2	0.16	0.15	0.24	0.020	0.051	0.45	0.029
SVOCs/PAHs	Dibenzofuran	132-64-9	mg/kg	6.1	NE	7.3	100	0.23	< 0.018 U	0.37	0.35	1.1	0.25	4.3	0.46	0.094	0.33 J	0.34	< 0.037 U
SVOCs/PAHs	Diethyl phthalate	84-66-2	mg/kg	100	3600	5100	66000	< 0.076 U	< 0.070 U	< 0.089 U	0.19 J	0.22	3.5	< 0.085 U	< 0.089 U	< 0.084 U	< 0.98 U	< 0.091 U	< 0.15 U
SVOCs/PAHs	Dimethyl phthalate	131-11-3	mg/kg	10	38	NE	NE	< 0.076 U	< 0.070 U	0.14 J	< 0.091 U	< 0.083 U	0.16 J	< 0.085 U	< 0.089 U	< 0.084 U	< 0.98 U	< 0.091 U	< 0.15 U
SVOCs/PAHs	Di-n-butyl phthalate	84-74-2	mg/kg	160	0.011	630	8200	< 0.076 U	0.11	1.7	0.98	0.43	25	0.61	1.9	0.074	1.3	0.42	1.1 E
SVOCs/PAHs	Di-n-octyl phthalate	117-84-0	mg/kg	NE	0.91	63	820	< 0.076 U	< 0.070 U	< 0.089 U	< 0.091 U	< 0.083 U	< 0.093 U	< 0.085 U	< 0.089 U	< 0.084 U	< 0.98 U	< 0.091 U	< 0.15 U
SVOCs/PAHs	Fluoranthene	206-44-0	mg/kg	10	22	240	3000	0.13 J-	0.067	2.7	1.5	24	2.1	2.8	3.8	0.13	1.9	11	0.19
SVOCs/PAHs	Fluorene	86-73-7	mg/kg	3.7	250	240	3000	2.0 J-	0.003	0.54	0.31	1.8	0.32	4.7	1.1	0.025	0.57	0.69	0.009
SVOCs/PAHs	Hexachlorobenzene	118-74-1	mg/kg	10	0.079	0.21	0.96	< 0.004 U	< 0.004 U	< 0.004 U	< 0.005 U	< 0.004 U	< 0.005 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.049 U	< 0.005 U	< 0.007 U
SVOCs/PAHs	Hexachlorobutadiene	87-68-3	mg/kg	NE	NE	1.2	5.3	< 0.023 U	< 0.021 U	< 0.027 U	< 0.027 U	< 0.025 U	< 0.028 U	< 0.025 U	< 0.027 U	< 0.025 U	< 0.29 U	< 0.027 U	< 0.045 U
SVOCs/PAHs	hexachlorocyclopentadiene	77-47-4	mg/kg	10	NE	0.18	0.75	< 0.19 U	< 0.18 U	< 0.22 U	< 0.23 U	< 0.21 U	< 0.23 U	< 0.21 U	< 0.22 U	< 0.21 U	< 2.5 U	< 0.23 U	< 0.37 U
SVOCs/PAHs	Hexachloroethane	67-72-1	mg/kg	NE	NE	1.8	8	< 0.038 U	< 0.035 U	< 0.045 U	< 0.045 U	< 0.042 U	< 0.047 U	< 0.042 U	< 0.044 U	< 0.042 U	< 0.49 U	< 0.046 U	< 0.074 U
SVOCs/PAHs	Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	NE	71	1.1	21	< 0.008 U	0.026	0.29	0.19	3.2	0.43	0.46	0.66	0.055	0.13	1.3	0.096
SVOCs/PAHs	Isophorone	78-59-1	mg/kg	NE	NE	570	2400	< 0.019 U	< 0.018 U	< 0.022 U	< 0.023 U	< 0.021 U	< 0.023 U	< 0.021 U	< 0.022 U	< 0.021 U	< 0.25 U	< 0.023 U	< 0.037 U
SVOCs/PAHs	Naphthalene	91-20-3	mg/kg	1	3.4	3.8	17	0.099 J-	0.20	5.9	6.2	13	3.2	11	14	0.31	3.1	2.1	0.098
SVOCs/PAHs	Nitrobenzene	98-95-3	mg/kg	2.2	4.8	5.1	22	< 0.030 U	< 0.028 U	< 0.036 U	< 0.036 U	< 0.033 U	< 0.037 U	< 0.034 U	< 0.036 U	< 0.034 U	< 0.39 U	< 0.037 U	< 0.059 U
SVOCs/PAHs	n-Nitroso-di-n-propylamine	621-64-7	mg/kg	NE	NE	0.078	0.33	< 0.023 U	< 0.021 U	< 0.027 U	< 0.027 U	< 0.025 U	< 0.028 U	< 0.025 U	< 0.027 U	< 0.025 U	< 0.29 U	< 0.027 U	< 0.045 U
SVOCs/PAHs	n-Nitrosodiphenylamine	86-30-6	mg/kg	20	NE	110	470	< 0.019 U	< 0.018 U	0.28	< 0.023 U	< 0.021 U	< 0.023 U	< 0.021 U	< 0.022 U	< 0.021 U	0.57	0.33	< 0.037 U
SVOCs/PAHs	Pentachlorophenol	87-86-5	mg/kg	3	0.36	1	4	< 0.042 U	< 0.039 U	< 0.049 U	< 0.050 U	< 0.046 U	< 0.051 U	< 0.047 U	< 0.049 U	< 0.046 U	< 0.54 U	< 0.050 U	< 0.082 U
SVOCs/PAHs	Phenanthrene	85-01-8	mg/kg	5.5	11	NE	NE	< 0.008 U	0.057	3.2	1.4	14	1.6	4.0	4.3	0.20	0.97	3.0	0.11
SVOCs/PAHs	Phenol	108-95-2	mg/kg	0.79	37	1900	25000	< 0.027 U	< 0.025 U	0.49	0.90	< 0.029 U	< 0.033 U	0.62	0.62	< 0.030 U	0.73 J	0.16	0.078 J

Table 4-4. Subsurface Soil Analytical Results

Analyte Group	Chemical Name	CAS #	Units	Screening Benchmarks: Soil ESV - Plants and Invertebrates	Soil ESV - Birds and Mammals	Soil RSL - Resident (THQ = 0.1)	Soil RSL - Industrial (THQ = 0.1)	OU2-1-SU001-10 10/29/2018 10 ft bgs	OU2-1-SU002-04 10/25/2018 4 ft bgs	OU2-1-SU003-08 10/29/2018 8 ft bgs	OU2-1-SU004-09 10/25/2018 9 ft bgs	OU2-1-SU004-14 10/25/2018 14 ft bgs	OU2-1-SU004-22 10/25/2018 22 ft bgs	OU2-1-SU005-06 10/26/2018 6 ft bgs	OU2-1-SU005-16 10/26/2018 16 ft bgs	OU2-1-SU006-05 10/26/2018 5 ft bgs	OU2-1-SU006-14 10/26/2018 14 ft bgs	OU2-1-SU007-10 10/29/2018 10 ft bgs	OU2-1-SU008-02 10/26/2018 2 ft bgs
SVOCs/PAHs	Pyrene	129-00-0	mg/kg	10	23	180	2300	0.17 J-	0.053	1.8	1.3	21	1.7	2.5	3.2	0.092	1.4	7.9	0.22
SVOCs/PAHs	Pyridine	110-86-1	mg/kg	NE	NE	7.8	120	< 0.076 UJ	< 0.070 UJ	< 0.089 UJ	< 0.091 UJ	< 0.083 UJ	< 0.093 UJ	< 0.085 UJ	< 0.089 UJ	< 0.084 UJ	< 0.98 UJ	< 0.091 UJ	< 0.15 UJ
SVOCs/PAHs	Total HMW PAHs	CALC-HMW PAHs	mg/kg	18	1.1	NE	NE	0.22	0.345	6.27	4.3	70	8.2	8.28	11.49	0.638	4.77	28.3	1.522
SVOCs/PAHs	Total LMW PAHs	CALC-LMW PAHs	mg/kg	29	100	NE	NE	3.249	0.363	15.162	11.946	60.27	9.24	39.07	28.27	0.874	8.539	19.86	0.583
VOCs	1,1,1-Trichloroethane	71-55-6	mg/kg	NE	260	810	3600	< 0.027 U	< 0.0006 U	< 0.040 UJ	< 0.001 U	< 0.0008 U	< 0.080 UJ	< 0.034 UJ	< 0.039 UJ	< 0.045 UJ	< 0.054 UJ	< 0.042 UJ	< 0.001 U
VOCs	1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	NE	NE	0.6	2.7	< 0.018 U	< 0.0004 U	< 0.027 UJ	< 0.0007 U	< 0.0006 U	< 0.054 UJ	< 0.023 UJ	< 0.026 UJ	< 0.030 UJ	< 0.036 UJ	< 0.028 UJ	< 0.0009 U
VOCs	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	76-13-1	mg/kg	NE	NE	670	2800	< 0.027 U	< 0.0006 U	< 0.040 UJ	< 0.001 U	< 0.0008 U	< 0.080 UJ	< 0.034 UJ	< 0.039 UJ	< 0.045 UJ	< 0.054 UJ	< 0.042 UJ	< 0.001 U
VOCs	1,1,2-Trichloroethane	79-00-5	mg/kg	NE	NE	0.15	0.63	< 0.022 U	< 0.0005 U	< 0.034 UJ	< 0.0008 U	< 0.0007 U	< 0.067 UJ	< 0.028 UJ	< 0.033 UJ	< 0.038 UJ	< 0.045 UJ	< 0.035 UJ	< 0.001 U
VOCs	1,1-Dichloroethane	75-34-3	mg/kg	NE	210	3.6	16	< 0.022 U	< 0.0005 U	< 0.034 UJ	< 0.0008 U	< 0.0007 U	< 0.067 UJ	< 0.028 UJ	< 0.033 UJ	< 0.038 UJ	< 0.045 UJ	< 0.035 UJ	< 0.001 U
VOCs	1,1-Dichloroethene	75-35-4	mg/kg	NE	11	23	100	< 0.022 U	< 0.0005 U	< 0.034 UJ	< 0.0008 U	< 0.0007 U	< 0.067 UJ	< 0.028 UJ	< 0.033 UJ	< 0.038 UJ	< 0.045 UJ	< 0.035 UJ	< 0.001 U
VOCs	1,2,4-Trichlorobenzene	120-82-1	mg/kg	1.2	0.27	5.8	26	< 0.22 U	< 0.005 U	< 0.34 UJ	< 0.008 U	< 0.007 U	< 0.67 UJ	< 0.28 UJ	< 0.33 UJ	< 0.38 UJ	< 0.45 UJ	< 0.35 UJ	< 0.012 U
VOCs	1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	NE	NE	0.0053	0.064	< 0.018 U	< 0.0004 U	< 0.027 UJ	< 0.0007 U	< 0.0006 U	< 0.054 UJ	< 0.023 UJ	< 0.026 UJ	< 0.030 UJ	< 0.036 UJ	< 0.028 UJ	< 0.0009 U
VOCs	1,2-Dibromoethane	106-93-4	mg/kg	NE	NE	0.036	0.16	< 0.018 U	< 0.0004 U	< 0.027 UJ	< 0.0007 U	< 0.0006 U	< 0.054 UJ	< 0.023 UJ	< 0.026 UJ	< 0.030 UJ	< 0.036 UJ	< 0.028 UJ	< 0.0009 U
VOCs	1,2-Dichlorobenzene	95-50-1	mg/kg	20	0.92	180	930	< 0.022 U	< 0.0005 U	0.18 J-	< 0.0008 U	< 0.0007 U	< 0.067 UJ	0.040 J-	0.066 J-	< 0.038 UJ	< 0.045 UJ	< 0.035 UJ	< 0.001 U
VOCs	1,2-Dichloroethane	107-06-2	mg/kg	NE	0.85	0.46	2	< 0.027 U	< 0.0006 U	< 0.040 UJ	< 0.001 U	< 0.0008 U	< 0.080 UJ	< 0.034 UJ	< 0.039 UJ	< 0.045 UJ	< 0.054 UJ	< 0.042 UJ	< 0.001 U
VOCs	1,2-Dichloropropane	78-87-5	mg/kg	700	NE	1.6	6.6	< 0.022 U	< 0.0005 U	< 0.034 UJ	< 0.0008 U	< 0.0007 U	< 0.067 UJ	< 0.028 UJ	< 0.033 UJ	< 0.038 UJ	< 0.045 UJ	< 0.035 UJ	< 0.001 U
VOCs	1,3-Dichlorobenzene	541-73-1	mg/kg	20	0.74	NE	NE	< 0.022 U	< 0.0005 U	< 0.034 UJ	< 0.0008 U	< 0.0007 U	< 0.067 UJ	< 0.028 UJ	< 0.033 UJ	< 0.038 UJ	< 0.045 UJ	< 0.035 UJ	< 0.001 U
VOCs	1,4-Dichlorobenzene	106-46-7	mg/kg	1.2	0.89	2.6	11	0.20 J	< 0.0004 U	0.069 J-	0.006 J	0.001 J	< 0.054 UJ	0.042 J-	0.094 J-	0.035 J-	0.055 J-	< 0.028 UJ	< 0.0009 U
VOCs	2-Butanone	78-93-3	mg/kg	NE	350	2700	19000	< 0.045 U	< 0.001 U	0.46 J-	0.055	0.073	0.14 J-	0.10 J-	0.37 J-	< 0.075 UJ	0.26 J-	0.086 J-	0.11 J+
VOCs	2-Hexanone	591-78-6	mg/kg	NE	0.36	20	130	< 0.045 U	< 0.001 U	< 0.067 UJ	< 0.002 U	< 0.001 U	< 0.13 UJ	< 0.057 UJ	< 0.065 UJ	< 0.075 UJ	< 0.091 UJ	< 0.071 UJ	< 0.002 U
VOCs	4-Methyl-2-pentanone	108-10-1	mg/kg	NE	9.7	3300	14000	< 0.045 U	< 0.001 U	< 0.067 UJ	< 0.002 U	< 0.001 U	< 0.13 UJ	< 0.057 UJ	< 0.065 UJ	< 0.075 UJ	< 0.091 UJ	< 0.071 UJ	< 0.002 U
VOCs	Acetone	67-64-1	mg/kg	NE	1.2	6100	67000	< 0.27 U	< 0.006 U	< 0.40 UJ	0.23	0.43	< 0.80 UJ	< 0.34 UJ	0.91 J-	< 0.45 UJ	0.63 J-	< 0.42 UJ	0.49 J+
VOCs	Benzene	71-43-2	mg/kg	NE	24	1.2	5.1	< 0.022 U	< 0.0005 U	0.11 J-	0.002 J	0.003 J	< 0.067 UJ	< 0.028 UJ	0.14 J-	< 0.038 UJ	0.051 J-	0.16 J-	< 0.001 U
VOCs	Bromodichloromethane	75-27-4	mg/kg	NE	NE	0.29	1.3	< 0.018 U	< 0.0004 U	< 0.027 UJ	< 0.0007 U	< 0.0006 U	< 0.054 UJ	< 0.023 UJ	< 0.026 UJ	< 0.030 UJ	< 0.036 UJ	< 0.028 UJ	< 0.0009 U
VOCs	Bromoform	75-25-2	mg/kg	NE	NE	19	86	< 0.22 U	< 0.005 U	< 0.34 UJ	< 0.008 U	< 0.007 U	< 0.67 UJ	< 0.28 UJ	< 0.33 UJ	< 0.38 UJ	< 0.45 UJ	< 0.35 UJ	< 0.012 U
VOCs	Bromomethane	74-83-9	mg/kg	NE	NE	0.68	3	< 0.031 U	< 0.0007 U	< 0.047 UJ	< 0.001 U	< 0.001 U	< 0.094 UJ	< 0.040 UJ	< 0.046 UJ	< 0.053 UJ	< 0.063 UJ	< 0.049 UJ	< 0.002 U
VOCs	Carbon disulfide	75-15-0	mg/kg	NE	0.81	77	350	< 0.027 U	< 0.0006 U	0.042 J-	0.002 J	0.005 J	< 0.080 UJ	0.068 J-	0.051 J-	< 0.045 UJ	0.10 J-	< 0.042 UJ	< 0.001 U
VOCs	Carbon tetrachloride	56-23-5	mg/kg	NE	58.6	0.65	2.9	< 0.022 U	< 0.0005 U	< 0.034 UJ	< 0.0008 U	< 0.0007 U	< 0.067 UJ	< 0.028 UJ	< 0.033 UJ	< 0.038 UJ	< 0.045 UJ	< 0.035 UJ	< 0.001 U
VOCs	Chlorobenzene	108-90-7	mg/kg	2.4	43	28	130	0.085 J	< 0.0005 U	< 0.034 UJ	< 0.0008 U	< 0.0007 U	< 0.067 UJ	< 0.028 UJ	0.11 J-	< 0.038 UJ	< 0.045 UJ	< 0.035 UJ	< 0.001 U
VOCs	Chloroethane	75-00-3	mg/kg	NE	NE	1400	5700	< 0.045 U	< 0.001 U	< 0.067 UJ	< 0.002 U	< 0.001 U	< 0.13 UJ	< 0.057 UJ	< 0.065 UJ	< 0.075 UJ	< 0.091 UJ	< 0.071 UJ	< 0.002 U
VOCs	Chloroform	67-66-3	mg/kg	NE	8	0.32	1.4	< 0.027 U	< 0.0006 U	< 0.040 UJ	< 0.001 U	< 0.0008 U	< 0.080 UJ	< 0.034 UJ	< 0.039 UJ	< 0.045 UJ	< 0.054 UJ	< 0.042 UJ	< 0.001 U
VOCs	Chloromethane	74-87-3	mg/kg	NE	NE	11	46	< 0.027 U	< 0.0006 U	< 0.040 UJ	< 0.001 U	< 0.0008 U	< 0.080 UJ	< 0.034 UJ	< 0.039 UJ	< 0.045 UJ	< 0.054 UJ	< 0.042 UJ	< 0.001 U
VOCs	cis-1,2-Dichloroethene	156-59-2	mg/kg	NE	89.6	16	230	< 0.022 U	< 0.0005 U	< 0.034 UJ	< 0.0008 U	0.001 J	< 0.067 UJ	< 0.028 UJ	0.094 J-	0.092 J-	< 0.045 UJ	0.048 J-	< 0.001 U
VOCs	cis-1,3-Dichloropropene	10061-01-5	mg/kg	NE	NE	NE	NE	< 0.018 U	< 0.0004 U	< 0.027 UJ	< 0.0007 U	< 0.0006 U	< 0.054 UJ	< 0.023 UJ	< 0.026 UJ	< 0.030 UJ	< 0.036 UJ	< 0.028 UJ	< 0.0009 U
VOCs	cyclohexane	110-82-7	mg/kg	NE	NE	650	2700	< 0.022 U	< 0.0005 U	< 0.034 UJ	< 0.0008 U	< 0.0007 U	< 0.067 UJ	< 0.028 UJ	< 0.033 UJ	< 0.038 UJ	< 0.045 UJ	< 0.035 UJ	< 0.001 U
VOCs	Cyclohexanone	108-94-1	mg/kg	NE	NE	2800	13000	< 1.1 U	< 0.024 U	2.4 J-	< 0.042 U	< 0.035 U	< 3.4 UJ	2.1 J-	< 1.6 UJ	< 1.9 UJ	< 2.3 UJ	< 1.8 UJ	< 0.059 U
VOCs	Dibromochloromethane	124-48-1	mg/kg	NE	NE	8.3	39	< 0.018 U	< 0.0004 U	< 0.027 UJ	< 0.0007 U	< 0.0006 U	< 0.054 UJ	< 0.023 UJ	< 0.026 UJ	< 0.030 UJ	< 0.036 UJ	< 0.028 UJ	< 0.0009 U
VOCs	Dichlorodifluoromethane	75-71-8	mg/kg	NE	NE	8.7	37	< 0.027 U	< 0.0006 U	< 0.040 UJ	< 0.001 U	< 0.0008 U	< 0.080 UJ	< 0.034 UJ	< 0.039 UJ	< 0.045 UJ	< 0.054 UJ	< 0.042 UJ	< 0.001 U
VOCs	Ethylbenzene	100-41-4	mg/kg	NE	NE	5.8	25	< 0.018 U	< 0.0004 U	0.10 J-	< 0.0007 U	0.001 J	< 0.054 UJ	0.034 J-	0.13 J-	< 0.030 UJ	< 0.036 UJ	0.18 J-	< 0.0009 U
VOCs	Isopropylbenzene	98-82-8	mg/kg	NE	NE	190	990	< 0.018 U	< 0.0004 U	0.040 J-	< 0.0007 U	< 0.0006 U	0.20 J-	0.032 J-	0.060 J-	< 0.030 UJ	< 0.036 UJ	0.030 J-	< 0.0009 U
VOCs	Methyl acetate	79-20-9	mg/kg	NE	NE	7800	120000	< 0.045 U	< 0.001 U	0.33 J-	< 0.002 U	0.005 J	6.9 J-	0.29 J-	0.51 J-	0.14 J-	0.92 J-	0.17 J-	< 0.002 U
VOCs	Methyl Tertiary Butyl Ether	1634-04-4	mg/kg	NE	NE	47	210	< 0.022 U	< 0.0005 U	< 0.034 UJ	< 0.0008 U	< 0.0007 U	< 0.067 UJ	< 0.028 UJ	< 0.033 UJ	< 0.038 UJ	< 0.045 UJ	< 0.035 UJ	< 0.001 U
VOCs	methylcyclohexane	108-87-2	mg/kg	NE	NE	NE	NE	< 0.027 U	< 0.0006 U	0.076 J-	< 0.001 U	< 0.0008 U	< 0.080 UJ	< 0.034 UJ	< 0.039 UJ	< 0.045 UJ	< 0.054 UJ	< 0.042 UJ	< 0.001 U
VOCs	Methylene chloride	75-09-2	mg/kg	1600	2.6	35	320	< 0.089 U	< 0.002 U	< 0.13 UJ	< 0.003 U	< 0.003 U	< 0.27 UJ	< 0.11 UJ	< 0.13 UJ	< 0.15 UJ	< 0.18 UJ	< 0.14 UJ	< 0.005 U
VOCs	Styrene	100-42-5	mg/kg	1.2	NE	600	3500	< 0.013 U	< 0.0003 U	< 0.020 UJ	< 0.0005 U	< 0.0004 U	< 0.040 UJ	< 0.017 UJ	< 0.020 UJ	< 0.023 UJ	< 0.027 UJ	< 0.021 UJ	< 0.0007 U
VOCs	Tetrachloroethene	127-18-4	mg/kg	10	0.18	8.1	39	< 0.022 U	< 0.0005 U	< 0.034 UJ	< 0.0008 U	< 0.0007 U	< 0.067 UJ	< 0.028 UJ	0.099 J-	0.50 J-	< 0.045 UJ	< 0.035 UJ	< 0.001 U
VOCs	Toluene	108-88-3	mg/kg	200	23	490	4700	< 0.027 U	< 0.0006 U	0.46 J-	0.001 J	0.010	< 0.080 UJ	0.063 J-	0.23 J-	0.14 J-	0.098 J-	0.31 J-	< 0.001 U
VOCs	trans-1,2-Dichloroethene	156-60-5	mg/kg	NE	89.6	160	2300	< 0.022 U	< 0.0005 U	< 0.034 UJ	< 0.0008 U	< 0.0007 U	< 0.067 UJ	< 0.028 UJ	< 0.033 UJ	< 0.038 UJ	< 0.045 UJ	< 0.035 UJ	< 0.001 U
VOCs	trans-1,3-Dichloropropene	10061-02-6	mg/kg	NE	NE	NE	NE	< 0.013 U	< 0.0003 U	< 0.020 UJ	< 0.0005 U	< 0.0004 U	< 0.040 UJ	< 0.017 UJ	< 0.020 UJ	< 0.023 UJ	< 0.027 UJ	< 0.021 UJ	< 0.0007 U
VOCs	Trichloroethene	79-01-6	mg/kg	NE	1.387	0.41	1.9	< 0.022 U	< 0.0005 U	< 0.034 UJ	< 0.0008 U	< 0.0007 U	< 0.067 UJ	< 0.028 UJ	< 0.033 UJ	< 0.038 UJ	< 0.045 UJ	< 0.035 UJ	< 0.001 U
VOCs	Trichlorofluoromethane	75-69-4	mg/kg	NE	52	2300	35000	< 0.031 U	< 0.0007 U	< 0.047 UJ	< 0.001 U	< 0.001 U	< 0.094 UJ	< 0.040 UJ	< 0.046 UJ	< 0.053 UJ	< 0.063 UJ	< 0.049 UJ	< 0.002 U
VOCs	Vinyl chloride	75-01-4	mg/kg	NE	0.12	0.059	1.7	< 0.027 U	< 0.0006 U	< 0.040 UJ	< 0.001 U	< 0.0008 U	< 0.080 UJ	< 0.034 UJ	< 0.039 UJ	< 0.045 UJ	< 0.054 UJ	< 0.042 UJ	< 0.001 U
VOCs	Xylenes (total)	1330-20-7	mg/kg	10	1.4	58	250	< 0.045 U	< 0.001 U	0.76 J-	< 0.002 U	0.007	< 0.13 UJ	0.15 J-	0.51 J-	0.11 J-	0.19 J-	0.83 J-	< 0.002 U

Analyte Group	Chemical Name	CAS #	Units	Screening Benchmarks: Soil ESV - Plants and Invertebrates	Soil ESV - Birds and Mammals	Soil RSL - Resident (THQ = 0.1)	Soil RSL - Industrial (THQ = 0.1)	OU2-1-SU001-08 10/29/2018 8 ft bgs	OU2-1-SU002-07 10/25/2018 7 ft bgs	OU2-1-SU003-09 10/29/2018 9 ft bgs	OU2-1-SU004-10 10/25/2018 10 ft bgs	OU2-1-SU004-16 10/25/2018 16 ft bgs	OU2-1-SU004-29 10/25/2018 29 ft bgs	OU2-1-SU005-01 10/26/2018 1 ft bgs	OU2-1-SU005-14 10/26/2018 14 ft bgs	OU2-1-SU006-10 10/26/2018 10 ft bgs	OU2-1-SU006-13 10/26/2018 13 ft bgs	OU2-1-SU007-08 10/29/2018 8 ft bgs	OU2-1-SU008-03 10/26/2018 3 ft bgs
Rad	Thorium-232 (via Ac-228)[1]	14331-83-0	pci/g	NE	6.2	1.1	NE	0.7	0.85	1.48 J+	0.88 J+	1.35 J+	0.86	0.70	1.32 J+	1.07 J+	1.15 J+	2.37 J	0.85 J+
Rad	Radium-226 (via Bi-214)[1]	14733-03-0	pci/g	NE	1.5	0.6	NE	0.69 J	0.82 J	1.54 J+	0.97 J+	1.26 J+	0.82 J	0.79 J	1.36 J+	1.03 J+	1.23 J+	2.41 J	1 J+
Rad	Uranium-238 (via Pa-234m)[1,2]	15100-28-4	pci/g	NE	400	14	NE	< 0.33 U	< 0.34 U	< 0.2 U	< 0.27 U	< 0.134 U	< 0.217 U	< 0.31 U	< 0.146 U	< 0.162 U	< 0.086 U	< 0.180 U	< 0.19 U

Notes:

For samples with duplicates, the maximum result of the duplicate and standard sample was reported.

BLUE	Exceeds Resident Soil RSL (THQ = 0.1)
RED	Exceeds Industrial Soil RSL (THQ = 0.1)
HIGHLIGHT	Exceeds Soil ESV(s)

NE = not established

U = not detected above method detection limit

UJ = not detected above method detection limit; method detection limit estimated

J = estimated value, unknown bias

J+ = estimated value, may be biased high

J- = estimated value, may be biased low

R = data rejected during validation

1 - The human health soil screening benchmarks for radionuclides are based on soil screening levels specified in NUREG 1757, Volume 1 (U.S. NRC, 2006).

2 - Pa-234m is reported as Pa-234 in the analytical reports presented in Appendix I.

Table 4-5. Groundwater Statistical Summary

Analyte Group	Analyte	Unit	# Samples	# Detects	Frequency of Detection	Min	Max	Average	Standard Deviation	Federal MCL		Tapwater RSL (THQ = 0.1)	
										Value	Exeedances	Value	Exeedances
Herbicides	2,4,5-T	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	16	0
Herbicides	2,4,5-TP (Silvex)	µg/L	4	1	0.250	0.013	0.013	0.0130	NA	50	0	11	0
Herbicides	2,4-D	µg/L	4	0	0.00	NA	NA	NA	NA	70	0	17	0
Herbicides	2,4-DB	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	45	0
Herbicides	2,4-DP (Dichloroprop)	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
Herbicides	Dalapon	µg/L	4	0	0.00	NA	NA	NA	NA	200	0	60	0
Herbicides	Dicamba	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	57	0
Herbicides	Dinoseb	µg/L	4	0	0.00	NA	NA	NA	NA	7	0	1.5	0
Herbicides	MCPA (2-Methyl-4-chlorophenoxy acetic acid)	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.75	0
Herbicides	MCPP (2-(2-Methyl-4-chlorophenoxy) propanoic acid)	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	1.6	0
Dissolved Metals	Aluminum	µg/L	4	1	0.250	219	219	219	NA	NE	0	2000	0
Dissolved Metals	Antimony	µg/L	4	2	0.500	0.46	3.5	1.98	2.15	6	0	0.78	1
Dissolved Metals	Arsenic	µg/L	4	4	1.00	2.5	17	7.48	6.74	10	1	0.052	4
Dissolved Metals	Barium	µg/L	4	4	1.00	69.2	1820	1000	719	2000	0	380	3
Dissolved Metals	Beryllium	µg/L	4	0	0.00	NA	NA	NA	NA	4	0	2.5	0
Dissolved Metals	Cadmium	µg/L	4	1	0.250	0.41	0.41	0.410	NA	5	0	0.92	0
Dissolved Metals	Calcium	µg/L	4	4	1.00	81100	277000	170000	102000	NE	0	NE	0
Dissolved Metals	Chromium	µg/L	4	3	0.750	2.3	6.5	4.20	2.13	100	0	NE	0
Dissolved Metals	Cobalt	µg/L	4	4	1.00	0.19	4.6	2.55	1.81	NE	0	0.6	3
Dissolved Metals	Copper	µg/L	4	1	0.250	13.3	13.3	13.3	NA	1300	0	80	0
Dissolved Metals	Iron	µg/L	4	4	1.00	1800	45900	14400	21200	NE	0	1400	4
Dissolved Metals	Lead	µg/L	4	1	0.250	9.5	9.5	9.50	NA	15	0	15	0
Dissolved Metals	Magnesium	µg/L	4	4	1.00	26900	63900	39200	16800	NE	0	NE	0
Dissolved Metals	Manganese	µg/L	4	4	1.00	428	2430	1220	875	NE	0	43	4
Dissolved Metals	Mercury	µg/L	4	0	0.00	NA	NA	NA	NA	2	0	0.063	0
Dissolved Metals	Nickel	µg/L	4	3	0.750	1.1	37.6	14.1	20.4	NE	0	39	0
Dissolved Metals	Potassium	µg/L	4	4	1.00	5010	29800	20300	10700	NE	0	NE	0
Dissolved Metals	Selenium	µg/L	4	0	0.00	NA	NA	NA	NA	50	0	10	0
Dissolved Metals	Silver	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	9.4	0
Dissolved Metals	Sodium	µg/L	4	4	1.00	20700	89400	51700	28600	NE	0	NE	0
Dissolved Metals	Thallium	µg/L	4	0	0.00	NA	NA	NA	NA	2	0	0.02	0
Dissolved Metals	Vanadium	µg/L	4	3	0.750	0.3	2.4	1.53	1.10	NE	0	8.6	0
Dissolved Metals	Zinc	µg/L	4	1	0.250	171	171	171	NA	NE	0	600	0
Total Metals	Aluminum	µg/L	4	2	0.500	41.5	971	506	657	NE	0	2000	0
Total Metals	Antimony	µg/L	4	2	0.500	0.53	3.5	2.02	2.10	6	0	0.78	1
Total Metals	Arsenic	µg/L	4	4	1.00	2.8	15.5	7.60	5.69	10	1	0.052	4
Total Metals	Barium	µg/L	4	4	1.00	73.6	1730	993	685	2000	0	380	3
Total Metals	Beryllium	µg/L	4	0	0.00	NA	NA	NA	NA	4	0	2.5	0
Total Metals	Cadmium	µg/L	4	1	0.250	0.64	0.64	0.640	NA	5	0	0.92	0
Total Metals	Calcium	µg/L	4	4	1.00	79400	263000	163000	93200	NE	0	NE	0
Total Metals	Chromium	µg/L	4	3	0.750	2.7	41.6	20.1	19.8	100	0	NE	0
Total Metals	Cobalt	µg/L	4	4	1.00	0.32	5	2.68	1.92	NE	0	0.6	3
Total Metals	Copper	µg/L	4	1	0.250	31.1	31.1	31.1	NA	1300	0	80	0
Total Metals	Iron	µg/L	4	4	1.00	2380	42200	14500	18600	NE	0	1400	4
Total Metals	Lead	µg/L	4	2	0.500	4.2	32.2	18.2	19.8	15	1	15	1
Total Metals	Magnesium	µg/L	4	4	1.00	25200	64700	38500	17800	NE	0	NE	0
Total Metals	Manganese	µg/L	4	4	1.00	448	2520	1220	923	NE	0	43	4
Total Metals	Mercury	µg/L	4	0	0.00	NA	NA	NA	NA	2	0	0.063	0
Total Metals	Nickel	µg/L	4	3	0.750	0.63	38.4	20.5	19.0	NE	0	39	0
Total Metals	Potassium	µg/L	4	4	1.00	4760	31100	20100	11200	NE	0	NE	0

Table 4-5. Groundwater Statistical Summary

Analyte Group	Analyte	Unit	# Samples	# Detects	Frequency of Detection	Min	Max	Average	Standard Deviation	Federal MCL		Tapwater RSL (THQ = 0.1)	
										Value	Exeedances	Value	Exeedances
Total Metals	Selenium	µg/L	4	0	0.00	NA	NA	NA	NA	50	0	10	0
Total Metals	Silver	µg/L	4	1	0.250	0.24	0.24	0.240	NA	NE	0	9.4	0
Total Metals	Sodium	µg/L	4	4	1.00	19400	88700	50200	29200	NE	0	NE	0
Total Metals	Thallium	µg/L	4	0	0.00	NA	NA	NA	NA	2	0	0.02	0
Total Metals	Vanadium	µg/L	4	4	1.00	0.28	6	2.24	2.65	NE	0	8.6	0
Total Metals	Zinc	µg/L	4	2	0.500	10.2	199	105	134	NE	0	600	0
PCBs	Aroclor 1016	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.14	0
PCBs	Aroclor 1221	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.0047	0
PCBs	Aroclor 1232	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.0047	0
PCBs	Aroclor 1242	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.0078	0
PCBs	Aroclor 1248	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.0078	0
PCBs	Aroclor 1254	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.0078	0
PCBs	Aroclor 1260	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.0078	0
PCBs	Aroclor 1262	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
PCBs	Aroclor 1268	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
PCBs	Total PCBs	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	µg/L	4	2	0.500	0.000005	0.000046	0.0000255	0.0000290	NE	0	NE	0
Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	µg/L	4	2	0.500	0.00001	0.0001	0.0000550	0.0000636	NE	0	NE	0
Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	µg/L	4	1	0.250	0.000004	0.000004	0.00000400	NA	NE	0	NE	0
Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
Dioxins/Furans	2,3,7,8-TCDD	µg/L	4	0	0.00	NA	NA	NA	NA	3e-005	0	1.2e-007	0
Dioxins/Furans	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
Dioxins/Furans	Dioxin TEQ	µg/L	4	2	0.500	1.851E-07	2.1576E-06	0.00000117	0.00000139	3e-005	0	1.2e-007	2
Dioxins/Furans	Octachlorodibenzofuran (OCDF)	µg/L	4	2	0.500	0.000007	0.000032	0.0000195	0.0000177	NE	0	NE	0
Dioxins/Furans	Octachlorodibenzo-p-dioxin (OCDD)	µg/L	4	2	0.500	0.00011	0.00096	0.000535	0.000601	NE	0	NE	0
Pesticides	4,4'-DDD	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.0063	0
Pesticides	4,4'-DDE	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.046	0
Pesticides	4,4'-DDT	µg/L	4	1	0.250	0.0067	0.0067	0.00670	NA	NE	0	0.23	0
Pesticides	Aldrin	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.00092	0
Pesticides	alpha Chlordane	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
Pesticides	alpha-BHC	µg/L	4	3	0.750	0.0064	0.024	0.0161	0.00895	NE	0	0.0072	2
Pesticides	beta-BHC	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.025	0
Pesticides	Chlordane	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
Pesticides	delta-BHC	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
Pesticides	Dieldrin	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.0018	0
Pesticides	Endosulfan I	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
Pesticides	Endosulfan II	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
Pesticides	Endosulfan sulfate	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
Pesticides	Endrin	µg/L	4	0	0.00	NA	NA	NA	NA	2	0	0.23	0
Pesticides	Endrin aldehyde	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
Pesticides	Endrin ketone	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0

Table 4-5. Groundwater Statistical Summary

Analyte Group	Analyte	Unit	# Samples	# Detects	Frequency of Detection	Min	Max	Average	Standard Deviation	Federal MCL		Tapwater RSL (THQ = 0.1)	
										Value	Exeedances	Value	Exeedances
Pesticides	gamma Chlordane	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
Pesticides	gamma-BHC (Lindane)	µg/L	4	0	0.00	NA	NA	NA	NA	0.2	0	0.042	0
Pesticides	Heptachlor	µg/L	4	0	0.00	NA	NA	NA	NA	0.4	0	0.0014	0
Pesticides	Heptachlor epoxide	µg/L	4	0	0.00	NA	NA	NA	NA	0.2	0	0.0014	0
Pesticides	Methoxychlor	µg/L	4	0	0.00	NA	NA	NA	NA	40	0	3.7	0
Pesticides	Total Chlordane	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
Pesticides	Total DDD, DDE, DDT	µg/L	4	1	0.250	0.0067	0.0067	0.00670	NA	NE	0	NE	0
Pesticides	Toxaphene	µg/L	4	0	0.00	NA	NA	NA	NA	3	0	0.071	0
SVOCs/PAHs	1,2,4-Trichlorobenzene	µg/L	4	0	0.00	NA	NA	NA	NA	70	0	0.4	0
SVOCs/PAHs	1,2-Dichlorobenzene	µg/L	4	0	0.00	NA	NA	NA	NA	600	0	30	0
SVOCs/PAHs	1,3-Dichlorobenzene	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
SVOCs/PAHs	1,4-Dichlorobenzene	µg/L	4	0	0.00	NA	NA	NA	NA	75	0	0.48	0
SVOCs/PAHs	1,4-Dioxane	µg/L	4	2	0.500	0.1	0.3	0.200	0.141	NE	0	0.46	0
SVOCs/PAHs	2,4,5-Trichlorophenol	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	120	0
SVOCs/PAHs	2,4,6-Trichlorophenol	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	1.2	0
SVOCs/PAHs	2,4-Dichlorophenol	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	4.6	0
SVOCs/PAHs	2,4-Dimethylphenol	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	36	0
SVOCs/PAHs	2,4-Dinitrophenol	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	3.9	0
SVOCs/PAHs	2,4-Dinitrotoluene	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.24	0
SVOCs/PAHs	2,6-Dinitrotoluene	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.049	0
SVOCs/PAHs	2-Chloronaphthalene	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	75	0
SVOCs/PAHs	2-Chlorophenol	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	9.1	0
SVOCs/PAHs	2-Methylnaphthalene	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	3.6	0
SVOCs/PAHs	2-Methylphenol	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	93	0
SVOCs/PAHs	2-Nitroaniline	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	19	0
SVOCs/PAHs	2-Nitrophenol	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
SVOCs/PAHs	3,3-Dichlorobenzidine	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.13	0
SVOCs/PAHs	3-Nitroaniline	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
SVOCs/PAHs	4,6-Dinitro-2-methylphenol	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.15	0
SVOCs/PAHs	4-Bromophenyl-phenylether	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
SVOCs/PAHs	4-Chloro-3-methylphenol	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	140	0
SVOCs/PAHs	4-Chloroaniline	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.37	0
SVOCs/PAHs	4-Chlorophenyl-phenylether	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
SVOCs/PAHs	4-Methylphenol	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	190	0
SVOCs/PAHs	4-Nitroaniline	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	3.8	0
SVOCs/PAHs	4-Nitrophenol	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
SVOCs/PAHs	Acenaphthene	µg/L	4	2	0.500	0.05	0.6	0.325	0.389	NE	0	53	0
SVOCs/PAHs	Acenaphthylene	µg/L	4	1	0.250	0.01	0.01	0.0100	NA	NE	0	NE	0
SVOCs/PAHs	Aniline	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	13	0
SVOCs/PAHs	Anthracene	µg/L	4	3	0.750	0.01	0.1	0.0467	0.0473	NE	0	180	0
SVOCs/PAHs	Benzo(a)anthracene	µg/L	4	2	0.500	0.02	0.02	0.0200	0.00	NE	0	0.03	0
SVOCs/PAHs	Benzo(a)pyrene	µg/L	4	1	0.250	0.02	0.02	0.0200	NA	0.2	0	0.025	0
SVOCs/PAHs	Benzo(a)Pyrene TEQ	µg/L	4	2	0.500	0.00303	0.02713	0.0151	0.0170	0.2	0	0.025	1
SVOCs/PAHs	Benzo(b)fluoranthene	µg/L	4	2	0.500	0.01	0.03	0.0200	0.0141	NE	0	0.25	0
SVOCs/PAHs	Benzo(g,h,i)perylene	µg/L	4	1	0.250	0.02	0.02	0.0200	NA	NE	0	NE	0
SVOCs/PAHs	Benzo(k)fluoranthene	µg/L	4	1	0.250	0.01	0.01	0.0100	NA	NE	0	2.5	0
SVOCs/PAHs	Benzyl Alcohol	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	200	0
SVOCs/PAHs	Bis(2-chloro-1-methylethyl) ether	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	71	0
SVOCs/PAHs	Bis(2-chloroethoxy)methane	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	5.9	0
SVOCs/PAHs	Bis(2-chloroethyl)ether	µg/L	4	2	0.500	0.03	0.04	0.0350	0.00707	NE	0	0.014	2

Table 4-5. Groundwater Statistical Summary

Analyte Group	Analyte	Unit	# Samples	# Detects	Frequency of Detection	Min	Max	Average	Standard Deviation	Federal MCL		Tapwater RSL (THQ = 0.1)	
										Value	Exeedances	Value	Exeedances
SVOCs/PAHs	Bis(2-ethylhexyl)phthalate	µg/L	4	2	0.500	0.3	1	0.650	0.495	6	0	5.6	0
SVOCs/PAHs	Carbazole	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
SVOCs/PAHs	Chrysene	µg/L	4	2	0.500	0.03	0.03	0.0300	0.00	NE	0	25	0
SVOCs/PAHs	Dibenz(a,h)anthracene	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.025	0
SVOCs/PAHs	Dibenzofuran	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.79	0
SVOCs/PAHs	Diethyl phthalate	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	1500	0
SVOCs/PAHs	Dimethyl phthalate	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
SVOCs/PAHs	Di-n-butyl phthalate	µg/L	4	2	0.500	0.2	0.2	0.200	0.00	NE	0	90	0
SVOCs/PAHs	Di-n-octyl phthalate	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	20	0
SVOCs/PAHs	Fluoranthene	µg/L	4	3	0.750	0.01	0.1	0.0533	0.0451	NE	0	80	0
SVOCs/PAHs	Fluorene	µg/L	4	3	0.750	0.02	0.4	0.150	0.217	NE	0	29	0
SVOCs/PAHs	Hexachlorobenzene	µg/L	4	0	0.00	NA	NA	NA	NA	1	0	0.0098	0
SVOCs/PAHs	Hexachlorobutadiene	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.14	0
SVOCs/PAHs	hexachlorocyclopentadiene	µg/L	4	0	0.00	NA	NA	NA	NA	50	0	0.041	0
SVOCs/PAHs	Hexachloroethane	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.33	0
SVOCs/PAHs	Indeno(1,2,3-cd)pyrene	µg/L	4	1	0.250	0.02	0.02	0.0200	NA	NE	0	0.25	0
SVOCs/PAHs	Isophorone	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	78	0
SVOCs/PAHs	Naphthalene	µg/L	4	3	0.750	0.06	0.1	0.0833	0.0208	NE	0	0.17	0
SVOCs/PAHs	Nitrobenzene	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.14	0
SVOCs/PAHs	n-Nitroso-di-n-propylamine	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.011	0
SVOCs/PAHs	n-Nitrosodiphenylamine	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	12	0
SVOCs/PAHs	Pentachlorophenol	µg/L	4	0	0.00	NA	NA	NA	NA	1	0	0.041	0
SVOCs/PAHs	Phenanthrene	µg/L	4	3	0.750	0.05	0.6	0.243	0.309	NE	0	NE	0
SVOCs/PAHs	Phenol	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	580	0
SVOCs/PAHs	Pyrene	µg/L	4	2	0.500	0.04	0.08	0.0600	0.0283	NE	0	12	0
SVOCs/PAHs	Pyridine	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	2	0
SVOCs/PAHs	Total HMW PAHs	µg/L	4	2	0.500	0.14	0.19	0.165	0.0354	NE	0	NE	0
SVOCs/PAHs	Total LMW PAHs	µg/L	4	3	0.750	0.21	1.91	0.797	0.965	NE	0	NE	0
VOCs	1,1,1-Trichloroethane	µg/L	4	0	0.00	NA	NA	NA	NA	200	0	800	0
VOCs	1,1,2,2-Tetrachloroethane	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.076	0
VOCs	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	1000	0
VOCs	1,1,2-Trichloroethane	µg/L	4	0	0.00	NA	NA	NA	NA	5	0	0.041	0
VOCs	1,1-Dichloroethane	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	2.8	0
VOCs	1,1-Dichloroethene	µg/L	4	0	0.00	NA	NA	NA	NA	7	0	28	0
VOCs	1,2,4-Trichlorobenzene	µg/L	4	1	0.250	0.08	0.08	0.0800	NA	70	0	0.4	0
VOCs	1,2-Dibromo-3-chloropropane	µg/L	4	0	0.00	NA	NA	NA	NA	0.2	0	0.00033	0
VOCs	1,2-Dibromoethane	µg/L	4	0	0.00	NA	NA	NA	NA	0.05	0	0.0075	0
VOCs	1,2-Dichlorobenzene	µg/L	4	1	0.250	0.1	0.1	0.100	NA	600	0	30	0
VOCs	1,2-Dichloroethane	µg/L	4	0	0.00	NA	NA	NA	NA	5	0	0.17	0
VOCs	1,2-Dichloropropane	µg/L	4	0	0.00	NA	NA	NA	NA	5	0	0.82	0
VOCs	1,3-Dichlorobenzene	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
VOCs	1,4-Dichlorobenzene	µg/L	4	1	0.250	0.2	0.2	0.200	NA	75	0	0.48	0
VOCs	2-Butanone	µg/L	4	1	0.250	0.7	0.7	0.700	NA	NE	0	560	0
VOCs	2-Hexanone	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	3.8	0
VOCs	4-Methyl-2-pentanone	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	630	0
VOCs	Acetone	µg/L	4	3	0.750	2.2	3.7	2.90	0.755	NE	0	1400	0
VOCs	Benzene	µg/L	4	2	0.500	0.1	0.3	0.200	0.141	5	0	0.46	0
VOCs	Bromodichloromethane	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.13	0
VOCs	Bromoform	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	3.3	0
VOCs	Bromomethane	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.75	0

Table 4-5. Groundwater Statistical Summary

Analyte Group	Analyte	Unit	# Samples	# Detects	Frequency of Detection	Min	Max	Average	Standard Deviation	Federal MCL		Tapwater RSL (THQ = 0.1)	
										Value	Exeedances	Value	Exeedances
VOCs	Carbon disulfide	µg/L	4	1	0.250	0.08	0.08	0.0800	NA	NE	0	81	0
VOCs	Carbon tetrachloride	µg/L	4	0	0.00	NA	NA	NA	NA	5	0	0.46	0
VOCs	Chlorobenzene	µg/L	4	2	0.500	0.2	1.6	0.900	0.990	100	0	7.8	0
VOCs	Chloroethane	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	2100	0
VOCs	Chloroform	µg/L	4	2	0.500	0.2	0.6	0.400	0.283	NE	0	0.22	1
VOCs	Chloromethane	µg/L	4	3	0.750	0.07	0.2	0.123	0.0681	NE	0	19	0
VOCs	cis-1,2-Dichloroethene	µg/L	4	2	0.500	0.06	0.09	0.0750	0.0212	70	0	3.6	0
VOCs	cis-1,3-Dichloropropene	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
VOCs	cyclohexane	µg/L	4	2	0.500	0.07	0.2	0.135	0.0919	NE	0	1300	0
VOCs	Cyclohexanone	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	140	0
VOCs	Dibromochloromethane	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	0.87	0
VOCs	Dichlorodifluoromethane	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	20	0
VOCs	Ethylbenzene	µg/L	4	0	0.00	NA	NA	NA	NA	700	0	1.5	0
VOCs	Isopropylbenzene	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	45	0
VOCs	Methyl acetate	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	2000	0
VOCs	Methyl Tertiary Butyl Ether	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	14	0
VOCs	methylcyclohexane	µg/L	4	2	0.500	0.08	0.1	0.0900	0.0141	NE	0	NE	0
VOCs	Methylene chloride	µg/L	4	1	0.250	0.3	0.3	0.300	NA	5	0	11	0
VOCs	Styrene	µg/L	4	0	0.00	NA	NA	NA	NA	100	0	120	0
VOCs	Tetrachloroethene	µg/L	4	0	0.00	NA	NA	NA	NA	5	0	4.1	0
VOCs	Toluene	µg/L	4	2	0.500	0.2	0.2	0.200	0.00	1000	0	110	0
VOCs	Total VOCs	µg/L	4	4	1.00	0.4	6.24	3.68	2.77	NE	0	NE	0
VOCs	trans-1,2-Dichloroethene	µg/L	4	0	0.00	NA	NA	NA	NA	100	0	36	0
VOCs	trans-1,3-Dichloropropene	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	NE	0
VOCs	Trichloroethene	µg/L	4	0	0.00	NA	NA	NA	NA	5	0	0.28	0
VOCs	Trichlorofluoromethane	µg/L	4	0	0.00	NA	NA	NA	NA	NE	0	520	0
VOCs	Vinyl chloride	µg/L	4	0	0.00	NA	NA	NA	NA	2	0	0.019	0
VOCs	Xylenes (total)	µg/L	4	1	0.250	0.2	0.2	0.200	NA	10000	0	19	0
Total Rad	GROSS ALPHA	pCi/L	4	4	1.00	1.9	8.2	4.70	2.74	15	0	NE	0
Total Rad	GROSS BETA	pCi/L	4	4	1.00	5.9	28.9	18.0	9.41	50	0	NE	0
Total Rad	Radium 226	pCi/L	4	4	1.00	0.71	3.4	1.58	1.23	5	0	NE	0
Total Rad	Radium 228	pCi/L	4	1	0.250	0.74	0.74	0.740	NA	5	0	NE	0
Total Rad	Total Ra 226_228	pCi/L	4	4	1.00	0.71	3.4	1.76	1.20	5	0	NE	0
Total Rad	Total Uranium	µg/L	4	3	0.750	1.1	1.6	1.37	0.252	30	0	NE	0
Dissolved Rad	Gross Alpha	pCi/L	4	2	0.500	2.38	10.8	6.59	5.95	15	0	NE	0
Dissolved Rad	Gross Beta	pCi/L	4	4	1.00	4.8	20.7	16.3	7.68	50	0	NE	0
Dissolved Rad	Radium 226	pCi/L	4	3	0.750	0.86	4.9	2.46	2.15	5	0	NE	0
Dissolved Rad	Radium 228	pCi/L	4	1	0.250	0.76	0.76	0.760	NA	5	0	NE	0
Dissolved Rad	Total Ra 226_228	pCi/L	4	3	0.750	1.62	4.9	2.71	1.89	5	0	NE	0
Dissolved Rad	Total Uranium	µg/L	4	3	0.750	1	1.6	1.33	0.306	30	0	NE	0

Note: Dissolved metals/rad correspond to filtered samples; total metals/rad correspond to unfiltered samples.

NA - not applicable

NE - not established

µg/L - micrograms per liter

pCi/L - picocuries per liter

Table 4-6. Groundwater Analytical Results

Analyte Group	Chemical Name	CAS #	Units	Screening Benchmarks		OU2-1-MW008I		OU2-1-MW008WT		OU2-1-MW009WT		OU2-1-MW010WT	
				Tapwater RSL (THQ = 0.1)	Federal MCLs	10/30/2018 Unfiltered	10/30/2018 Filtered	10/31/2018 Unfiltered	10/31/2018 Filtered	10/31/2018 Unfiltered	10/31/2018 Filtered	10/29/2018 Unfiltered	10/29/2018 Filtered
Herbicides	2,4,5-T	93-76-5	ug/L	16	NE	< 0.062 U	NA	< 0.063 U	NA	< 0.062 U	NA	< 0.061 U	NA
Herbicides	2,4,5-TP (Silvex)	93-72-1	ug/L	11	50	< 0.0095 U	NA	< 0.0096 U	NA	< 0.0096 U	NA	0.013	NA
Herbicides	2,4-D	94-75-7	ug/L	17	70	< 0.24 U	NA	< 0.24 U	NA	< 0.24 U	NA	< 0.24 U	NA
Herbicides	2,4-DB	94-82-6	ug/L	45	NE	< 0.60 U	NA	< 0.61 U	NA	< 0.60 U	NA	< 0.59 U	NA
Herbicides	2,4-DP (Dichloroprop)	120-36-5	ug/L	NE	NE	< 0.15 U	NA	< 0.15 U	NA	< 0.15 U	NA	< 0.15 U	NA
Herbicides	Dalapon	75-99-0	ug/L	60	200	< 1.7 U	NA	< 1.7 U	NA	< 1.7 U	NA	< 1.7 U	NA
Herbicides	Dicamba	1918-00-9	ug/L	57	NE	< 0.076 U	NA	< 0.077 U	NA	< 0.077 U	NA	< 0.075 U	NA
Herbicides	Dinoseb	88-85-7	ug/L	1.5	7	< 0.17 U	NA	< 0.17 U	NA	< 0.17 U	NA	< 0.17 U	NA
Herbicides	MCPA (2-Methyl-4-chlorophenoxy acetic acid)	94-74-6	ug/L	0.75	NE	< 47 U	NA	< 48 U	NA	< 48 U	NA	< 47 U	NA
Herbicides	MCPP (2-(2-Methyl-4-chlorophenoxy) propanoic acid)	93-65-2	ug/L	1.6	NE	< 47 U	NA	< 48 U	NA	< 48 U	NA	< 47 U	NA
Metals	Aluminum	7429-90-5	ug/L	2000	NE	41.5 J	< 19.7 U	< 19.7 U	< 19.7 U	< 19.7 U	< 19.7 U	971	219 J
Metals	Antimony	7440-36-0	ug/L	0.78	6	0.53 J	0.46 J	< 0.41 U	< 0.41 U	< 0.41 U	< 0.41 U	3.5	3.5
Metals	Arsenic	7440-38-2	ug/L	0.052	10	7.9	7.5	15.5	17	2.8	2.9	4.2	2.5
Metals	Barium	7440-39-3	ug/L	380	2000	1040	1030	1730	1820	73.6	69.2	1130	1100
Metals	Beryllium	7440-41-7	ug/L	2.5	4	< 0.091 U	< 0.091 U	< 0.091 U	< 0.091 U	< 0.091 U	< 0.091 U	< 0.091 U	< 0.091 U
Metals	Cadmium	7440-43-9	ug/L	0.92	5	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	0.64 J	0.41 J
Metals	Calcium (Ca)	7440-70-2	ug/L	NE	NE	79400	81100	263000	277000	87400	85800	221000	237000
Metals	Chromium	7440-47-3	ug/L	NE	100	41.6	3.8 J	2.7 J	2.3 J	< 0.70 U	< 0.70 U	16	6.5
Metals	Cobalt	7440-48-4	ug/L	0.6	NE	2.9	2.6	2.5	2.8	0.32 J	0.19 J	5	4.6
Metals	Copper	7440-50-8	ug/L	80	1300	< 9.9 U	< 9.9 U	< 9.9 U	< 9.9 U	< 9.9 U	< 9.9 U	31.1 J	13.3 J
Metals	Iron (Fe)	7439-89-6	ug/L	1400	NE	7630	7280	42200	45900	2380	2430	5830	1800
Metals	Lead	7439-92-1	ug/L	15	15	4.2	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	32.2	9.5
Metals	Magnesium (Mg)	7439-95-4	ug/L	NE	NE	64700	63900	32400	35300	25200	26900	31800	30600
Metals	Manganese (Mn)	7439-96-5	ug/L	43	NE	2520	2430	704	766	1190	1250	448	428
Metals	Mercury	7439-97-6	ug/L	0.063	2	< 0.050 U	< 0.050 U	< 0.050 U	< 0.050 U	< 0.050 U	< 0.050 U	< 0.050 U	< 0.050 U
Metals	Nickel	7440-02-0	ug/L	39	NE	22.5	3.5 J	0.63 J	< 0.60 U	< 0.60 U	1.1 J	38.4	37.6
Metals	Potassium (K)	7440-09-7	ug/L	NE	NE	24800	24500	19900	21700	4760	5010	31100	29800
Metals	Selenium	7782-49-2	ug/L	10	50	< 0.65 U	< 0.65 U	< 0.65 U	< 0.65 U	< 0.65 U	< 0.65 U	< 0.65 U	< 0.65 U
Metals	Silver	7440-22-4	ug/L	9.4	NE	< 0.17 U	< 0.17 U	< 0.17 U	< 0.17 U	< 0.17 U	< 0.17 U	0.24 J	< 0.17 U
Metals	Sodium (Na)	7440-23-5	ug/L	NE	NE	88700	89400	39500	43300	19400	20700	53000	53400
Metals	Thallium	7440-28-0	ug/L	0.02	2	< 0.11 U	< 0.11 U	< 0.11 U	< 0.11 U	< 0.11 U	< 0.11 U	< 0.11 U	< 0.11 U
Metals	Vanadium	7440-62-2	ug/L	8.6	NE	0.49 J	0.30 J	2.2	1.9	0.28 J	< 0.24 U	6	2.4
Metals	Zinc	7440-66-6	ug/L	600	NE	10.2 J	< 6.2 U	< 6.2 U	< 6.2 U	< 6.2 U	< 6.2 U	199	171
PCBs	Aroclor 1016	12674-11-2	ug/L	0.14	NE	< 0.083 U	NA	< 0.081 U	NA	< 0.081 U	NA	< 0.080 U	NA
PCBs	Aroclor 1221	11104-28-2	ug/L	0.0047	NE	< 0.083 U	NA	< 0.081 U	NA	< 0.081 U	NA	< 0.080 U	NA
PCBs	Aroclor 1232	11141-16-5	ug/L	0.0047	NE	< 0.17 U	NA	< 0.16 U	NA	< 0.16 U	NA	< 0.16 U	NA
PCBs	Aroclor 1242	53469-21-9	ug/L	0.0078	NE	< 0.083 U	NA	< 0.081 U	NA	< 0.081 U	NA	< 0.080 U	NA
PCBs	Aroclor 1248	12672-29-6	ug/L	0.0078	NE	< 0.083 U	NA	< 0.081 U	NA	< 0.081 U	NA	< 0.080 U	NA
PCBs	Aroclor 1254	11097-69-1	ug/L	0.0078	NE	< 0.083 U	NA	< 0.081 U	NA	< 0.081 U	NA	< 0.080 U	NA
PCBs	Aroclor 1260	11096-82-5	ug/L	0.0078	NE	< 0.12 U	NA	< 0.12 U	NA	< 0.12 U	NA	< 0.12 U	NA
PCBs	Aroclor 1262	37324-23-5	ug/L	NE	NE	< 0.17 U	NA	< 0.16 U	NA	< 0.16 U	NA	< 0.16 U	NA
PCBs	Aroclor 1268	11100-14-4	ug/L	NE	NE	< 0.13 U	NA	< 0.13 U	NA	< 0.13 U	NA	< 0.13 U	NA
PCBs	Total PCBs	CALC-PCB	ug/L	NE	NE	< 0.17 U	NA	< 0.16 U	NA	< 0.16 U	NA	< 0.16 U	NA
Dioxin/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	67562-39-4	ug/L	NE	NE	< 0.000002 U	NA	0.000005 J	NA	< 0.000002 U	NA	0.000046	NA
Dioxin/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	35822-46-9	ug/L	NE	NE	< 0.000004 U	NA	0.00001 J	NA	< 0.000004 U	NA	0.0001	NA
Dioxin/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	55673-89-7	ug/L	NE	NE	< 0.000002 U	NA	< 0.000002 U	NA	< 0.000002 U	NA	< 0.000002 U	NA
Dioxin/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	70648-26-9	ug/L	NE	NE	< 0.000002 U	NA	< 0.000002 U	NA	< 0.000002 U	NA	< 0.000002 U	NA
Dioxin/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	39227-28-6	ug/L	NE	NE	< 0.000002 U	NA	< 0.000002 U	NA	< 0.000002 U	NA	< 0.000002 U	NA
Dioxin/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	57117-44-9	ug/L	NE	NE	< 0.000002 U	NA	< 0.000002 U	NA	< 0.000002 U	NA	< 0.000002 U	NA

Table 4-6. Groundwater Analytical Results

Analyte Group	Chemical Name	CAS #	Units	Screening Benchmarks		OU2-1-MW008I		OU2-1-MW008WT		OU2-1-MW009WT		OU2-1-MW010WT	
				Tapwater RSL (THQ = 0.1)	Federal MCLs	10/30/2018 Unfiltered	10/30/2018 Filtered	10/31/2018 Unfiltered	10/31/2018 Filtered	10/31/2018 Unfiltered	10/31/2018 Filtered	10/29/2018 Unfiltered	10/29/2018 Filtered
Dioxin/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	57653-85-7	ug/L	NE	NE	< 0.000002 U	NA	< 0.000002 U	NA	< 0.000002 U	NA	0.000004 J	NA
Dioxin/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	72918-21-9	ug/L	NE	NE	< 0.000002 U	NA	< 0.000002 U	NA	< 0.000002 U	NA	< 0.000002 U	NA
Dioxin/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	19408-74-3	ug/L	NE	NE	< 0.000002 U	NA	< 0.000002 U	NA	< 0.000002 U	NA	< 0.000002 U	NA
Dioxin/Furans	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	57117-41-6	ug/L	NE	NE	< 0.000003 U	NA	< 0.000003 U	NA	< 0.000003 U	NA	< 0.000003 U	NA
Dioxin/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	40321-76-4	ug/L	NE	NE	< 0.000003 U	NA	< 0.000003 U	NA	< 0.000003 U	NA	< 0.000003 U	NA
Dioxin/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	60851-34-5	ug/L	NE	NE	< 0.000002 U	NA	< 0.000002 U	NA	< 0.000002 U	NA	< 0.000002 U	NA
Dioxin/Furans	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	57117-31-4	ug/L	NE	NE	< 0.000002 U	NA	< 0.000002 U	NA	< 0.000002 U	NA	< 0.000002 U	NA
Dioxin/Furans	2,3,7,8-TCDD	1746-01-6	ug/L	0.00000012	0.00003	< 0.0000008 U	NA	< 0.0000009 U	NA	< 0.0000008 U	NA	< 0.0000008 U	NA
Dioxin/Furans	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	51207-31-9	ug/L	NE	NE	< 0.0000008 U	NA	< 0.0000008 U	NA	< 0.0000008 U	NA	< 0.0000008 U	NA
Dioxin/Furans	Octachlorodibenzofuran (OCDF)	39001-02-0	ug/L	NE	NE	< 0.000006 U	NA	0.000007 J	NA	< 0.000006 U	NA	0.000032 J	NA
Dioxin/Furans	Octachlorodibenzo-p-dioxin (OCDD)	3268-87-9	ug/L	NE	NE	< 0.000034 U	NA	0.00011	NA	< 0.000035 U	NA	0.00096	NA
Dioxin/Furans	Dioxin TEQ	CALC-TEQ	ug/L	0.00000012	0.00003	< 0.0000008	NA	1.851E-07	NA	< 0.0000008	NA	2.1576E-06	NA
Pesticides	4,4'-DDD	72-54-8	ug/L	0.0063	NE	< 0.0041 U	NA	< 0.0041 U	NA	< 0.0040 UJ	NA	< 0.0050 U	NA
Pesticides	4,4'-DDE	72-55-9	ug/L	0.046	NE	< 0.0041 U	NA	< 0.0041 U	NA	< 0.0040 UJ	NA	< 0.0050 U	NA
Pesticides	4,4'-DDT	50-29-3	ug/L	0.23	NE	< 0.0043 U	NA	0.0067 J	NA	< 0.0042 UJ	NA	< 0.0052 U	NA
Pesticides	Aldrin	309-00-2	ug/L	0.00092	NE	< 0.0017 U	NA	< 0.0016 U	NA	< 0.0016 UJ	NA	< 0.0020 U	NA
Pesticides	alpha Chlordane	5103-71-9	ug/L	NE	NE	< 0.0025 U	NA	< 0.0024 U	NA	< 0.0024 UJ	NA	< 0.0030 U	NA
Pesticides	alpha-BHC	319-84-6	ug/L	0.0072	NE	0.0064	NA	0.018 J	NA	0.024 J-	NA	< 0.0030 U	NA
Pesticides	beta-BHC	319-85-7	ug/L	0.025	NE	< 0.0028 U	NA	< 0.0028 U	NA	< 0.0027 UJ	NA	< 0.0034 U	NA
Pesticides	Chlordane	57-74-9	ug/L	NE	NE	< 0.13 U	NA	< 0.13 U	NA	< 0.13 UJ	NA	< 0.16 U	NA
Pesticides	delta-BHC	319-86-8	ug/L	NE	NE	< 0.0028 U	NA	< 0.0028 U	NA	< 0.0027 UJ	NA	< 0.0034 U	NA
Pesticides	Dieldrin	60-57-1	ug/L	0.0018	NE	< 0.0044 U	NA	< 0.0043 U	NA	< 0.0043 UJ	NA	< 0.0053 U	NA
Pesticides	Endosulfan I	959-98-8	ug/L	NE	NE	< 0.0036 U	NA	< 0.0035 U	NA	< 0.0035 UJ	NA	< 0.0043 U	NA
Pesticides	Endosulfan II	33213-65-9	ug/L	NE	NE	< 0.012 U	NA	< 0.012 U	NA	< 0.012 UJ	NA	< 0.015 U	NA
Pesticides	Endosulfan sulfate	1031-07-8	ug/L	NE	NE	< 0.0048 U	NA	< 0.0047 U	NA	< 0.0047 UJ	NA	< 0.0058 U	NA
Pesticides	Endrin	72-20-8	ug/L	0.23	2	< 0.0067 U	NA	< 0.0066 U	NA	< 0.0065 UJ	NA	< 0.0081 U	NA
Pesticides	Endrin aldehyde	7421-93-4	ug/L	NE	NE	< 0.017 U	NA	< 0.016 U	NA	< 0.016 UJ	NA	< 0.020 U	NA
Pesticides	Endrin ketone	53494-70-5	ug/L	NE	NE	< 0.0041 U	NA	< 0.0041 U	NA	< 0.0040 UJ	NA	< 0.0050 U	NA
Pesticides	gamma Chlordane	5566-34-7	ug/L	NE	NE	< 0.0058 U	NA	< 0.0057 U	NA	< 0.0056 UJ	NA	< 0.0070 U	NA
Pesticides	gamma-BHC (Lindane)	58-89-9	ug/L	0.042	0.2	< 0.0017 U	NA	< 0.0016 U	NA	< 0.0016 UJ	NA	< 0.0020 U	NA
Pesticides	Heptachlor	76-44-8	ug/L	0.0014	0.4	< 0.0017 U	NA	< 0.0016 U	NA	< 0.0016 UJ	NA	< 0.0020 U	NA
Pesticides	Heptachlor epoxide	1024-57-3	ug/L	0.0014	0.2	< 0.0019 U	NA	< 0.0019 U	NA	< 0.0019 UJ	NA	< 0.0023 U	NA
Pesticides	Methoxychlor	72-43-5	ug/L	3.7	40	< 0.025 U	NA	< 0.024 U	NA	< 0.024 UJ	NA	< 0.030 U	NA
Pesticides	Toxaphene	8001-35-2	ug/L	0.071	3	< 0.25 U	NA	< 0.24 U	NA	< 0.24 UJ	NA	< 0.30 U	NA
SVOCs/PAHs	1,2,4-Trichlorobenzene	120-82-1	ug/L	0.4	70	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA
SVOCs/PAHs	1,2-Dichlorobenzene	95-50-1	ug/L	30	600	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA
SVOCs/PAHs	1,3-Dichlorobenzene	541-73-1	ug/L	NE	NE	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA
SVOCs/PAHs	1,4-Dichlorobenzene	106-46-7	ug/L	0.48	75	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA
SVOCs/PAHs	1,4-Dioxane	123-91-1	ug/L	0.46	NE	0.1 J	NA	0.3 J	NA	< 0.1 U	NA	< 0.1 U	NA
SVOCs/PAHs	2,4,5-Trichlorophenol	95-95-4	ug/L	120	NE	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA
SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	ug/L	1.2	NE	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA
SVOCs/PAHs	2,4-Dichlorophenol	120-83-2	ug/L	4.6	NE	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA
SVOCs/PAHs	2,4-Dimethylphenol	105-67-9	ug/L	36	NE	< 3 U	NA	< 3 U	NA	< 3 U	NA	< 3 U	NA
SVOCs/PAHs	2,4-Dinitrophenol	51-28-5	ug/L	3.9	NE	< 14 U	NA	< 14 U	NA	< 14 U	NA	< 15 U	NA
SVOCs/PAHs	2,4-Dinitrotoluene	121-14-2	ug/L	0.24	NE	< 1 U	NA	< 1 U	NA	< 1 U	NA	< 1 U	NA
SVOCs/PAHs	2,6-Dinitrotoluene	606-20-2	ug/L	0.049	NE	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA
SVOCs/PAHs	2-Chloronaphthalene	91-58-7	ug/L	75	NE	< 0.4 U	NA	< 0.4 U	NA	< 0.4 U	NA	< 0.4 U	NA
SVOCs/PAHs	2-Chlorophenol	95-57-8	ug/L	9.1	NE	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA
SVOCs/PAHs	2-Methylnaphthalene	91-57-6	ug/L	3.6	NE	< 0.1 U	NA	< 0.1 U	NA	< 0.1 U	NA	< 0.1 U	NA

Table 4-6. Groundwater Analytical Results

Analyte Group	Chemical Name	CAS #	Units	Screening Benchmarks		OU2-1-MW008I		OU2-1-MW008WT		OU2-1-MW009WT		OU2-1-MW010WT	
				Tapwater RSL (THQ = 0.1)	Federal MCLs	10/30/2018 Unfiltered	10/30/2018 Filtered	10/31/2018 Unfiltered	10/31/2018 Filtered	10/31/2018 Unfiltered	10/31/2018 Filtered	10/29/2018 Unfiltered	10/29/2018 Filtered
SVOCs/PAHs	2-Methylphenol	95-48-7	ug/L	93	NE	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA
SVOCs/PAHs	2-Nitroaniline	88-74-4	ug/L	19	NE	< 2 U	NA	< 2 U	NA	< 2 U	NA	< 2 U	NA
SVOCs/PAHs	2-Nitrophenol	88-75-5	ug/L	NE	NE	< 3 U	NA	< 3 U	NA	< 3 U	NA	< 3 U	NA
SVOCs/PAHs	3,3-Dichlorobenzidine	91-94-1	ug/L	0.13	NE	< 3 U	NA	< 3 U	NA	< 3 U	NA	< 3 U	NA
SVOCs/PAHs	3-Nitroaniline	99-09-2	ug/L	NE	NE	< 3 U	NA	< 3 U	NA	< 3 U	NA	< 3 U	NA
SVOCs/PAHs	4,6-Dinitro-2-methylphenol	534-52-1	ug/L	0.15	NE	< 8 U	NA	< 8 U	NA	< 8 U	NA	< 8 U	NA
SVOCs/PAHs	4-Bromophenyl-phenylether	101-55-3	ug/L	NE	NE	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA
SVOCs/PAHs	4-Chloro-3-methylphenol	59-50-7	ug/L	140	NE	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA
SVOCs/PAHs	4-Chloroaniline	106-47-8	ug/L	0.37	NE	< 4 U	NA	< 4 U	NA	< 4 U	NA	< 4 U	NA
SVOCs/PAHs	4-Chlorophenyl-phenylether	7005-72-3	ug/L	NE	NE	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA
SVOCs/PAHs	4-Methylphenol	106-44-5	ug/L	190	NE	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA
SVOCs/PAHs	4-Nitroaniline	100-01-6	ug/L	3.8	NE	< 0.9 U	NA	< 0.9 U	NA	< 0.9 U	NA	< 0.9 U	NA
SVOCs/PAHs	4-Nitrophenol	100-02-7	ug/L	NE	NE	< 10 U	NA	< 10 U	NA	< 10 U	NA	< 11 U	NA
SVOCs/PAHs	Acenaphthene	83-32-9	ug/L	53	NE	0.05 J	NA	0.6	NA	< 0.01 U	NA	< 0.01 U	NA
SVOCs/PAHs	Acenaphthylene	208-96-8	ug/L	NE	NE	< 0.01 U	NA	0.01 J	NA	< 0.01 U	NA	< 0.01 U	NA
SVOCs/PAHs	Aniline	62-53-3	ug/L	13	NE	< 3 U	NA	< 3 U	NA	< 3 U	NA	< 3 U	NA
SVOCs/PAHs	Anthracene	120-12-7	ug/L	180	NE	0.01 J	NA	0.1	NA	< 0.01 U	NA	0.03 J	NA
SVOCs/PAHs	Benzo(a)anthracene	56-55-3	ug/L	0.03	NE	< 0.01 U	NA	0.02 J	NA	< 0.01 U	NA	0.02 J	NA
SVOCs/PAHs	Benzo(a)pyrene	50-32-8	ug/L	0.025	0.2	< 0.01 U	NA	< 0.01 U	NA	< 0.01 U	NA	0.02 J	NA
SVOCs/PAHs	Benzo(a)Pyrene TEQ	CALC-BaP PAHs	ug/L	0.025	0.2	< 0.01	NA	0.00303	NA	< 0.01	NA	0.02713	NA
SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	ug/L	0.25	NE	< 0.01 U	NA	0.01 J	NA	< 0.01 U	NA	0.03 J	NA
SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	ug/L	NE	NE	< 0.01 U	NA	< 0.01 U	NA	< 0.01 U	NA	0.02 J	NA
SVOCs/PAHs	Benzo(k)fluoranthene	207-08-9	ug/L	2.5	NE	< 0.01 U	NA	< 0.01 U	NA	< 0.01 U	NA	0.01 J	NA
SVOCs/PAHs	Benzyl Alcohol	100-51-6	ug/L	200	NE	< 10 U	NA	< 10 U	NA	< 10 U	NA	< 11 U	NA
SVOCs/PAHs	Bis(2-chloro-1-methylethyl) ether	108-60-1	ug/L	71	NE	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA
SVOCs/PAHs	Bis(2-chloroethoxy)methane	111-91-1	ug/L	5.9	NE	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA
SVOCs/PAHs	Bis(2-chloroethyl)ether	111-44-4	ug/L	0.014	NE	0.03 J	NA	< 0.02 U	NA	< 0.02 U	NA	0.04 J	NA
SVOCs/PAHs	Bis(2-ethylhexyl)phthalate	117-81-7	ug/L	5.6	6	0.3 J	NA	< 0.08 U	NA	< 0.08 U	NA	1	NA
SVOCs/PAHs	Carbazole	86-74-8	ug/L	NE	NE	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA
SVOCs/PAHs	Chrysene	218-01-9	ug/L	25	NE	< 0.01 U	NA	0.03 J	NA	< 0.01 U	NA	0.03 J	NA
SVOCs/PAHs	Dibenz(a,h)anthracene	53-70-3	ug/L	0.025	NE	< 0.02 U	NA	< 0.02 U	NA	< 0.02 U	NA	< 0.02 U	NA
SVOCs/PAHs	Dibenzofuran	132-64-9	ug/L	0.79	NE	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA
SVOCs/PAHs	Diethyl phthalate	84-66-2	ug/L	1500	NE	< 2 U	NA	< 2 U	NA	< 2 U	NA	< 2 U	NA
SVOCs/PAHs	Dimethyl phthalate	131-11-3	ug/L	NE	NE	< 2 U	NA	< 2 U	NA	< 2 U	NA	< 2 U	NA
SVOCs/PAHs	Di-n-butyl phthalate	84-74-2	ug/L	90	NE	0.2 J	NA	< 0.05 U	NA	< 0.05 U	NA	0.2 J	NA
SVOCs/PAHs	Di-n-octyl phthalate	117-84-0	ug/L	20	NE	< 5 U	NA	< 5 U	NA	< 5 U	NA	< 5 U	NA
SVOCs/PAHs	Fluoranthene	206-44-0	ug/L	80	NE	0.01 J	NA	0.1	NA	< 0.01 U	NA	0.05 J	NA
SVOCs/PAHs	Fluorene	86-73-7	ug/L	29	NE	0.03 J	NA	0.4	NA	< 0.01 U	NA	0.02 J	NA
SVOCs/PAHs	Hexachlorobenzene	118-74-1	ug/L	0.0098	1	< 0.01 U	NA	< 0.01 U	NA	< 0.01 U	NA	< 0.01 U	NA
SVOCs/PAHs	Hexachlorobutadiene	87-68-3	ug/L	0.14	NE	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA
SVOCs/PAHs	hexachlorocyclopentadiene	77-47-4	ug/L	0.041	50	< 5 U	NA	< 5 U	NA	< 5 U	NA	< 5 U	NA
SVOCs/PAHs	Hexachloroethane	67-72-1	ug/L	0.33	NE	< 1 U	NA	< 1 U	NA	< 1 U	NA	< 1 U	NA
SVOCs/PAHs	Indeno(1,2,3-cd)pyrene	193-39-5	ug/L	0.25	NE	< 0.01 U	NA	< 0.01 U	NA	< 0.01 U	NA	0.02 J	NA
SVOCs/PAHs	Isophorone	78-59-1	ug/L	78	NE	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA
SVOCs/PAHs	Naphthalene	91-20-3	ug/L	0.17	NE	0.06 J	NA	0.1	NA	< 0.03 U	NA	0.09	NA
SVOCs/PAHs	Nitrobenzene	98-95-3	ug/L	0.14	NE	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA
SVOCs/PAHs	n-Nitroso-di-n-propylamine	621-64-7	ug/L	0.011	NE	< 0.7 U	NA	< 0.7 U	NA	< 0.7 U	NA	< 0.7 U	NA
SVOCs/PAHs	n-Nitrosodiphenylamine	86-30-6	ug/L	12	NE	< 0.7 U	NA	< 0.7 U	NA	< 0.7 U	NA	< 0.7 U	NA
SVOCs/PAHs	Pentachlorophenol	87-86-5	ug/L	0.041	1	< 1 U	NA	< 1 U	NA	< 1 U	NA	< 1 U	NA

Table 4-6. Groundwater Analytical Results

Analyte Group	Chemical Name	CAS #	Units	Screening Benchmarks		OU2-1-MW008I		OU2-1-MW008WT		OU2-1-MW009WT		OU2-1-MW010WT	
				Tapwater RSL (THQ = 0.1)	Federal MCLs	10/30/2018 Unfiltered	10/30/2018 Filtered	10/31/2018 Unfiltered	10/31/2018 Filtered	10/31/2018 Unfiltered	10/31/2018 Filtered	10/29/2018 Unfiltered	10/29/2018 Filtered
SVOCs/PAHs	Phenanthrene	85-01-8	ug/L	NE	NE	0.05 J	NA	0.6	NA	< 0.03 U	NA	0.08	NA
SVOCs/PAHs	Phenol	108-95-2	ug/L	580	NE	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA	< 0.5 U	NA
SVOCs/PAHs	Pyrene	129-00-0	ug/L	12	NE	< 0.01 U	NA	0.08	NA	< 0.01 U	NA	0.04 J	NA
SVOCs/PAHs	Pyridine	110-86-1	ug/L	2	NE	< 2 U	NA	< 2 U	NA	< 2 U	NA	< 2 U	NA
SVOCs/PAHs	Total HMW PAHs	CALC-HMW PAHs	ug/L	NE	NE	< 0.01	NA	0.14	NA	< 0.01	NA	0.19	NA
SVOCs/PAHs	Total LMW PAHs	CALC-LMW PAHs	ug/L	NE	NE	0.21	NA	1.91	NA	< 0.03	NA	0.27	NA
VOCs	1,1,1-Trichloroethane	71-55-6	ug/L	800	200	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA
VOCs	1,1,2,2-Tetrachloroethane	79-34-5	ug/L	0.076	NE	< 0.07 U	NA	< 0.07 U	NA	< 0.07 U	NA	< 0.07 U	NA
VOCs	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	76-13-1	ug/L	1000	NE	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA
VOCs	1,1,2-Trichloroethane	79-00-5	ug/L	0.041	5	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA
VOCs	1,1-Dichloroethane	75-34-3	ug/L	2.8	NE	< 0.07 U	NA	< 0.07 U	NA	< 0.07 U	NA	< 0.07 U	NA
VOCs	1,1-Dichloroethene	75-35-4	ug/L	28	7	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA
VOCs	1,2,4-Trichlorobenzene	120-82-1	ug/L	0.4	70	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA	0.08 J	NA
VOCs	1,2-Dibromo-3-chloropropane	96-12-8	ug/L	0.00033	0.2	< 0.1 U	NA	< 0.1 U	NA	< 0.1 U	NA	< 0.1 U	NA
VOCs	1,2-Dibromoethane	106-93-4	ug/L	0.0075	0.05	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA
VOCs	1,2-Dichlorobenzene	95-50-1	ug/L	30	600	< 0.06 U	NA	0.1 J	NA	< 0.06 U	NA	< 0.06 U	NA
VOCs	1,2-Dichloroethane	107-06-2	ug/L	0.17	5	< 0.05 U	NA	< 0.05 U	NA	< 0.05 U	NA	< 0.05 U	NA
VOCs	1,2-Dichloropropane	78-87-5	ug/L	0.82	5	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA
VOCs	1,3-Dichlorobenzene	541-73-1	ug/L	NE	NE	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA
VOCs	1,4-Dichlorobenzene	106-46-7	ug/L	0.48	75	< 0.07 U	NA	0.2 J	NA	< 0.07 U	NA	< 0.07 U	NA
VOCs	2-Butanone	78-93-3	ug/L	560	NE	< 0.6 U	NA	< 0.6 U	NA	< 0.6 U	NA	0.7 J	NA
VOCs	2-Hexanone	591-78-6	ug/L	3.8	NE	< 0.6 U	NA	< 0.6 U	NA	< 0.6 U	NA	< 0.6 U	NA
VOCs	4-Methyl-2-pentanone	108-10-1	ug/L	630	NE	< 0.7 U	NA	< 0.7 U	NA	< 0.7 U	NA	< 0.7 U	NA
VOCs	Acetone	67-64-1	ug/L	1400	NE	< 0.9 U	NA	3.7 J	NA	2.2 J	NA	2.8 J	NA
VOCs	Benzene	71-43-2	ug/L	0.46	5	< 0.05 U	NA	0.1 J	NA	< 0.05 U	NA	0.3 J	NA
VOCs	Bromodichloromethane	75-27-4	ug/L	0.13	NE	< 0.05 U	NA	< 0.05 U	NA	< 0.05 U	NA	< 0.05 U	NA
VOCs	Bromoform	75-25-2	ug/L	3.3	NE	< 0.3 U	NA	< 0.3 U	NA	< 0.3 U	NA	< 0.3 U	NA
VOCs	Bromomethane	74-83-9	ug/L	0.75	NE	< 0.07 U	NA	< 0.07 U	NA	< 0.07 U	NA	< 0.07 U	NA
VOCs	Carbon disulfide	75-15-0	ug/L	81	NE	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA	0.08 J	NA
VOCs	Carbon tetrachloride	56-23-5	ug/L	0.46	5	< 0.07 U	NA	< 0.07 U	NA	< 0.07 U	NA	< 0.07 U	NA
VOCs	Chlorobenzene	108-90-7	ug/L	7.8	100	0.2 J	NA	1.6	NA	< 0.06 U	NA	< 0.06 U	NA
VOCs	Chloroethane	75-00-3	ug/L	2100	NE	< 0.07 U	NA	< 0.07 U	NA	< 0.07 U	NA	< 0.07 U	NA
VOCs	Chloroform	67-66-3	ug/L	0.22	NE	0.2 J	NA	< 0.09 U	NA	< 0.09 U	NA	0.6	NA
VOCs	Chloromethane	74-87-3	ug/L	19	NE	< 0.06 U	NA	0.1 J	NA	0.2 J	NA	0.07 J	NA
VOCs	cis-1,2-Dichloroethene	156-59-2	ug/L	3.6	70	< 0.05 U	NA	0.09 J	NA	< 0.05 U	NA	0.06 J	NA
VOCs	cis-1,3-Dichloropropene	10061-01-5	ug/L	NE	NE	< 0.05 U	NA	< 0.05 U	NA	< 0.05 U	NA	< 0.05 U	NA
VOCs	cyclohexane	110-82-7	ug/L	1300	NE	< 0.05 U	NA	0.07 J	NA	< 0.05 U	NA	0.2 J	NA
VOCs	Cyclohexanone	108-94-1	ug/L	140	NE	< 1.8 U	NA	< 1.8 U	NA	< 1.8 U	NA	< 1.8 U	NA
VOCs	Dibromochloromethane	124-48-1	ug/L	0.87	NE	< 0.07 U	NA	< 0.07 U	NA	< 0.07 U	NA	< 0.07 U	NA
VOCs	Dichlorodifluoromethane	75-71-8	ug/L	20	NE	< 0.05 U	NA	< 0.05 U	NA	< 0.05 U	NA	< 0.05 U	NA
VOCs	Ethylbenzene	100-41-4	ug/L	1.5	700	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA
VOCs	Isopropylbenzene	98-82-8	ug/L	45	NE	< 0.05 U	NA	< 0.05 U	NA	< 0.05 U	NA	< 0.05 U	NA
VOCs	Methyl acetate	79-20-9	ug/L	2000	NE	< 0.1 U	NA	< 0.1 U	NA	< 0.1 U	NA	< 0.1 U	NA
VOCs	Methyl Tertiary Butyl Ether	1634-04-4	ug/L	14	NE	< 0.05 U	NA	< 0.05 U	NA	< 0.05 U	NA	< 0.05 U	NA
VOCs	methylcyclohexane	108-87-2	ug/L	NE	NE	< 0.05 U	NA	0.08 J	NA	< 0.05 U	NA	0.1 J	NA
VOCs	Methylene chloride	75-09-2	ug/L	11	5	< 0.07 U	NA	< 0.07 U	NA	< 0.07 U	NA	0.3 J	NA
VOCs	Styrene	100-42-5	ug/L	120	100	< 0.05 U	NA	< 0.05 U	NA	< 0.05 U	NA	< 0.05 U	NA
VOCs	Tetrachloroethene	127-18-4	ug/L	4.1	5	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA
VOCs	Toluene	108-88-3	ug/L	110	1000	< 0.07 U	NA	0.2 J	NA	< 0.07 U	NA	0.2 J	NA

Table 4-6. Groundwater Analytical Results

Analyte Group	Chemical Name	CAS #	Units	Screening Benchmarks		OU2-1-MW008I		OU2-1-MW008WT		OU2-1-MW009WT		OU2-1-MW010WT	
				Tapwater RSL (THQ = 0.1)	Federal MCLs	10/30/2018 Unfiltered	10/30/2018 Filtered	10/31/2018 Unfiltered	10/31/2018 Filtered	10/31/2018 Unfiltered	10/31/2018 Filtered	10/29/2018 Unfiltered	10/29/2018 Filtered
VOCs	trans-1,2-Dichloroethene	156-60-5	ug/L	36	100	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA
VOCs	trans-1,3-Dichloropropene	10061-02-6	ug/L	NE	NE	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA
VOCs	Trichloroethene	79-01-6	ug/L	0.28	5	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA	< 0.06 U	NA
VOCs	Trichlorofluoromethane	75-69-4	ug/L	520	NE	< 0.05 U	NA	< 0.05 U	NA	< 0.05 U	NA	< 0.05 U	NA
VOCs	Vinyl chloride	75-01-4	ug/L	0.019	2	< 0.1 U	NA	< 0.1 U	NA	< 0.1 U	NA	< 0.1 U	NA
VOCs	Xylenes (total)	1330-20-7	ug/L	19	10000	< 0.1 U	NA	< 0.1 U	NA	< 0.1 U	NA	0.2 J	NA
Rad	GROSS ALPHA	12587-46-1	pci/l	NE	15	3.3	< 3.4	8.2	10.8	1.9	2.38	5.4	< 4.6 U
Rad	GROSS BETA	12587-47-2	pci/l	NE	50	18.4	20.7	18.7	18.9	5.9	4.8	28.9	20.6
Rad	Radium 226	13982-63-3	pci/l	NE	5	1.15	0.86	3.4	4.9	1.04	< 0.38 U	0.71	1.62
Rad	Radium 228	15262-20-1	pci/l	NE	5	0.74	0.76	< 0.84 U	< 0.76 U	< 0.74 U	< 0.72 U	< 0.85 U	< 0.88 U
Rad	Total Ra 226_228	CALC-Ra 226_228	pci/l	NE	5	1.89	1.62	3.4	4.9	1.04	< 0.38	0.71	1.62
Rad	Total Uranium	7440-61-1	ug/L	NE	30	1.4	1.4	< 0.1 U	< 0.1 U	1.1	1	1.6	1.6

Notes:

For samples with duplicates, the maximum result of the duplicate and standard sample was reported.

BLUE	Exceeds Tapwater RSL (THQ = 0.1)
RED	Exceeds Federal MCL

NE = not established

NA = not analyzed

U = not detected above method detection limit

UJ = not detected above method detection limit; method detection limit estimated

J = estimated value, unknown bias

J+ = estimated value, may be biased high

J- = estimated value, may be biased low

R = data rejected during validation

Table 4-7. Sediment Statistical Summary

Analyte Group	Analyte	Unit	# Samples	# Detects	Frequency of Detection	Min	Max	Average	Standard Deviation	Sediment ESV - Marine		Sediment ESV - Freshwater		Soil RSL - Resident (THQ = 0.1)		Soil RSL - Industrial (THQ = 0.1)	
										Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances
Herbicides	2,4,5-T	mg/kg	6	1	0.167	0.0028	0.0028	0.00280	NA	NE	0	NE	0	63	0	820	0
Herbicides	2,4,5-TP (Silvex)	mg/kg	6	1	0.167	0.0015	0.0015	0.00150	NA	NE	0	NE	0	51	0	660	0
Herbicides	2,4-D	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	1.048	0	70	0	960	0
Herbicides	2,4-DB	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	190	0	2500	0
Herbicides	2,4-DP (Dichloroprop)	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
Herbicides	Dalapon	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	190	0	2500	0
Herbicides	Dicamba	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	2.717	0	190	0	2500	0
Herbicides	Dinoseb	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	1.5785	0	6.3	0	82	0
Herbicides	MCPA (2-Methyl-4-chlorophenoxy acetic acid)	mg/kg	6	0	0.00	NA	NA	NA	NA	1.24446	0	0.77038	0	3.2	0	41	0
Herbicides	MCPP (2-(2-Methyl-4-chlorophenoxy) propanoic acid)	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	6.3	0	82	0
Metals	Aluminum	mg/kg	6	6	1.00	4350	10900	7340	2660	NE	0	25000	0	7700	2	110000	0
Metals	Antimony	mg/kg	6	5	0.833	0.208	2.1	0.973	0.719	2	1	NE	0	3.1	0	47	0
Metals	Arsenic	mg/kg	6	6	1.00	2.05	9.09	4.58	2.52	7.24	1	9.7	0	0.68	6	3	4
Metals	Barium	mg/kg	6	6	1.00	18.7	150	69.1	47.6	NE	0	150	0	1500	0	22000	0
Metals	Beryllium	mg/kg	6	6	1.00	0.274	0.542	0.394	0.111	NE	0	NE	0	16	0	230	0
Metals	Cadmium	mg/kg	6	6	1.00	0.215	1.8	0.788	0.576	0.68	3	0.583	4	7.1	0	98	0
Metals	Calcium (Ca)	mg/kg	6	6	1.00	724	8840	2870	3040	NE	0	NE	0	NE	0	NE	0
Metals	Chromium	mg/kg	6	6	1.00	14.3	61.1	40.4	21.1	52.3	3	36.2	4	NE	0	NE	0
Metals	Cobalt	mg/kg	6	6	1.00	4.93	18.9	10.4	5.49	NE	0	NE	0	2.3	6	35	0
Metals	Copper	mg/kg	6	6	1.00	11	246	83.6	88.0	18.7	5	28	4	310	0	4700	0
Metals	Iron (Fe)	mg/kg	6	6	1.00	8970	21200	15300	5040	NE	0	20000	1	5500	6	82000	0
Metals	Lead	mg/kg	6	6	1.00	12.4	185	66.9	65.0	30.2	4	35	3	400	0	800	0
Metals	Magnesium (Mg)	mg/kg	6	6	1.00	2340	8560	4480	2140	NE	0	NE	0	NE	0	NE	0
Metals	Manganese (Mn)	mg/kg	6	6	1.00	61.7	161	122	42.0	NE	0	460	0	180	0	2600	0
Metals	Mercury	mg/kg	6	4	0.667	0.0594	0.267	0.128	0.0939	0.13	1	0.18	1	1.1	0	4.6	0
Metals	Nickel	mg/kg	6	6	1.00	26.2	124	75.4	39.7	15.9	6	19.5	6	150	0	2200	0
Metals	Potassium (K)	mg/kg	6	6	1.00	992	1680	1270	260	NE	0	NE	0	NE	0	NE	0
Metals	Selenium	mg/kg	6	5	0.833	0.206	0.64	0.347	0.181	NE	0	0.72	0	39	0	580	0
Metals	Silver	mg/kg	6	5	0.833	0.0669	0.709	0.396	0.263	0.73	0	0.5	2	39	0	580	0
Metals	Sodium (Na)	mg/kg	6	6	1.00	88.8	2300	782	884	NE	0	NE	0	NE	0	NE	0
Metals	Thallium	mg/kg	6	6	1.00	0.0558	0.141	0.103	0.0313	NE	0	NE	0	0.078	5	1.2	0
Metals	Vanadium	mg/kg	6	6	1.00	13.6	33.2	23.2	6.84	NE	0	NE	0	39	0	580	0
Metals	Zinc	mg/kg	6	6	1.00	42.8	383	165	126	120	3	98	4	2300	0	35000	0
PCBs	Aroclor 1016	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.059	0	0.41	0	5.1	0
PCBs	Aroclor 1221	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.2	0	0.83	0
PCBs	Aroclor 1232	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.17	0	0.72	0
PCBs	Aroclor 1242	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.059	0	0.23	0	0.95	0
PCBs	Aroclor 1248	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.059	0	0.23	0	0.95	0
PCBs	Aroclor 1254	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.059	0	0.12	0	0.97	0
PCBs	Aroclor 1260	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.059	0	0.24	0	0.99	0
PCBs	Aroclor 1262	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
PCBs	Aroclor 1268	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
PCBs	Total PCBs	mg/kg	6	0	0.00	NA	NA	NA	NA	0.022	0	0.032	0	NE	0	NE	0
Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	mg/kg	6	5	0.833	0.0000131	0.000446	0.000142	0.000183	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	mg/kg	6	6	1.00	0.0000153	0.00132	0.000378	0.000531	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	mg/kg	6	5	0.833	0.000000996	0.0000237	0.00000868	0.00000990	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	mg/kg	6	5	0.833	0.000000772	0.0000193	0.00000762	0.00000774	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	mg/kg	6	4	0.667	0.000000461	0.0000219	0.00000987	0.0000102	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	mg/kg	6	5	0.833	0.000000748	0.0000229	0.00000820	0.00000928	NE	0	NE	0	NE	0	NE	0

Table 4-7. Sediment Statistical Summary

Analyte Group	Analyte	Unit	# Samples	# Detects	Frequency of Detection	Min	Max	Average	Standard Deviation	Sediment ESV - Marine		Sediment ESV - Freshwater		Soil RSL - Resident (THQ = 0.1)		Soil RSL - Industrial (THQ = 0.1)	
										Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances
Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	mg/kg	6	4	0.667	0.00000189	0.0000581	0.0000246	0.0000259	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	mg/kg	6	2	0.333	0.000000429	0.00000747	0.00000395	0.00000498	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	mg/kg	6	6	1.00	0.000000958	0.0000464	0.0000133	0.0000187	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	mg/kg	6	5	0.833	0.000000455	0.00000739	0.00000380	0.00000313	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	mg/kg	6	6	1.00	0.000000431	0.0000118	0.00000437	0.00000555	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	mg/kg	6	5	0.833	0.000000739	0.0000247	0.00000908	0.00000996	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	mg/kg	6	5	0.833	0.000000587	0.0000103	0.00000470	0.00000379	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	2,3,7,8-TCDD	mg/kg	6	4	0.667	0.000000253	0.00000134	0.000000735	0.000000521	NE	0	8.5e-007	2	4.8e-006	0	2.2e-005	0
Dioxins/Furans	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	mg/kg	6	4	0.667	0.000000423	0.00000813	0.00000352	0.00000332	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	Dioxin TEQ	mg/kg	6	6	1.00	0.000001579	0.000057686	0.0000183	0.0000233	NE	0	8.5e-007	6	4.8e-006	3	2.2e-005	2
Dioxins/Furans	Octachlorodibenzofuran (OCDF)	mg/kg	6	5	0.833	0.0000142	0.000854	0.000286	0.000362	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	Octachlorodibenzo-p-dioxin (OCDD)	mg/kg	6	6	1.00	0.00011	0.011	0.00364	0.00414	NE	0	NE	0	NE	0	NE	0
Pesticides	4,4'-DDD	mg/kg	6	5	0.833	0.00082	0.22	0.0562	0.0926	0.00122	4	0.00488	4	0.19	1	2.5	0
Pesticides	4,4'-DDE	mg/kg	6	5	0.833	0.0017	0.021	0.0104	0.00861	0.002	4	0.0031	4	2	0	9.3	0
Pesticides	4,4'-DDT	mg/kg	6	2	0.333	0.0072	0.15	0.0786	0.101	0.001	2	0.0041	2	1.9	0	8.5	0
Pesticides	Aldrin	mg/kg	6	1	0.167	0.00037	0.00037	0.000370	NA	3.185	0	7.35	0	0.039	0	0.18	0
Pesticides	alpha Chlordane	mg/kg	6	4	0.667	0.001	0.022	0.00988	0.00995	NE	0	0.0032	2	NE	0	NE	0
Pesticides	alpha-BHC	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.02706	0	0.086	0	0.36	0
Pesticides	beta-BHC	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.005	0	0.3	0	1.3	0
Pesticides	Chlordane	mg/kg	6	1	0.167	0.17	0.17	0.170	NA	0.0005	1	0.00324	1	NE	0	NE	0
Pesticides	delta-BHC	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.138811	0	NE	0	NE	0
Pesticides	Dieldrin	mg/kg	6	0	0.00	NA	NA	NA	NA	2e-005	0	0.0019	0	0.034	0	0.14	0
Pesticides	Endosulfan I	mg/kg	6	2	0.333	0.0037	0.014	0.00885	0.00728	4.28e-006	2	6.42e-006	2	NE	0	NE	0
Pesticides	Endosulfan II	mg/kg	6	0	0.00	NA	NA	NA	NA	4.28e-006	0	6.42e-006	0	NE	0	NE	0
Pesticides	Endosulfan sulfate	mg/kg	6	0	0.00	NA	NA	NA	NA	4.28e-006	0	6.42e-006	0	NE	0	NE	0
Pesticides	Endrin	mg/kg	6	1	0.167	0.0081	0.0081	0.00810	NA	NE	0	0.0022	1	1.9	0	25	0
Pesticides	Endrin aldehyde	mg/kg	6	0	0.00	NA	NA	NA	NA	0.0002829	0	0.004428	0	NE	0	NE	0
Pesticides	Endrin ketone	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
Pesticides	gamma Chlordane	mg/kg	6	3	0.500	0.0017	0.039	0.0196	0.0187	NE	0	0.0032	2	NE	0	NE	0
Pesticides	gamma-BHC (Lindane)	mg/kg	6	0	0.00	NA	NA	NA	NA	0.00032	0	0.0023	0	0.57	0	2.5	0
Pesticides	Heptachlor	mg/kg	6	0	0.00	NA	NA	NA	NA	0.05076	0	0.0024	0	0.13	0	0.63	0
Pesticides	Heptachlor epoxide	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.00247	0	0.07	0	0.33	0
Pesticides	Methoxychlor	mg/kg	6	0	0.00	NA	NA	NA	NA	0.0293112	0	0.0185638	0	32	0	410	0
Pesticides	Total Chlordane	mg/kg	6	4	0.667	0.001	0.022	0.00988	0.00995	NE	0	NE	0	NE	0	NE	0
Pesticides	Total DDD, DDE, DDT	mg/kg	6	5	0.833	0.00252	0.388	0.0980	0.164	NE	0	NE	0	NE	0	NE	0
Pesticides	Toxaphene	mg/kg	6	0	0.00	NA	NA	NA	NA	0.000514	0	0.0001	0	0.49	0	2.1	0
SVOCs/PAHs	1,2,4-Trichlorobenzene	mg/kg	6	0	0.00	NA	NA	NA	NA	0.09612	0	0.011	0	5.8	0	26	0
SVOCs/PAHs	1,2-Dichlorobenzene	mg/kg	6	0	0.00	NA	NA	NA	NA	0.25914	0	0.004319	0	180	0	930	0
SVOCs/PAHs	1,3-Dichlorobenzene	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.43807	0	NE	0	NE	0
SVOCs/PAHs	1,4-Dichlorobenzene	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.03	0	2.6	0	11	0
SVOCs/PAHs	1,4-Dioxane	mg/kg	6	5	0.833	0.002	0.01	0.00380	0.00349	NE	0	NE	0	5.3	0	24	0
SVOCs/PAHs	2,4,5-Trichlorophenol	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.288	0	630	0	8200	0
SVOCs/PAHs	2,4,6-Trichlorophenol	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	6.3	0	82	0
SVOCs/PAHs	2,4-Dichlorophenol	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	19	0	250	0
SVOCs/PAHs	2,4-Dimethylphenol	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	130	0	1600	0
SVOCs/PAHs	2,4-Dinitrophenol	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	13	0	160	0
SVOCs/PAHs	2,4-Dinitrotoluene	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.29	0	1.7	0	7.4	0
SVOCs/PAHs	2,6-Dinitrotoluene	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.36	0	1.5	0
SVOCs/PAHs	2-Chloronaphthalene	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	480	0	6000	0

Table 4-7. Sediment Statistical Summary

Analyte Group	Analyte	Unit	# Samples	# Detects	Frequency of Detection	Min	Max	Average	Standard Deviation	Sediment ESV - Marine		Sediment ESV - Freshwater		Soil RSL - Resident (THQ = 0.1)		Soil RSL - Industrial (THQ = 0.1)	
										Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances
SVOCs/PAHs	2-Chlorophenol	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.02716	0	39	0	580	0
SVOCs/PAHs	2-Methylnaphthalene	mg/kg	6	2	0.333	0.019	0.025	0.0220	0.00424	0.0202	1	0.076	0	24	0	300	0
SVOCs/PAHs	2-Methylphenol	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.011856	0	320	0	4100	0
SVOCs/PAHs	2-Nitroaniline	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	63	0	800	0
SVOCs/PAHs	2-Nitrophenol	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
SVOCs/PAHs	3,3-Dichlorobenzidine	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	1.2	0	5.1	0
SVOCs/PAHs	3-Nitroaniline	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
SVOCs/PAHs	4,6-Dinitro-2-methylphenol	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.51	0	6.6	0
SVOCs/PAHs	4-Bromophenyl-phenylether	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.255	0	NE	0	NE	0
SVOCs/PAHs	4-Chloro-3-methylphenol	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	630	0	8200	0
SVOCs/PAHs	4-Chloroaniline	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	2.7	0	11	0
SVOCs/PAHs	4-Chlorophenyl-phenylether	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
SVOCs/PAHs	4-Methylphenol	mg/kg	6	2	0.333	0.04	0.15	0.0950	0.0778	NE	0	NE	0	630	0	8200	0
SVOCs/PAHs	4-Nitroaniline	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	25	0	110	0
SVOCs/PAHs	4-Nitrophenol	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
SVOCs/PAHs	Acenaphthene	mg/kg	6	5	0.833	0.002	0.09	0.0212	0.0385	0.00671	1	0.076	1	360	0	4500	0
SVOCs/PAHs	Acenaphthylene	mg/kg	6	6	1.00	0.001	0.029	0.00867	0.0109	0.00587	2	0.076	0	NE	0	NE	0
SVOCs/PAHs	Aniline	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	44	0	400	0
SVOCs/PAHs	Anthracene	mg/kg	6	6	1.00	0.002	0.45	0.0848	0.179	0.0469	1	0.01	3	1800	0	23000	0
SVOCs/PAHs	Benzo(a)anthracene	mg/kg	6	6	1.00	0.009	1.6	0.314	0.632	0.0748	3	0.015	5	1.1	1	21	0
SVOCs/PAHs	Benzo(a)pyrene	mg/kg	6	6	1.00	0.011	1.5	0.305	0.589	0.0888	2	0.032	3	0.11	2	2.1	0
SVOCs/PAHs	Benzo(a)Pyrene TEQ	mg/kg	6	6	1.00	0.019793	2.2612	0.463	0.887	NE	0	NE	0	0.11	3	2.1	1
SVOCs/PAHs	Benzo(b)fluoranthene	mg/kg	6	6	1.00	0.018	2.5	0.525	0.977	NE	0	0.19	2	1.1	1	21	0
SVOCs/PAHs	Benzo(g,h,i)perylene	mg/kg	6	6	1.00	0.01	0.77	0.170	0.299	NE	0	0.016	4	NE	0	NE	0
SVOCs/PAHs	Benzo(k)fluoranthene	mg/kg	6	6	1.00	0.008	0.83	0.177	0.323	NE	0	0.24	1	11	0	210	0
SVOCs/PAHs	Benzyl Alcohol	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	630	0	8200	0
SVOCs/PAHs	Bis(2-chloro-1-methylethyl) ether	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	310	0	4700	0
SVOCs/PAHs	Bis(2-chloroethoxy)methane	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	19	0	250	0
SVOCs/PAHs	Bis(2-chloroethyl)ether	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.23	0	1	0
SVOCs/PAHs	Bis(2-ethylhexyl)phthalate	mg/kg	6	1	0.167	1	1	1.00	NA	0.182	1	453	0	39	0	160	0
SVOCs/PAHs	Carbazole	mg/kg	6	1	0.167	0.11	0.11	0.110	NA	NE	0	NE	0	NE	0	NE	0
SVOCs/PAHs	Chrysene	mg/kg	6	6	1.00	0.013	1.9	0.381	0.748	0.108	2	0.026	4	110	0	2100	0
SVOCs/PAHs	Dibenz(a,h)anthracene	mg/kg	6	6	1.00	0.005	0.26	0.0548	0.101	0.00622	3	0.033	2	0.11	1	2.1	0
SVOCs/PAHs	Dibenzofuran	mg/kg	6	1	0.167	0.047	0.047	0.0470	NA	NE	0	0.300736	0	7.3	0	100	0
SVOCs/PAHs	Diethyl phthalate	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.6048	0	5100	0	66000	0
SVOCs/PAHs	Dimethyl phthalate	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0
SVOCs/PAHs	Di-n-butyl phthalate	mg/kg	6	2	0.333	0.015	0.07	0.0425	0.0389	NE	0	0.011	2	630	0	8200	0
SVOCs/PAHs	Di-n-octyl phthalate	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	16.8858	0	63	0	820	0
SVOCs/PAHs	Fluoranthene	mg/kg	6	6	1.00	0.017	3.5	0.681	1.38	0.113	3	0.031	5	240	0	3000	0
SVOCs/PAHs	Fluorene	mg/kg	6	6	1.00	0.002	0.18	0.0348	0.0712	0.0212	1	0.01	2	240	0	3000	0
SVOCs/PAHs	Hexachlorobenzene	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.21	0	0.96	0
SVOCs/PAHs	Hexachlorobutadiene	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.6981	0	1.2	0	5.3	0
SVOCs/PAHs	hexachlorocyclopentadiene	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.18	0	0.75	0
SVOCs/PAHs	Hexachloroethane	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.2136	0	1.8	0	8	0
SVOCs/PAHs	Indeno(1,2,3-cd)pyrene	mg/kg	6	6	1.00	0.01	0.81	0.173	0.315	NE	0	0.017	4	1.1	0	21	0
SVOCs/PAHs	Isophorone	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	570	0	2400	0
SVOCs/PAHs	Naphthalene	mg/kg	6	6	1.00	0.002	0.051	0.0213	0.0192	0.0346	2	0.014	3	3.8	0	17	0
SVOCs/PAHs	Nitrobenzene	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	5.1	0	22	0
SVOCs/PAHs	n-Nitroso-di-n-propylamine	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.078	0	0.33	0

Table 4-7. Sediment Statistical Summary

Analyte Group	Analyte	Unit	# Samples	# Detects	Frequency of Detection	Min	Max	Average	Standard Deviation	Sediment ESV - Marine		Sediment ESV - Freshwater		Soil RSL - Resident (THQ = 0.1)		Soil RSL - Industrial (THQ = 0.1)	
										Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances
SVOCs/PAHs	n-Nitrosodiphenylamine	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.516	0	110	0	470	0
SVOCs/PAHs	Pentachlorophenol	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.01	0	1	0	4	0
SVOCs/PAHs	Phenanthrene	mg/kg	6	6	1.00	0.01	1.7	0.318	0.678	0.0867	2	0.019	4	NE	0	NE	0
SVOCs/PAHs	Phenol	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.001152	0	1900	0	25000	0
SVOCs/PAHs	Pyrene	mg/kg	6	6	1.00	0.015	2.9	0.582	1.14	0.153	3	0.044	5	180	0	2300	0
SVOCs/PAHs	Pyridine	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	7.8	0	120	0
SVOCs/PAHs	Total HMW PAHs	mg/kg	6	6	1.00	0.094	12.81	2.71	5.01	0.655	3	0.193	5	NE	0	NE	0
SVOCs/PAHs	Total LMW PAHs	mg/kg	6	6	1.00	0.038	6.01	1.13	2.39	NE	0	0.076	5	NE	0	NE	0
SVOCs/PAHs	Total PAHs	mg/kg	6	3	0.500	0.137	19.08	7.14	10.4	NE	0	NE	0	NE	0	NE	0
SVOCs/PAHs	Total SVOCs	mg/kg	6	3	0.500	0.137	19.237	7.55	10.2	NE	0	NE	0	NE	0	NE	0
VOCs	1,1,1-Trichloroethane	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.0121	0	810	0	3600	0
VOCs	1,1,2,2-Tetrachloroethane	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.56913	0	0.6	0	2.7	0
VOCs	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	670	0	2800	0
VOCs	1,1,2-Trichloroethane	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.6012	0	0.15	0	0.63	0
VOCs	1,1-Dichloroethane	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.008178	0	3.6	0	16	0
VOCs	1,1-Dichloroethene	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.014725	0	23	0	100	0
VOCs	1,2,4-Trichlorobenzene	mg/kg	6	0	0.00	NA	NA	NA	NA	0.09612	0	0.011	0	5.8	0	26	0
VOCs	1,2-Dibromo-3-chloropropane	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.0053	0	0.064	0
VOCs	1,2-Dibromoethane	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.036	0	0.16	0
VOCs	1,2-Dichlorobenzene	mg/kg	6	0	0.00	NA	NA	NA	NA	0.25914	0	0.004319	0	180	0	930	0
VOCs	1,2-Dichloroethane	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.0174	0	0.46	0	2	0
VOCs	1,2-Dichloropropane	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	1.6	0	6.6	0
VOCs	1,3-Dichlorobenzene	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.43807	0	NE	0	NE	0
VOCs	1,4-Dichlorobenzene	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.03	0	2.6	0	11	0
VOCs	2-Butanone	mg/kg	6	5	0.833	0.005	0.19	0.0456	0.0809	NE	0	0.924716	0	2700	0	19000	0
VOCs	2-Hexanone	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.0128898	0	20	0	130	0
VOCs	4-Methyl-2-pentanone	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.0323	0	3300	0	14000	0
VOCs	Acetone	mg/kg	6	5	0.833	0.017	0.72	0.183	0.303	NE	0	0.065	2	6100	0	67000	0
VOCs	Benzene	mg/kg	6	0	0.00	NA	NA	NA	NA	0.06479	0	0.01	0	1.2	0	5.1	0
VOCs	Bromodichloromethane	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.29	0	1.3	0
VOCs	Bromoform	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.27872	0	19	0	86	0
VOCs	Bromomethane	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.68	0	3	0
VOCs	Carbon disulfide	mg/kg	6	4	0.667	0.001	0.005	0.00250	0.00173	NE	0	0.00042044	4	77	0	350	0
VOCs	Carbon tetrachloride	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.017052	0	0.65	0	2.9	0
VOCs	Chlorobenzene	mg/kg	6	0	0.00	NA	NA	NA	NA	0.05475	0	0.002847	0	28	0	130	0
VOCs	Chloroethane	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	1400	0	5700	0
VOCs	Chloroform	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.0007164	0	0.32	0	1.4	0
VOCs	Chloromethane	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	11	0	46	0
VOCs	cis-1,2-Dichloroethene	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	16	0	230	0
VOCs	cis-1,3-Dichloropropene	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	2.5135e-005	0	NE	0	NE	0
VOCs	cyclohexane	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	650	0	2700	0
VOCs	Cyclohexanone	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	2800	0	13000	0
VOCs	Dibromochloromethane	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	8.3	0	39	0
VOCs	Dichlorodifluoromethane	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	8.7	0	37	0
VOCs	Ethylbenzene	mg/kg	6	0	0.00	NA	NA	NA	NA	0.09075	0	0.026499	0	5.8	0	25	0
VOCs	Isopropylbenzene	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	190	0	990	0
VOCs	Methyl acetate	mg/kg	6	3	0.500	0.001	0.003	0.00200	0.00100	NE	0	NE	0	7800	0	120000	0
VOCs	Methyl Tertiary Butyl Ether	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	47	0	210	0
VOCs	methylcyclohexane	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0

Table 4-7. Sediment Statistical Summary

Analyte Group	Analyte	Unit	# Samples	# Detects	Frequency of Detection	Min	Max	Average	Standard Deviation	Sediment ESV - Marine		Sediment ESV - Freshwater		Soil RSL - Resident (THQ = 0.1)		Soil RSL - Industrial (THQ = 0.1)	
										Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances
VOCs	Methylene chloride	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.0114777	0	35	0	320	0
VOCs	Styrene	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.55872	0	600	0	3500	0
VOCs	Tetrachloroethene	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.002	0	8.1	0	39	0
VOCs	Toluene	mg/kg	6	1	0.167	0.004	0.004	0.00400	NA	0.3913	0	0.00364	1	490	0	4700	0
VOCs	Total VOCs	mg/kg	6	5	0.833	0.028	0.911	0.232	0.382	NE	0	NE	0	NE	0	NE	0
VOCs	trans-1,2-Dichloroethene	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.30975	0	160	0	2300	0
VOCs	trans-1,3-Dichloropropene	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	2.5135e-005	0	NE	0	NE	0
VOCs	Trichloroethene	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.03486	0	0.41	0	1.9	0
VOCs	Trichlorofluoromethane	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	2300	0	35000	0
VOCs	Vinyl chloride	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	0.059	0	1.7	0
VOCs	Xylenes (total)	mg/kg	6	0	0.00	NA	NA	NA	NA	NE	0	0.13	0	58	0	250	0
Rad	Thorium-232 (via Ac-228)[1]	pci/g	6	6	1.00	0.24	0.84	0.513	0.209	1300	0	1300	0	1.1	0	NE	0
Rad	Radium-226 (via Bi-214)[1]	pci/g	6	6	1.00	0.29	0.81	0.502	0.194	79.9	0	79.9	0	0.6	2	NE	0
Rad	Uranium-238 (via Pa-234m)[1,2]	pci/g	6	0	0.00	NA	NA	NA	NA	227	0	227	0	14	0	NE	0

NA - not applicable

NE - not established

mg/kg - milligrams per kilogram

pci/g - picocuries per gram

1 - The human health soil screening benchmarks for radionuclides are based on soil screening levels specified in NUREG 1757, Volume 1 (U.S. NRC, 2006).

2 - Pa-234m is reported as Pa-234 in the analytical reports presented in Appendix I.

Table 4-8. Sediment Analytical Results

Analyte Group	Chemical Name	CAS #	Units	Screening Benchmarks				OU2-1-SE001	OU2-1-SE002	OU2-1-SE003	OU2-1-SE004	OU1-1-SE005	REF-1-SE001
				Sediment ESV - Marine	Sediment ESV - Freshwater	Soil RSL - Resident (THQ = 0.1)	Soil RSL - Industrial (THQ = 0.1)	10/22/2018	10/22/2018	10/22/2018	10/22/2018	10/23/2018	10/23/2018
								0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs
Herbicides	2,4,5-T	93-76-5	mg/kg	NE	NE	63	820	< 0.0011 U	< 0.0015 U	< 0.0010 U	< 0.0012 U	< 0.0011 U	0.0028
Herbicides	2,4,5-TP (Silvex)	93-72-1	mg/kg	NE	NE	51	660	< 0.0010 U	< 0.0014 U	< 0.00091 U	< 0.0011 U	< 0.00099 U	0.0015 J
Herbicides	2,4-D	94-75-7	mg/kg	NE	1.048	70	960	< 0.016 U	< 0.022 U	< 0.015 U	< 0.017 U	< 0.016 U	< 0.018 U
Herbicides	2,4-DB	94-82-6	mg/kg	NE	NE	190	2500	< 0.013 U	< 0.018 U	< 0.012 U	< 0.014 U	< 0.065 U	< 0.075 U
Herbicides	2,4-DP (Dichloroprop)	120-36-5	mg/kg	NE	NE	NE	NE	< 0.012 U	< 0.016 U	< 0.011 U	< 0.013 U	< 0.012 U	< 0.014 U
Herbicides	Dalapon	75-99-0	mg/kg	NE	NE	190	2500	< 0.059 U	< 0.081 U	< 0.054 U	< 0.063 U	< 0.29 U	< 0.34 U
Herbicides	Dicamba	1918-00-9	mg/kg	NE	2.717	190	2500	< 0.0054 U	< 0.0073 U	< 0.0049 U	< 0.0057 U	< 0.0053 U	< 0.0061 U
Herbicides	Dinoseb	88-85-7	mg/kg	NE	1.5785	6.3	82	< 0.012 U	< 0.016 U	< 0.011 U	< 0.013 U	< 0.012 U	< 0.014 U
Herbicides	MCPA (2-Methyl-4-chlorophenoxy acetic acid)	94-74-6	mg/kg	1.24446	0.77038	3.2	41	< 1 U	< 1.4 U	< 0.93 U	< 1.1 U	< 1 U	< 1.2 U
Herbicides	MCPP (2-(2-Methyl-4-chlorophenoxy) propanoic acid)	93-65-2	mg/kg	NE	NE	6.3	82	< 5.1 U	< 7 U	< 4.6 U	< 5.4 U	< 5 U	< 5.8 U
Metals	Aluminum	7429-90-5	mg/kg	NE	25000	7700	110000	10900	9970	6250	4960	4350	7620
Metals	Antimony	7440-36-0	mg/kg	2	NE	3.1	47	< 0.122 U	2.10	0.599	0.789 J	0.208 J	1.17
Metals	Arsenic	7440-38-2	mg/kg	7.24	9.7	0.68	3	4.68	9.09	4.81	2.38 J	2.05	4.48
Metals	Barium	7440-39-3	mg/kg	NE	150	1500	22000	38.4	150	87.4	40.2 J	18.7	79.9
Metals	Beryllium	7440-41-7	mg/kg	NE	NE	16	230	0.542	0.510	0.349	0.296 J	0.274	0.395
Metals	Cadmium	7440-43-9	mg/kg	0.68	0.583	7.1	98	0.347	1.80	0.613	0.690 J	0.215	1.06
Metals	Calcium (Ca)	7440-70-2	mg/kg	NE	NE	NE	NE	724	2540	2770	849 J	1500	8840
Metals	Chromium	7440-47-3	mg/kg	52.3	36.2	NE	NE	56.6	61.1	36.4	14.3 J	16.8	56.9
Metals	Cobalt	7440-48-4	mg/kg	NE	NE	2.3	35	18.9	15.1	7.63	4.93 J	6.10	9.68
Metals	Copper	7440-50-8	mg/kg	18.7	28	310	4700	19.9	116	246	42.8 J	11.0	65.8
Metals	Iron (Fe)	7439-89-6	mg/kg	NE	20000	5500	82000	17500	21200	19300	8970	9730	14900
Metals	Lead	7439-92-1	mg/kg	30.2	35	400	800	13.8	185	77.7	33.5 J	12.4	78.9
Metals	Magnesium (Mg)	7439-95-4	mg/kg	NE	NE	NE	NE	3730	4300	4450	2340	3470	8560
Metals	Manganese (Mn)	7439-96-5	mg/kg	NE	460	180	2600	138	156	139	61.7	77.8	161
Metals	Mercury	7439-97-6	mg/kg	0.13	0.18	1.1	4.6	< 0.0408 U	0.267	0.0999 J	0.0594 J	< 0.0394 U	0.0875 J
Metals	Nickel	7440-02-0	mg/kg	15.9	19.5	150	2200	107	124	69.0	26.2 J	33.5	92.6
Metals	Potassium (K)	7440-09-7	mg/kg	NE	NE	NE	NE	1680	1340	1410	1200	992	1020
Metals	Selenium	7782-49-2	mg/kg	NE	0.72	39	580	0.219 J	0.640	0.206 J	0.269 J	< 0.136 U	0.400 J
Metals	Silver	7440-22-4	mg/kg	0.73	0.5	39	580	0.0669 J	0.709	0.291	0.618 J	< 0.0425 U	0.294
Metals	Sodium (Na)	7440-23-5	mg/kg	NE	NE	NE	NE	1420	347	2300	88.8 J	237	300
Metals	Thallium	7440-28-0	mg/kg	NE	NE	0.078	1.2	0.141	0.133 J	0.105	0.0913 J	0.0558 J	0.0895 J
Metals	Vanadium	7440-62-2	mg/kg	NE	NE	39	580	23.6	33.2	20.5	20.1 J	13.6	28.2
Metals	Zinc	7440-66-6	mg/kg	120	98	2300	35000	42.8	383	163	112 J	62.0	228
PCBs	Aroclor 1016	12674-11-2	mg/kg	NE	0.059	0.41	5.1	< 0.0048 U	< 0.033 U	< 0.022 U	< 0.0052 U	< 0.0048 U	< 0.027 U
PCBs	Aroclor 1221	11104-28-2	mg/kg	NE	NE	0.2	0.83	< 0.0061 U	< 0.042 U	< 0.028 U	< 0.0066 U	< 0.0061 U	< 0.035 U
PCBs	Aroclor 1232	11141-16-5	mg/kg	NE	NE	0.17	0.72	< 0.011 U	< 0.073 U	< 0.048 U	< 0.011 U	< 0.011 U	< 0.061 U
PCBs	Aroclor 1242	53469-21-9	mg/kg	NE	0.059	0.23	0.95	< 0.0044 U	< 0.030 U	< 0.020 U	< 0.0047 U	< 0.0044 U	< 0.025 U
PCBs	Aroclor 1248	12672-29-6	mg/kg	NE	0.059	0.23	0.95	< 0.0044 U	< 0.030 U	< 0.020 U	< 0.0047 U	< 0.0044 U	< 0.025 U
PCBs	Aroclor 1254	11097-69-1	mg/kg	NE	0.059	0.12	0.97	< 0.0044 U	< 0.030 U	< 0.020 U	< 0.0047 U	< 0.0044 U	< 0.025 U
PCBs	Aroclor 1260	11096-82-5	mg/kg	NE	0.059	0.24	0.99	< 0.0065 U	< 0.045 U	< 0.030 U	< 0.0070 U	< 0.0065 U	< 0.037 U
PCBs	Aroclor 1262	37324-23-5	mg/kg	NE	NE	NE	NE	< 0.0044 U	< 0.030 U	< 0.020 U	< 0.0047 U	< 0.0044 U	< 0.025 U
PCBs	Aroclor 1268	11100-14-4	mg/kg	NE	NE	NE	NE	< 0.0044 U	< 0.030 U	< 0.020 U	< 0.0047 U	< 0.0044 U	< 0.025 U
PCBs	Total PCBs	CALC-PCB	mg/kg	0.022	0.032	NE	NE	< 0.011 U	< 0.073 U	< 0.048 U	< 0.011 U	< 0.011 U	< 0.061 U
Dioxin/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	67562-39-4	mg/kg	NE	NE	NE	NE	< 0.000000328 U	0.000446 J	0.0000509 J	0.0000131 J	0.0000172	0.000184
Dioxin/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	35822-46-9	mg/kg	NE	NE	NE	NE	0.0000377 J	0.00132 J	0.000142 J	0.0000153 J	0.0000463	0.000706
Dioxin/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	55673-89-7	mg/kg	NE	NE	NE	NE	< 0.000000328 U	0.0000237 J	0.00000299 J	0.00000179 J	0.000000996 J	0.0000139
Dioxin/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	70648-26-9	mg/kg	NE	NE	NE	NE	< 0.000000328 U	0.0000193 J	0.00000347 J	0.00000287 J	0.000000772 J	0.0000117
Dioxin/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	39227-28-6	mg/kg	NE	NE	NE	NE	< 0.000000328 U	0.0000219 J	0.00000243 J	< 0.000000346 U	0.000000461 J	0.0000147
Dioxin/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	57117-44-9	mg/kg	NE	NE	NE	NE	< 0.000000328 U	0.0000229	0.00000361 J	0.00000195 J	0.000000748 J	0.0000118

Table 4-8. Sediment Analytical Results

Analyte Group	Chemical Name	CAS #	Units	Screening Benchmarks				OU2-1-SE001	OU2-1-SE002	OU2-1-SE003	OU2-1-SE004	OU1-1-SE005	REF-1-SE001
				Sediment ESV - Marine	Sediment ESV - Freshwater	Soil RSL - Resident (THQ = 0.1)	Soil RSL - Industrial (THQ = 0.1)	10/22/2018	10/22/2018	10/22/2018	10/22/2018	10/23/2018	10/23/2018
								0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs
Dioxin/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	57653-85-7	mg/kg	NE	NE	NE	NE	< 0.000000328 U	0.0000581 J	0.00000668 J	< 0.000000346 U	0.00000189 J	0.0000316
Dioxin/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	72918-21-9	mg/kg	NE	NE	NE	NE	< 0.000000328 U	< 0.000000460 U	< 0.000000298 U	< 0.000000346 U	0.000000429 J	0.00000747 J
Dioxin/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	19408-74-3	mg/kg	NE	NE	NE	NE	0.00000149 J	0.0000464	0.00000466 J	0.00000101 J	0.000000958 J	0.0000251
Dioxin/Furans	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	57117-41-6	mg/kg	NE	NE	NE	NE	< 0.000000328 U	0.00000686 J	0.00000187 J	0.00000241 J	0.000000455 J	0.00000739 J
Dioxin/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	40321-76-4	mg/kg	NE	NE	NE	NE	0.000000468 J	0.0000118 Q	0.00000187 J	0.000000451 J	0.000000431 J	0.0000112
Dioxin/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	60851-34-5	mg/kg	NE	NE	NE	NE	< 0.000000328 U	0.0000247 J	0.00000425 J	0.00000250 J	0.000000739 J	0.0000132
Dioxin/Furans	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	57117-31-4	mg/kg	NE	NE	NE	NE	< 0.000000328 U	0.0000103 J	0.00000377 J	0.00000240 J	0.000000587 J	0.00000642 J
Dioxin/Furans	2,3,7,8-TCDD	1746-01-6	mg/kg	NE	0.00000085	0.0000048	0.000022	< 0.000000175 U	0.000000994 J	0.00000134	0.000000253 J	0.000000351 J	< 0.000000205 U
Dioxin/Furans	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	51207-31-9	mg/kg	NE	NE	NE	NE	< 0.000000198 U	0.00000813	< 0.000000180 U	0.00000347	0.000000423 J	0.00000206
Dioxin/Furans	Dioxin TEQ	CALC-TEQ	mg/kg	NE	0.00000085	0.0000048	0.000022	0.000001579	0.000057686	0.0000095	0.00000256	0.0000025	0.0000361
Dioxin/Furans	Octachlorodibenzofuran (OCDF)	39001-02-0	mg/kg	NE	NE	NE	NE	< 0.000000713 U	0.000854 J	0.0000852 J	0.0000142 J	0.0000359	0.000440
Dioxin/Furans	Octachlorodibenzo-p-dioxin (OCDD)	3268-87-9	mg/kg	NE	NE	NE	NE	0.00195	0.0110	0.00205	0.000110 J	0.000750	0.00597
Pesticides	4,4'-DDD	72-54-8	mg/kg	0.00122	0.00488	0.19	2.5	< 0.0022 U	0.011 J	0.037	0.00082 J	0.012	0.22
Pesticides	4,4'-DDE	72-55-9	mg/kg	0.002	0.0031	2	9.3	< 0.0022 U	0.0069 J+	0.021	0.0017 J	0.0042	0.018 J
Pesticides	4,4'-DDT	50-29-3	mg/kg	0.001	0.0041	1.9	8.5	< 0.0053 U	< 0.0073 U	0.0072 J	< 0.0011 U	< 0.0010 U	0.15
Pesticides	Aldrin	309-00-2	mg/kg	3.185	7.35	0.039	0.18	< 0.0011 U	< 0.0016 U	< 0.0010 U	< 0.00024 U	0.00037 J	< 0.0052 U
Pesticides	alpha Chlordane	5103-71-9	mg/kg	NE	0.0032	NE	NE	< 0.0011 U	0.014 J+	0.0025 J+	< 0.00024 U	0.0010 J	0.022 J
Pesticides	alpha-BHC	319-84-6	mg/kg	NE	0.02706	0.086	0.36	< 0.0011 U	< 0.0016 U	< 0.0010 U	< 0.00024 U	< 0.00022 U	< 0.0052 U
Pesticides	beta-BHC	319-85-7	mg/kg	NE	0.005	0.3	1.3	< 0.0029 U	< 0.0041 U	< 0.0051 U	< 0.00063 U	< 0.00058 U	< 0.013 U
Pesticides	Chlordane	57-74-9	mg/kg	0.0005	0.00324	NE	NE	< 0.027 U	0.17 J+	< 0.024 U	< 0.0057 U	< 0.0053 U	< 0.12 U
Pesticides	delta-BHC	319-86-8	mg/kg	NE	0.138811	NE	NE	< 0.0030 U	< 0.0041 U	< 0.0027 U	< 0.00065 U	< 0.00059 U	< 0.014 U
Pesticides	Dieldrin	60-57-1	mg/kg	0.00002	0.0019	0.034	0.14	< 0.0022 U	< 0.0030 U	< 0.0020 U	< 0.00047 U	< 0.00044 U	< 0.01 U
Pesticides	Endosulfan I	959-98-8	mg/kg	0.00000428	0.00000642	NE	NE	< 0.0015 U	0.0037 J+	< 0.0013 U	< 0.00032 U	< 0.00061 U	0.014 J
Pesticides	Endosulfan II	33213-65-9	mg/kg	0.00000428	0.00000642	NE	NE	< 0.0073 U	< 0.01 U	< 0.0066 U	< 0.0016 U	< 0.0015 U	< 0.034 U
Pesticides	Endosulfan sulfate	1031-07-8	mg/kg	0.00000428	0.00000642	NE	NE	< 0.0022 U	< 0.0030 U	< 0.0020 U	< 0.00047 U	< 0.00044 U	< 0.01 U
Pesticides	Endrin	72-20-8	mg/kg	NE	0.0022	1.9	25	< 0.0045 U	< 0.0063 U	0.0081 J	< 0.00098 U	< 0.00090 U	< 0.021 U
Pesticides	Endrin aldehyde	7421-93-4	mg/kg	0.0002829	0.004428	NE	NE	< 0.0022 U	< 0.0030 U	< 0.0020 U	< 0.00047 U	< 0.00044 U	< 0.01 U
Pesticides	Endrin ketone	53494-70-5	mg/kg	NE	NE	NE	NE	< 0.0040 U	< 0.0055 U	< 0.0036 U	< 0.00086 U	< 0.00079 U	< 0.018 U
Pesticides	gamma Chlordane	5566-34-7	mg/kg	NE	0.0032	NE	NE	< 0.0017 U	0.018 J+	< 0.0039 U	< 0.00036 U	0.0017	0.039
Pesticides	gamma-BHC (Lindane)	58-89-9	mg/kg	0.00032	0.0023	0.57	2.5	< 0.0014 U	< 0.0019 U	< 0.0013 U	< 0.00030 U	< 0.00028 U	< 0.0064 U
Pesticides	Heptachlor	76-44-8	mg/kg	0.05076	0.0024	0.13	0.63	< 0.0021 U	< 0.0029 U	< 0.0019 U	< 0.00044 U	< 0.00041 U	< 0.0095 U
Pesticides	Heptachlor epoxide	1024-57-3	mg/kg	NE	0.00247	0.07	0.33	< 0.0011 U	< 0.0016 U	< 0.0044 U	< 0.00024 U	< 0.00022 U	< 0.0052 U
Pesticides	Methoxychlor	72-43-5	mg/kg	0.0293112	0.0185638	32	410	< 0.012 U	< 0.017 U	< 0.011 U	< 0.0026 U	< 0.0024 U	< 0.055 U
Pesticides	Toxaphene	8001-35-2	mg/kg	0.000514	0.0001	0.49	2.1	< 0.094 U	< 0.13 U	< 0.084 U	< 0.020 U	< 0.018 U	< 0.43 U
SVOCs/PAHs	1,2,4-Trichlorobenzene	120-82-1	mg/kg	0.09612	0.011	5.8	26	< 0.022 U	< 0.030 UJ	< 0.020 U	< 0.024 U	< 0.022 U	< 0.025 U
SVOCs/PAHs	1,2-Dichlorobenzene	95-50-1	mg/kg	0.25914	0.004319	180	930	< 0.027 U	< 0.036 UJ	< 0.024 U	< 0.029 U	< 0.026 U	< 0.030 U
SVOCs/PAHs	1,3-Dichlorobenzene	541-73-1	mg/kg	NE	0.43807	NE	NE	< 0.022 U	< 0.030 UJ	< 0.020 U	< 0.024 U	< 0.022 U	< 0.025 U
SVOCs/PAHs	1,4-Dichlorobenzene	106-46-7	mg/kg	NE	0.03	2.6	11	< 0.022 U	< 0.030 UJ	< 0.020 U	< 0.024 U	< 0.022 U	< 0.025 U
SVOCs/PAHs	1,4-Dioxane	123-91-1	mg/kg	NE	NE	5.3	24	0.002 J	0.01 J	0.003 J	0.002 J	0.002 J-	< 0.010 UJ
SVOCs/PAHs	2,4,5-Trichlorophenol	95-95-4	mg/kg	NE	0.288	630	8200	< 0.027 U	< 0.036 U	< 0.024 U	< 0.029 U	< 0.026 U	< 0.030 U
SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	mg/kg	NE	NE	6.3	82	< 0.027 U	< 0.036 U	< 0.024 U	< 0.029 U	< 0.026 U	< 0.030 U
SVOCs/PAHs	2,4-Dichlorophenol	120-83-2	mg/kg	NE	NE	19	250	< 0.022 U	< 0.030 U	< 0.020 U	< 0.024 U	< 0.022 U	< 0.025 U
SVOCs/PAHs	2,4-Dimethylphenol	105-67-9	mg/kg	NE	NE	130	1600	< 0.022 U	< 0.030 U	< 0.020 U	< 0.024 U	< 0.022 U	< 0.025 U
SVOCs/PAHs	2,4-Dinitrophenol	51-28-5	mg/kg	NE	NE	13	160	< 0.49 U	< 0.67 U	< 0.45 U	< 0.53 U	< 0.48 U	< 0.56 U
SVOCs/PAHs	2,4-Dinitrotoluene	121-14-2	mg/kg	NE	0.29	1.7	7.4	< 0.089 U	< 0.12 U	< 0.081 U	< 0.096 U	< 0.088 U	< 0.10 U
SVOCs/PAHs	2,6-Dinitrotoluene	606-20-2	mg/kg	NE	NE	0.36	1.5	< 0.027 U	< 0.036 U	< 0.024 U	< 0.029 U	< 0.026 U	< 0.030 U
SVOCs/PAHs	2-Chloronaphthalene	91-58-7	mg/kg	NE	NE	480	6000	< 0.009 U	< 0.012 U	< 0.008 U	< 0.01 U	< 0.009 U	< 0.010 U
SVOCs/PAHs	2-Chlorophenol	95-57-8	mg/kg	NE	0.02716	39	580	< 0.022 U	< 0.030 U	< 0.020 U	< 0.024 U	< 0.022 U	< 0.025 U
SVOCs/PAHs	2-Methylnaphthalene	91-57-6	mg/kg	0.0202	0.076	24	300	< 0.013 U	0.019 J	< 0.012 U	< 0.014 U	< 0.013 U	0.025 J

Table 4-8. Sediment Analytical Results

Analyte Group	Chemical Name	CAS #	Units	Screening Benchmarks				OU2-1-SE001	OU2-1-SE002	OU2-1-SE003	OU2-1-SE004	OU1-1-SE005	REF-1-SE001
				Sediment ESV - Marine	Sediment ESV - Freshwater	Soil RSL - Resident (THQ = 0.1)	Soil RSL - Industrial (THQ = 0.1)	10/22/2018	10/22/2018	10/22/2018	10/22/2018	10/23/2018	10/23/2018
								0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs
SVOCs/PAHs	2-Methylphenol	95-48-7	mg/kg	NE	0.011856	320	4100	< 0.036 U	< 0.048 U	< 0.032 U	< 0.038 U	< 0.035 U	< 0.041 U
SVOCs/PAHs	2-Nitroaniline	88-74-4	mg/kg	NE	NE	63	800	< 0.027 U	< 0.036 U	< 0.024 U	< 0.029 U	< 0.026 U	< 0.030 U
SVOCs/PAHs	2-Nitrophenol	88-75-5	mg/kg	NE	NE	NE	NE	< 0.022 U	< 0.030 U	< 0.020 U	< 0.024 U	< 0.022 U	< 0.025 U
SVOCs/PAHs	3,3-Dichlorobenzidine	91-94-1	mg/kg	NE	NE	1.2	5.1	< 0.13 U	< 0.18 U	< 0.12 U	< 0.14 U	< 0.13 U	< 0.15 U
SVOCs/PAHs	3-Nitroaniline	99-09-2	mg/kg	NE	NE	NE	NE	< 0.089 U	< 0.12 U	< 0.081 U	< 0.096 U	< 0.088 U	< 0.10 U
SVOCs/PAHs	4,6-Dinitro-2-methylphenol	534-52-1	mg/kg	NE	NE	0.51	6.6	< 0.22 U	< 0.30 U	< 0.20 U	< 0.24 U	< 0.22 U	< 0.25 U
SVOCs/PAHs	4-Bromophenyl-phenylether	101-55-3	mg/kg	NE	0.255	NE	NE	< 0.027 U	< 0.036 U	< 0.024 U	< 0.029 U	< 0.026 U	< 0.030 U
SVOCs/PAHs	4-Chloro-3-methylphenol	59-50-7	mg/kg	NE	NE	630	8200	< 0.022 U	< 0.030 U	< 0.020 U	< 0.024 U	< 0.022 U	< 0.025 U
SVOCs/PAHs	4-Chloroaniline	106-47-8	mg/kg	NE	NE	2.7	11	< 0.044 U	< 0.061 U	< 0.041 U	< 0.048 U	< 0.044 U	< 0.051 U
SVOCs/PAHs	4-Chlorophenyl-phenylether	7005-72-3	mg/kg	NE	NE	NE	NE	< 0.022 U	< 0.030 U	< 0.020 U	< 0.024 U	< 0.022 U	< 0.025 U
SVOCs/PAHs	4-Methylphenol	106-44-5	mg/kg	NE	NE	630	8200	< 0.027 U	< 0.036 U	< 0.024 U	0.040 J	< 0.026 U	0.15
SVOCs/PAHs	4-Nitroaniline	100-01-6	mg/kg	NE	NE	25	110	< 0.089 U	< 0.12 U	< 0.081 U	< 0.096 U	< 0.088 U	< 0.10 U
SVOCs/PAHs	4-Nitrophenol	100-02-7	mg/kg	NE	NE	NE	NE	< 0.22 U	< 0.30 U	< 0.20 U	< 0.24 U	< 0.22 U	< 0.25 U
SVOCs/PAHs	Acenaphthene	83-32-9	mg/kg	0.00671	0.076	360	4500	0.002	0.006	0.005	< 0.001 U	0.003	0.090
SVOCs/PAHs	Acenaphthylene	208-96-8	mg/kg	0.00587	0.076	NE	NE	0.002	0.013	0.005	0.001 J	0.002 J	0.029
SVOCs/PAHs	Aniline	62-53-3	mg/kg	NE	NE	44	400	< 0.22 U	< 0.30 U	< 0.20 U	< 0.24 U	< 0.22 U	< 0.25 U
SVOCs/PAHs	Anthracene	120-12-7	mg/kg	0.0469	0.01	1800	23000	0.007	0.026	0.015	0.002 J	0.009	0.45
SVOCs/PAHs	Benzo(a)anthracene	56-55-3	mg/kg	0.0748	0.015	1.1	21	0.025	0.14	0.076	0.009	0.035	1.6
SVOCs/PAHs	Benzo(a)pyrene	50-32-8	mg/kg	0.0888	0.032	0.11	2.1	0.023	0.18	0.084	0.011 J	0.029	1.5
SVOCs/PAHs	Benzo(a)Pyrene TEQ	CALC-BaP PAHs	mg/kg	NE	NE	0.11	2.1	0.035776	0.28262	0.130611	0.019793	0.045927	2.2612
SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	mg/kg	NE	0.19	1.1	21	0.036	0.38	0.16	0.018 J	0.053	2.5
SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	mg/kg	NE	0.016	NE	NE	0.016	0.15	0.054	0.01 J	0.019	0.77
SVOCs/PAHs	Benzo(k)fluoranthene	207-08-9	mg/kg	NE	0.24	11	210	0.015	0.14	0.052	0.008	0.019	0.83
SVOCs/PAHs	Benzyl Alcohol	100-51-6	mg/kg	NE	NE	630	8200	< 0.22 U	< 0.30 U	< 0.20 U	< 0.24 U	< 0.22 U	< 0.25 U
SVOCs/PAHs	Bis(2-chloro-1-methylethyl) ether	108-60-1	mg/kg	NE	NE	310	4700	< 0.022 U	< 0.030 U	< 0.020 U	< 0.024 U	< 0.022 U	< 0.025 UJ
SVOCs/PAHs	Bis(2-chloroethoxy)methane	111-91-1	mg/kg	NE	NE	19	250	< 0.022 U	< 0.030 U	< 0.020 U	< 0.024 U	< 0.022 U	< 0.025 U
SVOCs/PAHs	Bis(2-chloroethyl)ether	111-44-4	mg/kg	NE	NE	0.23	1	< 0.031 U	< 0.042 U	< 0.028 U	< 0.034 U	< 0.031 U	< 0.036 U
SVOCs/PAHs	Bis(2-ethylhexyl)phthalate	117-81-7	mg/kg	0.182	453	39	160	< 0.013 U	1.0	< 0.012 U	< 0.014 U	< 0.013 U	< 0.15 U
SVOCs/PAHs	Carbazole	86-74-8	mg/kg	NE	NE	NE	NE	< 0.022 U	< 0.030 U	< 0.020 U	< 0.024 U	< 0.022 U	0.11
SVOCs/PAHs	Chrysene	218-01-9	mg/kg	0.108	0.026	110	2100	0.026	0.22	0.091	0.013 J	0.037	1.9
SVOCs/PAHs	Dibenz(a,h)anthracene	53-70-3	mg/kg	0.00622	0.033	0.11	2.1	0.005	0.036	0.017	0.005 J	0.006	0.26
SVOCs/PAHs	Dibenzofuran	132-64-9	mg/kg	NE	0.300736	7.3	100	< 0.022 U	< 0.030 U	< 0.020 U	< 0.024 U	< 0.022 U	0.047 J
SVOCs/PAHs	Diethyl phthalate	84-66-2	mg/kg	NE	0.6048	5100	66000	< 0.089 U	< 0.12 U	< 0.081 U	< 0.096 U	< 0.088 U	< 0.10 U
SVOCs/PAHs	Dimethyl phthalate	131-11-3	mg/kg	NE	NE	NE	NE	< 0.089 U	< 0.12 U	< 0.081 U	< 0.096 U	< 0.088 U	< 0.10 U
SVOCs/PAHs	Di-n-butyl phthalate	84-74-2	mg/kg	NE	0.011	630	8200	< 0.009 U	0.070	0.015 J	< 0.01 U	< 0.009 U	< 0.10 U
SVOCs/PAHs	Di-n-octyl phthalate	117-84-0	mg/kg	NE	16.8858	63	820	< 0.089 U	< 0.12 U	< 0.081 U	< 0.096 U	< 0.088 U	< 0.10 U
SVOCs/PAHs	Fluoranthene	206-44-0	mg/kg	0.113	0.031	240	3000	0.055	0.28	0.16	0.017 J	0.074	3.5
SVOCs/PAHs	Fluorene	86-73-7	mg/kg	0.0212	0.01	240	3000	0.005	0.011	0.007	0.002 J	0.004	0.18
SVOCs/PAHs	Hexachlorobenzene	118-74-1	mg/kg	NE	NE	0.21	0.96	< 0.004 U	< 0.006 U	< 0.004 U	< 0.005 U	< 0.004 U	< 0.005 U
SVOCs/PAHs	Hexachlorobutadiene	87-68-3	mg/kg	NE	0.6981	1.2	5.3	< 0.027 U	< 0.036 U	< 0.024 U	< 0.029 U	< 0.026 U	< 0.030 U
SVOCs/PAHs	hexachlorocyclopentadiene	77-47-4	mg/kg	NE	NE	0.18	0.75	< 0.22 U	< 0.30 U	< 0.20 U	< 0.24 U	< 0.22 U	< 0.25 U
SVOCs/PAHs	Hexachloroethane	67-72-1	mg/kg	NE	0.2136	1.8	8	< 0.044 U	< 0.061 U	< 0.041 U	< 0.048 U	< 0.044 U	< 0.051 U
SVOCs/PAHs	Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	NE	0.017	1.1	21	0.015	0.13	0.054	0.01	0.019	0.81
SVOCs/PAHs	Isophorone	78-59-1	mg/kg	NE	NE	570	2400	< 0.022 U	< 0.030 U	< 0.020 U	< 0.024 U	< 0.022 U	< 0.025 U
SVOCs/PAHs	Naphthalene	91-20-3	mg/kg	0.0346	0.014	3.8	17	0.002 J	0.051	0.023	0.006 J	0.010	0.036 J
SVOCs/PAHs	Nitrobenzene	98-95-3	mg/kg	NE	NE	5.1	22	< 0.036 U	< 0.048 U	< 0.032 U	< 0.038 U	< 0.035 U	< 0.041 U
SVOCs/PAHs	n-Nitroso-di-n-propylamine	621-64-7	mg/kg	NE	NE	0.078	0.33	< 0.027 U	< 0.036 U	< 0.024 U	< 0.029 U	< 0.026 U	< 0.030 U
SVOCs/PAHs	n-Nitrosodiphenylamine	86-30-6	mg/kg	NE	0.516	110	470	< 0.022 U	< 0.030 U	< 0.020 U	< 0.024 U	< 0.022 U	< 0.025 U
SVOCs/PAHs	Pentachlorophenol	87-86-5	mg/kg	NE	0.01	1	4	< 0.049 U	< 0.067 U	< 0.045 U	< 0.053 U	< 0.048 U	< 0.056 U

Table 4-8. Sediment Analytical Results

Analyte Group	Chemical Name	CAS #	Units	Screening Benchmarks				OU2-1-SE001	OU2-1-SE002	OU2-1-SE003	OU2-1-SE004	OU1-1-SE005	REF-1-SE001
				Sediment ESV - Marine	Sediment ESV - Freshwater	Soil RSL - Resident (THQ = 0.1)	Soil RSL - Industrial (THQ = 0.1)	10/22/2018	10/22/2018	10/22/2018	10/22/2018	10/23/2018	10/23/2018
								0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs
SVOCs/PAHs	Phenanthrene	85-01-8	mg/kg	0.0867	0.019	NE	NE	0.027	0.11	0.043	0.01 J	0.017	1.7
SVOCs/PAHs	Phenol	108-95-2	mg/kg	NE	0.001152	1900	25000	< 0.031 U	< 0.042 U	< 0.028 U	< 0.034 U	< 0.031 U	< 0.036 U
SVOCs/PAHs	Pyrene	129-00-0	mg/kg	0.153	0.044	180	2300	0.045	0.30	0.16	0.015 J	0.069	2.9
SVOCs/PAHs	Pyridine	110-86-1	mg/kg	NE	NE	7.8	120	< 0.089 UJ	< 0.12 UJ	< 0.081 UJ	< 0.096 U	< 0.088 U	< 0.10 UJ
SVOCs/PAHs	Total HMW PAHs	CALC-HMW PAHs	mg/kg	0.655	0.193	NE	NE	0.201	2.14	0.731	0.094	0.28	12.81
SVOCs/PAHs	Total LMW PAHs	CALC-LMW PAHs	mg/kg	NE	0.076	NE	NE	0.1	0.258	0.258	0.038	0.119	6.01
VOCs	1,1,1-Trichloroethane	71-55-6	mg/kg	NE	0.0121	810	3600	< 0.0006 U	< 0.001 U	< 0.0005 U	< 0.0007 U	< 0.0006 U	< 0.0007 U
VOCs	1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	NE	0.56913	0.6	2.7	< 0.0004 U	< 0.0007 U	< 0.0004 U	< 0.0004 U	< 0.0004 U	< 0.0005 U
VOCs	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	76-13-1	mg/kg	NE	NE	670	2800	< 0.0006 U	< 0.001 U	< 0.0005 U	< 0.0007 U	< 0.0006 U	< 0.0007 U
VOCs	1,1,2-Trichloroethane	79-00-5	mg/kg	NE	0.6012	0.15	0.63	< 0.0005 U	< 0.0008 U	< 0.0004 U	< 0.0006 U	< 0.0005 U	< 0.0006 U
VOCs	1,1-Dichloroethane	75-34-3	mg/kg	NE	0.008178	3.6	16	< 0.0005 U	< 0.0008 U	< 0.0004 U	< 0.0006 U	< 0.0005 U	< 0.0006 U
VOCs	1,1-Dichloroethene	75-35-4	mg/kg	NE	0.014725	23	100	< 0.0005 U	< 0.0008 U	< 0.0004 U	< 0.0006 U	< 0.0005 U	< 0.0006 U
VOCs	1,2,4-Trichlorobenzene	120-82-1	mg/kg	0.09612	0.011	5.8	26	< 0.005 U	< 0.008 UJ	< 0.004 U	< 0.006 U	< 0.005 U	< 0.006 U
VOCs	1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	NE	NE	0.0053	0.064	< 0.0004 U	< 0.0007 U	< 0.0004 U	< 0.0004 U	< 0.0004 U	< 0.0005 U
VOCs	1,2-Dibromoethane	106-93-4	mg/kg	NE	NE	0.036	0.16	< 0.0004 U	< 0.0007 U	< 0.0004 U	< 0.0004 U	< 0.0004 U	< 0.0005 U
VOCs	1,2-Dichlorobenzene	95-50-1	mg/kg	0.25914	0.004319	180	930	< 0.0005 U	< 0.0008 UJ	< 0.0004 U	< 0.0006 U	< 0.0005 U	< 0.0006 U
VOCs	1,2-Dichloroethane	107-06-2	mg/kg	NE	0.0174	0.46	2	< 0.0006 U	< 0.001 U	< 0.0005 U	< 0.0007 U	< 0.0006 U	< 0.0007 U
VOCs	1,2-Dichloropropane	78-87-5	mg/kg	NE	NE	1.6	6.6	< 0.0005 U	< 0.0008 U	< 0.0004 U	< 0.0006 U	< 0.0005 U	< 0.0006 U
VOCs	1,3-Dichlorobenzene	541-73-1	mg/kg	NE	0.43807	NE	NE	< 0.0005 U	< 0.0008 UJ	< 0.0004 U	< 0.0006 U	< 0.0005 U	< 0.0006 U
VOCs	1,4-Dichlorobenzene	106-46-7	mg/kg	NE	0.03	2.6	11	< 0.0004 U	< 0.0007 UJ	< 0.0004 U	< 0.0004 U	< 0.0004 U	< 0.0005 U
VOCs	2-Butanone	78-93-3	mg/kg	NE	0.924716	2700	19000	0.018	0.19	0.005 J	0.007 J	0.008 J	< 0.001 U
VOCs	2-Hexanone	591-78-6	mg/kg	NE	0.0128898	20	130	< 0.001 U	< 0.002 U	< 0.0009 U	< 0.001 U	< 0.001 U	< 0.001 U
VOCs	4-Methyl-2-pentanone	108-10-1	mg/kg	NE	0.0323	3300	14000	< 0.001 U	< 0.002 U	< 0.0009 U	< 0.001 U	< 0.001 U	< 0.001 U
VOCs	Acetone	67-64-1	mg/kg	NE	0.065	6100	67000	0.11	0.72	0.017 J	0.031 J	0.035	< 0.007 U
VOCs	Benzene	71-43-2	mg/kg	0.06479	0.01	1.2	5.1	< 0.0005 U	< 0.0008 UJ	< 0.0004 U	< 0.0006 U	< 0.0005 U	< 0.0006 U
VOCs	Bromodichloromethane	75-27-4	mg/kg	NE	NE	0.29	1.3	< 0.0004 U	< 0.0007 U	< 0.0004 U	< 0.0004 U	< 0.0004 U	< 0.0005 U
VOCs	Bromoform	75-25-2	mg/kg	NE	0.27872	19	86	< 0.005 U	< 0.008 U	< 0.004 U	< 0.006 U	< 0.005 U	< 0.006 U
VOCs	Bromomethane	74-83-9	mg/kg	NE	NE	0.68	3	< 0.0007 U	< 0.001 U	< 0.0006 U	< 0.0008 U	< 0.0007 U	< 0.0008 U
VOCs	Carbon disulfide	75-15-0	mg/kg	NE	0.00042044	77	350	0.002 J	0.001 J	0.005	< 0.0007 U	0.002 J	< 0.0007 U
VOCs	Carbon tetrachloride	56-23-5	mg/kg	NE	0.017052	0.65	2.9	< 0.0005 U	< 0.0008 U	< 0.0004 U	< 0.0006 U	< 0.0005 U	< 0.0006 U
VOCs	Chlorobenzene	108-90-7	mg/kg	0.05475	0.002847	28	130	< 0.0005 U	< 0.0008 UJ	< 0.0004 U	< 0.0006 U	< 0.0005 U	< 0.0006 U
VOCs	Chloroethane	75-00-3	mg/kg	NE	NE	1400	5700	< 0.001 U	< 0.002 U	< 0.0009 U	< 0.001 U	< 0.001 U	< 0.001 U
VOCs	Chloroform	67-66-3	mg/kg	NE	0.0007164	0.32	1.4	< 0.0006 U	< 0.001 U	< 0.0005 U	< 0.0007 U	< 0.0006 U	< 0.0007 U
VOCs	Chloromethane	74-87-3	mg/kg	NE	NE	11	46	< 0.0006 U	< 0.001 U	< 0.0005 U	< 0.0007 U	< 0.0006 U	< 0.0007 U
VOCs	cis-1,2-Dichloroethene	156-59-2	mg/kg	NE	NE	16	230	< 0.0005 U	< 0.0008 U	< 0.0004 U	< 0.0006 U	< 0.0005 U	< 0.0006 U
VOCs	cis-1,3-Dichloropropene	10061-01-5	mg/kg	NE	0.000025135	NE	NE	< 0.0004 U	< 0.0007 U	< 0.0004 U	< 0.0004 U	< 0.0004 U	< 0.0005 U
VOCs	cyclohexane	110-82-7	mg/kg	NE	NE	650	2700	< 0.0005 U	< 0.0008 U	< 0.0004 U	< 0.0006 U	< 0.0005 U	< 0.0006 U
VOCs	Cyclohexanone	108-94-1	mg/kg	NE	NE	2800	13000	< 0.025 U	< 0.042 U	< 0.022 U	< 0.028 U	< 0.025 U	< 0.028 U
VOCs	Dibromochloromethane	124-48-1	mg/kg	NE	NE	8.3	39	< 0.0004 U	< 0.0007 U	< 0.0004 U	< 0.0004 U	< 0.0004 U	< 0.0005 U
VOCs	Dichlorodifluoromethane	75-71-8	mg/kg	NE	NE	8.7	37	< 0.0006 U	< 0.001 U	< 0.0005 U	< 0.0007 U	< 0.0006 U	< 0.0007 U
VOCs	Ethylbenzene	100-41-4	mg/kg	0.09075	0.026499	5.8	25	< 0.0004 U	< 0.0007 UJ	< 0.0004 U	< 0.0004 U	< 0.0004 U	< 0.0005 U
VOCs	Isopropylbenzene	98-82-8	mg/kg	NE	NE	190	990	< 0.0004 U	< 0.0007 UJ	< 0.0004 U	< 0.0004 U	< 0.0004 U	< 0.0005 U
VOCs	Methyl acetate	79-20-9	mg/kg	NE	NE	7800	120000	0.003 J	< 0.002 U	0.001 J	0.002 J	< 0.001 U	< 0.001 U
VOCs	Methyl Tertiary Butyl Ether	1634-04-4	mg/kg	NE	NE	47	210	< 0.0005 U	< 0.0008 U	< 0.0004 U	< 0.0006 U	< 0.0005 U	< 0.0006 U
VOCs	methylcyclohexane	108-87-2	mg/kg	NE	NE	NE	NE	< 0.0006 U	< 0.001 U	< 0.0005 U	< 0.0007 U	< 0.0006 U	< 0.0007 U
VOCs	Methylene chloride	75-09-2	mg/kg	NE	0.0114777	35	320	< 0.002 U	< 0.003 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U
VOCs	Styrene	100-42-5	mg/kg	NE	0.55872	600	3500	< 0.0003 U	< 0.0005 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U
VOCs	Tetrachloroethene	127-18-4	mg/kg	NE	0.002	8.1	39	< 0.0005 U	< 0.0008 U	< 0.0004 U	< 0.0006 U	< 0.0005 U	< 0.0006 U
VOCs	Toluene	108-88-3	mg/kg	0.3913	0.00364	490	4700	< 0.0006 U	< 0.001 UJ	< 0.0005 U	0.004 J	< 0.0006 U	< 0.0007 U

Table 4-8. Sediment Analytical Results

Analyte Group	Chemical Name	CAS #	Units	Screening Benchmarks				OU2-1-SE001	OU2-1-SE002	OU2-1-SE003	OU2-1-SE004	OU1-1-SE005	REF-1-SE001
				Sediment ESV - Marine	Sediment ESV - Freshwater	Soil RSL - Resident (THQ = 0.1)	Soil RSL - Industrial (THQ = 0.1)	10/22/2018	10/22/2018	10/22/2018	10/22/2018	10/23/2018	10/23/2018
								0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs	0 - 0.5 ft bgs
VOCs	trans-1,2-Dichloroethene	156-60-5	mg/kg	NE	0.30975	160	2300	< 0.0005 U	< 0.0008 U	< 0.0004 U	< 0.0006 U	< 0.0005 U	< 0.0006 U
VOCs	trans-1,3-Dichloropropene	10061-02-6	mg/kg	NE	0.000025135	NE	NE	< 0.0003 U	< 0.0005 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U
VOCs	Trichloroethene	79-01-6	mg/kg	NE	0.03486	0.41	1.9	< 0.0005 U	< 0.0008 U	< 0.0004 U	< 0.0006 U	< 0.0005 U	< 0.0006 U
VOCs	Trichlorofluoromethane	75-69-4	mg/kg	NE	NE	2300	35000	< 0.0007 U	< 0.001 U	< 0.0006 U	< 0.0008 U	< 0.0007 U	< 0.0008 U
VOCs	Vinyl chloride	75-01-4	mg/kg	NE	NE	0.059	1.7	< 0.0006 U	< 0.001 U	< 0.0005 U	< 0.0007 U	< 0.0006 U	< 0.0007 U
VOCs	Xylenes (total)	1330-20-7	mg/kg	NE	0.13	58	250	< 0.001 U	< 0.002 UJ	< 0.0009 U	< 0.001 U	< 0.001 U	< 0.001 U
Rad	Thorium-232 (via Ac-228)[1]	14331-83-0	pCi/g	1300	1300	1.1	NE	0.65	0.84 J+	0.47	0.39	0.24 J-	0.49 J+
Rad	Radium-226 (via Bi-214)[1]	14733-03-0	pCi/g	79.9	79.9	0.6	NE	0.61 J	0.81 J+	0.48	0.31	0.29 J-	0.51 J+
Rad	Uranium-238 (via Pa-234m)[1,2]	15100-28-4	pCi/g	227	227	14	NE	< 0.36 U	< 0.26 U	< 0.34 U	< 0.38 U	< 0.25 UJ	< 0.27 U

Notes:

For samples with duplicates, the maximum result of the duplicate and standard sample was reported.

BLUE	Exceeds Resident Soil RSL (THQ = 0.1)
RED	Exceeds Industrial Soil RSL (THQ = 0.1)
HIGHLIGHT	Exceeds Soil ESV(s)

NE = not established

U = not detected above method detection limit

UJ = not detected above method detection limit; method detection limit estimated

J = estimated value, unknown bias

J+ = estimated value, may be biased high

J- = estimated value, may be biased low

R = data rejected during validation

1 - The human health soil screening benchmarks for radionuclides are based on soil screening levels specified in NUREG 1757, Volume 1 (U.S. NRC, 2006).

2 - Pa-234m is reported as Pa-234 in the analytical reports presented in Appendix I.

Table 4-9. Surface Water Statistical Summary

Analyte Group	Analyte	Unit	# Samples	# Detects	Frequency of Detection	Min	Max	Average	Standard Deviation	Surface Water ESV Amphibian		Surface Water ESV Freshwater		Surface Water ESV Marine		Federal MCL		Tapwater RSL (THQ = 0.1)	
										Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances
Herbicides	2,4,5-T	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	16	0
Herbicides	2,4,5-TP (Silvex)	µg/L	6	5	0.833	0.014	0.02	0.0160	0.00245	NE	0	NE	0	NE	0	50	0	11	0
Herbicides	2,4-D	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	4	0	NE	0	70	0	17	0
Herbicides	2,4-DB	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	932	0	NE	0	NE	0	45	0
Herbicides	2,4-DP (Dichloroprop)	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	NE	0
Herbicides	Dalapon	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	200	0	60	0
Herbicides	Dicamba	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	10	0	NE	0	NE	0	57	0
Herbicides	Dinoseb	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	0.05	0	NE	0	7	0	1.5	0
Herbicides	MCPA (2-Methyl-4-chlorophenoxy acetic acid)	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	2.6	0	4.2	0	NE	0	0.75	0
Herbicides	MCPP (2-(2-Methyl-4-chlorophenoxy) propanoic acid)	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	1.6	0
Metals	Aluminum	µg/L	6	4	0.667	42.7	203	99.2	70.9	87	1	5	4	NE	0	NE	0	2000	0
Metals	Antimony	µg/L	6	3	0.500	0.42	0.85	0.690	0.235	NE	0	30	0	NE	0	6	0	0.78	2
Metals	Arsenic	µg/L	6	6	1.00	0.95	4.4	2.14	1.36	150	0	3.1	2	12.5	0	10	0	0.052	6
Metals	Barium	µg/L	6	6	1.00	33	308	170	105	NE	0	3.9	6	NE	0	2000	0	380	0
Metals	Beryllium	µg/L	6	0	0.00	NA	NA	NA	NA	0.66	0	0.66	0	NE	0	4	0	2.5	0
Metals	Cadmium	µg/L	6	1	0.167	0.33	0.33	0.330	NA	0.360421	0	0.07	1	0.12	1	5	0	0.92	0
Metals	Calcium (Ca)	µg/L	6	6	1.00	25200	132000	75500	36600	NE	0	116000	1	NE	0	NE	0	NE	0
Metals	Chromium	µg/L	6	6	1.00	1	17.8	5.72	6.69	NE	0	NE	0	NE	0	100	0	NE	0
Metals	Cobalt	µg/L	6	6	1.00	0.87	1.8	1.33	0.316	23	0	3	0	NE	0	NE	0	0.6	6
Metals	Copper	µg/L	6	1	0.167	17.8	17.8	17.8	NA	1.6	1	0.23	1	3.1	1	1300	0	80	0
Metals	Iron (Fe)	µg/L	6	6	1.00	336	11900	4070	4370	1000	5	158	6	NE	0	NE	0	1400	4
Metals	Lead	µg/L	6	3	0.500	1.4	8.7	4.03	4.05	0.916181	3	NE	0	8.1	1	15	0	15	0
Metals	Magnesium (Mg)	µg/L	6	6	1.00	13000	86700	36000	26100	NE	0	82000	1	NE	0	NE	0	NE	0
Metals	Manganese (Mn)	µg/L	6	6	1.00	67.3	1210	626	435	NE	0	112	5	NE	0	NE	0	43	6
Metals	Mercury	µg/L	6	2	0.333	0.055	0.059	0.0570	0.00283	0.77	0	0.026	2	0.016	2	2	0	0.063	0
Metals	Nickel	µg/L	6	6	1.00	8.8	18.7	11.7	3.71	23.9553	0	5	6	8.2	6	NE	0	39	0
Metals	Potassium (K)	µg/L	6	6	1.00	5440	29300	11400	9180	NE	0	53000	0	NE	0	NE	0	NE	0
Metals	Selenium	µg/L	6	0	0.00	NA	NA	NA	NA	5	0	1	0	71	0	50	0	10	0
Metals	Silver	µg/L	6	1	0.167	0.3	0.3	0.300	NA	0.0665214	1	NE	0	0.19	1	NE	0	9.4	0
Metals	Sodium (Na)	µg/L	6	6	1.00	47200	677000	205000	244000	NE	0	680000	0	NE	0	NE	0	NE	0
Metals	Thallium	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	0.03	0	NE	0	2	0	0.02	0
Metals	Vanadium	µg/L	6	6	1.00	0.46	5.3	1.70	1.86	NE	0	19	0	NE	0	NE	0	8.6	0
Metals	Zinc	µg/L	6	4	0.667	6.5	39.6	19.8	14.8	54.3524	0	30	1	81	0	NE	0	600	0
PCBs	Aroclor 1016	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	0.014	0	NE	0	NE	0	0.14	0
PCBs	Aroclor 1221	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	0.014	0	NE	0	NE	0	0.0047	0
PCBs	Aroclor 1232	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	0.014	0	NE	0	NE	0	0.0047	0
PCBs	Aroclor 1242	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	0.014	0	NE	0	NE	0	0.0078	0
PCBs	Aroclor 1248	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	0.014	0	NE	0	NE	0	0.0078	0
PCBs	Aroclor 1254	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	0.014	0	NE	0	NE	0	0.0078	0
PCBs	Aroclor 1260	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	0.014	0	NE	0	NE	0	0.0078	0
PCBs	Aroclor 1262	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	NE	0
PCBs	Aroclor 1268	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	NE	0
PCBs	Total PCBs	µg/L	6	0	0.00	NA	NA	NA	NA	0.014	0	0.014	0	0.03	0	NE	0	NE	0
Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	µg/L	6	2	0.333	0.000002	0.000003	0.00000250	0.000000707	NE	0	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	µg/L	6	3	0.500	0.000004	0.000007	0.00000567	0.00000153	NE	0	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	NE	0

Table 4-9. Surface Water Statistical Summary

Analyte Group	Analyte	Unit	# Samples	# Detects	Frequency of Detection	Min	Max	Average	Standard Deviation	Surface Water ESV Amphibian		Surface Water ESV Freshwater		Surface Water ESV Marine		Federal MCL		Tapwater RSL (THQ = 0.1)	
										Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances
Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	2,3,7,8-TCDD	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	2e-006	0	NE	0	3e-005	0	1.2e-007	0
Dioxins/Furans	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	Octachlorodibenzofuran (OCDF)	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	Octachlorodibenzo-p-dioxin (OCDD)	µg/L	6	4	0.667	0.000044	0.000072	0.0000565	0.0000123	NE	0	NE	0	NE	0	NE	0	NE	0
Dioxins/Furans	Dioxin TEQ	µg/L	6	4	0.667	2.16E-08	0.000000115	0.0000000720	0.0000000425	NE	0	2e-006	0	NE	0	3e-005	0	1.2e-007	0
Pesticides	4,4'-DDD	µg/L	6	0	0.00	NA	NA	NA	NA	0.011	0	0.011	0	NE	0	NE	0	0.0063	0
Pesticides	4,4'-DDE	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	100	0	NE	0	NE	0	0.046	0
Pesticides	4,4'-DDT	µg/L	6	2	0.333	0.029	0.03	0.0295	0.000707	0.001	2	0.001	2	0.001	2	NE	0	0.23	0
Pesticides	Aldrin	µg/L	6	0	0.00	NA	NA	NA	NA	0.3	0	0.3	0	0.13	0	NE	0	0.00092	0
Pesticides	alpha Chlordane	µg/L	6	1	0.167	0.0037	0.0037	0.00370	NA	0.0043	0	0.0043	0	0.004	0	NE	0	NE	0
Pesticides	alpha-BHC	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	2.2	0	NE	0	NE	0	0.0072	0
Pesticides	beta-BHC	µg/L	6	3	0.500	0.0061	0.017	0.0117	0.00546	NE	0	2.2	0	NE	0	NE	0	0.025	0
Pesticides	Chlordane	µg/L	6	0	0.00	NA	NA	NA	NA	0.0043	0	0.0043	0	0.004	0	NE	0	NE	0
Pesticides	delta-BHC	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	2.2	0	NE	0	NE	0	NE	0
Pesticides	Dieldrin	µg/L	6	0	0.00	NA	NA	NA	NA	0.056	0	0.056	0	0.0019	0	NE	0	0.0018	0
Pesticides	Endosulfan I	µg/L	6	3	0.500	0.0051	0.0068	0.00607	0.000874	0.056	0	0.003	3	0.002	3	NE	0	NE	0
Pesticides	Endosulfan II	µg/L	6	0	0.00	NA	NA	NA	NA	0.056	0	0.003	0	0.002	0	NE	0	NE	0
Pesticides	Endosulfan sulfate	µg/L	6	0	0.00	NA	NA	NA	NA	0.056	0	0.003	0	0.002	0	NE	0	NE	0
Pesticides	Endrin	µg/L	6	0	0.00	NA	NA	NA	NA	0.036	0	0.036	0	0.0023	0	2	0	0.23	0
Pesticides	Endrin aldehyde	µg/L	6	0	0.00	NA	NA	NA	NA	0.036	0	0.036	0	0.0023	0	NE	0	NE	0
Pesticides	Endrin ketone	µg/L	6	0	0.00	NA	NA	NA	NA	0.036	0	0.036	0	0.0023	0	NE	0	NE	0
Pesticides	gamma Chlordane	µg/L	6	0	0.00	NA	NA	NA	NA	0.0043	0	NE	0	0.004	0	NE	0	NE	0
Pesticides	gamma-BHC (Lindane)	µg/L	6	1	0.167	0.0022	0.0022	0.00220	NA	0.095	0	0.01	0	0.016	0	0.2	0	0.042	0
Pesticides	Heptachlor	µg/L	6	1	0.167	0.0042	0.0042	0.00420	NA	0.0038	1	0.0038	1	0.0036	1	0.4	0	0.0014	1
Pesticides	Heptachlor epoxide	µg/L	6	0	0.00	NA	NA	NA	NA	0.0038	0	0.0038	0	0.0036	0	0.2	0	0.0014	0
Pesticides	Methoxychlor	µg/L	6	0	0.00	NA	NA	NA	NA	0.03	0	0.019	0	0.03	0	40	0	3.7	0
Pesticides	Toxaphene	µg/L	6	0	0.00	NA	NA	NA	NA	0.0002	0	0.0002	0	0.0002	0	3	0	0.071	0
SVOCs/PAHs	1,2,4-Trichlorobenzene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	24	0	5.4	0	70	0	0.4	0
SVOCs/PAHs	1,2-Dichlorobenzene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	0.7	0	42	0	600	0	30	0
SVOCs/PAHs	1,3-Dichlorobenzene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	71	0	NE	0	NE	0	NE	0
SVOCs/PAHs	1,4-Dichlorobenzene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	15	0	NE	0	75	0	0.48	0
SVOCs/PAHs	1,4-Dioxane	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	0.46	0
SVOCs/PAHs	2,4,5-Trichlorophenol	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	18	0	NE	0	NE	0	120	0
SVOCs/PAHs	2,4,6-Trichlorophenol	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	18	0	NE	0	NE	0	1.2	0
SVOCs/PAHs	2,4-Dichlorophenol	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	0.2	0	NE	0	NE	0	4.6	0
SVOCs/PAHs	2,4-Dimethylphenol	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	36	0
SVOCs/PAHs	2,4-Dinitrophenol	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	3.9	0
SVOCs/PAHs	2,4-Dinitrotoluene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	65	0	NE	0	NE	0	0.24	0
SVOCs/PAHs	2,6-Dinitrotoluene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	230	0	NE	0	NE	0	0.049	0
SVOCs/PAHs	2-Chloronaphthalene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	75	0
SVOCs/PAHs	2-Chlorophenol	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	7	0	NE	0	NE	0	9.1	0
SVOCs/PAHs	2-Methylnaphthalene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	330	0	NE	0	NE	0	3.6	0

Table 4-9. Surface Water Statistical Summary

Analyte Group	Analyte	Unit	# Samples	# Detects	Frequency of Detection	Min	Max	Average	Standard Deviation	Surface Water ESV Amphibian		Surface Water ESV Freshwater		Surface Water ESV Marine		Federal MCL		Tapwater RSL (THQ = 0.1)	
										Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances
SVOCs/PAHs	2-Methylphenol	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	13	0	NE	0	NE	0	93	0
SVOCs/PAHs	2-Nitroaniline	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	19	0
SVOCs/PAHs	2-Nitrophenol	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	60	0	NE	0	NE	0	NE	0
SVOCs/PAHs	3,3-Dichlorobenzidine	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	0.13	0
SVOCs/PAHs	3-Nitroaniline	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	NE	0
SVOCs/PAHs	4,6-Dinitro-2-methylphenol	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	0.15	0
SVOCs/PAHs	4-Bromophenyl-phenylether	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	1.5	0	NE	0	NE	0	NE	0
SVOCs/PAHs	4-Chloro-3-methylphenol	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	140	0
SVOCs/PAHs	4-Chloroaniline	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	0.37	0
SVOCs/PAHs	4-Chlorophenyl-phenylether	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	NE	0
SVOCs/PAHs	4-Methylphenol	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	190	0
SVOCs/PAHs	4-Nitroaniline	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	3.8	0
SVOCs/PAHs	4-Nitrophenol	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	60	0	NE	0	NE	0	NE	0
SVOCs/PAHs	Acenaphthene	µg/L	6	1	0.167	0.04	0.04	0.0400	NA	NE	0	5.8	0	NE	0	NE	0	53	0
SVOCs/PAHs	Acenaphthylene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	4800	0	NE	0	NE	0	NE	0
SVOCs/PAHs	Aniline	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	13	0
SVOCs/PAHs	Anthracene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	0.012	0	NE	0	NE	0	180	0
SVOCs/PAHs	Benzo(a)anthracene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	0.018	0	NE	0	NE	0	0.03	0
SVOCs/PAHs	Benzo(a)pyrene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	0.014	0	NE	0	0.2	0	0.025	0
SVOCs/PAHs	Benzo(a)Pyrene TEQ	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	0.2	0	0.025	0
SVOCs/PAHs	Benzo(b)fluoranthene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	9	0	NE	0	NE	0	0.25	0
SVOCs/PAHs	Benzo(g,h,i)perylene	µg/L	6	1	0.167	0.01	0.01	0.0100	NA	NE	0	7.6	0	NE	0	NE	0	NE	0
SVOCs/PAHs	Benzo(k)fluoranthene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	0.0041	0	NE	0	NE	0	2.5	0
SVOCs/PAHs	Benzyl Alcohol	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	200	0
SVOCs/PAHs	Bis(2-chloro-1-methylethyl) ether	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	71	0
SVOCs/PAHs	Bis(2-chloroethoxy)methane	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	5.9	0
SVOCs/PAHs	Bis(2-chloroethyl)ether	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	0.014	0
SVOCs/PAHs	Bis(2-ethylhexyl)phthalate	µg/L	6	1	0.167	0.1	0.1	0.100	NA	3	0	3	0	NE	0	6	0	5.6	0
SVOCs/PAHs	Carbazole	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	NE	0
SVOCs/PAHs	Chrysene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	0.0018	0	NE	0	NE	0	25	0
SVOCs/PAHs	Dibenz(a,h)anthracene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	0.0034	0	NE	0	NE	0	0.025	0
SVOCs/PAHs	Dibenzofuran	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	3.7	0	NE	0	NE	0	0.79	0
SVOCs/PAHs	Diethyl phthalate	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	210	0	NE	0	NE	0	1500	0
SVOCs/PAHs	Dimethyl phthalate	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	3	0	NE	0	NE	0	NE	0
SVOCs/PAHs	Di-n-butyl phthalate	µg/L	6	2	0.333	0.07	0.07	0.0700	0.00	NE	0	19	0	NE	0	NE	0	90	0
SVOCs/PAHs	Di-n-octyl phthalate	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	3	0	NE	0	NE	0	20	0
SVOCs/PAHs	Fluoranthene	µg/L	6	1	0.167	0.01	0.01	0.0100	NA	NE	0	0.04	0	NE	0	NE	0	80	0
SVOCs/PAHs	Fluorene	µg/L	6	1	0.167	0.02	0.02	0.0200	NA	NE	0	3	0	NE	0	NE	0	29	0
SVOCs/PAHs	Hexachlorobenzene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	1	0	0.0098	0
SVOCs/PAHs	Hexachlorobutadiene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	1.3	0	NE	0	NE	0	0.14	0
SVOCs/PAHs	hexachlorocyclopentadiene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	50	0	0.041	0
SVOCs/PAHs	Hexachloroethane	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	12	0	NE	0	NE	0	0.33	0
SVOCs/PAHs	Indeno(1,2,3-cd)pyrene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	4.3	0	NE	0	NE	0	0.25	0
SVOCs/PAHs	Isophorone	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	78	0
SVOCs/PAHs	Naphthalene	µg/L	6	5	0.833	0.05	0.2	0.0820	0.0661	NE	0	1.1	0	1.4	0	NE	0	0.17	1
SVOCs/PAHs	Nitrobenzene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	550	0	NE	0	NE	0	0.14	0
SVOCs/PAHs	n-Nitroso-di-n-propylamine	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	0.011	0
SVOCs/PAHs	n-Nitrosodiphenylamine	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	40	0	NE	0	NE	0	12	0
SVOCs/PAHs	Pentachlorophenol	µg/L	6	0	0.00	NA	NA	NA	NA	15	0	0.5	0	7.9	0	1	0	0.041	0

Table 4-9. Surface Water Statistical Summary

Analyte Group	Analyte	Unit	# Samples	# Detects	Frequency of Detection	Min	Max	Average	Standard Deviation	Surface Water ESV Amphibian		Surface Water ESV Freshwater		Surface Water ESV Marine		Federal MCL		Tapwater RSL (THQ = 0.1)	
										Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances
SVOCs/PAHs	Phenanthrene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	0.4	0	NE	0	NE	0	NE	0
SVOCs/PAHs	Phenol	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	4	0	NE	0	NE	0	580	0
SVOCs/PAHs	Pyrene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	0.025	0	NE	0	NE	0	12	0
SVOCs/PAHs	Pyridine	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	2	0
SVOCs/PAHs	Total HMW PAHs	µg/L	6	1	0.167	0.01	0.01	0.0100	NA	NE	0	NE	0	NE	0	NE	0	NE	0
SVOCs/PAHs	Total LMW PAHs	µg/L	6	5	0.833	0.05	0.2	0.0960	0.0650	NE	0	NE	0	NE	0	NE	0	NE	0
VOCs	1,1,1-Trichloroethane	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	11	0	NE	0	200	0	800	0
VOCs	1,1,2,2-Tetrachloroethane	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	610	0	NE	0	NE	0	0.076	0
VOCs	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	1000	0
VOCs	1,1,2-Trichloroethane	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	1200	0	NE	0	5	0	0.041	0
VOCs	1,1-Dichloroethane	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	47	0	NE	0	NE	0	2.8	0
VOCs	1,1-Dichloroethene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	25	0	NE	0	7	0	28	0
VOCs	1,2,4-Trichlorobenzene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	24	0	5.4	0	70	0	0.4	0
VOCs	1,2-Dibromo-3-chloropropane	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	0.2	0	0.00033	0
VOCs	1,2-Dibromoethane	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	0.05	0	0.0075	0
VOCs	1,2-Dichlorobenzene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	0.7	0	42	0	600	0	30	0
VOCs	1,2-Dichloroethane	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	100	0	NE	0	5	0	0.17	0
VOCs	1,2-Dichloropropane	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	5	0	0.82	0
VOCs	1,3-Dichlorobenzene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	71	0	NE	0	NE	0	NE	0
VOCs	1,4-Dichlorobenzene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	15	0	NE	0	75	0	0.48	0
VOCs	2-Butanone	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	7200	0	NE	0	NE	0	560	0
VOCs	2-Hexanone	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	99	0	NE	0	NE	0	3.8	0
VOCs	4-Methyl-2-pentanone	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	170	0	NE	0	NE	0	630	0
VOCs	Acetone	µg/L	6	6	1.00	2.1	4.2	3.00	0.790	NE	0	1500	0	NE	0	NE	0	1400	0
VOCs	Benzene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	46	0	110	0	5	0	0.46	0
VOCs	Bromodichloromethane	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	0.13	0
VOCs	Bromoform	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	320	0	NE	0	NE	0	3.3	0
VOCs	Bromomethane	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	1300	0	NE	0	NE	0	0.75	0
VOCs	Carbon disulfide	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	0.92	0	NE	0	NE	0	81	0
VOCs	Carbon tetrachloride	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	9.8	0	NE	0	5	0	0.46	0
VOCs	Chlorobenzene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	1.3	0	25	0	100	0	7.8	0
VOCs	Chloroethane	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	2100	0
VOCs	Chloroform	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	1.8	0	NE	0	NE	0	0.22	0
VOCs	Chloromethane	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	19	0
VOCs	cis-1,2-Dichloroethene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	590	0	NE	0	70	0	3.6	0
VOCs	cis-1,3-Dichloropropene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	0.055	0	NE	0	NE	0	NE	0
VOCs	cyclohexane	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	1300	0
VOCs	Cyclohexanone	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	140	0
VOCs	Dibromochloromethane	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	0.87	0
VOCs	Dichlorodifluoromethane	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	20	0
VOCs	Ethylbenzene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	7.3	0	25	0	700	0	1.5	0
VOCs	Isopropylbenzene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	45	0
VOCs	Methyl acetate	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	2000	0
VOCs	Methyl Tertiary Butyl Ether	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	10000	0	5000	0	NE	0	14	0
VOCs	methylcyclohexane	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	NE	0
VOCs	Methylene chloride	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	98.1	0	NE	0	5	0	11	0
VOCs	Styrene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	72	0	NE	0	100	0	120	0
VOCs	Tetrachloroethene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	50	0	NE	0	5	0	4.1	0
VOCs	Toluene	µg/L	6	4	0.667	0.1	0.2	0.150	0.0577	NE	0	2	0	215	0	1000	0	110	0

Table 4-9. Surface Water Statistical Summary

Analyte Group	Analyte	Unit	# Samples	# Detects	Frequency of Detection	Min	Max	Average	Standard Deviation	Surface Water ESV Amphibian		Surface Water ESV Freshwater		Surface Water ESV Marine		Federal MCL		Tapwater RSL (THQ = 0.1)	
										Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances	Value	Exeedances
VOCs	trans-1,2-Dichloroethene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	590	0	NE	0	100	0	36	0
VOCs	trans-1,3-Dichloropropene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	0.055	0	NE	0	NE	0	NE	0
VOCs	Trichloroethene	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	21	0	NE	0	5	0	0.28	0
VOCs	Trichlorofluoromethane	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	NE	0	520	0
VOCs	Vinyl chloride	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	NE	0	NE	0	2	0	0.019	0
VOCs	Xylenes (total)	µg/L	6	0	0.00	NA	NA	NA	NA	NE	0	13	0	NE	0	10000	0	19	0
Rad	Gross Alpha	pCi/L	6	4	0.667	1.17	10.2	4.57	3.91	NE	0	NE	0	NE	0	15	0	NE	0
Rad	Gross Beta	pCi/L	6	6	1.00	4.9	21.3	8.82	6.27	NE	0	NE	0	NE	0	50	0	NE	0
Rad	Radium 226	pCi/L	6	3	0.500	0.47	0.81	0.680	0.184	NE	0	0.1	3	8110	0	5	0	NE	0
Rad	Radium 228	pCi/L	6	1	0.167	29.8	29.8	29.8	NA	NE	0	0.09	1	6780	0	5	1	NE	0
Rad	Total Ra 226&228	pCi/L	6	4	0.667	0.47	29.8	7.96	14.6	NE	0	NE	0	NE	0	5	1	NE	0
Rad	Total Uranium	µg/L	6	6	1.00	0.21	0.58	0.390	0.148	NE	0	24	0	406000	0	30	0	NE	0

NA - not applicable

NE - not established

µg/L - micrograms per liter

pCi/L - picocuries per liter

Table 4-10. Surface Water Analytical Results

Analyte Group	Chemical Name	CAS #	Units	Screening Benchmarks					OU1-1-SW005	OU2-1-SW001	OU2-1-SW002	OU2-1-SW003	OU2-1-SW004	REF-1-SW001
				Surface Water ESV - Amphibian	Surface Water ESV - Freshwater	Surface Water ESV - Marine	Tapwater RSL (THQ = 0.1)	Federal MCL	10/19/2018	10/18/2018	10/19/2018	10/18/2018	10/18/2018	10/18/2018
Herbicides	2,4,5-T	93-76-5	ug/L	NE	NE	NE	16	NE	< 0.061 U	< 0.065 U	< 0.063 U	< 0.067 U	< 0.067 U	< 0.068 U
Herbicides	2,4,5-TP (Silvex)	93-72-1	ug/L	NE	NE	NE	11	50	0.014 J	0.016 J	0.014 J	0.016 J	< 0.024 U	0.020 J
Herbicides	2,4-D	94-75-7	ug/L	NE	4	NE	17	70	< 0.24 U	< 0.25 U	< 0.24 U	< 0.26 U	< 0.26 U	< 0.26 U
Herbicides	2,4-DB	94-82-6	ug/L	NE	932	NE	45	NE	< 0.59 U	< 0.63 U	< 0.61 U	< 0.65 U	< 0.65 U	< 0.66 U
Herbicides	2,4-DP (Dichloroprop)	120-36-5	ug/L	NE	NE	NE	NE	NE	< 0.15 U	< 0.16 U	< 0.15 U	< 0.17 U	< 0.17 U	< 0.17 U
Herbicides	Dalapon	75-99-0	ug/L	NE	NE	NE	60	200	< 1.7 U	< 1.8 U	< 1.7 U	< 1.9 U	< 1.9 U	< 1.9 U
Herbicides	Dicamba	1918-00-9	ug/L	NE	10	NE	57	NE	< 0.075 U	< 0.080 U	< 0.077 U	< 0.083 U	< 0.083 U	< 0.084 U
Herbicides	Dinoseb	88-85-7	ug/L	NE	0.05	NE	1.5	7	< 0.17 UJ	< 0.18 UJ	< 0.17 UJ	< 0.19 UJ	< 0.19 UJ	< 0.19 UJ
Herbicides	MCPA (2-Methyl-4-chlorophenoxy acetic acid)	94-74-6	ug/L	NE	2.6	4.2	0.75	NE	< 47 U	< 50 U	< 48 U	< 52 U	< 52 U	< 52 U
Herbicides	MCPP (2-(2-Methyl-4-chlorophenoxy) propanoic acid)	93-65-2	ug/L	NE	NE	NE	1.6	NE	< 47 U	< 50 U	< 48 U	< 52 U	< 52 U	< 52 U
Metals	Aluminum	7429-90-5	ug/L	87	5	NE	2000	NE	73.8 J	77.1 J	42.7 J	203 J	< 19.7 U	< 19.7 U
Metals	Antimony	7440-36-0	ug/L	NE	30	NE	0.78	6	< 0.41 U	< 0.41 U	0.42 J	0.80 J	0.85 J	< 0.41 U
Metals	Arsenic	7440-38-2	ug/L	150	3.1	12.5	0.052	10	1.5 J	0.95 J	4.4	1.6 J	3.2	1.2 J
Metals	Barium	7440-39-3	ug/L	NE	3.9	NE	380	2000	116	33.0	284	308	138	143
Metals	Beryllium	7440-41-7	ug/L	0.66	0.66	NE	2.5	4	< 0.091 U	< 0.091 U	< 0.091 U	< 0.091 U	< 0.091 U	< 0.091 U
Metals	Cadmium	7440-43-9	ug/L	0.360421	0.07	0.12	0.92	5	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	0.33 J	< 0.15 U
Metals	Calcium (Ca)	7440-70-2	ug/L	NE	116000	NE	NE	NE	57500	60700	132000	94600	25200	83000
Metals	Chromium	7440-47-3	ug/L	NE	NE	NE	NE	100	9.4	2.0 J	1.3 J	2.8 J	17.8	1.0 J
Metals	Cobalt	7440-48-4	ug/L	23	3	NE	0.6	NE	0.87 J	1.4	1.8	1.2	1.5	1.2
Metals	Copper	7440-50-8	ug/L	1.6	0.23	3.1	80	1300	< 9.9 U	< 9.9 U	< 9.9 U	< 9.9 U	17.8 J	< 9.9 U
Metals	Iron (Fe)	7439-89-6	ug/L	1000	158	NE	1400	NE	1520	336	11900	3230	6250	1180
Metals	Lead	7439-92-1	ug/L	0.916181	NE	8.1	15	15	< 1.1 U	< 1.1 U	1.4 J	2.0 J	8.7	< 1.1 U
Metals	Magnesium (Mg)	7439-95-4	ug/L	NE	82000	NE	NE	NE	26200	37600	25300	86700	13000	27000
Metals	Manganese (Mn)	7439-96-5	ug/L	NE	112	NE	43	NE	747	178	1210	645	67.3	907
Metals	Mercury	7439-97-6	ug/L	0.77	0.026	0.016	0.063	2	< 0.050 U	0.055 J	0.059 J	< 0.050 U	< 0.050 U	< 0.050 U
Metals	Nickel	7440-02-0	ug/L	23.9553	5	8.2	39	NE	9.4	12.9	8.8	10.5	18.7	9.9
Metals	Potassium (K)	7440-09-7	ug/L	NE	53000	NE	NE	NE	6820	13300	6810	29300	7000	5440
Metals	Selenium	7782-49-2	ug/L	5	1	71	10	50	< 0.65 U	< 0.65 U	< 0.65 U	< 0.65 U	< 0.65 U	< 0.65 U
Metals	Silver	7440-22-4	ug/L	0.0665214	NE	0.19	9.4	NE	< 0.17 U	< 0.17 U	< 0.17 U	< 0.17 U	0.30 J	< 0.17 U
Metals	Sodium (Na)	7440-23-5	ug/L	NE	680000	NE	NE	NE	127000	253000	63000	677000	47200	61400
Metals	Thallium	7440-28-0	ug/L	NE	0.03	NE	0.02	2	< 0.11 U	< 0.11 U	< 0.11 U	< 0.11 U	< 0.11 U	< 0.11 U
Metals	Thorium	7440-29-1	ug/L	NE	NE	NE	NE	NE	< 205 U	< 205 U	< 205 U	< 205 U	< 205 U	< 205 U
Metals	Uranium	7440-61-1	ug/L	NE	24	406000	NE	30	0.63	0.50 J	0.23 J	0.44 J	0.20 J	0.33 J
Metals	Vanadium	7440-62-2	ug/L	NE	19	NE	8.6	NE	0.90 J	0.75 J	0.69 J	2.1	5.3	0.46 J
Metals	Zinc	7440-66-6	ug/L	54.3524	30	81	600	NE	< 6.2 U	10.8 J	6.5 J	22.4	39.6	< 6.2 U
PCBs	Aroclor 1016	12674-11-2	ug/L	NE	0.014	NE	0.14	NE	< 0.081 U	< 0.084 U	< 0.080 U	< 0.082 U	< 0.085 U	< 0.090 U
PCBs	Aroclor 1221	11104-28-2	ug/L	NE	0.014	NE	0.0047	NE	< 0.081 U	< 0.084 U	< 0.080 U	< 0.082 U	< 0.085 U	< 0.090 U
PCBs	Aroclor 1232	11141-16-5	ug/L	NE	0.014	NE	0.0047	NE	< 0.16 U	< 0.17 U	< 0.16 U	< 0.16 U	< 0.17 U	< 0.18 U
PCBs	Aroclor 1242	53469-21-9	ug/L	NE	0.014	NE	0.0078	NE	< 0.081 U	< 0.084 U	< 0.080 U	< 0.082 U	< 0.085 U	< 0.090 U
PCBs	Aroclor 1248	12672-29-6	ug/L	NE	0.014	NE	0.0078	NE	< 0.081 U	< 0.084 U	< 0.080 U	< 0.082 U	< 0.085 U	< 0.090 U
PCBs	Aroclor 1254	11097-69-1	ug/L	NE	0.014	NE	0.0078	NE	< 0.081 U	< 0.084 U	< 0.080 U	< 0.082 U	< 0.085 U	< 0.090 U
PCBs	Aroclor 1260	11096-82-5	ug/L	NE	0.014	NE	0.0078	NE	< 0.12 U	< 0.13 U	< 0.12 U	< 0.12 U	< 0.13 U	< 0.13 U
PCBs	Aroclor 1262	37324-23-5	ug/L	NE	NE	NE	NE	NE	< 0.16 U	< 0.17 U	< 0.16 U	< 0.16 U	< 0.17 U	< 0.18 U
PCBs	Aroclor 1268	11100-14-4	ug/L	NE	NE	NE	NE	NE	< 0.13 U	< 0.13 U	< 0.13 U	< 0.13 U	< 0.14 U	< 0.14 U
PCBs	Total PCBs	CALC-PCB	ug/L	0.014	0.014	0.03	NE	NE	< 0.16 U	< 0.17 U	< 0.16 U	< 0.16 U	< 0.17 U	< 0.18 U
Dioxin/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	67562-39-4	ug/L	NE	NE	NE	NE	NE	< 0.000002 U	< 0.000003 U	0.000003 J	0.000002 J	< 0.000003 U	< 0.000003 U
Dioxin/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	35822-46-9	ug/L	NE	NE	NE	NE	NE	0.000004 J	< 0.000005 U	0.000007 J	0.000006 J	< 0.000005 U	< 0.000005 U
Dioxin/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	55673-89-7	ug/L	NE	NE	NE	NE	NE	< 0.000002 U	< 0.000003 U	< 0.000002 U	< 0.000002 U	< 0.000003 U	< 0.000003 U

Table 4-10. Surface Water Analytical Results

Analyte Group	Chemical Name	CAS #	Units	Screening Benchmarks					OU1-1-SW005	OU2-1-SW001	OU2-1-SW002	OU2-1-SW003	OU2-1-SW004	REF-1-SW001
				Surface Water ESV - Amphibian	Surface Water ESV - Freshwater	Surface Water ESV - Marine	Tapwater RSL (THQ = 0.1)	Federal MCL	10/19/2018	10/18/2018	10/19/2018	10/18/2018	10/18/2018	10/18/2018
Dioxin/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	70648-26-9	ug/L	NE	NE	NE	NE	NE	< 0.000002 U	< 0.000003 U	< 0.000002 U	< 0.000002 U	< 0.000003 U	< 0.000003 U
Dioxin/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	39227-28-6	ug/L	NE	NE	NE	NE	NE	< 0.000002 U	< 0.000003 U	< 0.000002 U	< 0.000002 U	< 0.000003 U	< 0.000003 U
Dioxin/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	57117-44-9	ug/L	NE	NE	NE	NE	NE	< 0.000002 U	< 0.000003 U	< 0.000002 U	< 0.000002 U	< 0.000003 U	< 0.000003 U
Dioxin/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	57653-85-7	ug/L	NE	NE	NE	NE	NE	< 0.000002 U	< 0.000003 U	< 0.000002 U	< 0.000002 U	< 0.000003 U	< 0.000003 U
Dioxin/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	72918-21-9	ug/L	NE	NE	NE	NE	NE	< 0.000002 U	< 0.000003 U	< 0.000002 U	< 0.000002 U	< 0.000003 U	< 0.000003 U
Dioxin/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	19408-74-3	ug/L	NE	NE	NE	NE	NE	< 0.000002 U	< 0.000003 U	< 0.000002 U	< 0.000002 U	< 0.000003 U	< 0.000003 U
Dioxin/Furans	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	57117-41-6	ug/L	NE	NE	NE	NE	NE	< 0.000003 U	< 0.000003 U	< 0.000003 U	< 0.000003 U	< 0.000003 U	< 0.000003 U
Dioxin/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	40321-76-4	ug/L	NE	NE	NE	NE	NE	< 0.000003 U	< 0.000003 U	< 0.000003 U	< 0.000003 U	< 0.000003 U	< 0.000003 U
Dioxin/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	60851-34-5	ug/L	NE	NE	NE	NE	NE	< 0.000002 U	< 0.000003 U	< 0.000002 U	< 0.000002 U	< 0.000003 U	< 0.000003 U
Dioxin/Furans	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	57117-31-4	ug/L	NE	NE	NE	NE	NE	< 0.000002 U	< 0.000003 U	< 0.000002 U	< 0.000002 U	< 0.000003 U	< 0.000003 U
Dioxin/Furans	2,3,7,8-TCDD	1746-01-6	ug/L	NE	0.000002	NE	0.00000012	0.00003	< 0.0000008 U	< 0.0000009 U	< 0.0000008 U	< 0.0000009 U	< 0.0000009 U	< 0.0000009 U
Dioxin/Furans	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	51207-31-9	ug/L	NE	NE	NE	NE	NE	< 0.0000008 U	< 0.0000008 U	< 0.0000008 U	< 0.0000008 U	< 0.0000008 U	< 0.0000009 U
Dioxin/Furans	Octachlorodibenzofuran (OCDF)	39001-02-0	ug/L	NE	NE	NE	NE	NE	< 0.000006 U	< 0.000006 U	< 0.000006 U	< 0.000006 U	< 0.000006 U	< 0.000006 U
Dioxin/Furans	Octachlorodibenzo-p-dioxin (OCDD)	3268-87-9	ug/L	NE	NE	NE	NE	NE	0.000044 J	0.000072 J	0.000050 J	0.000060 J	< 0.000036 U	< 0.000038 U
Dioxin/Furans	Dioxin TEQ	CALC-TEQ	ug/L	NE	0.000002	NE	0.00000012	0.00003	0.0000000532	0.0000000216	0.000000115	0.000000098	< 0.0000008	< 0.0000009
Pesticides	4,4'-DDD	72-54-8	ug/L	0.011	0.011	NE	0.0063	NE	< 0.0040 U	< 0.0042 U	< 0.0040 U	< 0.0041 U	< 0.0043 U	< 0.0045 U
Pesticides	4,4'-DDE	72-55-9	ug/L	NE	100	NE	0.046	NE	< 0.0040 U	< 0.0042 U	< 0.0040 U	< 0.0041 U	< 0.0043 U	< 0.0045 U
Pesticides	4,4'-DDT	50-29-3	ug/L	0.001	0.001	0.001	0.23	NE	0.029	0.030	< 0.0042 U	< 0.0042 U	< 0.0044 U	< 0.0047 U
Pesticides	Aldrin	309-00-2	ug/L	0.3	0.3	0.13	0.00092	NE	< 0.0016 U	< 0.0017 U	< 0.0016 U	< 0.0016 U	< 0.0017 U	< 0.0018 U
Pesticides	alpha Chlordane	5103-71-9	ug/L	0.0043	0.0043	0.004	NE	NE	< 0.0024 U	0.0037 J	< 0.0024 U	< 0.0024 U	< 0.0026 U	< 0.0027 U
Pesticides	alpha-BHC	319-84-6	ug/L	NE	2.2	NE	0.0072	NE	< 0.0024 U	< 0.0025 U	< 0.0024 U	< 0.0024 U	< 0.0026 U	< 0.0027 U
Pesticides	beta-BHC	319-85-7	ug/L	NE	2.2	NE	0.025	NE	< 0.0036 U	< 0.014 U	< 0.0068 U	0.012	0.0061 J	0.017
Pesticides	Chlordane	57-74-9	ug/L	0.0043	0.0043	0.004	NE	NE	< 0.13 U	< 0.13 U	< 0.13 U	< 0.13 U	< 0.14 U	< 0.14 U
Pesticides	delta-BHC	319-86-8	ug/L	NE	2.2	NE	NE	NE	< 0.0028 U	< 0.0029 U	< 0.0027 U	< 0.0028 U	< 0.0029 U	< 0.0030 U
Pesticides	Dieldrin	60-57-1	ug/L	0.056	0.056	0.0019	0.0018	NE	< 0.0043 U	< 0.0045 U	< 0.0042 U	< 0.0043 U	< 0.0045 U	< 0.0048 U
Pesticides	Endosulfan I	959-98-8	ug/L	0.056	0.003	0.002	NE	NE	< 0.0035 UJ	0.0063 J-	0.0051 J-	< 0.0035 UJ	< 0.0037 UJ	0.0068 J-
Pesticides	Endosulfan II	33213-65-9	ug/L	0.056	0.003	0.002	NE	NE	< 0.012 U	< 0.013 U	< 0.012 U	< 0.012 U	< 0.013 U	< 0.013 U
Pesticides	Endosulfan sulfate	1031-07-8	ug/L	0.056	0.003	0.002	NE	NE	< 0.0047 U	< 0.0049 U	< 0.0046 U	< 0.0047 U	< 0.0049 U	< 0.0052 U
Pesticides	Endrin	72-20-8	ug/L	0.036	0.036	0.0023	0.23	2	< 0.0066 U	< 0.0068 U	< 0.0065 U	< 0.0066 U	< 0.0069 U	< 0.0073 U
Pesticides	Endrin aldehyde	7421-93-4	ug/L	0.036	0.036	0.0023	NE	NE	< 0.016 U	< 0.017 U	< 0.016 U	< 0.016 U	< 0.017 U	< 0.018 U
Pesticides	Endrin ketone	53494-70-5	ug/L	0.036	0.036	0.0023	NE	NE	< 0.0040 U	< 0.0042 U	< 0.0040 U	< 0.0041 U	< 0.0043 U	< 0.0045 U
Pesticides	gamma Chlordane	5566-34-7	ug/L	0.0043	NE	0.004	NE	NE	< 0.0057 U	< 0.0059 U	< 0.0056 U	< 0.0057 U	< 0.0060 U	< 0.0063 U
Pesticides	gamma-BHC (Lindane)	58-89-9	ug/L	0.095	0.01	0.016	0.042	0.2	< 0.0016 U	< 0.0017 U	< 0.0016 U	< 0.0016 U	0.0022 J	< 0.0018 U
Pesticides	Heptachlor	76-44-8	ug/L	0.0038	0.0038	0.0036	0.0014	0.4	0.0042 J	< 0.0017 U	< 0.0016 U	< 0.0016 U	< 0.0017 U	< 0.0018 U
Pesticides	Heptachlor epoxide	1024-57-3	ug/L	0.0038	0.0038	0.0036	0.0014	0.2	< 0.0019 U	< 0.0019 U	< 0.0018 U	< 0.0019 U	< 0.0020 U	< 0.0021 U
Pesticides	Methoxychlor	72-43-5	ug/L	0.03	0.019	0.03	3.7	40	< 0.024 U	< 0.025 U	< 0.024 U	< 0.024 U	< 0.026 U	< 0.027 U
Pesticides	Toxaphene	8001-35-2	ug/L	0.0002	0.0002	0.0002	0.071	3	< 0.24 U	< 0.25 U	< 0.24 U	< 0.24 U	< 0.26 U	< 0.27 U
SVOCs/PAHs	1,2,4-Trichlorobenzene	120-82-1	ug/L	NE	24	5.4	0.4	70	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U	< 0.6 U
SVOCs/PAHs	1,2-Dichlorobenzene	95-50-1	ug/L	NE	0.7	42	30	600	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U	< 0.6 U
SVOCs/PAHs	1,3-Dichlorobenzene	541-73-1	ug/L	NE	71	NE	NE	NE	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U	< 0.6 U
SVOCs/PAHs	1,4-Dichlorobenzene	106-46-7	ug/L	NE	15	NE	0.48	75	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U	< 0.6 U
SVOCs/PAHs	1,4-Dioxane	123-91-1	ug/L	NE	NE	NE	0.46	NE	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
SVOCs/PAHs	2,4,5-Trichlorophenol	95-95-4	ug/L	NE	18	NE	120	NE	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U	< 0.6 U
SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	ug/L	NE	18	NE	1.2	NE	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U	< 0.6 U
SVOCs/PAHs	2,4-Dichlorophenol	120-83-2	ug/L	NE	0.2	NE	4.6	NE	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U	< 0.6 U
SVOCs/PAHs	2,4-Dimethylphenol	105-67-9	ug/L	NE	NE	NE	36	NE	< 3 UJ	< 3 U	< 3 U	< 3 U	< 3 U	< 3 U
SVOCs/PAHs	2,4-Dinitrophenol	51-28-5	ug/L	NE	NE	NE	3.9	NE	< 15 UJ	< 15 U	< 15 U	< 15 U	< 15 U	< 16 U
SVOCs/PAHs	2,4-Dinitrotoluene	121-14-2	ug/L	NE	65	NE	0.24	NE	< 1 UJ	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U

Table 4-10. Surface Water Analytical Results

Analyte Group	Chemical Name	CAS #	Units	Screening Benchmarks					OU1-1-SW005	OU2-1-SW001	OU2-1-SW002	OU2-1-SW003	OU2-1-SW004	REF-1-SW001
				Surface Water ESV - Amphibian	Surface Water ESV - Freshwater	Surface Water ESV - Marine	Tapwater RSL (THQ = 0.1)	Federal MCL	10/19/2018	10/18/2018	10/19/2018	10/18/2018	10/18/2018	10/18/2018
SVOCs/PAHs	2,6-Dinitrotoluene	606-20-2	ug/L	NE	230	NE	0.049	NE	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U	< 0.6 U
SVOCs/PAHs	2-Chloronaphthalene	91-58-7	ug/L	NE	NE	NE	75	NE	< 0.4 UJ	< 0.4 U	< 0.4 U	< 0.4 U	< 0.4 U	< 0.4 U
SVOCs/PAHs	2-Chlorophenol	95-57-8	ug/L	NE	7	NE	9.1	NE	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U	< 0.6 U
SVOCs/PAHs	2-Methylnaphthalene	91-57-6	ug/L	NE	330	NE	3.6	NE	< 0.1 UJ	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
SVOCs/PAHs	2-Methylphenol	95-48-7	ug/L	NE	13	NE	93	NE	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U	< 0.6 U
SVOCs/PAHs	2-Nitroaniline	88-74-4	ug/L	NE	NE	NE	19	NE	< 2 UJ	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
SVOCs/PAHs	2-Nitrophenol	88-75-5	ug/L	NE	60	NE	NE	NE	< 3 UJ	< 3 U	< 3 U	< 3 U	< 3 U	< 3 U
SVOCs/PAHs	3,3-Dichlorobenzidine	91-94-1	ug/L	NE	NE	NE	0.13	NE	< 3 UJ	< 3 U	< 3 U	< 3 U	< 3 U	< 3 U
SVOCs/PAHs	3-Nitroaniline	99-09-2	ug/L	NE	NE	NE	NE	NE	< 3 UJ	< 3 U	< 3 U	< 3 U	< 3 U	< 3 U
SVOCs/PAHs	4,6-Dinitro-2-methylphenol	534-52-1	ug/L	NE	NE	NE	0.15	NE	< 9 UJ	< 8 U	< 8 U	< 9 U	< 9 U	< 9 U
SVOCs/PAHs	4-Bromophenyl-phenylether	101-55-3	ug/L	NE	1.5	NE	NE	NE	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U	< 0.6 U
SVOCs/PAHs	4-Chloro-3-methylphenol	59-50-7	ug/L	NE	NE	NE	140	NE	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U	< 0.6 U
SVOCs/PAHs	4-Chloroaniline	106-47-8	ug/L	NE	NE	NE	0.37	NE	< 4 UJ	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U
SVOCs/PAHs	4-Chlorophenyl-phenylether	7005-72-3	ug/L	NE	NE	NE	NE	NE	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U	< 0.6 U
SVOCs/PAHs	4-Methylphenol	106-44-5	ug/L	NE	NE	NE	190	NE	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U	< 0.6 U
SVOCs/PAHs	4-Nitroaniline	100-01-6	ug/L	NE	NE	NE	3.8	NE	< 1 UJ	< 0.9 U	< 0.9 U	< 1 U	< 1 U	< 1 U
SVOCs/PAHs	4-Nitrophenol	100-02-7	ug/L	NE	60	NE	NE	NE	< 11 UJ	< 10 U	< 11 U	< 11 U	< 11 U	< 11 U
SVOCs/PAHs	Acenaphthene	83-32-9	ug/L	NE	5.8	NE	53	NE	< 0.01 U	< 0.01 U	< 0.01 U	0.04 J	< 0.01 U	< 0.01 U
SVOCs/PAHs	Acenaphthylene	208-96-8	ug/L	NE	4800	NE	NE	NE	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
SVOCs/PAHs	Aniline	62-53-3	ug/L	NE	NE	NE	13	NE	< 3 UJ	< 3 U	< 3 U	< 3 U	< 3 U	< 3 U
SVOCs/PAHs	Anthracene	120-12-7	ug/L	NE	0.012	NE	180	NE	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
SVOCs/PAHs	Benzo(a)anthracene	56-55-3	ug/L	NE	0.018	NE	0.03	NE	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
SVOCs/PAHs	Benzo(a)pyrene	50-32-8	ug/L	NE	0.014	NE	0.025	0.2	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
SVOCs/PAHs	Benzo(a)Pyrene TEQ	CALC-BaP PAHs	ug/L	NE	NE	NE	0.025	0.2	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	ug/L	NE	9	NE	0.25	NE	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	ug/L	NE	7.6	NE	NE	NE	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	0.01 J	< 0.01 U
SVOCs/PAHs	Benzo(k)fluoranthene	207-08-9	ug/L	NE	0.0041	NE	2.5	NE	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
SVOCs/PAHs	Benzyl Alcohol	100-51-6	ug/L	NE	NE	NE	200	NE	< 11 UJ	< 10 U	< 11 U	< 11 U	< 11 U	< 11 U
SVOCs/PAHs	Bis(2-chloro-1-methylethyl) ether	108-60-1	ug/L	NE	NE	NE	71	NE	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U	< 0.6 U
SVOCs/PAHs	Bis(2-chloroethoxy)methane	111-91-1	ug/L	NE	NE	NE	5.9	NE	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U	< 0.6 U
SVOCs/PAHs	Bis(2-chloroethyl)ether	111-44-4	ug/L	NE	NE	NE	0.014	NE	< 0.02 U	< 0.02 U	< 0.02 U	< 0.02 U	< 0.02 U	< 0.02 U
SVOCs/PAHs	Bis(2-ethylhexyl)phthalate	117-81-7	ug/L	3	3	NE	5.6	6	< 0.09 U	< 0.08 U	0.1 J	< 0.09 U	< 0.09 U	< 0.09 U
SVOCs/PAHs	Carbazole	86-74-8	ug/L	NE	NE	NE	NE	NE	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U	< 0.6 U
SVOCs/PAHs	Chrysene	218-01-9	ug/L	NE	0.0018	NE	25	NE	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
SVOCs/PAHs	Dibenz(a,h)anthracene	53-70-3	ug/L	NE	0.0034	NE	0.025	NE	< 0.02 U	< 0.02 U	< 0.02 U	< 0.02 U	< 0.02 U	< 0.02 U
SVOCs/PAHs	Dibenzofuran	132-64-9	ug/L	NE	3.7	NE	0.79	NE	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U	< 0.6 U
SVOCs/PAHs	Diethyl phthalate	84-66-2	ug/L	NE	210	NE	1500	NE	< 2 UJ	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
SVOCs/PAHs	Dimethyl phthalate	131-11-3	ug/L	NE	3	NE	NE	NE	< 2 UJ	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
SVOCs/PAHs	Di-n-butyl phthalate	84-74-2	ug/L	NE	19	NE	90	NE	< 0.05 U	< 0.05 U	0.07 J	0.07 J	< 0.06 U	< 0.06 U
SVOCs/PAHs	Di-n-octyl phthalate	117-84-0	ug/L	NE	3	NE	20	NE	< 5 UJ	< 5 U	< 5 U	< 6 U	< 6 U	< 6 U
SVOCs/PAHs	Fluoranthene	206-44-0	ug/L	NE	0.04	NE	80	NE	< 0.01 U	< 0.01 U	< 0.01 U	0.01 J	< 0.01 U	< 0.01 U
SVOCs/PAHs	Fluorene	86-73-7	ug/L	NE	3	NE	29	NE	< 0.01 U	< 0.01 U	< 0.01 U	0.02 J	< 0.01 U	< 0.01 U
SVOCs/PAHs	Hexachlorobenzene	118-74-1	ug/L	NE	NE	NE	0.0098	1	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
SVOCs/PAHs	Hexachlorobutadiene	87-68-3	ug/L	NE	1.3	NE	0.14	NE	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U	< 0.6 U
SVOCs/PAHs	hexachlorocyclopentadiene	77-47-4	ug/L	NE	NE	NE	0.041	50	< 5 UJ	< 5 UJ	< 5 UJ	< 6 UJ	< 6 UJ	< 6 UJ
SVOCs/PAHs	Hexachloroethane	67-72-1	ug/L	NE	12	NE	0.33	NE	< 1 UJ	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
SVOCs/PAHs	Indeno(1,2,3-cd)pyrene	193-39-5	ug/L	NE	4.3	NE	0.25	NE	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
SVOCs/PAHs	Isophorone	78-59-1	ug/L	NE	NE	NE	78	NE	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U	< 0.6 U

Table 4-10. Surface Water Analytical Results

Analyte Group	Chemical Name	CAS #	Units	Screening Benchmarks					OU1-1-SW005	OU2-1-SW001	OU2-1-SW002	OU2-1-SW003	OU2-1-SW004	REF-1-SW001
				Surface Water ESV - Amphibian	Surface Water ESV - Freshwater	Surface Water ESV - Marine	Tapwater RSL (THQ = 0.1)	Federal MCL	10/19/2018	10/18/2018	10/19/2018	10/18/2018	10/18/2018	10/18/2018
SVOCs/PAHs	Naphthalene	91-20-3	ug/L	NE	1.1	1.4	0.17	NE	0.06 J	0.05 J	0.05 J	0.05 J	< 0.03 U	0.2
SVOCs/PAHs	Nitrobenzene	98-95-3	ug/L	NE	550	NE	0.14	NE	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U	< 0.6 U
SVOCs/PAHs	n-Nitroso-di-n-propylamine	621-64-7	ug/L	NE	NE	NE	0.011	NE	< 0.8 UJ	< 0.7 U	< 0.7 U	< 0.8 U	< 0.8 U	< 0.8 U
SVOCs/PAHs	n-Nitrosodiphenylamine	86-30-6	ug/L	NE	40	NE	12	NE	< 0.8 UJ	< 0.7 U	< 0.7 U	< 0.8 U	< 0.8 U	< 0.8 U
SVOCs/PAHs	Pentachlorophenol	87-86-5	ug/L	15	0.5	7.9	0.041	1	< 1 UJ	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
SVOCs/PAHs	Phenanthrene	85-01-8	ug/L	NE	0.4	NE	NE	NE	< 0.03 U	< 0.03 U	< 0.03 U	< 0.03 U	< 0.03 U	< 0.03 U
SVOCs/PAHs	Phenol	108-95-2	ug/L	NE	4	NE	580	NE	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U	< 0.6 U
SVOCs/PAHs	Pyrene	129-00-0	ug/L	NE	0.025	NE	12	NE	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
SVOCs/PAHs	Pyridine	110-86-1	ug/L	NE	NE	NE	2	NE	< 2 UJ	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
SVOCs/PAHs	Total HMW PAHs	CALC-HMW PAHs	ug/L	NE	NE	NE	NE	NE	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01
SVOCs/PAHs	Total LMW PAHs	CALC-LMW PAHs	ug/L	NE	NE	NE	NE	NE	0.06	0.05	0.05	0.12	< 0.03	0.2
VOCs	1,1,1-Trichloroethane	71-55-6	ug/L	NE	11	NE	800	200	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U
VOCs	1,1,2,2-Tetrachloroethane	79-34-5	ug/L	NE	610	NE	0.076	NE	< 0.07 U	< 0.07 U	< 0.07 U	< 0.07 U	< 0.07 U	< 0.07 U
VOCs	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	76-13-1	ug/L	NE	NE	NE	1000	NE	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U
VOCs	1,1,2-Trichloroethane	79-00-5	ug/L	NE	1200	NE	0.041	5	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U
VOCs	1,1-Dichloroethane	75-34-3	ug/L	NE	47	NE	2.8	NE	< 0.07 U	< 0.07 U	< 0.07 U	< 0.07 U	< 0.07 U	< 0.07 U
VOCs	1,1-Dichloroethene	75-35-4	ug/L	NE	25	NE	28	7	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U
VOCs	1,2,4-Trichlorobenzene	120-82-1	ug/L	NE	24	5.4	0.4	70	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U
VOCs	1,2-Dibromo-3-chloropropane	96-12-8	ug/L	NE	NE	NE	0.00033	0.2	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
VOCs	1,2-Dibromoethane	106-93-4	ug/L	NE	NE	NE	0.0075	0.05	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U
VOCs	1,2-Dichlorobenzene	95-50-1	ug/L	NE	0.7	42	30	600	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U
VOCs	1,2-Dichloroethane	107-06-2	ug/L	NE	100	NE	0.17	5	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
VOCs	1,2-Dichloropropane	78-87-5	ug/L	NE	NE	NE	0.82	5	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U
VOCs	1,3-Dichlorobenzene	541-73-1	ug/L	NE	71	NE	NE	NE	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U
VOCs	1,4-Dichlorobenzene	106-46-7	ug/L	NE	15	NE	0.48	75	< 0.07 U	< 0.07 U	< 0.07 U	< 0.07 U	< 0.07 U	< 0.07 U
VOCs	2-Butanone	78-93-3	ug/L	NE	7200	NE	560	NE	< 0.6 U	< 0.6 U	< 0.6 U	< 0.6 U	< 0.6 U	< 0.6 U
VOCs	2-Hexanone	591-78-6	ug/L	NE	99	NE	3.8	NE	< 0.6 U	< 0.6 U	< 0.6 U	< 0.6 U	< 0.6 U	< 0.6 U
VOCs	4-Methyl-2-pentanone	108-10-1	ug/L	NE	170	NE	630	NE	< 0.7 U	< 0.7 U	< 0.7 U	< 0.7 U	< 0.7 U	< 0.7 U
VOCs	Acetone	67-64-1	ug/L	NE	1500	NE	1400	NE	2.7 J	2.3 J	3.2 J	3.5 J	4.2 J	2.1 J
VOCs	Benzene	71-43-2	ug/L	NE	46	110	0.46	5	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
VOCs	Bromodichloromethane	75-27-4	ug/L	NE	NE	NE	0.13	NE	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
VOCs	Bromoform	75-25-2	ug/L	NE	320	NE	3.3	NE	< 0.3 U	< 0.3 U	< 0.3 U	< 0.3 U	< 0.3 U	< 0.3 U
VOCs	Bromomethane	74-83-9	ug/L	NE	1300	NE	0.75	NE	< 0.07 U	< 0.07 U	< 0.07 U	< 0.07 U	< 0.07 U	< 0.07 U
VOCs	Carbon disulfide	75-15-0	ug/L	NE	0.92	NE	81	NE	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U
VOCs	Carbon tetrachloride	56-23-5	ug/L	NE	9.8	NE	0.46	5	< 0.07 U	< 0.07 U	< 0.07 U	< 0.07 U	< 0.07 U	< 0.07 U
VOCs	Chlorobenzene	108-90-7	ug/L	NE	1.3	25	7.8	100	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U
VOCs	Chloroethane	75-00-3	ug/L	NE	NE	NE	2100	NE	< 0.07 U	< 0.07 U	< 0.07 U	< 0.07 U	< 0.07 U	< 0.07 U
VOCs	Chloroform	67-66-3	ug/L	NE	1.8	NE	0.22	NE	< 0.09 U	< 0.09 U	< 0.09 U	< 0.09 U	< 0.09 U	< 0.09 U
VOCs	Chloromethane	74-87-3	ug/L	NE	NE	NE	19	NE	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U
VOCs	cis-1,2-Dichloroethene	156-59-2	ug/L	NE	590	NE	3.6	70	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
VOCs	cis-1,3-Dichloropropene	10061-01-5	ug/L	NE	0.055	NE	NE	NE	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
VOCs	cyclohexane	110-82-7	ug/L	NE	NE	NE	1300	NE	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
VOCs	Cyclohexanone	108-94-1	ug/L	NE	NE	NE	140	NE	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U
VOCs	Dibromochloromethane	124-48-1	ug/L	NE	NE	NE	0.87	NE	< 0.07 U	< 0.07 U	< 0.07 U	< 0.07 U	< 0.07 U	< 0.07 U
VOCs	Dichlorodifluoromethane	75-71-8	ug/L	NE	NE	NE	20	NE	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
VOCs	Ethylbenzene	100-41-4	ug/L	NE	7.3	25	1.5	700	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U
VOCs	Isopropylbenzene	98-82-8	ug/L	NE	NE	NE	45	NE	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
VOCs	Methyl acetate	79-20-9	ug/L	NE	NE	NE	2000	NE	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U

Table 4-10. Surface Water Analytical Results

Analyte Group	Chemical Name	CAS #	Units	Screening Benchmarks					OU1-1-SW005	OU2-1-SW001	OU2-1-SW002	OU2-1-SW003	OU2-1-SW004	REF-1-SW001
				Surface Water ESV - Amphibian	Surface Water ESV - Freshwater	Surface Water ESV - Marine	Tapwater RSL (THQ = 0.1)	Federal MCL	10/19/2018	10/18/2018	10/19/2018	10/18/2018	10/18/2018	10/18/2018
VOCs	Methyl Tertiary Butyl Ether	1634-04-4	ug/L	NE	10000	5000	14	NE	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
VOCs	methylcyclohexane	108-87-2	ug/L	NE	NE	NE	NE	NE	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
VOCs	Methylene chloride	75-09-2	ug/L	NE	98.1	NE	11	5	< 0.07 U	< 0.07 U	< 0.07 U	< 0.07 U	< 0.07 U	< 0.07 U
VOCs	Styrene	100-42-5	ug/L	NE	72	NE	120	100	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
VOCs	Tetrachloroethene	127-18-4	ug/L	NE	50	NE	4.1	5	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U
VOCs	Toluene	108-88-3	ug/L	NE	2	215	110	1000	0.1 J	< 0.07 U	0.2 J	< 0.07 U	0.2 J	0.1 J
VOCs	trans-1,2-Dichloroethene	156-60-5	ug/L	NE	590	NE	36	100	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U
VOCs	trans-1,3-Dichloropropene	10061-02-6	ug/L	NE	0.055	NE	NE	NE	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U
VOCs	Trichloroethene	79-01-6	ug/L	NE	21	NE	0.28	5	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.06 U
VOCs	Trichlorofluoromethane	75-69-4	ug/L	NE	NE	NE	520	NE	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
VOCs	Vinyl chloride	75-01-4	ug/L	NE	NE	NE	0.019	2	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
VOCs	Xylenes (total)	1330-20-7	ug/L	NE	13	NE	19	10000	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Rad	GROSS ALPHA	12587-46-1	pci/l	NE	NE	NE	NE	15	< 2.6	< 3.7	3.5	10.2	1.17	3.4
Rad	GROSS BETA	12587-47-2	pci/l	NE	NE	NE	NE	50	5.1	8.5	5.8	21.3	7.3	4.9
Rad	Radium 226	13982-63-3	pci/l	NE	0.1	8110	NE	5	0.47	< 0.47	0.81	0.76	< 0.4	< 0.43
Rad	Radium 228	15262-20-1	pci/l	NE	0.09	6780	NE	5	< 3.3	< 3.3	< 3	< 3.2	< 3	29.8
Rad	Total Ra 226_228	CALC-Ra 226_228	pci/l	NE	NE	NE	NE	5	0.47	< 0.47	0.81	0.76	< 0.4	29.8
Rad	Total Uranium	7440-61-1	ug/L	NE	24	406000	NE	30	0.58	0.53	0.25	0.41	0.21	0.36

Notes:

For samples with duplicates, the maximum result of the duplicate and standard sample was reported.

BLUE	Exceeds Tapwater RSL (THQ = 0.1)
RED	Exceeds Federal MCL
HIGHLIGHT	Exceeds Soil ESV(s)

NE = not established

U = not detected above method detection limit

UJ = not detected above method detection limit; method detection limit estimated

J = estimated value, unknown bias

J+ = estimated value, may be biased high

J- = estimated value, may be biased low

R = data rejected during validation

Table 7-1. List of COPCs and ROPCs by Analyte Group and Media

Analyte Group	List of Chemicals Exceeding Human Health Screening Benchmarks				
	Surface Soil	Subsurface Soil	Groundwater	Sediment	Surface Water
Metals	Aluminum Antimony Arsenic Cadmium Cobalt Copper Iron Lead Manganese Mercury Silver Thallium Vanadium	Aluminum Antimony Arsenic Cadmium Cobalt Copper Iron Lead Manganese Mercury Thallium Vanadium Zinc	Antimony Arsenic Barium Cobalt Iron Lead Manganese	Aluminum Arsenic Cobalt Iron Thallium	Antimony Arsenic Cobalt Iron Manganese
PCBs	Aroclor 1254	Aroclor 1254 Aroclor 1260			
Dioxins/Furans	2,3,7,8-TCDD Dioxin TEQ	2,3,7,8-TCDD Dioxin TEQ	Dioxin TEQ	Dioxin TEQ	
Pesticides	4,4'-DDD Toxaphene		alpha-BHC	4,4'-DDD	Heptachlor
SVOCs/PAHs	Benzo(a)pyrene Benzo(a)pyrene TEQ	1,4-Dichlorobenzene Benzo(a)anthracene Benzo(a)pyrene Benzo(a)pyrene TEQ Benzo(b)fluoranthene Dibenz(a,h)anthracene Indeno(1,2,3-cd)pyrene Naphthalene	Benzo(a)Pyrene TEQ Bis(2-chloroethyl)ether	Benzo(a)anthracene Benzo(a)pyrene Benzo(a)pyrene TEQ Benzo(b)fluoranthene Dibenz(a,h)anthracene	Naphthalene
VOCs			Chloroform		
Rad	Radium-226 Thorium-232	Radium-226 Thorium-232		Radium-226	

Table 7-2. List of COPECs and ROPECs by Analyte Group and Media

Analyte Group	List of Chemicals Exceeding Ecological Screening Benchmarks			
	Surface Soil	Subsurface Soil	Sediment	Surface Water
Metals	Aluminum Antimony Arsenic Barium Cadmium Chromium Cobalt Copper Lead Manganese Mercury Nickel Selenium Silver Thallium Vanadium Zinc	Aluminum Antimony Arsenic Barium Cadmium Chromium Cobalt Copper Lead Manganese Mercury Nickel Selenium Silver Thallium Vanadium Zinc	Antimony Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Silver Zinc	Aluminum Arsenic Barium Cadmium Calcium Copper Iron Lead Magnesium Manganese Mercury Nickel Silver Zinc
PCBs	Aroclor 1254	Aroclor 1254 Aroclor 1260		
Dioxins/Furans	2,3,7,8-TCDD Dioxin TEQ	2,3,7,8-TCDD Dioxin TEQ	2,3,7,8-TCDD Dioxin TEQ	
Pesticides	4,4'-DDD 4,4'-DDE 4,4'-DDT alpha Chlordane Chlordane	4,4'-DDD 4,4'-DDE 4,4'-DDT alpha Chlordane beta-BHC Chlordane Dieldrin	4,4'-DDD 4,4'-DDE 4,4'-DDT alpha Chlordane Chlordane Endosulfan I Endrin gamma Chlordane	4,4'-DDT Endosulfan I Heptachlor
SVOCs/PAHs	Bis(2-ethylhexyl)phthalate Di-n-butyl phthalate Total HMW PAHs	1,2-Dichlorobenzene 1,4-Dichlorobenzene 2,4-Dimethylphenol Acenaphthene Benzo(a)anthracene Benzo(a)pyrene Bis(2-ethylhexyl)phthalate Chrysene Di-n-butyl phthalate Fluoranthene Fluorene Naphthalene Phenanthrene Phenol Pyrene Total HMW PAHs	2-Methylnaphthalene Acenaphthene Acenaphthylene Anthracene Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Bis(2-ethylhexyl)phthalate Chrysene Dibenz(a,h)anthracene Di-n-butyl phthalate Fluoranthene Fluorene Indeno(1,2,3-cd)pyrene	

Analyte Group	List of Chemicals Exceeding Ecological Screening Benchmarks			
	Surface Soil	Subsurface Soil	Sediment	Surface Water
		Total LMW PAHs	Naphthalene Phenanthrene Pyrene Total HMW PAHs Total LMW PAHs	
VOCs		Tetrachloroethene	Acetone Carbon disulfide Toluene	
Rad	Radium-226	Radium-226		Radium 226 Radium 228