FIFTH FIVE-YEAR REVIEW REPORT FOR
COAKLEY LANDFILL SUPERFUND SITE
ROCKINGHAM COUNTY, NEW HAMPSHIRE

SEPTEMBER 2021

Prepared by

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LIST OF ABBREVIATIONS & ACRONYMS

AGQS	Ambient Groundwater Quality Standard
ARAR	Applicable or Relevant and Appropriate Requirement
BAM	Bioavailable Absorbent Material
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
CLG	Coakley Landfill Group
COC	Contaminants of Concern
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FYR	Five-Year Review
GMP	Groundwater Management Permit
GMZ	Groundwater Management Zone
HA	Health Advisory
HI	Hazard Index
HQ	Hazard Quotient
HWRB	Hazardous Waste Remediation Bureau
IC	Institutional Control
ICP	Institutional Control Plan
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
mg/kg	Milligrams per Kilogram
µg/L	Micrograms per Liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
ng/L	Nanograms per Liter
NHDES	New Hampshire Department of Environmental Services
NOAA	National Oceanic and Atmospheric Administration
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PFAS	Polyfluoroalkyl Substances
PFBA	Perfluorobutanoic Acid
PFBS	Perfluorobutanesulfonic Acid
PFC	Perfluorinated Compound
PFDA	Perfluorodecanoic Acid
PFHpA	Perfluoroheptanoic Acid
PFHpS	Perfluoroheptanesulfonic Acid
PFHxA	Perfluorohexanoic Acid
PFHxS	Perfluorohexanesulfonic Acid
PFNA	Perfluorononanoic Acid
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctanoic Sulfonate
PFOSA	Perfluorooctanesulfonamide
PFpEA	Perfluoropentanoic Acid
POP	Project Operations Plan
ppb	Parts per Billion
ppt	Parts per Trillion
PRP	Potentially Responsible Party
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objective
RfD	Reference Dose

ROD	Record of Decision
RPM	Remedial Project Manager
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
SAP	Sampling and Analysis Plan
SQuiRT	Screening Quick Reference Table
TBA	Tert-Butyl Alcohol
TBD	To-Be-Determined Criteria
TEC	Threshold Effects Concentration
UU/UE	Unlimited Use and Unrestricted Exposure
VISL	Vapor Intrusion Screening Level
VOC	Volatile Organic Compound

I. INTRODUCTION

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

The U.S. Environmental Protection Agency (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii)), and considering EPA policy.

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

The Site consists of two operable units (OUs). This FYR addresses both OUs. OU1 addresses the source of contamination at the Site, including the contaminated groundwater beneath the landfill. OU2 addresses groundwater contamination that has migrated from the landfill.

EPA remedial project manager (RPM) Richard Hull led the FYR. Participants included Kelsey Dumville (EPA community involvement coordinator (CIC)), RuthAnn Sherman (EPA attorney), Courtney Carroll, Bart Hoskins, Taya Gibeau (EPA risk assessors), Andrew Hoffman (New Hampshire Department of Environmental Services (NHDES)) and Claire Marcussen and Johnny Zimmerman-Ward (EPA FYR support contractor Skeo). The potentially responsible parties (PRPs) were notified of the initiation of the FYR. The review began on 1/14/2021. Appendix A lists the documents reviewed for this FYR. Appendix B provides the Site's chronology of events.

Site Background

The 92-acre Site is located in the towns of Greenland and North Hampton, Rockingham County, in New Hampshire. The Site is located about 400 to 800 feet west of Lafayette Road (U.S. Route 1), directly south of Breakfast Hill Road and about 2.5 miles northeast of the center of the town of North Hampton (Figure 1). The landfill covers about 27 acres in the southern part of the Site. The landfill borders undeveloped woodlands and wetlands to the north and west and commercial and residential properties to the east and south.

The town of North Hampton operated the permitted landfill between 1972 and 1985. It accepted municipal and industrial wastes from the municipalities of Portsmouth, North Hampton, Newington and New Castle as well as Pease Air Force Base. Coincident with landfill operations, rock quarrying took place at the Site from 1973 through 1977. Site operators placed much of the disposed wastes in open (some liquid-filled) trenches created by rock quarrying sand and gravel mining. Site operators accepted incinerator residue from the incineration plant operated by the city of Portsmouth for a refuse-to-energy project from 1982 to 1985, when landfill operations ceased. Disposal activities resulted in the contamination of soil, groundwater and surface water with metals and organic contaminants. Prior to the introduction of public water in the 1980s, significant levels of contaminants were found in the private water supply wells in the vicinity of the Coakley Landfill.

The landfill forms a prominent raised plateau, with a generally flat upper surface. The landfill has moderately steep slopes except on the northern side, which has a gentler slope. As part of site remedy design and construction activities implemented in the mid and late 1990s, stormwater runoff from the landfill surface is conveyed to two unlined stormwater retention basins, one near the northeast corner of the landfill and one near the northwest corner of the landfill, via a series of perimeter drainage ditches and rip-rap let-down structures on the landfill (Figure 2). Stormwater retained in the basins is subsequently discharged to adjacent wetland areas and ultimately Berrys Brook through infiltration and via an outlet structure in each basin and associated corrugated metal piping. Groundwater contamination under the Site occurs in two major formations, the overburden and the fractured bedrock hydrogeologic units. The two groundwater units are hydraulically connected. Overburden thickness ranges from less than 1 foot in upland areas up to about 85 feet west-northwest of the landfill. Bedrock occurs as outcrops in areas north and northwest of the landfill. The top of bedrock is shallower under the landfill, as the landfill sits on a bedrock topographical high.

In early 1983 the New Hampshire Water Supply and Pollution Control Commission received a complaint regarding the water quality from a domestic drinking water well. Testing of private wells confirmed the presence of site-related contaminants to the south, southeast and northeast of the landfill. As a result, the town of North Hampton extended public water to Lafayette Terrace in 1983 and to Birch and North Roads in 1986. Prior to this time, commercial and residential water supply came from private wells. Also, in 1983, the Rye Water district completed a water main extension along Washington Road from the corner of Lafayette Road and along Dow Lane. Private wells are still in use where municipal water supply is not available in areas to the north, west and south of the Site. Some of these wells are part of an ongoing sampling program. Due to the exceedance of state groundwater standards, the NHDES enforced its groundwater management permit (GMP) and required that two private wells be equipped with point-of-entry treatment systems.

After completion of the landfill cap system in 1998, groundwater flow in the overburden is westward from the landfill and discharges into a large wetland area that serves as the headwaters for Berry's Brook, which flows to the north, and Little River, which flows to the south. Groundwater flow in deeper portions of bedrock may be more constrained by the physical characteristics of water-bearing fractures. Groundwater elevations in bedrock wells support a flow direction to the west from under the landfill toward the north-south trending bedrock topographic low coincident with the wetland complex, Little River (south) and Berrys Brook (north) valleys. A minor easterly component of flow in bedrock is present east of the landfill.

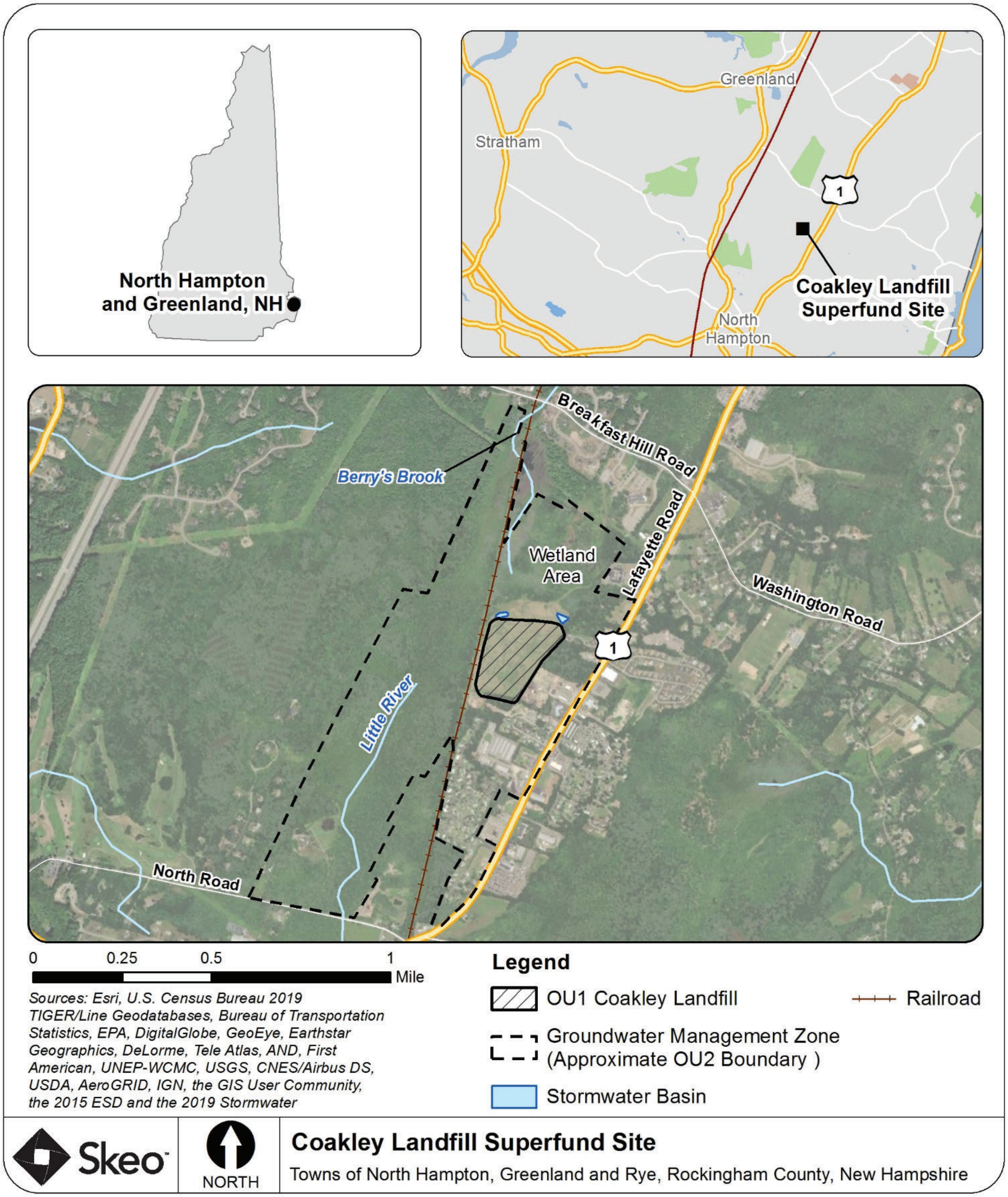
FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Coakley Landfill		
EPA ID: NHD064424153		
Region: 1	**State:** NH	**City/County:** North Hampton and Greenland/Rockingham County

SITE STATUS	
NPL Status: Final	
Multiple OUs? Yes	**Has the Site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: EPA
Author name: Richard Hull, with additional support provided by Skeo
Author affiliation: EPA Region 1
Review period: 1/14/2021 - 9/1/2021
Date of site inspection: 5/11/2021
Type of review: Statutory
Review number: 5
Triggering action date: 9/26/2016
Due date *(five years after triggering action date)*: 9/26/2021

Figure 1: Site Vicinity



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

EPA signed a cooperative agreement with the state of New Hampshire (the State) in August 1985 to conduct the Site's remedial investigation and feasibility study (RI/FS). The RI/FS for OU1 (Source Control) finished in March 1990. EPA completed the RI/FS for OU2 (Management of Migration) in September 1994. The State completed a human health risk assessment for OU1 in 1990. It evaluated risks associated with potable use of groundwater and a recreational child exposed to soil, surface water and sediment. The only OU1 exposure pathways resulting in unacceptable health risks were the future potable use of groundwater and the potential for leaching of soil contaminants to groundwater.

EPA completed a human health and ecological risk assessment for OU2 in 1994. It evaluated risks associated with potable use of groundwater and a recreational child exposure to surface water and sediment in nearby streams and wetlands. The 1994 human health risks results showed that the only pathway that could result in unacceptable risk is the ingestion of contaminated groundwater.

The OU2 1994 ecological risk assessment concluded that the ecological risks were low based on ecological exposure to wetlands and streams. Table 1 lists the Site's contaminants of concern (COCs) and associated media. Although surface water and sediment did not pose unacceptable health risks to humans or the environment, the response actions to address groundwater contamination also require monitoring of surface water and sediment to ensure that the groundwater remedy does not negatively impact the wetlands, which is discussed in more detail in the Response Actions section of this FYR Report.

Table 1: Site COCs, by Media

COC	Media		
	Soil/Sediment	Groundwater	Surface Water
Benzene	X	X	X
Chlorobenzene	X	X	X
Tetrachloroethylene	X	X	X
1,2-Dichloropropane		X	
2-Butanone	X	X	X
Diethyl phthalate	X	X	X
Trans-1,2-dichloroethylene	X	X	X
Phenol	X	X	X
Antimony		X	
Arsenic		X	X
Beryllium		X	
Chromium		X	X
Lead		X	
Manganese		X	
Nickel		X	X
Vanadium		X	
Tetrahydrofuran		X	
1,4-Dioxane		X	

Notes:
X = contaminant is a COC in the medium.
Blank = contaminant not identified as a COC in the medium.
Sources: 1990 OU1 Record of Decision (ROD), Table 12, page 34 for groundwater, page 36 for soil/sediment and page 38 indicates the groundwater COCs are also the surface water COCs following treatment of groundwater.
1994 OU2 ROD Table 12, page 31 for groundwater.
2007 OU1 Explanation of Significant Differences (ESD), page 4 for adding tetrahydrofuran to groundwater.
2015 OU1 and OU2 ESD, page 3 for adding 1,4-dioxane.

Response Actions

In 1979, the State received a complaint concerning leachate at the Site. An investigation by the State found allegedly empty drums with markings indicative of cyanide waste. Following a second complaint regarding the water quality from a domestic drinking water well, the State completed more investigations. They found volatile organic compounds (VOCs) in private wells south, southeast and northeast of the Coakley Landfill. As a result, the Rye Water District completed a water main extension along Washington Road to the corner of Lafayette Road (U.S. Route 1) and along Dow Lane in 1983. The Town extended public water to Lafayette Terrace in 1983 and to Birch and North Roads in 1986. EPA finalized the Site on the Superfund program's National Priorities List (NPL) in June 1986.

OU1 Source Control

EPA selected the OU1 source control remedy for soil and groundwater contamination in the 1990 OU1 Record of Decision (ROD), with modifications to some of the remedy components and cleanup goals in five Explanation of Significant Differences (ESDs) in 1991, 1996, 1999, 2007 and 2015. Table 2 lists the Site's remedial action objectives (RAOs) and final remedy components. For groundwater, EPA selected cleanup levels based on maximum contaminant levels (MCLs) and non-zero maximum contaminant level goals (MCLGs) established under the federal Safe Drinking Water Act, or the more conservative New Hampshire ambient groundwater quality standards (AGQSs) (Table 4). EPA established soil/sediment cleanup goals based on the protection of groundwater.

Table 2: Summary of OU1 RAOs and Final Remedy Components

RAOs[a]	Final Remedy Components
• Prevent ingestion of groundwater containing contamination in excess of federal and state drinking water standards or criteria, or that poses a threat to public health and the environment. • Prevent the public from direct contact with contaminated soils, sediments, solid waste and surface water. • Eliminate or minimize the migration of contaminants from the soil into groundwater. • Prevent the off-site migration of contaminants above levels protective of public health and the environment. • Restore groundwater and surface water, soils and sediments to levels protective of public health and the environment.	• Excavation of contaminated sediment and soil/solid waste and consolidation of the material in the landfill. • Capping of the landfill with a multi-layer cap system consisting of a vegetative layer, a drainage layer and an impermeable barrier (include both a synthetic liner and an underlying clay).[b] • Installation of a passive landfill gas collection system.[c] • Long-term environmental monitoring.[d] • Access restrictions. • Institutional controls.[e,f]

Notes:

a. Identified on page 19 of the 1990 ROD.
b. As required by the 1991 ESD. The 1990 ROD required a synthetic liner or a clay barrier.
c. Established by the 1996 ESD to replace the 1990 ROD component of active collection and treatment of landfill gas and the 1991 ESD requirement of treatment of landfill gas using carbon adsorption or thermal destruction.
d. The 1999 ESD eliminated the need for the groundwater/leachate extraction and treatment component based on groundwater data collected after cap installation. The 1990 ROD indicated long-term monitoring would include periodic monitoring of air, surface water and groundwater.
e. The 2007 ESD also included a new applicable or relevant and appropriate requirement (ARAR) that requires establishment of a groundwater management zone (GMZ) at OU1 that controls groundwater uses and land use in areas where groundwater exceeds state cleanup goals.
f. The 2015 ESD required changes to the GMZ, expanding it due to detections of 1,4-dioxane above cleanup goals.

OU2 Management of Migration

EPA selected the remedy for managing contaminant migration in the Site's 1994 OU2 ROD, with modifications to some remedy components and cleanup goals in three ESDs in 2007, 2009 and 2015. Table 3 lists the RAOs and final remedy components. EPA selected cleanup goals based on MCLs and non-zero MCLGs established under the federal Safe Drinking Water Act, or more conservative AGQSs (Table 4).

Table 3: Summary of OU2 RAOs and Final Remedy Components

RAOs[a]	Final Remedy Components
• Prevent ingestion of groundwater contamination in excess of drinking water standards (MCLs/MCLGs) or, in their absence, an excess cancer risk level of 10^{-6}, for each carcinogenic compound. Also, prevent ingestion of contaminated groundwater in excess of a total cancer risk level for all carcinogenic compounds outside the risk range of 10^{-4} to 10^{-6}. • Prevent ingestion of groundwater contaminated in excess of drinking water standards for each non-carcinogenic compound and a total hazard index (HI) greater than 1 for each noncarcinogenic compound. • Facilitate the restoration of the groundwater aquifer to drinking water standards or, in their absence, the more conservative of an excess cancer risk of 10^{-6}, for each carcinogenic compound or a hazard quotient (HQ) of 1 for each non-carcinogenic compound. Also, restore aquifer water quality to the more conservative of: 1) a total excess cancer risk within the risk range of 10^{-4} to 10^{-6}; and 2) an HI of 1 to 10. • Ensure that the remedy does not negatively impact the wetlands and facilitates the restoration of the wetland environment.	• Natural attenuation for the contaminated groundwater plume. • Institutional controls: o Deed restrictions. o Groundwater use restrictions.[a] o Well installation reporting requirements.[b] o Land use restrictions.[b] • Groundwater monitoring.[c]

Notes:
a. Identified on page 19 of the 1994 ROD and page 3 requires expansion of the GMZ at OU2.
b. As required by the 2015 ESD.
c. The 1994 OU2 ROD lists this remedy component as groundwater monitoring. However, on page 33, the ROD specifies that "the monitoring program will be developed to determine the extent of migration of the contaminated groundwater and other potentially affected media (surface water and sediments) and to track the natural attenuation of the contamination."

Table 4: COC Cleanup Goals, OU1 and OU2

COC	OU1 ROD Cleanup Levels[a]		OU2 ROD Cleanup Levels[b]
	Soil/Sediment (mg/kg)	Groundwater (µg/L)	Groundwater (µg/L)
Benzene	0.055	5	5
Chlorobenzene	9.4	100	-
Tetrachloroethylene	0.13	3.5	-
Tetrahydrofuran	-	154[c]	-
1,2-Dichloropropane	-	-	50
2-Butanone	0.8	200	-
Diethyl phthalate	900	2,800	-
Trans-1,2-dichloroethylene	2.2	100	-
Phenol	2.3	280	-
1,4-Dioxane	-	3[d]	3[d]
Antimony	-	-	6
Arsenic	-	10[e]	10[e]
Beryllium	-	-	4
Chromium	-	50	100
Lead	-	-	15
Manganese	-	300[c]	300[e]
Nickel	-	100	100
Vanadium	-	-	260

COC	OU1 ROD Cleanup Levels[a]		OU2 ROD Cleanup Levels[b]
	Soil/Sediment (mg/kg)	Groundwater (µg/L)	Groundwater (µg/L)

Notes:
a. OU1 1990 ROD Table 12 for groundwater cleanup levels and Table 13 for soil cleanup levels based on leaching to groundwater.
b. OU2 1994 ROD, Table 12 groundwater cleanup levels.
c. OU1 2007 ESD.
d. OU1 and OU2 ESD (2015).
e. OU2 ESD (2007) incorrectly updated the arsenic MCL to 100 µg/L and revised it to 10 µg/L in the 2009 ESD. The 2007 ESD also revised the cleanup goal for manganese.
- = contaminant not identified as a COC in this OU.
µg/L = micrograms per liter
mg/kg = milligrams per kilogram

Status of Implementation

OU1 Source Control
A Consent Decree for the remedial design, construction, and operation and maintenance (O&M) of the source control remedy became effective in May 1992. In 1996, the Coakley Landfill Group (CLG), representing PRPs for site contamination, completed the design with EPA approval. The PRPs began remedy construction in September 1996, with the relocation of trash from along the perimeter of the landfill to the top of the landfill. In 1997, the PRPs removed wetland sediments, placed them on the landfill and completed the landfill cap in fall 1998. CLG installed a passive landfill gas collection system as per the OU1 1996 ESD. EPA and NHDES completed the pre-final inspection of the cap in September 1998 and the wetland construction/restoration in October 1998. The agencies concluded that no significant construction items remained.

The PRPs continued monitoring of groundwater quality and water levels throughout the remedial design, construction and post-construction phases. EPA evaluated those data and documented in the OU1 1999 ESD that the landfill cap was effective in reducing leachate generation such that the collection and treatment of contaminated groundwater at the edge of the landfill was no longer necessary.

In 2016, EPA and NHDES identified polyfluoroalkyl substances (PFAS) as an emerging environmental contaminant group that may be present in site landfill waste and requested that the CLG sample for PFAS in groundwater. In May 2016, the CLG initiated sampling for PFAS at a select group of monitoring wells within OU1 and confirmed the presence of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) above EPA's health advisory for lifetime exposure to these substances. Since 2016, PFAS has been included in the ongoing monitoring at the Site.

In 2017, the CLG noted that concentrations of PFAS in a seep sample next to the landfill were significantly higher in the spring event, when discharge was observed from the adjacent stormwater basin outfall pipe, as compared to the fall event, when little or no discharge was observed in the basin outfall pipe. At the request of EPA and NHDES, the CLG installed four warning signs along Berrys Brook in August 2017 (from the area next to the landfill to Breakfast Hill Road) due to PFAS concentrations in surface water exceeding the most conservative site-specific surface water screening levels in areas where there is public access and possible contact with surface waters. The signage states the following:

> "Please Take Notice. Contaminants associated with the Coakley Landfill Superfund Site have been detected in surface waters in this area. Further investigation and evaluation is ongoing. Please avoid contact with surface water along the trail."

In December 2017, the CLG submitted a work plan to the agencies, followed by stormwater sampling performed in conjunction with the 2018 spring semiannual sampling event. All stormwater samples reported PFOA/PFOS concentrations higher than those reported in the seep sample, suggesting that stormwater is coming in contact with PFAS-containing materials and then being conveyed to the wetland complex west of the landfill.

The CLG completed a second work plan in October 2018 to further investigate the relationship between stormwater discharge, shallow groundwater and landfill seep discharge. In September 2019, the CLG completed a Stormwater Investigation Report confirming that stormwater runoff and stormwater discharge from the landfill cover system contributed to PFAS in shallow groundwater and the adjacent wetland complex. The 2019 report concluded that materials in the landfill cover system, primarily the topsoil/vegetative layer, contain PFAS that is dissolved in stormwater and transported via direct surface runoff of precipitation and via infiltration of stormwater through the cover soil to underdrain collection piping that subsequently discharges to the wetland complex west and north of the landfill and to ground surface at a rip rap swale northwest of the landfill. Based on these results and the ongoing discharge of contaminated groundwater to surface water, and in response to New Hampshire House Bill 494[1], the CLG prepared a work plan in October 2020 to implement a pilot-scale passive surface water treatment system to reduce the amount of site contaminants entering Berrys Brook. CLG implemented the pilot study between November and December 2020 using bioavailable absorbent material (BAM). In general, CLG did not observe reductions in PFAS in post-treatment samples primarily due to limited contact time between the surface water and the BAM and the low permeability of the BAM materials resulting in bypass of the blankets. The CLG is currently evaluating other technologies using passive treatment. To date, PFOA or PFOS have not formally been identified as final site COCs.

OU2 Management of Migration

A Consent Decree for the implementation of the management of migration remedy became effective in January 1999. The CLG prepared an Environmental Monitoring Plan that EPA approved in March 1999. The plan has been updated multiple times based on long-term sampling results from various media. The O&M section of this FYR Report discusses the changes further.

Based on the results of the initial PFAS groundwater investigation at OU1 in May 2016, EPA and NHDES required more PFAS sampling to include OU2 monitoring wells and residential supply wells. In July 2016, the CLG confirmed the presence of PFOA and PFOS in OU2 groundwater above EPA's recently issued health advisory (HA) of 70 parts per trillion (ppt). Based on these results, the CLG incorporated PFAS into the annual monitoring program.

The previous FYR Report identified the need to further determine the extent of OU2 groundwater contamination, based on the results of 1,4-dioxane and PFAS monitoring results. In addition, the 2017 FYR Addendum noted that, while groundwater flow in the overburden and shallow bedrock is well known and documented, the knowledge about deep-bedrock groundwater flow and the fate and transport of site COCs in this geologic stratum is very limited. In response to these issues, EPA directed the CLG to execute a sitewide deep-bedrock investigation to characterize groundwater flow paths and the extent of contamination in bedrock, and to assess the potential for migration of contaminants to local receptors. The CLG completed the first phase of the deep-bedrock investigation in 2018 and issued the Deep Bedrock Investigation Interim Report on November 25, 2019, that detailed the work completed to date, provided an updated conceptual site model, identified data gaps and made recommendations for completing the bedrock investigation. The CLG is currently completing more characterization activities to address data gaps identified in the Deep Bedrock Investigation Interim Report and plans on concluding the investigation in 2021.

In September 2018, the state AGQS for 1,4-dioxane was lowered from 3.0 micrograms per liter (µg/L) to 0.32 µg/L. Due to the presence of 1,4-dioxane in two private wells on Breakfast Hill Road above the new AGQS, in September 2018 the NHDES directed the CLG to resample the two private wells in accordance with groundwater management permit (GMP) compliance criteria. The subsequent sampling results exceeded the AGQS for 1,4-dioxane at the two wells and the NHDES enforced their GMP requirements and directed the CLG to provide bottled water and/or install treatment systems for the wells. The CLG installed carbon adsorption point-of-entry

[1] Requires that the NHDES, working with the CLG, propose a remedy to "ensure the substantial reduction of the contaminants entering Berrys Brook from the Coakley Landfill Superfund site."

treatment systems (POETs) at the two private wells in November 2018, which it monitors and maintains. Monitoring data is regularly collected by CLG and submitted to NHDES, which to date has shown that the POETs are effectively removing 1,4-dioxane and PFAS compounds to below AGQS.

Institutional Control (IC) Review

The OU1 1990 ROD required access restrictions and the OU1 2007 ESD required a groundwater management zone (GMZ) to protect against the use of groundwater and protect the remedy components. The OU2 1994 ROD required institutional controls to prevent the use of groundwater. The NHDES established a GMZ to address groundwater contamination above cleanup levels. The CLG submitted a plan for implementation of institutional controls to EPA in June 2000. The final draft of the Groundwater Use Restriction documents for incorporation into the plan was submitted in June 2001. Both documents were approved by EPA in August 2001. The objectives of the Institutional Control Plan (ICP) are to: 1) provide a plan and schedule to implement institutional controls to restrict ingestion of the degraded groundwater plume that is migrating from the Site; and 2) evaluate the effectiveness of the selected and implemented institutional controls.

The CLG proposed a GMZ that encompasses OU1 and OU2, which NHDES approved via issuance of a groundwater management permit (GMP) in June 2008. NHDES renewed the permit in January 2014, which expanded the GMZ due to the exceedances of the state AGQS of 1,4-dioxane, arsenic, and manganese in groundwater at the northwestern boundary of OU2. The CLG submitted a GMP renewal application to NHDES in October 2018, prior to the existing permit expiration in January 2019. The renewal application considered the new AGQS for 1,4-dioxane of 0.32 μg/L, but because the two private wells that had detections of 1,4-dioxane in the past tested lower than the new AGQS during the most recent sampling event in April 2018, an expansion of the GMZ was not proposed in the renewal application. Subsequently, samples collected from the two private wells during the fall sampling round in October 2018 exceeded the new AGQS for 1,4-dioxane, so the CLG submitted a GMP renewal application addendum in December 2018 that expanded the GMZ to the northwest. The NHDES also enforced the conditions of the GMP to have the CLG provide treatment systems for the two private wells as described above. NHDES is awaiting the results of the ongoing bedrock investigation to review the current GMZ boundary and determine if modifications are warranted based on the findings of the investigation.

The previous GMP included groundwater easements obtained by the CLG from property owners that do not have alternate water available. These groundwater easements restrict and/or control the use of groundwater within the GMZ. In addition, notifications were recorded with the Registry of Deeds in Rockingham County on all parcels contained within the GMZ. Figure 2 shows the current extent of the GMZ. The GMP, as filed with the Rockingham County Registry of Deeds, includes a list of the properties located in the GMZ, including the landfill property, and a copy of the GMP issued by NHDES. Restrictions on the landfill property prohibit any activity, including, but not limited to any construction, or use of the property that would damage the landfill cap, or interfere with the performance, operation or maintenance of remedial actions for OU1 and OU2.

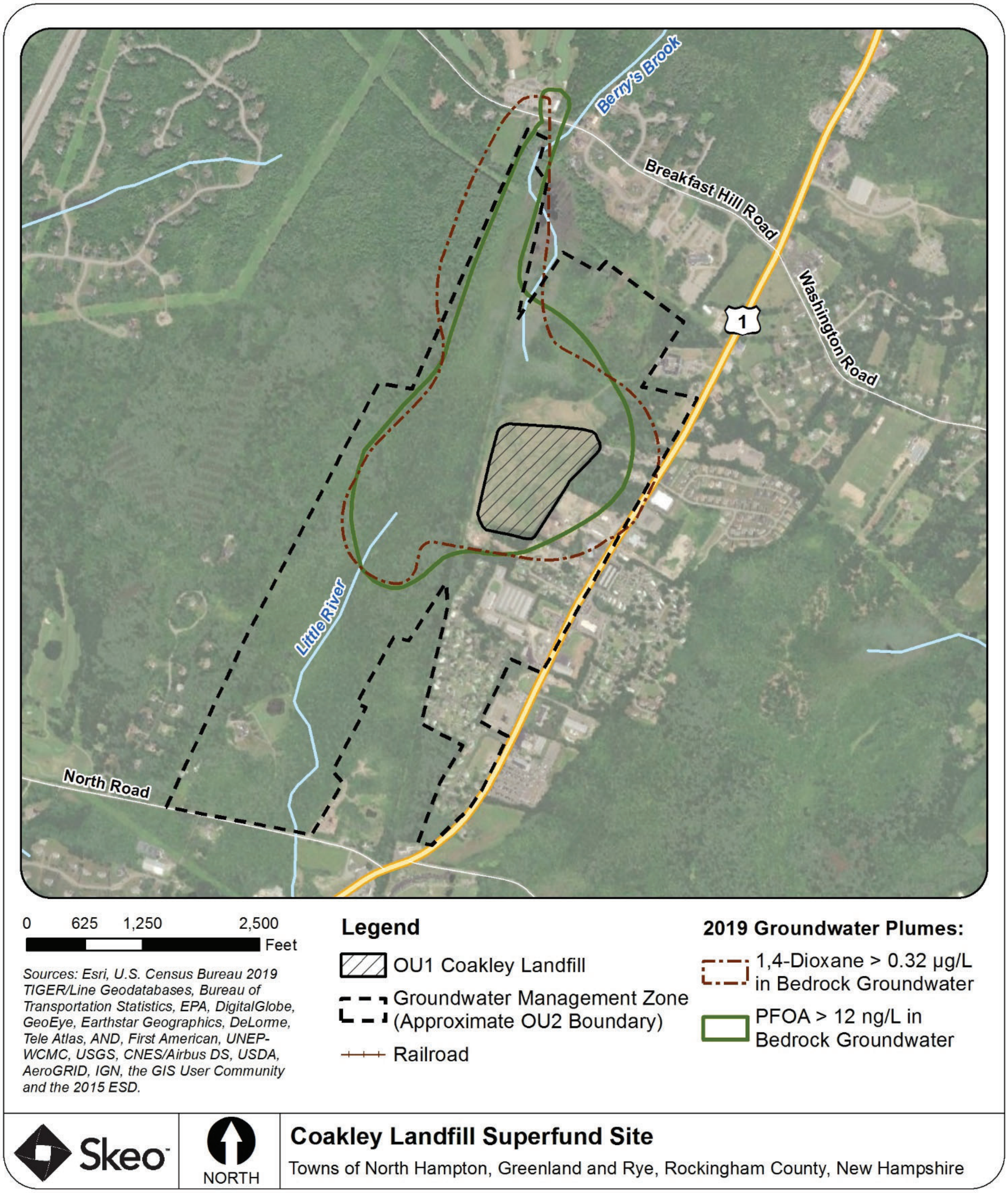
In September 2013, the town of Greenland issued a conditional approval for the construction of a 10-lot residential subdivision development and associated bedrock drinking water wells on the property located at 410 Breakfast Hill Road (Tax Map R-1, Lot #10) outside of the northern end of the existing GMZ. EPA and NHDES contacted the Town of Greenland and the developer of the proposed residential subdivision expressing reservations about placement of additional bedrock wells in this area. EPA and NHDES indicated that there is a strong potential for these wells to cause groundwater contaminant migration, including 1,4-dioxane, from the Site toward the proposed residential development. The 2015 ESD specifies that land use restrictions or other institutional controls (for example, a municipal ordinance regarding well drilling) are needed at specific parcels, including the 10-lot subdivision on Breakfast Hill Road, prohibiting or restricting the installation of new wells and the increased use of existing wells, except those needed for response actions at the Site and approved by EPA. The developer, the property owner, the Coakley Landfill Group (CLG), and the City of Portsmouth reached an agreement for the installation of a municipal water supply line to serve the 10 new residential parcels. The agreement included the implementation of deed restrictions prohibiting the installation of wells and the use of groundwater. Due to the transfer of ownership and usage, there is no longer a need for restrictions at the other

parcels specified in the 2015 ESD, as documented in EPA's June 8, 2021, Fourth Five-Year Review Report and Addendum to Fourth Five-Year Review memorandum to the file and included in Appendix D.
Ongoing site characterization shows that the 1,4-dioxane plume has been further delineated outside of the current GMZ boundary, including the two private wells impacted by 1,4-dioxane. The NHDES will consider expansion of the GMZ to accommodate a broader area based on current groundwater sampling data and the findings of the deep bedrock investigation, which is anticipated to be completed in 2021.

Table 5: Summary of Planned and/or Implemented Institutional Controls (ICs)

Media That Do Not Support UU/UE Based on Current Conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
OU1 Soil	Yes	Yes	Identified in GMP renewal	To prohibit any activity, including, but not limited to any construction, or use of the property that would damage the landfill cap, or interfere with the performance, operation or maintenance of remedial actions for OU1 and OU2.	Implemented. NHDES Groundwater Management Permit # GWP198712001-N002 (issued 01/07/14).
OU1 and OU2 Groundwater	Yes	Yes	Identified in GMP renewal	Prohibits use of groundwater as a drinking water supply.	Implemented. NHDES Groundwater Management Permit # GWP198712001-N002 (issued 01/07/14).
Groundwater Outside the GMZ	Yes	Yes	Will be identified in the GMP	To prohibit or restrict the installation of new wells and the increased use of existing wells, except those needed for response actions and approved by EPA.	GMP, which is not yet finalized until the deep bedrock investigations are completed to support expanding the GMZ as part of the GMP. EPA is exploring options for further institutional controls to prevent an unacceptable risk in the future while balancing those controls with existing property rights.

Figure 2: Institutional Control Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

Systems Operations/Operation and Maintenance (O&M)

Long-term monitoring for OU1 has been ongoing since the landfill capping finished in 1998. Long-term monitoring includes monitoring of landfill gas, methane in occupied structures, groundwater, surface water and sediment quality in accordance with the 1999 Environmental Monitoring Plan. The 1999 requirements also included annual mowing and inspection of the landfill cap and surface water drainage systems, and quarterly ambient air and landfill gas monitoring. Over time, the scope of environmental monitoring activities has been modified. Currently, the CLG conducts environmental monitoring activities according to the April 2010 Revised Project Operations Plan (POP). The POP outlines the remedy performance monitoring activities, which include:

- Groundwater, sediment, surface water, and leachate sampling and analysis.
- Groundwater level monitoring.
- Soil gas methane monitoring probes (M1 through M7).

In 2016, NHDES, in consultation with EPA, allowed a reduction in the frequency of the landfill gas generation/migration monitoring required by state regulations, from quarterly to annual, with sampling occurring when snow/ice is present (e.g., annual first-quarter sampling). NHDES also allowed a reduction in the frequency of monitoring at gas probes M-1 and M-2 to once every five years, with sampling occurring the years when FYRs are due. The CLG also monitors indoor air at three buildings beyond the eastern boundary of the landfill. Methane monitoring is done via continuously operating gas alarms inside the buildings. The alarms have been operating at two lots since March 2007 and at a third lot since March 2008. They are checked annually for proper operation.

EPA and NHDES conditionally approved a POP for the management of the OU2 migration remedy in May 2010; it contained an Environmental Monitoring Plan, a Quality Assurance Project Plan, a Health and Safety Plan, and a Methane Monitoring Plan. The Environmental Monitoring Plan's purpose was to monitor the extent of migration of the contaminated groundwater and other potentially affected media (surface water and sediments), and to track the natural attenuation of the groundwater contamination. The plan outlined the methods and procedures to demonstrate conformance and compliance with cleanup levels. In August 2014, after a number of field audits performed jointly by NHDES and EPA, the POP was superseded by a Sampling and Analysis Plan (SAP). The latest version of the SAP at the time of this review is the SAP dated July 2018. This SAP incorporates the requirements contained in the EPA-approved NHDES Hazardous Waste Remediation Bureau's Waste Management Division Master Quality Assurance Project Plan (HWRB Master QAPP) Revision 1, dated February 2018.

Semi-annual sampling and monitoring of groundwater, private water supply wells, surface water, landfill leachate seep and sediment are conducted to address both OUs. Since some institutional controls are in place, annual monitoring of their effectiveness is also required. No problems in the implementation of system operations or O&M activities have been identified.

III. PROGRESS SINCE THE PREVIOUS REVIEW

This section includes the protectiveness determinations and statements from the 2016 FYR Report and the 2017 FYR Addendum as well as the recommendations from the 2016 FYR Report and the 2017 FYR Addendum and the status of those recommendations. The protectiveness for OU2 was deferred in the 2016 FYR Report but later revised to short-term protective following the completion of additional sampling in the southern area of the GMZ for all COCs, PFOA/PFOS, and the other PFAS to include private drinking water wells.

Table 6: Protectiveness Determinations/Statements from the 2016 FYR Report and 2017 FYR Addendum

<table>
<tr><th>OU #</th><th>Protectiveness Determination</th><th>Protectiveness Statement</th></tr>
<tr><td>1</td><td>Protective</td><td>The remedy at OU1 is protective of human health and the environment.</td></tr>
<tr><td>2</td><td>Short-term Protective</td><td>The remedy at OU2 is protective in the short term because the data indicates no human exposures to COCs (including PFAS) at levels exceeding either state standards or EPA cleanup levels. This is evidenced by the data obtained from the following:
annual monitoring events
the regular sampling of off-Site private drinking water supplies,
the additional sampling for PFAS and VOCs performed by NHDES at numerous private residential wells near the Site’s GMZ
the initial groundwater sampling from three re-developed wells that are now the southernmost monitoring wells south/southwest of the landfill
a second round of sampling on those wells
sampling performed by NHDES at three private drinking water wells within close proximity to the southwestern-most edge of the GMZ.
Also, a GMZ has been established via a NHDES GMP, and ICs have been established for all properties within the GMZ. Groundwater monitoring to determine compliance with the groundwater monitoring standards for the landfill will continue to be conducted as a component of OU2. Long-term protectiveness will be achieved in OU2 when groundwater cleanup levels for all contaminants of concern are met.</td></tr>
<tr><td>Sitewide</td><td>Short-term Protective</td><td>The remedy at all OUs currently protects human health and the environment in the short term because the following elements of the remedy are in place:
The wastes at the Site have been consolidated and capped under a landfill and the landfill cap is functioning as intended.
A fence around the landfill, warning signs, and deed restrictions are preventing human exposures at the capped landfill.
Toxicity tests that have been applied to a “worst case scenario” in the sediment samples, have revealed no significant ecological impact, and EPA has concluded that it is likely there are no significant ecological impacts in surface water and sediment at the Site.
Surface water and sediment monitoring remain in place to ensure that the currently nontoxic concentrations are not increasing significantly. The monitoring has been recently expanded to include PFAS and the results are being compared to Site-specific screening levels.
A landfill gas monitoring program also remains in place, as a precaution.
A groundwater monitoring program which includes on-site monitoring wells and off-site private drinking water wells is in place. The data from these wells indicate there are no human exposures to PFAS and COCs at levels exceeding either State Standards or EPA CLs.
A GMZ has been established via a NHDES GMP, and ICs have been established for all properties within the GMZ. Groundwater monitoring to determine compliance with the groundwater monitoring standards for the landfill, will continue to be conducted as a component of OU2.
However, in order for the remedy to be protective in the long-term, the following new actions must occur:
The CLG must conduct a Bedrock Investigation (as directed by EPA) to address the gap in the knowledge of the groundwater flow at the deep bedrock and the fate and transport of PFAS and COCs in such medium.
EPA must perform additional risk evaluations for the potential pathway of exposure to PFAS from the incidental consumption of surface water and/or sediments.
The CLG must conduct fish-tissue sampling along Berrys Brook to determine whether there are any human exposures to PFAS that can be attributed to the landfill, and compare the results against Site-specific regional screening levels prepared by EPA Region 1.
Sitewide long-term protectiveness will be achieved when the actions laid out above are satisfactorily implemented, and when groundwater cleanup levels for all contaminants of concern are met and restrictions on the use of groundwater within OU2 can be removed. Monitoring of the Site will continue until cleanup levels for the contaminants of concern are met.</td></tr>
</table>

Table 7: Status of Recommendations from the 2016 FYR and 2017 FYR Addendum

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
2	There are currently no institutional controls in place for the proposed residential development site. These are needed in order to prevent the potential for further migration of the impacted groundwater plume and to ensure that such groundwater is not used as drinking water or for any other purpose.	Implement land use restrictions, and/or other institutional controls (e.g., a municipal ordinance) prohibiting the installation of new wells and the increased use of existing wells, as laid out in the August 2015 ESD.	Completed	ICs implemented for development on parcel #10. ICs no longer required for parcels #11, 11A and 11B because they are now owned by the State of New Hampshire, and on parcel #12 because a treatment system has been installed for the existing private well.	6/8/2021
2	Two new contaminants, PFOA and PFOS, have been identified in the groundwater but it has not been possible to test for the presence of those contaminants in sediments and surface water due to the extremely dry conditions. The surface water/sediment pathway needs further evaluation.	Determine whether it is necessary to collect surface water and/or sediment samples plus leachate samples for the analysis of PFOA/PFOS and the other perfluorinated compounds already measured.	Completed	EPA Region 1 consulted with EPA Headquarters and proposed site-specific screening levels for the incidental ingestion of surface water and sediments by children and adults. Site-specific screening levels for PFOA, PFOS and perfluorobutanesulfonic acid (PFBS) were approved for EPA Region 1 use and public disclosure. Surface water, sediment samples and leachate samples were collected in April/May 2017 and analyzed for PFAS.	2/1/2017
1,2	The recent detection of two emerging contaminants (PFOA and PFOS) in both OUs and in some private drinking water wells has the potential to impact future remedy protectiveness.	Continue testing all previously sampled monitoring wells and private drinking water wells twice a year (spring and fall) for the next two years to determine whether there are trends indicating migration of the plume and impacts to nearby private drinking water wells.	Completed	PFOA, PFOS and PFOA/PFOS combined were not reported above applicable, federal health advisories in any residential wells sampled during the spring and fall sampling events in 2017, 2018 and 2019. In October 2019, the AGQS for PFOA and PFOS were lowered from their previous level of 70 nanograms per liter (ng/L) each to 12 ng/L and 15 ng/L, respectively. New AGQSs were established for perfluorononanoic acid (PFNA) at 11 ng/L and perfluorohexanesulfonic acid (PFHxS) at 18 ng/L. Spring 2020 sampling showed exceedances of old and new state standards for PFOA and PFOS at OU1 and OU2 monitoring well samples. In addition, PFNA and PFHxS concentrations exceeded the new AGQS standards in the monitoring well samples. PFOA exceeded the new AGQS in one residential well on Breakfast Hill Road and was similar to historical results. There is a treatment system in place for this well. Sampling and analysis of PFAS is ongoing for monitoring wells and residential wells.	3/1/2019

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
2	The data for 1,4-dioxane and PFCs in OU2 indicates that there is a need to sample or install additional monitoring wells along the southern component of the plume to further determine its extent in the southern direction.	Identify existing wells (overburden and bedrock) south of well GZ-105 that could be incorporated into the annual monitoring program to function as southern GMZ boundary compliance wells. If no existing wells are identified, propose location(s), install and sample a new well cluster (overburden and bedrock wells) for COCs and PFCs.	Completed	CLG's contractor evaluated the existing monitoring wells in the southern GMZ area and identified an existing cluster of three monitoring wells that could potentially be sampled (FPC-3 well cluster). The wells were tested for COCs and PFAS and incorporated into the annual monitoring program.	7/11/2017
2	Well FPC-5A needs to be decommissioned and replaced with a new well. Also, two additional monitoring well couplets are needed in the area of the GMZ extension shown in the GMP renewal.	Decommission well FPC-5A and replace it with another well as close as possible to it. Also install, develop and sample two additional monitoring well couplets within the GMZ extension, for all COCs, PFOA/PFOS, and the other perfluorinated compounds (PFCs) already measured.	Completed	Well FPC-5A was decommissioned in early 2018 and replaced with well (FPC-5AR) located close to well FPC-5B. EPA and NHDES have requested that the CLG perform geophysical work at an existing well to select the optimal location and sampling depths of the two couplets to be installed. The CLG installed well couplets in the northwest GMZ extension in July 2018 to include MW-20/21/22 in the overburden and later in the bedrock in August 2019. These well couplets were sampled for the first time in November 2018 for COCs and PFCs.	8/29/2019
2	The concentrations of arsenic and manganese imply that reducing conditions in the groundwater downgradient of the landfill have resulted in the mobilization of naturally occurring arsenic and manganese present in overburden and bedrock. It is unclear how much comes directly from the landfill vs. mobilized by the reducing conditions created by the landfill vs. the reducing background conditions already present in the area due to the presence of wetlands.	Design and implement a background study, including sampling and analysis, as necessary, to determine if the concentrations of arsenic and manganese are reflective of background conditions or rather the result of mobilization due to the reducing conditions created by the landfill.	Ongoing	The CLG submitted a proposal to conduct a background study in July 2017 for regulatory review. The proposal is under review.	Not Applicable

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
1,2	At the time this FYR Report was being prepared the CLG had not submitted validated data results for the PFOA/ PFOS sampling that the CLG performed in OU1 and OU2. This validated data is needed to assess the protectiveness of the remedy and to precisely determine what should be the next steps.	Obtain and review validated data results for the PFOA/ PFOS sampling that the CLG performed in OU1 and OU2.	Completed	The CLG submitted validated data for the PFOA/PFOS sampling done by the CLG in OU1 and OU2.	6/28/2017
2*	At the time this FYR Report was being prepared, NHDES and EPA had not received validated data results for the sampling that the NHDES performed in several off-site residential wells. This validated data is needed to assess the protectiveness of the remedy and to precisely determine what should be the next steps.	Obtain and review validated data results for the sampling that NHDES performed on residential wells at the time this Report was being prepared.	Completed	NHDES and EPA obtained validated data for the sampling done by NHDES when the fourth FYR Report was being prepared.	11/16/2016
1,2*	The cleanup level for total chromium (50 µg/L) is considered protective because it is lower than the current MCL and the NHDES AGQS (both set at 100 µg/L). However, this CL is based on the assumption that there is no significant amount of hexavalent chromium in the Site's groundwater. Only trace levels of total chromium (1 - 16 µg/L) have been detected in monitoring wells since 2009 and hexavalent chromium is not normally expected in landfills. Nonetheless, its presence at the Site is unknown and further testing is needed to confirm that this CL is adequate.	Test for the presence of hexavalent chromium in all monitoring wells at OU1 and OU2 for the next two sampling rounds.	Completed	Groundwater samples were analyzed for hexavalent chromium during the spring and fall 2017 sampling events; hexavalent chromium was not detected in any sample during either event. The CLG recommended discontinuing hexavalent chromium analysis based on these results. EPA approved discontinuing sampling groundwater monitoring wells for hexavalent chromium in March 2018.	3/14/2018

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
1,2*	The knowledge about groundwater flow and the fate and transport of site COCs in the deep bedrock is very limited.	The CLG to conduct a Deep Bedrock Investigation (as directed by EPA) to address the gap in the knowledge of the groundwater flow at the deep bedrock and the fate and transport of PFAS and COCs in such medium.	Ongoing	The CLG initiated a deep-bedrock investigation in 2018 that included installation of four new, and redevelopment of 11 historical bedrock boreholes, borehole geophysics and sampling, surface geophysics and bedrock outcrop mapping, and a pump test. The investigation is ongoing. Its completion is anticipated in 2021.	Not Applicable
2	Recent surface water samples collected by NHDES and the CLG, at a couple of locations in close proximity to the landfill, have shown exceedances to EPA site specific screening levels for the incidental ingestion of surface water and sediment.	EPA to perform additional risk evaluations for the potential pathway of exposure to PFAS from the incidental consumption of surface water and/or sediments.	Completed	EPA developed site-specific screening levels for PFOA, PFOS and PFBS based on a recreational adult and child exposure to surface water and sediment at the Site. EPA also conducted a risk screening and evaluation and concluded that there are currently no unacceptable risks to a child recreator through exposure to surface water.	5/12/2021
2	Since some of the surface water and sediment samples that have been collected by NHDES and the CLG have exceeded EPA's PFAS Site specific screening levels for the incidental ingestion of surface water and sediment, there is concern about potential PFAS exposures to consumers of Berrys Brook fish.	The CLG to conduct fish-tissue sampling along Berrys Brook to determine whether there are any human exposures to PFAS that can be attributed to the landfill, and compare the results against Site-specific regional screening levels prepared by EPA Region 1.	Completed	The CLG completed fish sampling in June 2018. PFAS concentrations detected in fish tissue samples varied by fish species and location. However, in all cases, PFAS concentrations detected in fish samples were below the site-specific, single-contaminant screening levels established by EPA for both an adult and child consuming fish. These results support that the finding that the fish ingestion exposure pathway does not pose a concern based on the concentrations measured in 2018.	9/4/2018
Notes: * These issues were added as part of the 2017 FYR Addendum.					

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Community Involvement and Site Interviews

A public notice was made available via a press release on February 25, 2021. Appendix C provides a copy of the press release. EPA also provided notice of the FYR in a public information update document posted to EPA's site profile page for the Site in February 2021. The public update is available at: https://www.epa.gov/newsreleases/epa-review-cleanups-seven-new-england-superfund-sites-year. The results of the review and the report will be made available at the Site information repository located at EPA Site Profile web page http://www.epa.gov/region1/superfund/sites/coakley and the following locations:

- The North Hampton Public Library, 237-A Atlantic Avenue, North Hampton, New Hampshire. For the library hours please call 603-964-6326.
- The U.S. Environmental Protection Agency Records Center located at 5 Post Office Square, Suite 100, Boston, Massachusetts. For the Records Center hours and to book an appointment to view the records at the EPA's office please call at 617-918-1440.
- On-line at the NHDES website.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy that has been implemented to date. Summarized below are interviews that EPA conducted with local residents, community officials, the NHDES, the CLG, and other interested parties.

Resident 1:

The interviewee is a resident of Greenland, New Hampshire. She loves the area and where she lives, with the exception of the toxic landfill, referring to the Coakley Landfill Superfund site. The well at her home has been tested regularly by the CLG. Her main concern as a parent is that the well continue to be tested to ensure the levels continue to be below any concern. The CLG and EPA should continue to prioritize the safety of her family and others like hers in the area.

The resident feels that EPA communications around Site activities have been good, but the CLG does not communicate well and seem to only do the minimum necessary. The CLG do not seem to care what the community thinks and only do whatever is legally required. She stated that the CLG come off as the big bad guys and that it does not make sense to have the fox guarding the henhouse, referring to the relationship between the CLG and the EPA. The appearance is that NHDES and EPA are always trying to get information from the CLG. The resident requested that Eric Spear, Robert Sullivan or others from the CLG be interviewed as part of the FYR, not just Peter Britz who has been interviewed in the past.

When asked if she was aware of any community concerns regarding the Site, she felt that there is a mark on the area. Some people are less informed and refer to the area as a bigger problem than it actually is. It was disturbing to see a new development (off of Breakfast Hill Rd) built with town water supplied when there are ongoing concerns about water for other residents. Living across from a home where water is being pumped in from a town supply when she still has well water results in a constant fear that something is wrong.

The resident feels that this is a national problem and recognizes that plenty of other places likely have similar issues. She felt optimistic after a meeting with former Regional Administrator Alex Dunn. A lot of people in the community felt hopeful following the visit, but then it felt like nothing happened. If a big deal is made about a meeting, something should actually occur as a follow up. She is looking for a more concrete result on the Site and would like to see EPA set an MCL for PFAS and that the CLG be held to that.

When asked about engaging and informing the community, she suggested getting more stories into the public about the things that EPA is doing well. While some people are still nervous about meeting in person, the tide is changing, and it is better to inform people than not. Especially the older residents in the community who have more trouble getting out and about. When you have people come in person and clearly explain things, it helps to dispel myths about the contamination at the site. It is also important to give context of this issue on a national scale and help people understand that this is happening everywhere.

Resident 2:

The interviewee is a resident of Greenland who lives about one mile from the Coakley Landfill Superfund site. The resident feels that not enough has been done to protect the health of local residents and stop the flow of toxins from the landfill into groundwater, and that the ongoing bedrock investigation should be completed as soon as possible.

The interviewee indicated that she was aware of multiple cases of cancer in her neighborhood. She also feels that the Coakley Landfill Superfund site should be "cleaned up as soon as possible" and that EPA needs to protect the citizens impacted by the Site. She also feels that actions taken to date have not done enough to help the community and stressed the need to clean up the Coakley Landfill Superfund Site.

NHDES Project Manager (Mr. Andrew Hoffman, P.E.)

Mr. Andrew Hoffman is the Site Project Manager for the Site with the NHDES. As mentioned in the interview for the 2016 FYR, NHDES's continues to be concerned with the two emerging contaminants, 1,4-dioxane and PFAS that have been confirmed to be present at the Site and in the extended plume. Since the 2016 Review, the State has adopted more restrictive drinking water standards for both 1,4-dioxane and four of the PFAS compounds. Consequently, two private wells, located north of the Site along Breakfast Hill Road, now exceed one or more of the revised standards and have since been provided point-of-entry water treatment systems for the removal of these contaminants. The on-going Deep Bedrock Investigation at the Site is nearing completion with the implementation of a groundwater pump test that will further refine the conceptual model of bedrock flow. NHDES will work with EPA to evaluate the data from this investigation and determine if there is existing, or potential for future, migration of Site contaminants that may pose an unacceptable risk or environmental impact. Should an unacceptable condition be identified, NHDES and EPA will consider options to manage the issue, including possible remedy modifications.

Administrator, Town of Greenland:

The Administrator's overall feeling is that more must be done to contain pollution and prevent it from migrating into Berrys Brook and the groundwater. The current containment methods do not work and more should be done. The primary concerns are: the cap in place on the landfill may be contributing to PFAS contamination; fractures in the bedrock may allow more contamination to enter residential wells in the future; lab testing reports may not be accurate (due to labs processing steps); that the EPA is allowing the CLG to maintain status quo using containment methods that are not working; and that the EPA has not required treatment methods to actively treat pollution.

The respondent is concerned that since the contamination has not yet been contained, the community has concerns about the CLG's ability to contain it. There is also concern that the EPA is reluctant to demand more action be taken to actively treat the pollution. The CLG should be held accountable for failing to stop this public health threat, only having a financial obligation to do the bare minimum does not work. More should be done to actively treat the contamination and stop it from spreading. The landfill cap is contributing to the PFAS contamination in Berrys Brook, the cap does not work. The "solution" has become part of the "problem".

Public forums and opportunity for public input have helped the community, but ultimately, they will not be satisfied with anything short of a solution to stop the pollution from migrating off the landfill. An active treatment remedy is necessary as the current containment methods have failed.

The property is not suitable or safe for reuse of any kind and likely will not be in the future. There is concern that future uses of property surrounding Coakley may impact the bedrock and groundwater flow in a way that allows pollution to spread.

The EPA should not permit the CLG to continue making decisions about the Site without more oversight and direction from the EPA. The EPA should take a stronger position in demanding that the pollution be treated and not simply contained. The containment method is not working, and this threatens the public health of the community.

CLG Project Manager (Mr. Peter Britz):
The CLG's overall impression is that the capping of the Site has had the effect of containing the waste and spread of contaminants away from the capped landfill. Most recently, the detections of monitored contaminants appear to be following the directions of flow as modeled in the conceptual site model. With the completion of the deep bedrock study, the CLG will be able to refine the conceptual site model for the movement of contaminants within the subsurface.

Monitoring data have shown that some contaminants have decreased to levels well below applicable groundwater quality standards. New compounds are being sampled that do not have as long a history of sampling; however, the majority of these emerging contaminants appear to be stable. Overall, the results over the past five years appear to be stable.

The Site is visited by staff or contractors on a monthly or bi-monthly basis. There is an annual review / inspection of institutional controls, and sampling activities occur on semi-annual or annual basis depending on the media being sampled (bedrock and overburden groundwater, landfill gas, sediment, surface water). Some sampling protocols have changed over the past five years, and all specific activities / results are documented in the annual summary report for the Coakley Landfill. Oversight and O&M work is ongoing on a regular basis for activities such as mowing, fence repair, clearing drainage ditches, etc.

The CLG contributed funds toward the cost of installing a public water line installed for a new 10 lot subdivision. In addition, as part of the deep bedrock study many of the historic site wells that were not being sampled have been redeveloped and are being monitored as part of the current ongoing deep bedrock study. Due to these efforts, there have been increased costs at the Site. These activities have been planned as part of the ongoing coordination with EPA and NHDES.

Local communities are most concerned with the water quality of drinking water wells and the possibility the Site could be impacting their wells. Additionally, there have been concerns raised regarding the detection of PFAS in Berrys Brook. The CLG is working on an approach to reduce contaminants in the surface water in the vicinity of the Site before it enters Berrys Brook. The CLG has been working with EPA and NHDES to provide regular updates on investigation results to the local communities and residents through public meetings.

The CLG continues to work closely with EPA and NHDES to implement the site remedy. Even with the detection and monitoring of emerging contaminants the Site appears to be protective of human health. The work being done to better understand the Site and these emerging contaminants, in particular their presence in deep bedrock, should help confirm our understanding of the Site and the fate of site contaminants.

Other Interested Parties:
Email responses were collected from other individuals with various interests at the Site. This is a summary of those responses.

Respondents generally feel that more should be done to clean up the Site and that not enough has been done to protect residents and their families. The overall impression is that citizens' and legislators' concerns regarding the need to prevent environmental contamination and to protect public health have not adequately been addressed. There is a feeling that EPA needs to take on greater oversite responsibilities and require NHDES and the CLG to take more action to clean up the Site. The responsible party, CLG, has made public comments that indicate they do not take their responsibility regarding the Site seriously, which does not instill confidence in their commitment to the Site. For this reason, the CLG requires close supervision by regulatory agencies including written and other direction to ensure they understand the gravity of the situation at the Site.

Specific responses regarding House Bill 494 were included. There is a strong feeling that the responsible party did not take proper action to implement the House Bill and needs to be held accountable for preventing migration of contaminants offsite.

Although some residents have been supplied with bottled water, there is a strong request for EPA to act. Specific recommendations were made for EPA to conduct a health study, take a precautionary approach and implement a public health assessment, take action to stop the migration of pollution offsite, issue the bedrock study as soon as possible, and compel the CLG to implement a permanent strategy by reopening the ROD. EPA should take an aggressive approach to protect public health, the environment, and the property values in the area.

Responses emphasized the concern about PFAS contamination migrating offsite and polluting water bodies and drinking water. Some respondents reference cancer levels in the area and related deaths, with concern that cancer may be related to site contamination. There is a feeling that the issue lacks a necessary urgency.

Regarding reuse of the Site, the respondents did not think reuse of the Site was a possibility at this point.

Data Review

This FYR provides an overview of the sample collection and analyses conducted for the spring and fall biannual monitoring events completed between 2017 through fall of 2020. Sample locations are presented in Figure G-1, except for landfill gas, which are shown on Figure G-2. The data were compared against the COC cleanup levels for groundwater established in OU1 and OU2 RODs, as modified in the 2015 ESD, and criteria established by EPA and NHDES since 2015 for 1,4-dioxane and four of the PFAS contaminants.[2] In addition, at the request of EPA and NHDES in 2016, CLG sampled and confirmed the presence of PFAS in groundwater. In response to an issue and recommendation from the 2016 FYR Report, CLG now monitors for PFAS in groundwater, surface water, sediment and private water supply wells. CLG also analyzed fish tissue samples in 2018 and stormwater runoff from the landfill cap in 2018, 2019, and 2021 for PFAS.

The purpose of the review is to assess the effectiveness of the constructed remedy components. Supplemental investigations are ongoing, including a deep-bedrock investigation to fill data gaps to improve the conceptual site understanding of site COCs and PFAS in bedrock groundwater. Overall, the OU1 groundwater contamination is the medium that remains above the ROD cleanup levels for some site COCs (1,4-dioxane, arsenic, manganese) and the AGQS for tert-butyl alcohol (TBA) and four PFAS. OU2 data reflect lower groundwater COC concentrations as groundwater migrates away from the landfill; however, COC (1,4-dioxane, arsenic, manganese) concentrations remain above ROD cleanup levels and PFAS is above AGQS values. All private wells that are part of the CLG's sampling program are below all ROD cleanup levels and applicable health advisories. Two private wells exceeded the state AGQS for 1,4-dioxane in 2018 and CLG installed treatment systems on these wells in accordance with the provisions of the GMP and as directed by NHDES. In 2020, a sample collected before groundwater enters the treatment system on one of these wells had PFOA above the AGQS. Monitoring data shows that the treatment systems remove 1,4-dioxane and PFAS compounds to below AGQS. Surface water and sediment exhibit limited contamination, with PFAS in surface water at two locations slightly exceeding the most conservative EPA screening level for a recreator child. EPA conducted a risk screening and evaluation and concluded that there are currently no unacceptable risks to a child recreator through exposure to surface water (Appendix I).

OU1 Source Area Landfill Monitoring

In 2016, NHDES, in consultation with EPA, allowed a reduction in the frequency of the landfill gas generation/migration monitoring from quarterly to annually and allowed a reduction in the frequency of monitoring at gas probes M-1 and M-2 to once every five years, with sampling occurring during the years when

[2] In September 2018, the state lowered the AGQS for 1,4-dioxane from 3.0 µg/L to 0.32 µg/L. In July 2020, the state promulgated MCLs for the following four PFAS: PFOA (12 ng/L), PFOS (15 ng/L), PFHxS (18 ng/L) and PFNA (11 ng/L).

the FYRs are due. Groundwater monitoring is ongoing for all COCs and some additional contaminants (e.g., PFAS). OU1 monitoring results are summarized below.

- Landfill Gas: During this FYR period, methane gas was not detected in the monitoring probes between 2017 and 2021 (Figure G-2). In March 2021, CLG sampled LFG monitoring probes M-1, M-2, M-4, M-5, M-6, and M-7. The methane gas concentrations are below the NHDES methane soil gas action level of 2.5% by volume, demonstrating that the landfill gas does not pose an explosive concern.

- Landfill Seep: The CLG collects landfill leachate samples from one location, referred to as seep sample L-1.[3] The sample is located in the GMZ at the northwest corner of the landfill (Figure G-1). There are no cleanup goals for seeps. However, the CLG compares the results against the acute and chronic NHDES surface water standards, which were identified as applicable, relevant and appropriate regulations (ARARs) in the ROD. Table G-1 lists the historical seep results. Overall, the Spring 2020 exceedances are consistent with historical data. A sample was not collected during the Fall 2020 as insufficient water was present to sample. In the last six sample events only iron and ammonia consistently exceed the chronic standards. There are no acute and chronic screening levels available for PFAS; however, PFAS compounds were detected in the seep sample.

- Groundwater: The CLG samples 11 monitoring wells in OU1 (Figure G-1). The analytical results for 2020 (Table G-2) show that:
  - Contamination for site-related contaminants appears more widespread in the deep-bedrock groundwater versus the overburden, with regulatory threshold exceedances during the FYR period similar to historical monitoring events.
  - 1,4-Dioxane and PFOA represent the most widespread plumes in bedrock groundwater (Figures G-3 and Figure G-4, respectively) and these plumes are interpreted to extend slightly beyond the northern extent of the GMZ boundary. The arsenic and manganese plumes are much smaller.
  - Compounds reported at concentrations exceeding the ROD cleanup levels or federal lifetime health advisories in one or more wells in 2020 were limited to arsenic, manganese, 1,4-dioxane, and PFOA and PFOS. In addition, TBA, PFHxS, PFNA, PFOA and PFOS exceed the state AGQS, but these compounds are not identified as COCs.
  - Eight other PFAS compounds without established federal or state standards were also detected [(perfluorobutanoic acid (PFBA), perfluoropentanoic acid (PFpEA), PFBS, perfluorohexanoic acid (PFHxA), perfluoroheptanoic acid (PFHpA), perfluoroheptanesulfonic acid (PFHpS), perfluorooctanesulfonamide (PFOSA) and perfluorodecanoic acid (PFDA)].
  - Statistical analysis from the monitoring reports included for data collected from 2004 to 2020 (Table G-3) shows that:
    - 1,4-Dioxane and manganese statistically show most wells with a decreasing trend or no trend.
    - PFOA/PFOS statistically show no trend, but visually concentrations have increased in some wells and have exceeded the federal health advisory (HA) (Table G-2).
    - Arsenic shows a statistically increasing trend in three wells (BP-4, MW-5S and MW-11) and manganese shows an increasing trend in two wells (MW-6 and OP-2). The CLG suggested that the increasing trends associated with these naturally occurring inorganic compounds may be attributed to reducing conditions where natural degradation of organic materials is occurring or where limited exchange of fresh water is occurring, and oxygen becomes depleted. In response to the recommendation from the 2016 FYR, the CLG has prepared a proposal to evaluate the contributions of arsenic and manganese from background in 2017, which remains under review by the agencies.
    - The time-series plots for arsenic in the bedrock and overburden groundwater also illustrate these trends as shown in Figure G-5. Manganese follows a similar pattern.

[3] The landfill does not have a leachate collection system. Field observations in 2019 indicate samples collected at L-1 are representative of shallow overburden groundwater discharging via seepage from an embankment to an impounded wetland area near the northwest margin of the landfill.

OU2 Management of Migration

Currently, CLG evaluates contaminant migration by monitoring site-related contaminants in groundwater, surface water and sediment. Samples of fish tissue and stormwater runoff have also been collected. In addition, there is an extensive private well monitoring program to assess any impacts to nearby wells from site contaminants.

The OU2 monitoring results are summarized below, and generally reflect similar results throughout the FYR period:

- Indoor Methane Monitoring: The CLG monitors three properties abutting the landfill via continuously operating gas alarms inside the buildings. The gas alarms are checked by the CLG on an annual basis to ensure all units are operating properly. The alarms appeared to be in good condition and functioning properly, with two exceptions. In March 2017, one alarm was not functioning properly (Lot 021-028-001). It was replaced. In March 2021 CLG determined that the third methane alarm was missing due to renovations that were completed on the residential unit owned by SNS, LLC. SNS indicated that the alarm will be replaced. None of the alarms were triggered during the FYR period.

- Ambient Air: Monitoring of ambient air stopped in December 2015. Methane gas in ambient air readings has not been detected at levels above 0.2% since the beginning of monitoring activities in March 1999.

- Groundwater: Environmental monitoring results for the 2020 sampling events and trends in groundwater quality parameters are generally consistent with the conceptual site model and overall trends in groundwater quality during the FYR period. Groundwater quality is stable or improving at most locations, including OU2 monitoring wells and at off-site residential supply wells. However, the groundwater remedy has not achieved the cleanup goals in the 11-year timeframe outlined in the OU2 ROD. The analytical results in Table G-4 show:

  - COCs reported at concentrations equal to or exceeding the ROD cleanup levels or federal health advisories in one or more wells were limited to arsenic, manganese and 1,4-dioxane. In addition, PFAS (PFHxS, PFNA, PFOA and PFOS) exceed the federal lifetime health advisory or state AGQS, but these compounds are not identified as COCs.

  - Eight other PFAS without established federal or state standards were also detected (PFBA, PFpEA, PFBS, PFHxA, PFHpA, PFHpS, PFOSA and PFDA).

  - Statistical analysis of data collected from 2004 to 2020 (Table G-3) shows:

    - 1,4-Dioxane generally shows a decreasing trend or no trend.
    - PFOA/PFOS generally shows no trend statistically but visual trends show increases in AE-2B, FPC-9B, FPC-11A, FPC-11B and GZ-105. However, PFAS with standards consistently exceed the AGQS and the federal HA (Table G-4).
    - Arsenic and manganese show statistically increasing trends in three and five wells, respectively (Table G-3). The CLG suggests that the increasing trends associated with these naturally occurring inorganic compounds may be attributed to reducing conditions where natural degradation of organic materials is occurring or where limited exchange of fresh water is occurring, and oxygen becomes depleted.

- Residential Supply Wells: As required by the 2018 Sampling and Analysis Plan, 24 private water supply wells are sampled biannually unless access is not provided by the owner. Samples are collected prior to water treatment systems at each residence. Twenty-two and twenty-four residential wells were sampled during the spring and fall 2020 events, respectively. The 2020 spring and fall sampling show:

- 1,4-Dioxane[4] was not detected above the NHDES AGQS of 0.32 µg/L in any residential well sampled in spring 2020. However, in fall 2020, residential wells 339 BHR and R-3 had slight exceedances of 1,4-dioxane (0.57 to 0.50 µg/L, respectively) above the NHDES AGQS. The CLG installed water treatment systems at both locations in November 2018, under direction of NHDES in its enforcement of the state GMP.

- PFOA was detected in 339 BHR (16.3 ng/L spring 2020, 19.6 ng/L fall 2020), slightly above the AGQS of 12 ng/L but below EPA's HA of 70 ng/L. Similarly, PFOA was detected slightly above the AGQS of 12 ng/L in fall 2020 (12.3 J ng/L) in the duplicate sample for well R-3. Both wells have a carbon adsorption treatment system in place that addresses PFAS compounds and 1,4-dioxane. The sample collected reflects pre-treatment results.[5] Several PFAS without established federal or state standards were also detected (PFBA, PFpEA, PFBS, PFHxA, PFHpA and PFOSA).

- Surface Water: Surface water is collected from eight locations when water is present [three locations in the wetland (SW-4, SW-5, SW-103), one location in the Little River (SW-LR) and four locations in Berrys Brook (SW-110, SW-111, SW-BB1 and SW-BB2)] (Figure G-1). For example, in fall 2020, samples could not be collected at SW-4, SW-5, SW-103, SW-110, SW-BB1 or SW-BB2 because insufficient water was present to facilitate sampling. EPA did not establish cleanup goals for surface water or sediment in the ROD. According to the 2018 SAP, surface water data results are compared to NHDES surface water quality standards (where they exist). Surface water PFAS results are compared against EPA screening levels established for several PFAS (PFOA, PFOS, PFBS) based on recreational exposure of an adult and child. As shown in Table G-5, the following general observations can be made:

    - Several metals, which are not identified as COCs, were detected consistently above acute or more often chronic standards as shown in the annual reports for the FYR period. In spring 2020, copper exceeded the chronic and acute standards at SW-4; iron exceeded the chronic standard at SW-5 and SW-BB1. Aluminum exceeded the chronic standard in SW-LR. In fall 2020, lead at SW-111 exceeded the chronic standard of 0.00041 mg/L with a concentration of 0.0014 mg/L.

    - 1,4-Dioxane was reported at concentrations ranging from non-detect to 1.8 µg/L (SW-5), also consistent with past results. 1,4-Dioxane does not have a chronic or acute standard.

    - PFOA and PFOS concentrations are consistent with past events, with PFOS concentrations in SW-5 (1,060 ng/L) and SW-103 (1,080 ng/L) exceeding the most conservative EPA screening level for a recreator child (760 ng/L), but below the screening level for recreator adult (6,850 ng/L). A risk screening and evaluation was performed for recent surface water data for the recreator child, which found that although there were exceedances of EPA's most conservative surface water screening level, the non-cancer risk estimates for PFOA and PFOS individually, as well as PFOA and PFOS combined, were all below the EPA acceptable HQ of 1 (Appendix I). SW-5 is located about 250 feet from the northwestern boundary of the landfill, roughly between seep L-1 and the railroad right-of-way. SW-103 is located about 450 feet from the northwestern boundary of the landfill and 200 feet downstream of SW-5. Both locations are within wetland areas not suitable for recreation, and access to these areas is limited and exposure unlikely, with the property being owned by either the CLG or the New Hampshire Department of Transportation (railroad easement).

[4] Results from post-treatment samples collected from the carbon adsorption systems have shown that they have been effective in reducing 1,4-dioxane concentrations to below the AGQS at the point of use. Information related to the treatment systems and test results are forwarded to EPA and NHDES in separate submittals.
[5] Under direction of NHDES in its enforcement of the GMP, carbon adsorption water treatment systems were installed by the CLG due to the presence of 1,4-dioxane above the state standard; the treatment system also addresses the presence of PFAS. The samples from the private wells are collected from a sample port prior to and following water treatment. Samples results show the effective removal of 1,4-dioxane and PFAS to below AGQS.

- Sediment: Samples are co-located with seven of the eight surface water sample locations (SED-4, SED-5, SED-110, SED-111, SED-LR, SED-BB1 and SED-BB2). There are no cleanup goals established for sediment. According to the 2018 SAP, sediment analytical results are compared to published, peer-reviewed screening levels included in the sediment quality guidance levels, as listed in the National Oceanic and Atmospheric Administration Screening Quick Reference Tables (NOAA SQuiRT Tables). In addition, sediment results for PFAS are compared to EPA recreational-based screening levels, when available. The following general observations can be made:

    - Six parameters (total arsenic, total chromium, total copper, total lead, total mercury, and total nickel) in one or more sediment samples were reported above their associated NOAA SQuiRT threshold effects concentration (TEC) standard in spring 2020, which is consistent with historical results (Table G-6).

    - An ecological risk evaluation during the previous FYR showed that the metals in sediment samples are unlikely to be toxic to aquatic organisms, thus posing no significant risk to the ecosystem.

    - During the FYR period, the landfill cap and surrounding areas within the perimeter fence were observed to be well vegetated and have been stable for many years. No evidence of significant soil erosion has been observed during on-site inspections by the CLG. As a result, the landfill area does not appear to be actively contributing significant amounts of sediment or contaminants to wetland areas around the landfill.

    - 1,4-Dioxane was not reported in any of the sediment samples collected.

    - None of the samples exceeded EPA health-based screening levels for PFAS compounds for which screening levels are established, consistent with past events.

- Fish: At the direction of EPA, the CLG collected fish tissue samples from Berrys Brook in June 2018. Prior to the collection and analysis of the samples, EPA developed risk-based screening levels for fish consumption for PFOA, PFOS and PFBS. Concentrations of PFOS were detected in some fish samples above the most conservative site-specific, single-contaminant screening levels established by EPA. PFOA was detected in some samples but below the site-specific screening levels, and PFBS was below detection in all samples. In response to the screening level for PFOS being exceeded, EPA's risk assessor performed further risk assessment by calculating the hazard quotients (HQs) for each individual PFAS and the hazard index (HI), which is the sum of the individual HQs. The sum of the HQs of PFOA and PFOS detected (the HI) was less than 1, and the risk assessor concluded that the risk of recreational fish consumption in Berrys Brook is lower than EPA's risk limit of HI =1. These results suggest that the fish ingestion exposure pathway does not pose a concern based on the concentrations measured in 2018 (Table G-7). However, uncertainty exists because PFNA was detected in most fish samples but a screening level has not been established for this PFAS.

Site Inspection

The site inspection took place on 5/11/2021. Participants included: Richard Hull (EPA RPM), Andrew Hoffman (NHDES), Peter Britz (CLG), Johnny Zimmerman-Ward and Kirby Webster (EPA FYR support contractor Skeo). The purpose of the inspection was to assess the protectiveness of the remedy. Appendix E includes the site inspection checklist, and Appendix F includes site inspection photos.

Site inspection participants met at the north entrance to the landfill, located at southern end of the parking lot behind the Bethany Church (500 Breakfast Hill Road, Greenland, New Hampshire). Site inspection participants discussed the current status of the Site, particularly the implementation of institutional controls and the redevelopment potential for the area. The new development (Sewall Meadow located at 410 Breakfast Hill Road) has been built and deed restrictions are in place for the parcels in the development. Houses are attached to water through an agreement with the neighboring town of Rye.

Site inspection participants accessed the landfill through two locked sets of gates on the north side of the landfill, south of the Bethany Church and the power lines. Both sets of gates include "No Trespassing" signs. Participants viewed the western and southern side of the landfill and across the top. The northwest stormwater basin was dry, while the northeast stormwater basin contained standing water. Fences observed were in good condition. Surface drainage and underdrain cleanout structures observed were in good condition. There was no evidence of trespassing or vandalism. The landfill is well vegetated. It is mowed once per year with the timing dependent on the weather and the grass growth. Some vegetation was growing in the drainage channels, but does not appear to impede flow, and will be cut down when mowing occurs. Gas vents appeared to be in good condition. Observed groundwater monitoring wells were all in good condition.

Participants observed the residential developments where private well sampling occurs, and Berrys Brook. Signage was observed along the rail trail next to Berrys Brook. One sign was observed to be knocked down in the wetland area; but this is the first problem that has occurred with the signage. The CLG replaced the sign immediately following the inspection. Though the rail trail adjacent to Berrys Brook and the landfill is frequently accessed by the public for walking, running and biking, there was no evidence of recreation occurring in Berrys Brook or associated wetlands that would result in a completed exposure pathway to the surface water.

V. TECHNICAL ASSESSMENT

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

Question A Summary:

Yes. EPA identified the OU1 source control remedy components in the Site's 1990 OU1 ROD with modifications to some of the remedy components and cleanup goals in five ESDs (1991, 1996, 1999, 2007 and 2015). The OU1 remedy included the excavation and consolidation of contaminated soil, sediment and solid waste in the landfill and covering of the material using a multi-layer cap system along with passive gas venting. Site monitoring and routine O&M inspections indicate that the cap is containing landfill waste material. However, a 2019 stormwater investigation confirmed that materials in the landfill cover system, primarily the topsoil/vegetative layer, contain PFAS that is dissolved in stormwater and transported via direct surface runoff of precipitation and via infiltration of stormwater through the cover soil. The infiltrated water then reaches the underdrain collection piping that discharges to the wetland complex and Berrys Brook. EPA and NHDES are working with the CLG to evaluate the extent of contaminant loading from stormwater runoff and pilot remedial alternatives to limit the contaminant loading to Berrys Brook. Landfill gas monitoring during this FYR period shows that methane concentrations are predominantly below detection or below the NHDES methane action level of 2.5% by volume. No methane has been detected by the methane alarms installed at any of the residential and commercial buildings monitored. Monitoring of landfill gas will continue as a precaution. In addition, institutional controls are in place that prevent disturbance of the OU1 remedy and restrict groundwater use. Access controls (fence around the landfill and warning signs) are also in place and in good condition, as evidenced by visits to the Site. They continue to be effective in preventing trespassing and potential exposures.

EPA identified the OU2 remedy to manage contaminant migration in the Site's 1994 OU2 ROD, with modifications to some remedy components and cleanup goals in three ESDs (2007, 2009 and 2015). The 1994 ROD estimated that groundwater cleanup levels would be achieved in 11 years, but levels of 1,4-dioxane, arsenic and manganese in groundwater remain above the ROD cleanup levels. Due to the exceedance of the state AGQS for 1,4-dioxane and the identification of PFAS in groundwater since the previous FYR, CLG has implemented a private well monitoring program, installed groundwater treatment units on two affected residential wells as directed by the NHDES enforcement of the GMP, and is further characterizing the groundwater contamination in deep-bedrock groundwater. The previous FYR recommended that a background study be conducted to determine if the concentrations of arsenic and manganese are reflective of background conditions or rather the result of mobilization due to the reducing conditions created by the landfill. In addition, CLG conducted a pilot study to address the migration of contaminants from the landfill into downgradient Berrys Brook. The additional characterization efforts will be reviewed to support the possible expansion of the GMZ due to 1,4-dioxane exceeding the current state AGQS beyond the current GMZ boundary. Institutional controls in the form of deed restrictions are now in place at the 10-lot subdivision that was developed north of the landfill, just outside of the GMZ, to prevent the use of groundwater and potential impact to the groundwater plume. EPA is exploring options for further institutional controls to prevent an unacceptable risk in the future while balancing those controls with existing property rights.

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

Question B Summary:

No. There have been changes to toxicity values, standards, and methods of evaluating risk since the remedy was selected. For example, new state standards were released for 1,4-dioxane. In addition, while not a COC, the presence of PFAS in groundwater was confirmed in 2016 (Appendix H), which led to evaluations of different Site media including groundwater, surface water, sediment, stormwater, and fish. New Hampshire established new groundwater standards for PFAS in 2020.

There have been other changes since the previous FYR, including a newly available inhalation toxicity value for trans-1,2-dichloroethylene and new tools for evaluating the vapor intrusion exposure pathway. EPA also released an updated toxicity assessment for perfluorobutane sulfonic acid (PFBS) that changed the toxicity value.

The changes, as described in the following sections, are not expected to alter the protectiveness of the remedy for OU1 or OU2 because:

- CLG uses the current NHDES AGQS for 1,4-dioxane in ongoing site characterization activities and monitoring reports. In addition, the CLG incorporated the current AGQS as part of the GMP permit renewal addendum that it submitted in December 2018.

- CLG has incorporated current state PFAS standards in ongoing investigations of this group of emerging contaminants to determine if PFAS requires response action under the GMP.

- Trans-1,2-dichloroethylene has been below detection in the OU1 and OU2 monitoring wells and in the water supply wells since the previous FYR and FYR Addendum, with detection limits ranging from < 0.5 μg/L to < 2 μg/L), which is well below the cleanup level of 100 μg/L.

Changes in Standards and To-Be-Considered Criteria (TBCs)

New standards should be considered during the FYR process as part of the protectiveness determination. Under the NCP, if a new requirement is promulgated after the ROD is signed, and the requirement is determined to be an applicable or relevant and appropriate requirement (ARAR), the new requirement must be attained only if necessary to ensure that the remedy is protective of human health and the environment.

EPA guidance states:

> "Subsequent to the initiation of the remedial action new standards based on new scientific information or awareness may be developed and these standards may differ from the cleanup standards on which the remedy was based. These new … [standards] should be considered as part of the review conducted at least every five years under CERCLA §121(c) for sites where hazardous substances remain on-site. The review requires EPA to assure that human health and the environment are being protected by the remedial action. Therefore, the remedy should be examined in light of any new standards that would be applicable or relevant and appropriate to the circumstances at the site or pertinent new [standards], in order to ensure that the remedy is still protective. In certain situations, new standards or the information on which they are based may indicate that the site presents a significant threat to health or environment. If such information

comes to light at times other than at the five-year reviews, the necessity of acting to modify the remedy should be considered at such times." (See CERCLA Compliance with Other Laws Manual: Interim Final (Part 1) EPA/540/G-89/006 August 1988, p. 1-56.)

- *PFAS*

  In May 2016, EPA issued final lifetime drinking water health advisories for PFOA and PFOS. The EPA HA for PFOA and PFOS is 70 ng/L (parts per trillion [ppt]), individually or combined. See also EPA's Interim Recommendations to Address Groundwater Contaminated with Perfluorooctanoic Acid and Pefluorooctanesulfonate (Office of Solid Waste and Emergency Response Directive 9283.1-47, December 19, 2019), which establishes a screening level of 40 ng/L (ppt) for PFOA and PFOS individually. Using the standard Superfund approach, an unacceptable non-cancer risk may be triggered by an exceedance of an HQ of 1. EPA's HA of 70 ng/L (ppt) equates to an HQ of less than 1 (about 0.1 to 0.2). Should data indicate that PFAS levels have reached or exceeded 40 ng/L (ppt) for either PFOA or PFOS, EPA guidance recommends further evaluation.

  In July 2020, New Hampshire promulgated state MCLs for the following four PFAS into the State's Safe Drinking Water Act:

  - PFOA: 12 ng/L (ppt)
  - PFOS: 15 ng/L (ppt)
  - PFHxS: 18 ng/L (ppt)
  - PFNA: 11 ng/L (ppt)

  Current state law requires that AGQS be the same value as any MCL established by NHDES and also that they be at least as conservative as health advisories set by EPA.

  As shown in the Data Review section above, EPA and NHDES requested that CLG investigate the presence (or absence) of PFAS in groundwater. In May 2016, CLG initiated sampling for PFAS at a select group of monitoring wells within OU1 and due to exceedances of the HA, conducted sampling in OU2 monitoring wells and private wells in July 2016. Exceedances of EPA's HA occurred in OU2 monitoring wells in 2016, 2017, 2018, 2019 and 2020, but concentrations of PFOA and PFOS were below EPA's HA and screening level in all residential wells sampled. However, comparing these data to the 2020 promulgated state MCLs, an exceedance for PFOA occurred in fall 2019 and spring 2020 in the same residential well, 15 ng/L and 16.3 ng/L, respectively. These concentrations are below EPA's HA and do not pose a current exposure concern, as the CLG installed a water treatment system at this well and at another private well in November 2018 due to the presence of 1,4-dioxane; this treatment system also addresses PFAS contamination.

  For the purposes of this FYR, EPA has compared the PFAS data collected from private wells with EPA's PFOA/PFOS HA for drinking water of 70 ng/L (ppt) and the State's MCLs for PFAS. EPA's HA of 70 ng/L (ppt) equates to a Superfund noncancer risk of less than an HQ of 1, which is below EPA's acceptable noncancer risk threshold of an HQ of 1. Thus, the existing remedy remains protective and the remedy does not need to be modified to add the new state MCLs for PFAS at this time. Monitoring for PFAS will continue as per the 2018 SAP to ensure the remedy remains protective. The analytical results for groundwater monitored in OU1 and OU2 confirm the presence of PFOA and PFOS, and other PFAS compounds.

- *1,4-Dioxane*

  Using 2013 updated Integrated Risk Information System toxicity information and the standard Superfund risk assessment approach, EPA's carcinogenic risk range of 10^{-6} to 10^{-4} for 1,4-dioxane equates to a concentration range of 0.46 to 46 μg/L (parts per billion (ppb)).

As shown in the Data Review section and discussed in Remedy Implementation section above, the CLG is in the process of completing a deep bedrock investigation and has proposed to expand the GMZ in the GMP renewal submitted in December 2018. The current ROD cleanup level for 1,4-dioxane is 3.0 µg/L, but for the purpose of establishing the GMZ, the NHDES compares the analytical results from groundwater monitoring to the most current AGQS of 0.32 µg/L.

Changes in Toxicity and Other Contaminant Characteristics

- *2020 Trans-1,2-dichloroethylene Non-cancer Toxicity Value*
  In November 2020, EPA finalized a new reference concentration for trans-1,2-dichloroethylene based on a new provisional peer-reviewed toxicity value. There previously was no reference concentration for trans-1,2-dichloroethylene. The concentrations of trans-1,2-dichloroethylene has been below detection in the OU1 and OU2 monitoring wells and in the residential water supply wells since the previous FYR and FYR addendum with detection limits ranging from <0.5 µg/L to <2 µg/L, which is well below the cleanup level of 100 µg/L.

- *2016 PFOA/PFOS Non-cancer Toxicity Values*
  In May 2016, EPA issued final lifetime drinking water health advisories for PFOA and PFOS, which identified a chronic oral reference dose (RfD) of 0.00002 mg/kg-day for PFOA and PFOS (USEPA, 2016a and USEPA, 2016b). These RfD values should be used when evaluating potential risks from ingestion of contaminated groundwater at Superfund sites where PFOA and PFOS might be present based on site history.

- *2021 PFBS Non-Cancer Toxicity Value*
  Perfluorobutane sulfonic acid (PFBS) has a chronic oral RfD of 3E-04 mg/kg-day based on an EPA Provisional Peer Reviewed Toxicity Value (PPRTV) (USEPA, 2021). This RfD value should be used when evaluating potential risks from ingestion of contaminated groundwater at Superfund sites where PFBS might be present based on site history.

  PFAS was found to be present in site monitoring wells at levels above the HA in May 2016. Subsequent monitoring showed detections of PFAS in residential wells as well as in surface water in locations near the landfill. A risk evaluation was performed for recent surface water data, which found that although there were exceedances of EPA's most conservative surface water screening level, the non-cancer risk estimates for PFOA and PFOS individually, as well as PFOA and PFOS combined, were all below the EPA acceptable HQ of 1. PFBS has not been detected above surface water screening levels.

  Concentrations of PFOS were detected in some fish samples above the most conservative site-specific screening levels established by EPA. PFOA was detected in some samples but below the site-specific screening levels, and PFBS was below detection in all samples. In response to the screening level for PFOS being exceeded, EPA's risk assessor performed further risk assessment which concluded that there was no unacceptable risk. Access to property owned by the CLG or the New Hampshire Department of Transportation (railroad easement) where the surface water exceeded screening levels for PFAS is limited by site conditions and warning signs.

Changes in Risk Assessment Methods

- ***2018 EPA Vapor Intrusion Screening Level (VISL) Calculator***

  In February 2018, EPA launched an online VISL calculator that can be used to obtain risk-based screening level concentrations for groundwater, sub-slab soil gas and indoor air. The VISL calculator uses the same database as the regional screening levels (RSLs) for toxicity values and physiochemical parameters. It is automatically updated during the semi-annual RSL updates. The User's Guide provides more information on how to use the VISL calculator: https://www.epa.gov/vaporintrusion/vapor-intrusion-screening-level-calculator.

A vapor intrusion evaluation was conducted as part of this FYR using the maximum OU1 and OU2 volatile COC concentrations detected in the groundwater and entering them into the VISL calculator. The results (Appendix I) show that the potential vapor intrusion exposure risks are within EPA's acceptable cancer risk range and below the non-cancer HI of 1, indicating this exposure pathway does not pose a concern to human health at this time.

Changes in Exposure Pathways

- A 10-unit residential subdivision was developed north of the landfill, just outside of the GMZ. Institutional controls in the form of deed restrictions are now in place to prevent the use of groundwater and potential impact to the groundwater plume.

Expected Progress Toward Meeting RAOs

- The 1994 OU2 ROD estimated that groundwater cleanup levels would be achieved in 11 years. Over 25 years have passed and cleanup levels for most site COCs have been achieved with the exception of 1,4-dioxane, arsenic and manganese. The remedy is progressing, but the timeframe is taking longer than expected to meet RAOs for several COCs. In addition, a number of PFAS, while not formally identified as a site COC, continue to exceed AGQS and the federal HA. EPA and NDHES are working with the CLG to further characterize groundwater contamination in the deep bedrock and will evaluate if additional response actions are needed.

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

No other information has come to light that could call into question the protectiveness of the remedy in minimizing migration of contaminants and reducing risk from exposure to contaminants.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the FYR:
None

Issues and Recommendations Identified in the FYR:

OU(s): 1 and 2	Issue Category: Other			
	Issue: The investigations and revision of the conceptual site model have not been completed to understand groundwater flow and the fate and transport of site COCs and PFAS compounds in the deep bedrock.			
	Recommendation: Complete the deep-bedrock investigations to delineate the extent of contamination in bedrock groundwater, as well as, fate and transport of PFAS compounds and site COCs in groundwater and determine if further action is warranted.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	6/30/2022

OU(s): 2	Issue Category: Monitoring			
	Issue: The increased concentrations of arsenic and manganese imply that reducing conditions in the groundwater downgradient of the landfill have resulted in the mobilization of naturally occurring arsenic and manganese present in overburden and bedrock. However, it is unknown if the landfill is directly releasing these metals or whether their presence is due to reducing conditions in the natural soils around the landfill and wetland areas. The estimate from the OU2 1994 ROD for the natural attenuation and achievement of cleanup levels for arsenic and manganese has been exceeded.			
	Recommendation: Design and implement a background study, including sampling and analysis, as necessary, to determine if the concentrations of arsenic and manganese are reflective of background conditions or rather are the result of mobilization due to the reducing conditions created by the landfill. Results from the background study will be used to assess natural attenuation and time to cleanup for arsenic and manganese.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	9/30/2025

OTHER FINDINGS

In addition, the following findings were identified during the FYR. These recommendations do not affect current and/or future protectiveness.

- Groundwater monitoring, the deep bedrock investigation, and other ongoing investigations demonstrate the presence of PFAS above the federal HA and state AGQS. Groundwater from on-site monitoring wells and private wells, along with surface water, sediment, and stormwater runoff should continue to be sampled and analyzed for PFAS compounds to identify trends and continue to compare against current screening levels and standards.
- Continue to evaluate the need for ICs for areas outside of the current GMZ, based on plume delineation and future land use.

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement	
Operable Unit: 1	*Protectiveness Determination:* Short-term Protective
Protectiveness Statement: The remedy at OU1 currently protects human health and the environment because contaminated soil, sediment and solid waste have been excavated and placed in a capped landfill. In addition, institutional controls are in place that prevent disturbance of the remedy components and prohibit use of groundwater. For the remedy to be protective over the long term, the following actions need to be taken: • Complete the deep-bedrock investigations to delineate the extent of contamination in bedrock groundwater, as well as, fate and transport of PFAS compounds and site COCs in groundwater and determine if further action is warranted.	

Protectiveness Statement	
Operable Unit: 2	*Protectiveness Determination:* Short-term Protective
Protectiveness Statement: The remedy at OU2 currently protects human health and the environment because some institutional controls and access controls are in place that prevent exposure to site groundwater, and access to surface water that exceeds risk-based screening levels is limited by property access, site conditions and warning signs. Additionally, a risk evaluation of surface water data that exceeds screening levels found that the non-cancer risk estimates for PFOA and PFOS individually, as well as PFOA and PFOS combined, were all below the EPA acceptable hazard quotient of 1.0, and that there are currently no unacceptable risks to a recreator through exposure to surface water. For the remedy to be protective over the long term, the following actions need to be taken: • Complete the deep-bedrock investigations to delineate the extent of contamination in bedrock groundwater, as well as, fate and transport of PFAS compounds and site COCs in groundwater and determine if further action is warranted. • Design and implement a background study, including sampling and analysis, as necessary, to determine if the concentrations of arsenic and manganese are reflective of background conditions or rather are the result of mobilization due to the reducing conditions created by the landfill. Results from the background study will be used to assess natural attenuation and time to cleanup for arsenic and manganese.	

Sitewide Protectiveness Statement
Protectiveness Determination: Short-term Protective
Protectiveness Statement: The Site remedies currently protect human health and the environment because remediation has addressed the contaminant source and institutional controls and access controls are in place that prevent exposure to site sources and downgradient groundwater, and access to surface water that exceeds risk-based screening levels is limited by property access, site conditions and warning signs. Additionally, a risk evaluation of surface water data that exceeds screening levels found that the non-cancer risk estimates for PFOA and PFOS individually, as well as PFOA and PFOS combined, were all below the EPA acceptable hazard quotient of 1.0, and that there are currently no unacceptable risks to a recreator through exposure to surface water. For the remedy to be protective over the long term, the following actions need to be taken: • Complete the deep-bedrock investigations to delineate the extent of contamination in bedrock groundwater, as well as, fate and transport of PFAS compounds and site COCs in groundwater and determine if further action is warranted. • Design and implement a background study, including sampling and analysis, as necessary, to determine if the concentrations of arsenic and manganese are reflective of background conditions or rather are the result of mobilization due to the reducing conditions created by the landfill. Results from the background study will be used to assess natural attenuation and time to cleanup for arsenic and manganese.

VIII. NEXT REVIEW

The next FYR Report for the Coakley Landfill Superfund site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

Annual Summary Report - 2017. Coakley Landfill, Breakfast Hill Road, North Hampton, New Hampshire. Prepared by CES, Inc. January 2018.

Annual Summary Report -2018. Coakley Landfill, Breakfast Hill Road, North Hampton, New Hampshire. Prepared by CES, Inc. March 2019.

Annual Summary Report-2019. Coakley Landfill, Breakfast Hill Road, North Hampton, New Hampshire. Prepared by CES, Inc. July 2020.

Annual Summary Report-2020. Coakley Landfill, Breakfast Hill Road, North Hampton, New Hampshire. Prepared by CES, Inc. May 2021.

Berrys Brook Fish Tissue Sampling Results. Coakley Landfill – North Hampton and Greenland, New Hampshire. Prepared by CES, Inc. September 2018.

Correspondence from EPA to CLG in response to the Berrys Brook fish tissue sample results memo. Prepared by EPA Region 1. March 18, 2019.

Deep Bedrock Investigation Interim Report. Coakley Landfill – North Hampton and Greenland, New Hampshire. Prepared by CES, Inc. November 2019.

Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA). U.S. Environmental Protection Agency, Office of Water: Washington, DC. EPA 822-R-16-005. 2016.

Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS). U.S. Environmental Protection Agency, Office of Water: Washington, DC. EPA 822-R-16-004. 2016.

Explanation of Significant Differences. Operable Unit 1. Coakley Landfill Superfund Site. U.S. Environmental Protection Agency. March 1991.

Explanation of Significant Differences. Operable Unit 1. Coakley Landfill Superfund Site. U.S. Environmental Protection Agency. May 1996.

Explanation of Significant Differences. Operable Unit 1. Coakley Landfill Superfund Site. U.S. Environmental Protection Agency. September 1999.

Explanation of Significant Differences. Operable Unit 1. Coakley Landfill Superfund Site. U.S. Environmental Protection Agency. September 2007.

Explanation of Significant Differences. Operable Unit 2. Coakley Landfill Superfund Site. U.S. Environmental Protection Agency. September 2007.

Explanation of Significant Differences. Operable Unit 1. Coakley Landfill Superfund Site. U.S. Environmental Protection Agency. July 2009.

Explanation of Significant Differences. Operable Unit 1 and Operable Unit 2. Coakley Landfill Superfund Site. U.S. Environmental Protection Agency. August 2015.

Five Year Review Report. Coakley Landfill Superfund Site. U.S. Environmental Protection Agency. September 2016

Five Year Review Report Addendum. Coakley Landfill Superfund Site. U.S. Environmental Protection Agency. September 2017.

Groundwater Management Permit Renewal Application. Coakley Landfill, Greenland and North Hampton, New Hampshire. Prepared by CES, Inc. October 2018.

House Bill 494 - Surface Water Treatment Pilot Study – Work Plan. Coakley Landfill – North Hampton and Greenland, New Hampshire. Prepared by CES, Inc. October 2020.

House Bill 494 - Surface Water Treatment Pilot Study. Coakley Landfill – North Hampton and Greenland, New Hampshire. Prepared by Haley Ward. March 15, 2021.

Landfill Gas Monitoring Results - 2020. Prepared by StoneHill Environmental. May 2020.

Landfill Gas Monitoring Results - 2019. Prepared by StoneHill Environmental. April 2019.

Landfill Gas Monitoring Results - 2018. Prepared by StoneHill Environmental. April 2018.

Landfill Gas Monitoring Results - 2017. Prepared by Aries. May 2017.

Provisional Peer-Reviewed Toxicity Values for Perfluorobutane Sulfonic Acid (CASRN 375-73-5) and Related Compound Potassium Perfluorobutane Sulfonate (CASRN 29420-49-3). U.S. Environmental Protection Agency, Office of Research and Development: Cincinnati, OH. 2021.

Record of Decision Operable Unit 1. Coakley Landfill Superfund Site. U.S. Environmental Protection Agency. June 1990.

Record of Decision Operable Unit 2. Coakley Landfill Superfund Site. U.S. Environmental Protection Agency. September 1994.

Remedial Action Report. Coakley Landfill Superfund Site. North Hampton, New Hampshire. Prepared by Golder and Associates, Inc. October 1998.

Revised Project Operations Plan. Coakley Landfill Superfund Site, Revision 1.0. April 2010.

Sampling and Analysis Plan. Coakley Landfill Superfund Site, North Hampton, New Hampshire. Prepared by CES, Inc. July 2018.

Spring 2020 Sampling Analytical Results. Coakley Landfill Superfund Site, North Hampton, New Hampshire. Prepared by CES, Inc. November 2020.

Stormwater Investigation Report. Coakley Landfill – North Hampton and Greenland, New Hampshire. Prepared by CES, Inc. September 2019.

APPENDIX B – SITE CHRONOLOGY

Table B-1: Site Chronology

Event	Date
Town of North Hampton operated the permitted landfill	1972-1982
Rock quarrying conducted concurrent with landfill operations	1973-1977
Initial discovery of contamination	1979
Water districts in the towns of North Hampton and Rye Water completed water main extension near the Site	1983-1986
PRP ceased landfill operations	July 1985
EPA signed cooperative agreement with the State to conduct the RI/FS for OU1	August 12, 1985
EPA finalized the Site's listing on the NPL	June 10, 1986
The State completed the OU1 RI/FS	March 2, 1990
EPA signed the OU1 ROD	June 28, 1990
EPA initiated the OU2 RI/FS	September 27, 1990
EPA issued the OU1 ESD addressing landfill cap design	March 22, 1991
CLG formed to represent site PRPs	February 1992
A Consent Decree between EPA, NHDES and CLG was issued for OU1	May 5, 1992
CLG began the OU1 remedial design	June 19, 1992
EPA completed the OU2 RI/FS and issued the OU2 ROD	September 30, 1994
CLG completed the OU1 remedial design and began the remedial action	January 25, 1999
EPA issued the OU1 ESD addressing landfill gas system design	May 17, 1996
CLG began remedy construction for OU1	September 24, 1996
CLG began the remedial design for OU2	October 23, 1998
A Consent Decree between EPA, NHDES and CLG was issued for OU2	January 11, 1999
CLG completed the OU2 remedial design and began the remedial action	March 10, 1999
EPA issued the OU1 ESD to address leachate collection and treatment	September 29, 1999
CLG completed remedy construction for OU2	September 29, 1999
CLG completed the OU1 and OU2 remedial action	March 8, 2000
EPA issued the Site's first FYR Report	September 25, 2001
EPA issued the Site's second FYR Report	September 21, 2006
EPA issued an ESD for OU1 and OU2, updating ARARs, and revised additional standards	September 20, 2007
The State approved a GMZ for the Site	June 19, 2008
EPA issued an ESD for OU2 clarifying the revision of the arsenic MCL	July 24, 2009
EPA issued an ESD for OU1 clarifying the revision of the arsenic MCL	July 29, 2009
EPA issued an Addendum to the second FYR	July 29, 2009
EPA approved the CLG's updated OU2 Project Operations Plan	May 10, 2010
EPA determined that the Site is ready for reuse and redevelopment	March 23, 2011
EPA issued the Site's third FYR Report	September 22, 2011
EPA issued an ESD for OU1 and OU2 documenting changes made to the GMZ, institutional controls and the Site's monitoring network, and adding 1,4-dioxane as a COC for the Site and establishing a groundwater cleanup level	August 4, 2015
CLG sampled a select group of OU1 wells and confirmed the presence of PFOA and PFOS above regulatory standards	May 24-25, 2016
CLG sampled OU2 wells and off-site water supply wells for PFAS and confirmed the presence of PFOA and PFOS in OU2 groundwater above regulatory standards but below the standards in the off-site water supply wells	July 12-14, 2016
EPA issued the Site's fourth FYR Report	September 26, 2016
CLG installed four warning signs along Berrys Brook (from the area next to the landfill to Breakfast Hill Road) due to PFAS concentrations in surface water exceeding the most conservative site-specific screening levels	August 10, 2017

Event	Date
EPA issued an Addendum to the Site's fourth FYR	September 28, 2017
CLG installed treatment systems at two private wells due to the presence of 1,4-dioxane above the New Hampshire AGQS	November 2018
CLG submitted a proposal to expand the GMZ due to the presence of 1,4-dioxane above the new AGQS beyond the existing GMZ boundaries	December 21, 2018
CLG completed a Stormwater Investigation Report confirming that PFAS in shallow groundwater and the adjacent wetland complex is from stormwater runoff and stormwater discharge from the landfill cover system	September 2019
CLG completed a Deep Rock Investigation Interim Report to further delineate site contamination	November 2019

APPENDIX C – PRESS NOTICE

News Releases from Region 01

EPA to Review Cleanups at Seven New England Superfund Sites This Year

02/25/2021

Contact Information:
Dave Deegan (deegan.dave@epa.gov)
(617) 918-1017

BOSTON – The U.S. Environmental Protection Agency (EPA) will conduct comprehensive reviews of previously-completed cleanup work at seven National Priorities List (NPL) Superfund sites in New England this year. The sites, located in Connecticut, Maine, Massachusetts and New Hampshire, will undergo a legally-required Five-Year Review to ensure that previous remediation efforts at the sites continue to protect public health and the environment.

"Five-Year Reviews are designed to ensure that cleanup remedies continue to protect human health and the environment over time," **said EPA New England Acting Regional Administrator Deborah Szaro.** "These reviews also identify if changing circumstances or scientific understanding might require EPA to take additional actions at the site. By doing this work EPA provides assurance to community that health protection measures are adequate and working."

The Superfund program, a federal program established by Congress in 1980, investigates and cleans up the most complex, uncontrolled or abandoned hazardous waste sites in the country and works to facilitate activities to return them to productive use. EPA oversees Superfund studies and cleanups at 123 NPL sites across the six New England states. There are many phases of the Superfund cleanup process including considering future use and redevelopment and conducting post-cleanup monitoring of sites. EPA must ensure completed remedies continue to be protective of public health and the environment.

The Superfund sites where EPA will complete Five-Year Reviews in 2021 are listed below, and the web links provide detailed information on site status and past assessment and cleanup activity. Once the Five-Year Review is complete, its findings will be posted to the website in a final report.

Five-Year Reviews of Superfund sites in New England to be completed in 2021

Durham Meadows, Durham, Conn. www.epa.gov/superfund/durham
Callahan Mine, Brooksville, Maine www.epa.gov/superfund/callahan
Eastern Surplus, Meddybemps, Maine www.epa.gov/superfund/eastern
AMTL (Materials Technology Lab), Watertown, Mass. www.epa.gov/superfund/amtl
Fort Devens - Sudbury Training Annex, Sudbury, Mass. www.epa.gov/superfund/sudburyannex
Coakley Landfill, N. Hampton, N.H. www.epa.gov/superfund/coakley
Savage Municipal Water Supply, Milford, N.H. www.epa.gov/superfund/savage

More information on Superfund and other cleanup sites in New England: https://www.epa.gov/cleanups/cleaning-new-england

LAST UPDATED ON FEBRUARY 25, 2021

APPENDIX D – INSTITUTIONAL CONTROL INFORMATION

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 1
5 Post Office Square, Suite 100
Boston, MA 02109-3912

MEMORANDUM

DATE: June 8, 2021

FROM: Richard Hull, Remedial Project Manager

TO: Coakley Landfill Superfund Site File

SUBJ: *Fourth Five-Year Review Report* and *Addendum to Fourth Five-Year Review*, Coakley Landfill Superfund Site, North Hampton, NH

On September 26, 2017, EPA issued *Addendum to Fourth Five-Year Review* ("Addendum") for the Coakley Landfill Superfund Site (the "Site"). The Addendum was issued to update the protectiveness determination for OU-2 and the sitewide protectiveness statement that had been included in the *Fourth Five-Year Review Report* ("Fourth FYR") that was issued on September 23, 2016.

The Addendum detailed measures that had been taken to address the issues and recommendations from the Fourth FYR. Those measures, once implemented, warranted updating the sitewide protectiveness determination from "protectiveness deferred" to "short-term protective." The Addendum also listed the issues and recommendations from the Fourth FYR that remained unresolved, along with new issues and recommendations that would need to be addressed for the remedy to be protective in the long-term. One of the recommendations from the Fourth FYR that was identified as being unresolved was the implementation of land use restrictions or other institutional controls (ICs) to regulate well installation and groundwater use, as set forth in the August 2015 Explanation of Significant Differences (ESD). Among other changes to the remedy, that ESD specified the implementation of land use restrictions or other ICs for specific parcels of land that had been identified for potential residential development, including the installation of water supply wells. The parcels are in the Town of Greenland and identified on tax map R-1 as Lots #10, 11, 11A, 11B, and 12.

Since issuance of the 2015 ESD and the Fourth FYR, Lot #10 was subdivided in to 10 residential parcels. Due to the potential for a negative impact to the contaminant plume from the installation of wells and use of groundwater from the subdivided parcels, the developer, the property owner, the Coakley Landfill Group (CLG), and the City of Portsmouth[1] reached an agreement for the installation of a municipal water supply line to

[1] The City of Portsmouth is the lawful authority that operates and maintains a public water system in the Town of Greenland where the subdivision is located.

serve the 10 new residential parcels. The agreement included the implementation of deed restrictions prohibiting the installation of wells and the use of groundwater. These deed restrictions have been established for all 10 parcels.

In addition, since the issuance of the Fourth FYR, parcels #11, 11A and 11B which were previously part of the railroad easement, have been sold to the NHDOT as part of the ongoing NH Seacoast Greenway rail trail development. These parcels include the actual railway right of way, and two abutting easement parcels, which are not sized, suited or zoned for development. EPA has determined that controls are no longer required for these parcels at this time. Furthermore, Parcel #12 is an occupied residential property that already includes a water supply well that is in use. Because of the level of contaminants measured in this well (1,4-dioxane above the NH AGQS of 0.32 ug/L) and the determination that it is impacted by the contaminant plume from the Site, the NHDES directed the CLG to install a point-of-entry treatment system for the well, as required by the Groundwater Management Permit. The system has been installed and is being maintained by the CLG. EPA has determined that because there is an existing well at this property that is equipped with a treatment system, controls are currently not needed for this parcel.

Accordingly, this memorandum documents that the recommendation from the Fourth FYR, as specified in the August 2015 ESD, for the implementation of land use restrictions or other institutional controls (ICs) to regulate well installation and groundwater use on the parcels in the Town of Greenland identified on tax map R-1 as Lots #10, 11, 11A, 11B, and 12 has been resolved.

APPENDIX E – SITE INSPECTION CHECKLIST

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

I. SITE INFORMATION

Site Name: Coakley Landfill Superfund Site	**Date of Inspection:** 5/11/2021
Location and Region: North Hampton, Greenland and Rye, NH 1	**EPA ID: NHD064424153**
Agency, Office or Company Leading the Five-Year Review: EPA Region 1	**Weather/Temperature:** high 50s, breezy and clear

Remedy Includes: (Check all that apply)

☒ Landfill cover/containment
☒ Access controls
☒ Institutional controls
☐ Groundwater pump and treatment
☐ Surface water collection and treatment
☒ Other: Excavation of contaminated sediment and soil/solid waste and consolidation of the material in the landfill
☒ Monitored natural attenuation
☐ Groundwater containment
☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (check all that apply)

1. **O&M Site Manager** _____ _____ _____
Name Title Date
Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
Problems, suggestions ☐ Report attached: _____

2. **O&M Staff** _____ _____ _____
Name Title Date
Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
Problems/suggestions ☐ Report attached: _____

3. **Local Regulatory Authorities and Response Agencies** (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply.

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone No.
Problems/suggestions ☐ Report attached: _____

Agency _____
Contact _____Name _____ _____ _____
Title Date Phone No.
Problems/suggestions ☐ Report attached:_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone No.
Problems/suggestions ☐ Report attached:_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone No.
Problems/suggestions ☐ Report attached:_____

4. **Other Interviews** (optional) ☐ Report attached: _____

III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)

1. **O&M Documents**

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

Remarks: _____

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

Remarks: _____

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

Remarks: _____

4. **Permits and Service Agreements**

☐ Air discharge permit	☐ Readily available	☐ Up to date	☐ N/A
☐ Effluent discharge	☐ Readily available	☐ Up to date	☐ N/A
☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☐ N/A
☒ Other permits: Groundwater Management Permit expired in January 2019	☐ Readily available	☐ Up to date	☒ N/A

Remarks: Completing further contaminant delineation in the bedrock aquifer in support of expanding the GMZ and subsequent permit renewal.

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

Remarks: _____

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

Remarks: _____

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

Remarks: _____

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

Remarks: _____

9. **Discharge Compliance Records**

☐ Air	☐ Readily available	☐ Up to date	☒ N/A
☐ Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

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

Remarks: _____

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for state

☐ PRP in-house ☒ Contractor for PRP

☐ Federal facility in-house ☐ Contractor for Federal facility

☐ _____

2. **O&M Cost Records**

☐ Readily available ☐ Up to date

☐ Funding mechanism/agreement in place ☒ Unavailable

Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available

From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached

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

Describe costs and reasons: _____

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

A. Fencing

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

Remarks: _____

B. Other Access Restrictions

1. **Signs and Other Security Measures** ☐ Location shown on site map ☐ N/A

Remarks: One sign near Berrys Brook along the rail trail had fallen over.

C. Institutional Controls (ICs)

1. **Implementation and Enforcement**

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

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

Type of monitoring (e.g., self-reporting, drive by): _____

Frequency: _____

Responsible party/agency: _____

Contact	_____	_____	_____	_____
	Name	Title	Date	Phone no.

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

Other problems or suggestions: ☐ Report attached

Implementation of ICs on properties impacted by the contaminant plume, as required by ROD, has been met. We don't need to classify potential future development as a current specific requirement. We will also resolve the prior recommendation for ICs at particular parcels (11, 11A, 11B, 12) before this FYR is final as these parcels are either now owned by state of NH or already have a well equipped with a treatment system (12).

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

Remarks: Implementation of ICs on properties impacted by the contaminant plume, as required by the ROD has been met. On a yearly basis, in accordance with NH Department of Environmental Services rule Env-Or 607.06(d) the CLG sends a letter to all property owners within the GMZ established by the GMP. This letter requests the self-reporting of any new drinking water wells installed within these properties. Also, during the sampling events (Spring and Fall every year) the contractor performing the work is required to note any observations about new wells and report it to the CLG. In addition, several wells have been equipped with a treatment system.

D. General

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

Remarks: _____

2. **Land Use Changes On Site** ☐ N/A

Remarks: None.

3. **Land Use Changes Off Site** ☐ N/A

Remarks: There is a new residential area near the northern end of the plume, but the houses in the neighborhood are on municipal water and deed restrictions have been implemented.

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads Damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: _____

B. Other Site Conditions

Remarks: _____		
VII. LANDFILL COVERS	☒ Applicable	☐ N/A
A. Landfill Surface		
1. **Settlement** (low spots)	☐ Location shown on site map	☒ Settlement not evident
Area extent: _____		Depth: _____
Remarks: _____		
2. **Cracks**	☐ Location shown on site map	☒ Cracking not evident
Lengths: _____	Widths: _____	Depths: _____
Remarks: _____		
3. **Erosion**	☐ Location shown on site map	☒ Erosion not evident
Area extent: _____		Depth: _____
Remarks: _____		
4. **Holes**	☐ Location shown on site map	☒ Holes not evident
Area extent: _____		Depth: _____
Remarks: _____		
5. **Vegetative Cover**	☒ Grass	☐ Cover properly established
☒ No signs of stress	☐ Trees/shrubs (indicate size and locations on a diagram)	
Remarks: _____		
6. **Alternative Cover** (e.g., armored rock, concrete)		☒ N/A
Remarks: _____		
7. **Bulges**	☐ Location shown on site map	☒ Bulges not evident
Area extent: _____		Height: _____
Remarks: _____		
8. **Wet Areas/Water Damage**	☒ Wet areas/water damage not evident	
☐ Wet areas	☐ Location shown on site map	Area extent: _____
☐ Ponding	☐ Location shown on site map	Area extent: _____
☐ Seeps	☐ Location shown on site map	Area extent: _____
☐ Soft subgrade	☐ Location shown on site map	Area extent: _____
Remarks: _____		
9. **Slope Instability**	☐ Slides	☐ Location shown on site map
☒ No evidence of slope instability		
Area extent: _____		
Remarks: _____		
B. Benches	☒ Applicable	☐ N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)		

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

Remarks: _____

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

Remarks: _____

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

Remarks: _____

C. Letdown Channels ☒ Applicable ☐ N/A

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

1. **Settlement** (Low spots) ☐ Location shown on site map ☒ No evidence of settlement

Area extent: _____ Depth: _____

Remarks: _____

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

Material type:_____ Area extent: _____

Remarks: _____

3. **Erosion** ☐ Location shown on site map ☒ No evidence of erosion

Area extent: _____ Depth: _____

Remarks: _____

4. **Undercutting** ☐ Location shown on site map ☒ No evidence of undercutting

Area extent: _____ Depth: _____

Remarks: _____

5. **Obstructions** Type: _____ ☒ No obstructions

☐ Location shown on site map Area extent: _____

Size: _____

Remarks: _____

6. **Excessive Vegetative Growth** Type: _____

☒ No evidence of excessive growth ☐ Vegetation in channels does not obstruct flow

☐ Location shown on site map Area extent: _____

Remarks: _____

D. Cover Penetrations ☒ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☒ Passive

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

Remarks: _____

2. **Gas Monitoring Probes**

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ Evidence of leakage at penetration		☐ Needs maintenance	☒ N/A
Remarks: _____			
3. **Monitoring Wells** (within surface area of landfill)			
☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
☐ Evidence of leakage at penetration		☐ Needs maintenance	☒ N/A
Remarks: _____			
4. **Extraction Wells Leachate**			
☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
☐ Evidence of leakage at penetration		☐ Needs maintenance	☒ N/A
Remarks: _____			
5. **Settlement Monuments**	☒ Located	☐ Routinely surveyed	☐ N/A
Remarks: _____			
E. Gas Collection and Treatment	☐ Applicable	☒ N/A	
1. **Gas Treatment Facilities**			
☐ Flaring	☐ Thermal destruction		☐ Collection for reuse
☐ Good condition	☐ Needs maintenance		
Remarks: _____			
2. **Gas Collection Wells, Manifolds and Piping**			
☐ Good condition	☐ Needs maintenance		
Remarks: _____			
3. **Gas Monitoring Facilities** (e.g., gas monitoring of adjacent homes or buildings)			
X☐ Good condition	☐ Needs maintenance	☐ N/A	
Remarks: _____			
F. Cover Drainage Layer	☒ Applicable	☐ N/A	
1. **Outlet Pipes Inspected**	☒ Functioning	☐ N/A	
Remarks: _____			
2. **Outlet Rock Inspected**	☒ Functioning	☐ N/A	
Remarks: _____			
G. Detention/Sedimentation Ponds	☒ Applicable	☐ N/A	
1. **Siltation**	Area extent: _____	Depth: _____	☐ N/A
☒ Siltation not evident			
Remarks: _____			
2. **Erosion**	Area extent: _____	Depth: _____	
☒ Erosion not evident			
Remarks: _____			
3. **Outlet Works**	☒ Functioning		☐ N/A

Remarks: _____			
4. **Dam**	☒ Functioning		☐ N/A
Remarks: _____			
H. Retaining Walls	☐ Applicable	☒ N/A	
1. **Deformations**	☐ Location shown on site map	X☐ Deformation not evident	
Horizontal displacement: _____		Vertical displacement: _____	
Rotational displacement: _____			
Remarks: _____			
2. **Degradation**	☐ Location shown on site map	X☐ Degradation not evident	
Remarks: _____			
I. Perimeter Ditches/Off-Site Discharge	☒ Applicable	☐ N/A	
1. **Siltation**	☐ Location shown on site map	☒ Siltation not evident	
Area extent: _____		Depth: _____	
Remarks: _____			
2. **Vegetative Growth**	☐ Location shown on site map	☐ N/A	
☒ Vegetation does not impede flow			
Area extent: _____		Type: _____	
Remarks: _____			
3. **Erosion**	☐ Location shown on site map	☒ Erosion not evident	
Area extent: _____		Depth: _____	
Remarks: _____			
4. **Discharge Structure**	☒ Functioning	☐ N/A	
Remarks: _____			
VIII. VERTICAL BARRIER WALLS	☐ Applicable	☒ N/A	
1. **Settlement**	☐ Location shown on site map	☐ Settlement not evident	
Area extent: _____		Depth: _____	
Remarks: _____			
2. **Performance Monitoring**	Type of monitoring: _____		
☐ Performance not monitored			
Frequency: _____		☐ Evidence of breaching	
Head differential: _____			
Remarks: _____			
IX. GROUNDWATER/SURFACE WATER REMEDIES	☒ Applicable	☐ N/A	
A. Groundwater Extraction Wells, Pumps and Pipelines	☐ Applicable	☒ N/A	
1. **Pumps, Wellhead Plumbing and Electrical**			
☐ Good condition	☐ All required wells properly operating	☐ Needs maintenance	☐ N/A

Remarks: _____

2. **Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

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

1. **Collection Structures, Pumps and Electrical**

☐ Good condition ☐ Needs maintenance

Remarks: _____

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

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

C. Treatment System ☐ Applicable ☒ N/A

1. **Treatment Train** (check components that apply)

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation

☐ Air stripping ☐ Carbon adsorbers

☐ Filters: _____

☐ Additive (e.g., chelation agent, flocculent): _____

☐ Others: _____

☐ Good condition ☐ Needs maintenance

☐ Sampling ports properly marked and functional

☐ Sampling/maintenance log displayed and up to date

☐ Equipment properly identified

☐ Quantity of groundwater treated annually: _____

☐ Quantity of surface water treated annually: _____

Remarks: _____

2. **Electrical Enclosures and Panels** (properly rated and functional)

☐ N/A ☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Tanks, Vaults, Storage Vessels**

☐ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs maintenance

Remarks: _____

4. **Discharge Structure and Appurtenances**

☐ N/A ☐ Good condition ☐ Needs maintenance

Remarks: _____

5. **Treatment Building(s)**

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

☐ Chemicals and equipment properly stored

Remarks: _____

6. **Monitoring Wells** (pump and treatment remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☐ N/A

Remarks: _____

D. Monitoring Data

1. **Monitoring Data**

☒ Is routinely submitted on time ☒ Is of acceptable quality

2. **Monitoring Data Suggests:**

☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

☐ Properly secured/locked ☒ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☐ N/A

Remarks: _____

X. OTHER REMEDIES

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

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

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

The OU1 remedy included the excavation and consolidation of contaminated soil, sediment and solid waste in the landfill and covering of the material using a multi-layer cap system along with passive gas venting. Site monitoring and routine O&M inspections indicate that the cap is containing site COCs. At OU2, due to changes in some site COC groundwater standards as well as the identification of PFAS since the previous FYR, CLG has installed point of use treatment units on two affected residential wells, and is further characterizing the groundwater contamination in deep-bedrock groundwater.

B. Adequacy of O&M

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

Semi-annual sampling and monitoring of groundwater, private water supply wells, surface water, landfill leachate seep and sediment are conducted to address both OUs. Since some institutional controls are in place, annual monitoring of their effectiveness is also required. No problems in the implementation of system operations or O&M activities have been identified. The landfill cap is well maintained and monitoring is completed as scheduled.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. <u>The previous FYR recommended that a background study be conducted to determine if the concentrations of arsenic and manganese are reflective of background conditions or rather the result of mobilization due to the reducing conditions created by the landfill. In addition, CLG is conducting a pilot study to reduce the migration of groundwater contaminants into downgradient Berrys Brook. The additional characterization efforts will be reviewed to support the potential expansion of the GMZ due to 1,4-dioxane exceeding the current state AGQS beyond the current GMZ.</u>
D. Opportunities for Optimization
Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. <u>None</u>

APPENDIX F – SITE INSPECTION PHOTOS

Northern end of landfill looking southeast

Eastern side of landfill with perimeter road on right

Northwest basin

Gas vent and monitoring well in southeast corner of landfill


Drainage on northwest corner of landfill

Signage on Breakfast Hill Road at entrance of rail trail


BB-1 surface water sampling location in Berrys Brook on east side of rail trail

Berrys Brook near former beaver dam area on east side of rail trail

Berrys Brook near former beaver dam area on west side of rail trail

APPENDIX G – DETAILED DATA ANALYSIS

Figure G-1: Sample Location Map

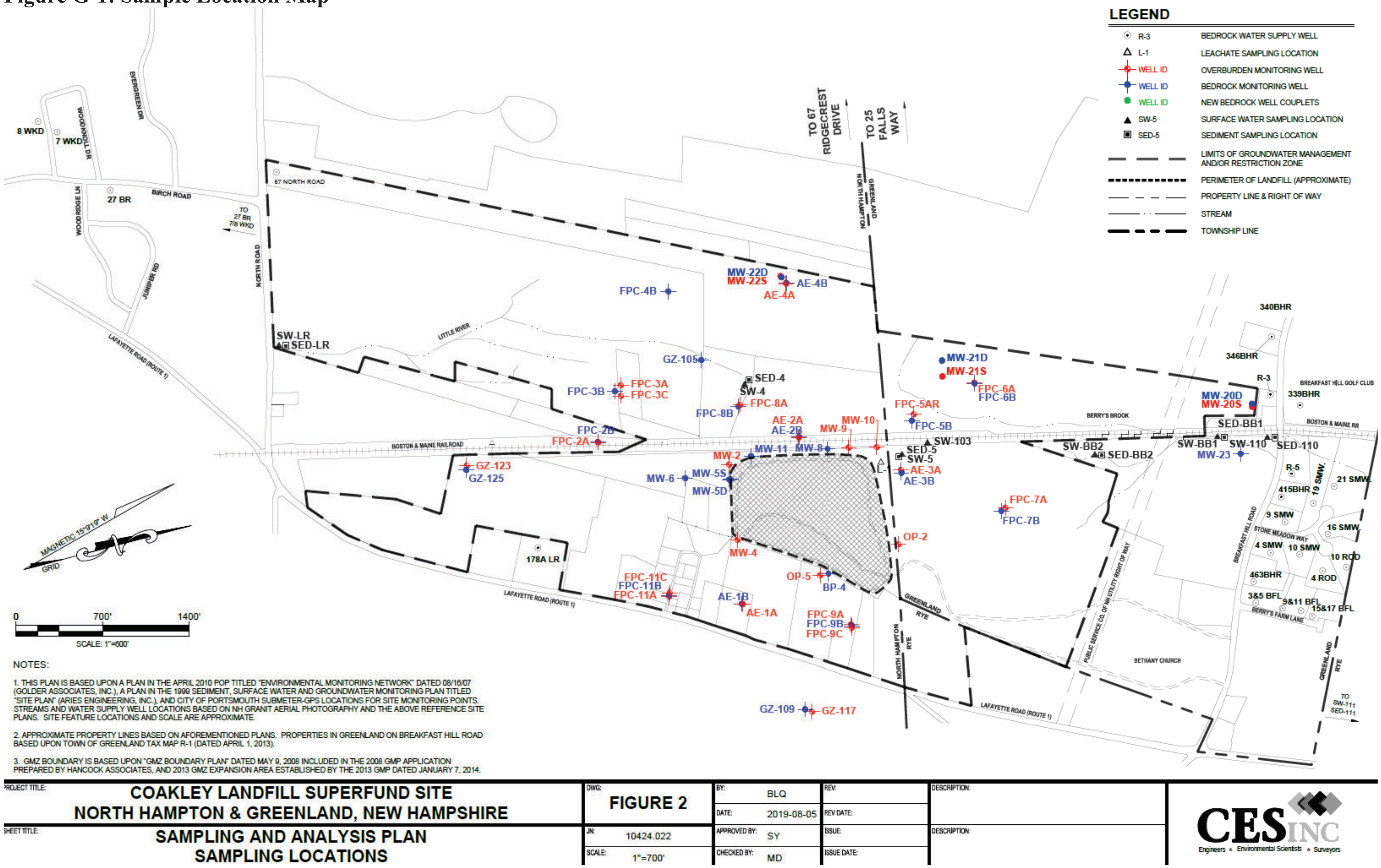
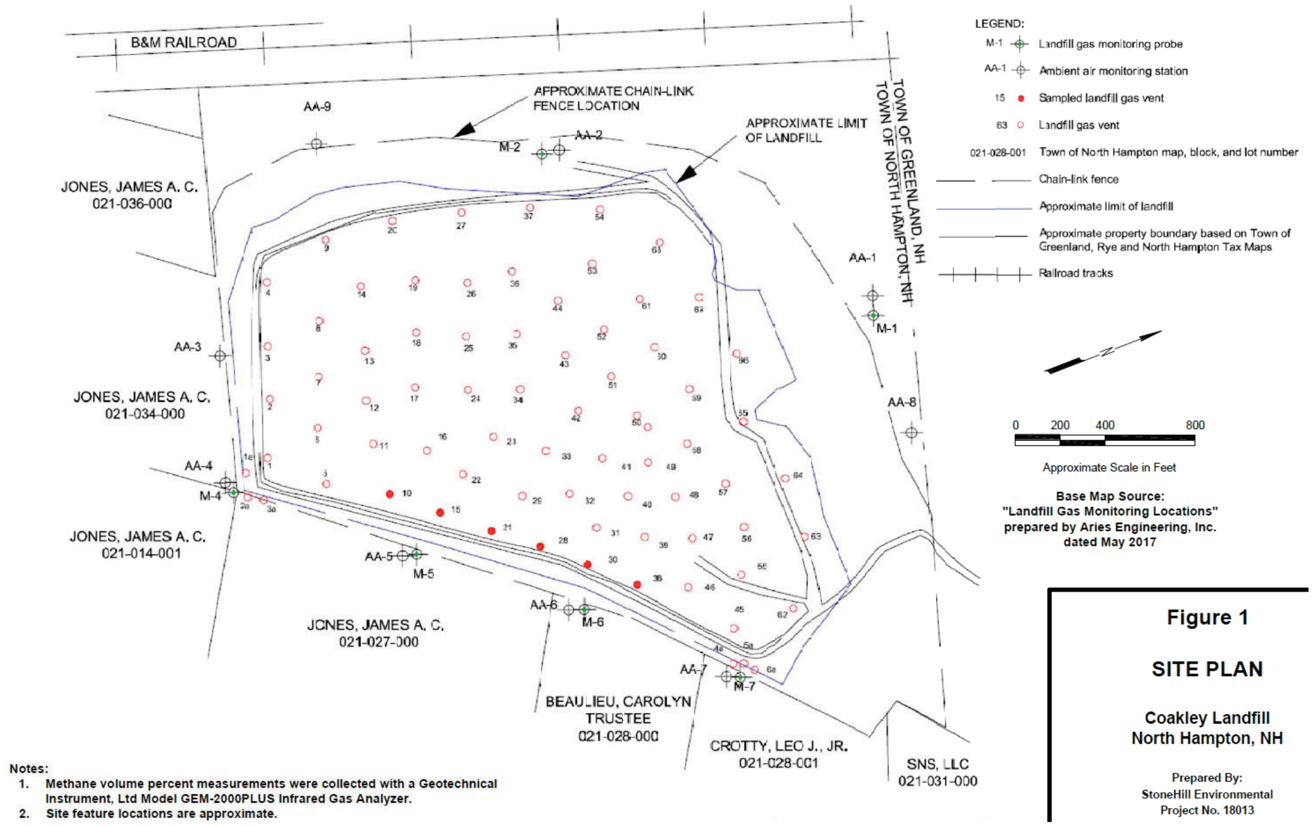
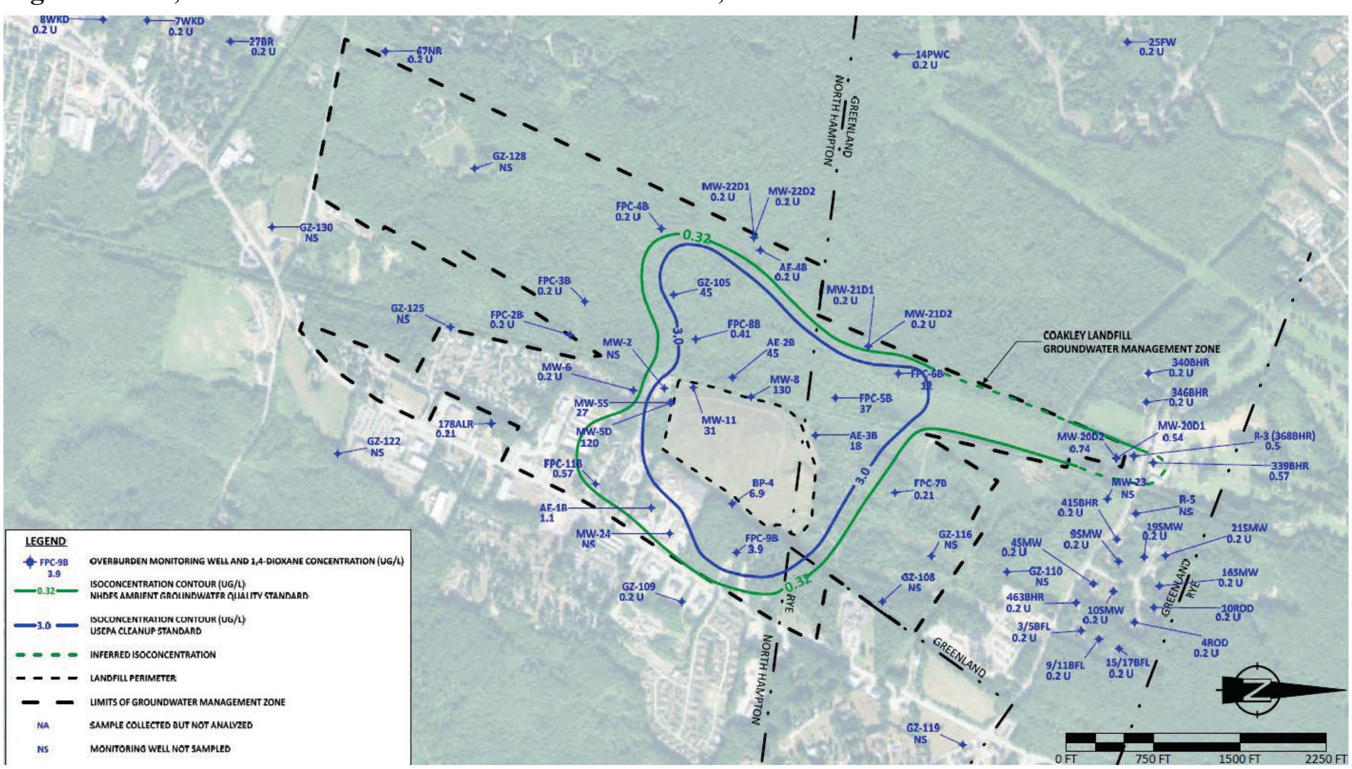


Figure G-2: Landfill Gas Monitoring Probe Locations



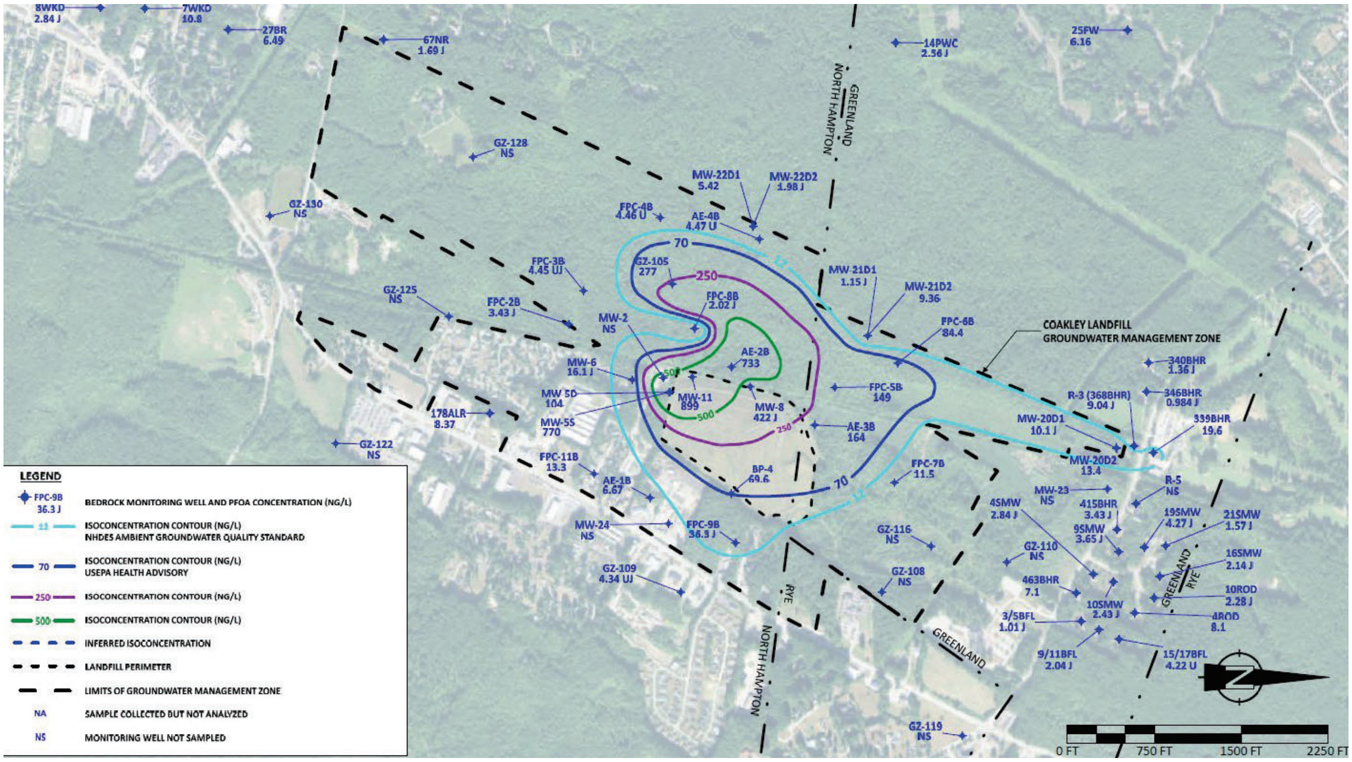
Source: 2020 Landfill Gas Monitoring Results. Prepared by StoneHill Environmental. May 2020.

Figure G-3: 1,4-Dioxane Plume in Bedrock Groundwater, Fall 2020



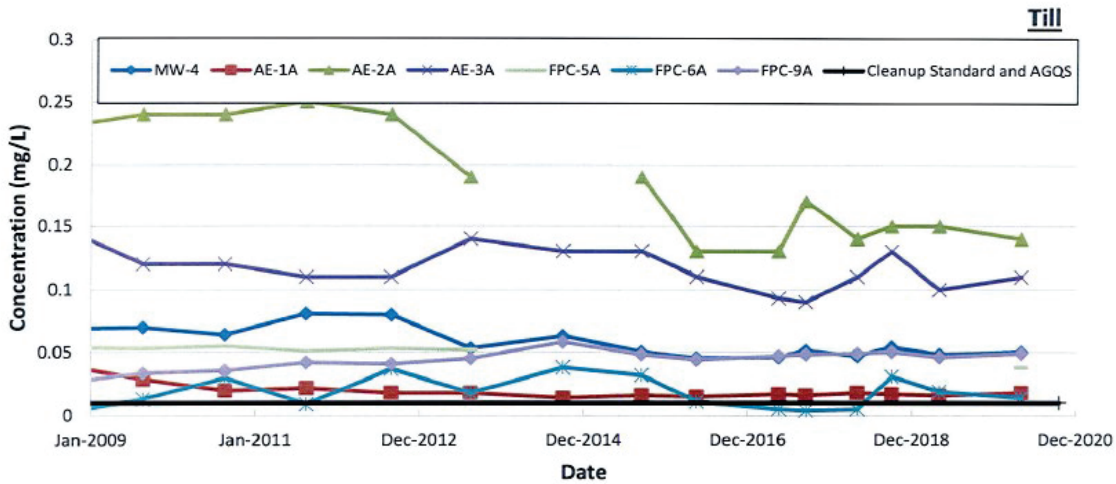
Source: 2020 Annual Summary Report. Draft. Prepared by Coakley Landfill Group. May 2021.

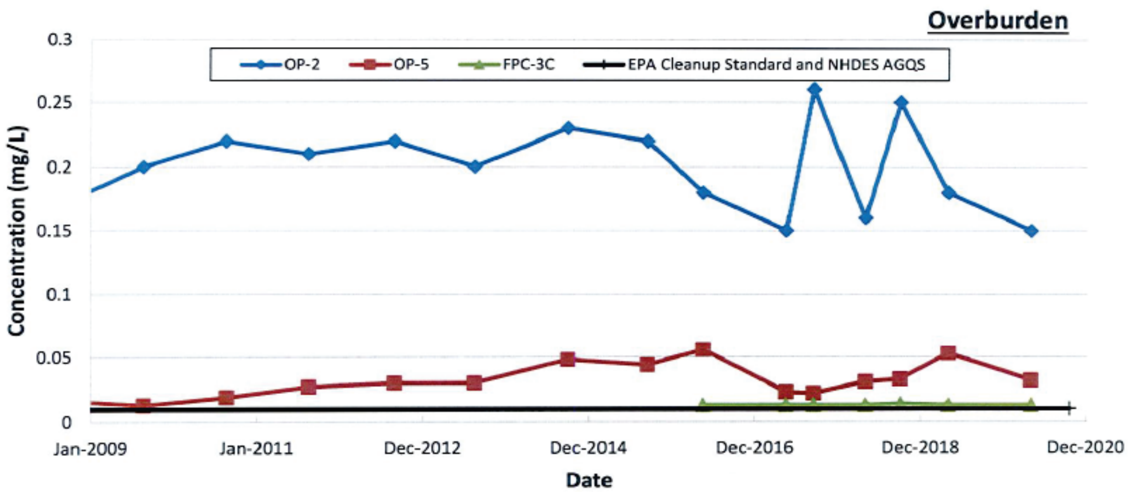
Figure G-4: PFOA Plume in Bedrock Groundwater, Fall 2020

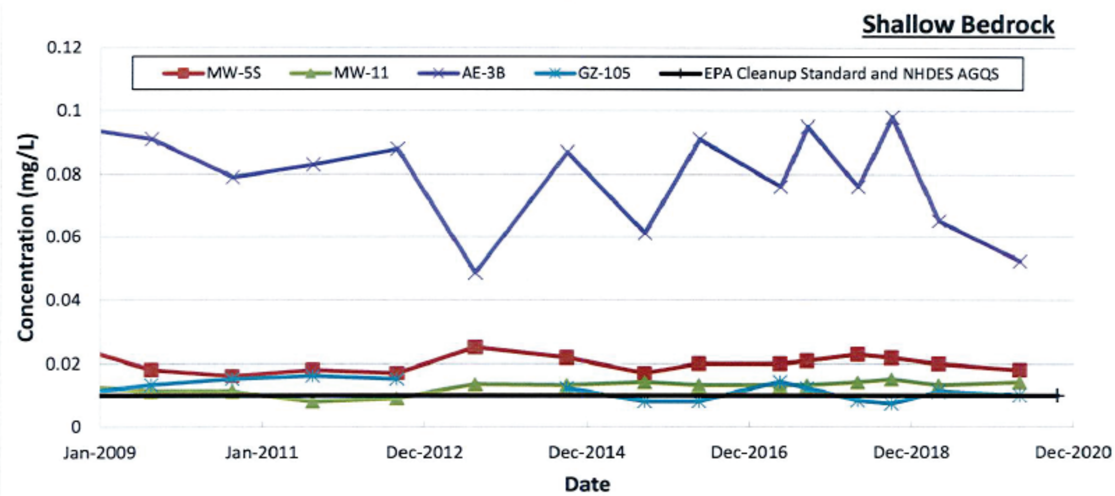


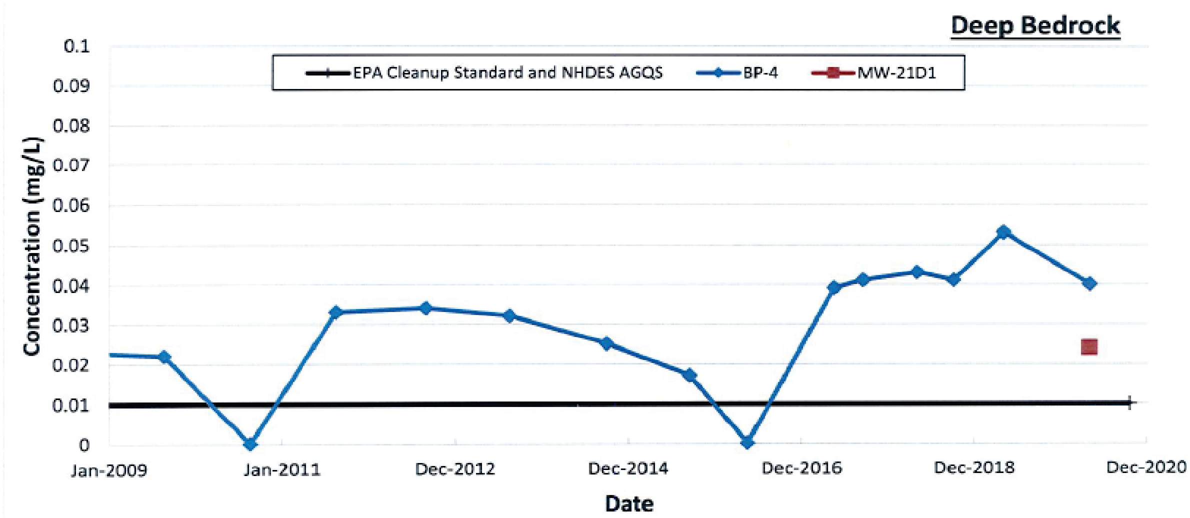
Source: 2020 Annual Summary Report. Draft. Prepared by Coakley Landfill Group. May 2021.

Figure G-5: Time Series Plots – Arsenic in Groundwater









Notes:

a. EPA cleanup standard and NHDES AGQS for arsenic is 0.01 mg/L
b. Non-detects are plotted as zero
c. In instances where primary and duplicate samples were collected, the higher value is plotted.

Source: 2020 Bi-Annual Summary Report. Draft. Prepared by Coakley Landfill Group. August 2021.

Table G-1: Landfill Historical Seep/Leachate Data

SAMPLE IDENTIFICATION	NHDES SURFACE WATER STANDARDS		L-1	L-1-DUP	L-1	L-1-DUP	L-1	L-1-DUP	L-1	L-1-DUP	L-1	L-1-DUP	L-1	L-1-DUP	L-1	L-1-DUP	L-1
DATE SAMPLED			28-Apr-17	28-Apr-17	21-Sep-17	21-Sep-17	30-Apr-18	30-Apr-18	28-Oct-18	28-Oct-18	15-May-19	15-May-19	10-Oct-19	10-Oct-19	5/20/2020[14]	5/20/2020[14]	5-Oct-20
COMMENTS	ACUTE	CHRONIC															
PARAMETER ANALYZED																	
VOLATILE ORGANIC COMPOUNDS (ug/L)																	
Acetone	NSE	NSE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.5 J	5 U	10 U	10 U	Dry
Benzene	5300	NSE	1 U	1 U	1	1	<1	<1	<1	<1	1.5	1.4	1.2	1.2	1 U	1.1	Dry
Chlorobenzene	250	50	1 U	1 U	12	12	2.6	2.7	<1	<1	12	12	12	12	8	8.7	Dry
Chloroethane	NSE	NSE	5 U	5 U	5 U	5 U	<5	<5	<5	<5	5 U	5 U	2.1	2.1	2 U	2 U	Dry
1,4 Dichlorobenzene (See Note 4)	1120	763	1 U	1 U	2	2	<1	<1	<1	<1	1.5	1.6	1.7 J	1.8 J	1.2	1.3	Dry
1,3-Dichlorobenzene (See Note 4)			1 U	1 U	1 U	1 U	<1	<1	<1	<1	1 U	1 U	2.5 U	2.5 U	1 U	1 U	Dry
1,2 Dichlorobenzene (See Note 4)			1 U	1 U	1 U	1 U	<1	<1	<1	<1	1 U	1 U	0.6 J	0.6 J	1 U	1 U	Dry
Isopropylbenzene	NSE	NSE	1 U	1 U	1 U	1 U	<1	<1	<1	<1	1 U	1 U	0.31 J	0.33 J	1 U	1 U	Dry
Diethyl Ether	NSE	NSE	5 U	5 U	7	7	<5	<5	<5	<5	8.8	8.6	8.6	8.2	6.6	6.9	Dry
Naphthalene	2300	620	5 U	5 U	5 U	5 U	<5	<5	<5	<5	5 U	5 U	1.2 J	1.2 J	2 U	2 U	Dry
Tetrahydrofuran	NSE	NSE	10 U	10 U	10 U	10 U	<10	<10	<10	<10	10 U	10	7.3	6.8	10 U	10 U	Dry
Tert-Butyl Alcohol	NSE	NSE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	11	2 U	30 U	30 U	Dry
Toluene	17500	NSE	1 U	1 U	1 U	1 U	<1	<1	<1	<1	1 U	1 U	0.75 U	0.75 U	1 U	1 U	Dry
LOW LEVEL 1,4-DIOXANE (ug/L)																	
1,4-Dioxane	NSE	NSE	1.5	1.3	17	18	4.9	4.1	<0.2	<0.2	12	12	15.3	14.5	8.8 J	9.6	Dry
METALS (ug/L)			Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
Aluminum	750	87	80	70	100 U	100 U	100 U	100 U	140	140	100 U	100 U	16.63	7.914 J	50 U	50 U	Dry
Antimony	9,000	1,600	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	Dry
Arsenic	340	150	2	2	5	5	1.1	1.2	2.3	2.3	2.1	2.1	4.246	3.998	1.8	2.2	Dry
Barium	NSE	NSE	11	10	75	78	25	25	6.2	6	71	70	92.02	93.52	62	66	Dry
Beryllium	130	5.3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	Dry
Cadmium	0.39	0.21	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	Dry
Calcium	NSE	NSE	17,000	16,000	57,000	57,000	28,000	29,000	10,000	10,000	64,000	58,000	67,500	68,500	58,000 J+	59,000 J+	Dry
Chromium	152	19.8	1 U	1	1 U	1 U	1 U	1 U	1.4	1.7	1 U	1 U	0.4606 J	0.4158 J	1 U	1 U	Dry
Cobalt	NSE	NSE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.8658 J	0.8695 J	1 U	1 U	Dry
Copper	2.9	2.3	**9**	**8**	1 U	1 U	**5.6 J+**	**6.4 J+**	**13**	**13**	1 U	1 U	1 U	1 U	1 U	1 U	Dry
Iron	NSE	1,000	2,800	2,500	32,000	33,000	8,800	8,700	450	390	35,000	36,000	42,200	44,000	32,000	39,000	Dry
Lead	10.5	0.41	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	Dry
Magnesium	NSE	NSE	3,400	3,100	18,000	19,000	7,200	7,300	1,300	1,200	19,000	18,000	20,000	19,700	17,000	17,000	Dry
Manganese	NSE	NSE	400	370	2,800	2,900	1,200	1,200	29	23	2,800	2,900	4,009	4,015	3,300	3,300	Dry
Mercury	1.4	0.77	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.1 U	0.1 U	Dry
Nickel	120	13.3	4	3	5	5	3.7	4.5	2.1	2.4	4.7	5	5.503	5.615	5.1	5	Dry
Potassium	NSE	NSE	5,200	5,300	25,000	26,000	11,000	11,000	3,500	3,500	26,000	25,000	30,600	31,090	25,000	24,000	Dry
Selenium	NSE	5	4	3	4	4	1 U	1 U	1 U	1 U	1 U	1 U	5 U	5 U	1 U	1 U	Dry
Silver	0.2	NSE	1 U	1 U	1 U,J	1 U,J	1 U	1 U	1 U	1 U	1 U	1 U	0.4 U	0.4 U	1 U	1 U	Dry
Sodium	NSE	NSE	8,000	8,000	65,000	71,000	23,000	24,000	5,000 U	5,000 U	71,000	70,000	83,440	83,090	58,000	58,000	Dry
Thallium	1,400	40	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	Dry
Vanadium	NSE	NSE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	Dry
Zinc	30	30	**38**	**34**	5 U	5 U	**34**	**37**	19	19	9	14	10 U	8.138 J	7.2	13	Dry
PERFLUORINATED CHEMICALS BY MODIFIED 537 - (ng/L)																	
Perfluorobutanoic Acid (PFBA)	NSE	NSE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	31.6	31.4	37.8	35.9	Dry
Perfluoropentanoic acid (PFpEA)	NSE	NSE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	59.1	60.6	60.1	58.2	Dry
Perfluorobutanesulfonic acid (PFBS)	NSE	NSE	2.09 U	2.13 U	4.85 J	5.50 J	2.72 J	2.99 J	4.2 U	4.13 U	6.47	6.27	6.88	6.95	5.69	5.48	Dry
Perfluorohexanoix Acid (PFHxA)	NSE	NSE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	80.7	82.9	101 J	101 J	Dry
Perfluoroheptanoic acid (PFHpA)	NSE	NSE	175	170	111	109	208	196	523	483	133	134	127	130	164 J	170 J	Dry
Perfluorohexanesulfonic acid (PFHxS)	NSE	NSE	9.12 J	9.39 J	19.0 J	19.4 J	12.0 J	11.6 J	10.8	9.77	18.1	18.7	25.6	24	25.7 J	23.8	Dry
Perfluorooctanoic acid (PFOA)	NSE	NSE	656	736	319	310	532	492	1,040	948	369 J	369	340	344	501 J	456	Dry
1H, 1H, 2H, 2H-Perfluorooctanesulfonic Acid (6:2FTS)	NSE	NSE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.86 J	5.22	4.58 U	4.38 U	Dry
Perfluoroheptanesulfonic Acid (PFHpS)	NSE	NSE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.72	4.79	2.93 J	2.26	Dry
Perfluorononanoic acid (PFNA)	NSE	NSE	308	310	70.3	75.6	207 J	193	366	339	83.6	80.5	71.6	74.2	114	102	Dry
Perfluorooctanesulfonic (PFOS)	NSE	NSE	1,930 D	1,560 J	164 J	150	567	571	1210	1,210	137 J	147	154 J+	158	239 J	204	Dry
Perfluorodecanoic Acid (PFDA)	NSE	NSE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	18.2	17.9	22.4	19.5	Dry
1H, 1H, 2H, 2H-Perfluorodecanesulfonic Acid (8:2FTS)	NSE	NSE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.1 J+	1.45 J+	4.58 U	4.38 U	Dry
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFO	NSE	NSE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.18 U	2.21 U	4.58 U	4.38 U	Dry
Perfluoroundecanoic Acid (PFUnA)	NSE	NSE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.76 J	1.65 J	2.60 J	2.14 J	Dry
Perfluorodecanesulfonic Acid (PFDS)	NSE	NSE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.18 UJ	2.21 UJ	4.58 UJ	4.38 U	Dry
Perfluorooctanesulfonamide (FOSA)	NSE	NSE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.83 J	1.62 J	15.6	12	Dry
N-Ethyl Perfluorooctanesulfonamidoacetic (NEtFOSAA)	NSE	NSE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.57	8.46	16.9	13.30	Dry
Perfluorododecanoic Acid (PFDoA)	NSE	NSE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.18 U	2.21 U	4.58 U	4.38 U	Dry
Perfluorotrodecanoic Acid (PFTrDA)	NSE	NSE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.18 U	2.21 U	4.58 U	4.38 U	Dry
Perfluorotetradecanoic Acid (PFTA)	NSE	NSE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.18 U	2.21 U	4.58 U	4.38 U	Dry
Perfluorogexadecanoic Acid (PFHxDA)	NSE	NSE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.37 U	4.42 U	4.58 U	4.38 UJ	Dry
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)	NSE	NSE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	21.8 U	22.1 U	23.4 UJ	21.9 U	Dry
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)	NSE	NSE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	21.8 U	22.1 U	23.4 UJ	21.9 U	Dry
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)	NSE	NSE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	54.6 U	55.3 U	22.9 U	21.9 U	Dry
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)	NSE	NSE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	54.6 U	55.3 U	22.9 U	21.9 U	Dry
Combination of PFOA and PFOS	NSE	NSE	2,586 D	2,296 J	483 J	460	1,099	1,063	2,250	2,158	506 J	516	494	502	740	660	Dry
GENERAL CHEMISTRY																	
Chemical Oxygen Demand (mg/l)	NSE	NSE	28	33	55	48	20	19	46	44	18	25 J	49 J+	54 J+	28	34	Dry
Ammonia-N (mg/l)	36.1	5.91	1.5	1.3	19	19	5.8	6.2	0.15	0.16	17	17 J+	16.7	16.6	17.0	17.0	Dry

Source: 2020 Annual Summary Report. Draft. Prepared by Coakley Landfill Group. May 2021.

Table G-2: OU1 Groundwater Data, Spring and Fall 2020

			OPERABLE UNIT 1 (OU-1)																							
Sampling Point ID			MW-4[7]	MW-4-DUP[7]	MW-4	MW-4-DUP	MW-5D	MW-5D	MW-5S	MW-5S	MW-6	MW-6	MW-8[7]	MW-8	MW-9	MW-9	MW-10	MW-10	MW-11	MW-11	OP-2	OP-2	OP-5	OP-5	BP-4	BP-4
Monitored Zone / Unit	USEPA	NHDES	Till	Till	Till	Till	DBR	DBR	SBR	SBR	OBH-BR	OBH-BR	SBR	SBR	Outwash	Outwash	Outwash	Outwash	SBR	SBR	Outwash	Outwash	Outwash	Outwash	OBH-BR	OBH-BR
Date of Sample Collection	CL	AGQS	5/19/20	5/19/20	10/13/20	10/13/20	5/15/20	10/12/20	5/15/20	10/12/20	5/22/20	10/8/20	5/20/20	10/12/20	5/22/20	10/12/20	5/22/20	10/12/20	5/18/20	10/12/20	5/14/20	10/8/20	5/13/20	10/9/20	5/18/20	10/12/20
VOLATILE ORGANIC COMPOUNDS BY 8260C - (ug/L)																										
1,2,4-Trimethylbenzene	---	330	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,2-Dichloropropane	5	5	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,4-Dichlorobenzene	---	75	N/A	N/A	N/A	N/A	1.1	N/A	1	N/A	1 U	N/A	1.6	N/A	N/A	N/A	N/A	N/A	1 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2-Butanone(MEK)	200	4,000	N/A	N/A	N/A	N/A	10 U	N/A	10 U	N/A	10 U	N/A	10 U	N/A	N/A	N/A	N/A	N/A	10 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Acetone	---	6,000	N/A	N/A	N/A	N/A	10 U	N/A	10 U	N/A	10 U	N/A	12	N/A	N/A	N/A	N/A	N/A	10 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzene	5	5	N/A	N/A	N/A	N/A	2	N/A	1.9	N/A	1 U	N/A	3	N/A	N/A	N/A	N/A	N/A	1.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Carbon disulfide	---	70	N/A	N/A	N/A	N/A	2 U	N/A	2 U	N/A	2 U	N/A	2 U	N/A	N/A	N/A	N/A	N/A	2 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chlorobenzene	100	100	N/A	N/A	N/A	N/A	1.8	N/A	1	N/A	1 U	N/A	5.6	N/A	N/A	N/A	N/A	N/A	1 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chloroethane	---	---	N/A	N/A	N/A	N/A	35	N/A	3.7	N/A	2 U	N/A	11	N/A	N/A	N/A	N/A	N/A	15	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chloroform	80	---	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Diethyl Ether	---	1,400	N/A	N/A	N/A	N/A	100	N/A	23	N/A	2 U	N/A	59	N/A	N/A	N/A	N/A	N/A	11	N/A	N/A	N/A	N/A	N/A	N/A	N/A
IsoPropylbenzene	---	800	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1.5	N/A	N/A	N/A	N/A	N/A	1 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Methyl-t-butyl ether(MTBE)	---	13	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A
m&p-Xylene	---	10,000^	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A
o-Xylene	---	10,000^	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A
tert-Butyl Alcohol (TBA)	---	40	N/A	N/A	N/A	N/A	55	N/A	30 U	N/A	30 U	N/A	46	N/A	N/A	N/A	N/A	N/A	30 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tetrachloroethene	3.5	5	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tetrahydrofuran(THF)	154	600	N/A	N/A	N/A	N/A	89	N/A	11	N/A	10 U	N/A	88	N/A	N/A	N/A	N/A	N/A	10 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A
trans-1,2-Dichloroethene	100	100	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,4-DIOXANE BY 8260B SIM - (ug/L)																										
1,4-Dioxane	3	0.32	4.3	4.2	3.5	3.6	140	120	36	27	0.2 U	0.2 U	100 J+	130	0.2 U	N/A	1.3	10	26	31	0.43	0.79	0.2 U	0.2 U	5.7	6.9
DISSOLVED METALS BY 200.8 - (mg/L)																										
Dissolved Antimony	0.006	0.006	0.001 U	0.001 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	0.001 U	N/A	N/A	N/A
Dissolved Arsenic	0.01	0.01	0.048	0.05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0047	N/A	0.0063	N/A	N/A	N/A	0.15	N/A	0.032	N/A	N/A	N/A
Dissolved Barium	---	2	0.065	0.066	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.02	N/A	0.019	N/A	N/A	N/A	0.0098	N/A	0.012	N/A	N/A	N/A
Dissolved Beryllium	0.004	0.004	0.001 U	0.001 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	0.001 U	N/A	N/A	N/A
Dissolved Calcium	---	---	73 J+	73 J+	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	35 J+	N/A	25 J+	N/A	N/A	N/A	37 J+	N/A	10 J+	N/A	N/A	N/A
Dissolved Chromium	0.05	0.1	0.001 U	0.001 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.001U	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	0.001 U	N/A	N/A	N/A
Dissolved Iron	---	---	29 J+	30 J+	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.9 J+	N/A	13 J+	N/A	N/A	N/A	52 J+	N/A	14 J+	N/A	N/A	N/A
Dissolved Lead	0.015	0.015	0.001 U	0.001 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	0.001 U	N/A	N/A	N/A
Dissolved Magnesium	---	---	20	21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.8	N/A	6	N/A	N/A	N/A	7.2	N/A	2.4	N/A	N/A	N/A
Dissolved Manganese	0.3	0.84	1.2	1.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.65	N/A	1.2	N/A	N/A	N/A	2.1	N/A	2.5	N/A	N/A	N/A
Dissolved Nickel	0.1	0.1	0.0092	0.012	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0048	N/A	0.0018	N/A	N/A	N/A	0.0098	N/A	0.015	N/A	N/A	N/A
Dissolved Potassium	---	160	35	35	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.1	N/A	4.7	N/A	N/A	N/A	9.1	N/A	2	N/A	N/A	N/A
Dissolved Sodium	---	---	32	33	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.5	N/A	17	N/A	N/A	N/A	1.3	N/A	6.2	N/A	N/A	N/A
Dissolved Vanadium	0.26	---	0.005 U	0.005 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.005 U	N/A	0.005 U	N/A	N/A	N/A	0.005 U	N/A	0.005 U	N/A	N/A	N/A
TOTAL METALS BY 200.8																										
Total Antimony	0.006	0.006	N/A	N/A	N/A	N/A	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A
Total Arsenic	0.01	0.01	N/A	N/A	N/A	N/A	0.0052	N/A	0.018	N/A	0.001 U	N/A	0.0018	N/A	N/A	N/A	N/A	N/A	0.014	N/A	N/A	N/A	N/A	N/A	0.04	N/A
Total Barium	---	2	N/A	N/A	N/A	N/A	0.11	N/A	0.12	N/A	0.012	N/A	0.15	N/A	N/A	N/A	N/A	N/A	0.059	N/A	N/A	N/A	N/A	N/A	0.038	N/A
Total Beryllium	0.004	0.004	N/A	N/A	N/A	N/A	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A
Total Calcium	---	---	N/A	N/A	N/A	N/A	38 J+	N/A	38 J+	N/A	29 J+	N/A	29 J+	N/A	N/A	N/A	N/A	N/A	19 J+	N/A	N/A	N/A	N/A	N/A	54 J+	N/A
Total Chromium	0.05	0.1	N/A	N/A	N/A	N/A	0.001 U	N/A	0.001 U	N/A	0.0011	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A
Total Iron	---	---	N/A	N/A	N/A	N/A	17 J+	N/A	13 J+	N/A	15 J+	N/A	2.6 J+	N/A	N/A	N/A	N/A	N/A	14 J+	N/A	N/A	N/A	N/A	N/A	16 J+	N/A
Total Lead	0.015	0.015	N/A	N/A	N/A	N/A	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A
Total Magnesium	---	---	N/A	N/A	N/A	N/A	34	N/A	18	N/A	13	N/A	36	N/A	N/A	N/A	N/A	N/A	16	N/A	N/A	N/A	N/A	N/A	21	N/A
Total Manganese	0.3	0.84	N/A	N/A	N/A	N/A	1	N/A	3.3	N/A	4	N/A	1.5	N/A	N/A	N/A	N/A	N/A	0.49	N/A	N/A	N/A	N/A	N/A	1.6	N/A
Total Nickel	0.1	0.1	N/A	N/A	N/A	N/A	0.0095	N/A	0.0076	N/A	0.0082	N/A	0.026	N/A	N/A	N/A	N/A	N/A	0.0064	N/A	N/A	N/A	N/A	N/A	0.0086	N/A
Total Potassium	---	160	N/A	N/A	N/A	N/A	23	N/A	18	N/A	2.9	N/A	11	N/A	N/A	N/A	N/A	N/A	9.3	N/A	N/A	N/A	N/A	N/A	16	N/A
Total Sodium	---	---	N/A	N/A	N/A	N/A	120	N/A	70	N/A	28	N/A	150	N/A	N/A	N/A	N/A	N/A	65	N/A	N/A	N/A	N/A	N/A	50	N/A
Total Vanadium	0.26	---	N/A	N/A	N/A	N/A	0.005 U	N/A	0.005 U	N/A	0.005 U	N/A	0.005 U	N/A	N/A	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A	N/A	N/A	0.005 U	N/A

OPERABLE UNIT 1 (OU-1)																										
Sampling Point ID			MW-4[7]	MW-4-DUP[7]	MW-4	MW-4-DUP	MW-5D	MW-5D	MW-5S	MW-5S	MW-6	MW-6	MW-8[7]	MW-8	MW-9	MW-9	MW-10	MW-10	MW-11	MW-11	OP-2	OP-2	OP-5	OP-5	BP-4	BP-4
Monitored Zone / Unit	USEPA	NHDES	Till	Till	Till	Till	DBR	DBR	SBR	SBR	OBH-BR	OBH-BR	SBR	SBR	Outwash	Outwash	Outwash	Outwash	SBR	SBR	Outwash	Outwash	Outwash	Outwash	OBH-BR	OBH-BR
Date of Sample Collection	CL	AGQS	5/19/20	5/19/20	10/13/20	10/13/20	5/15/20	10/12/20	5/15/20	10/12/20	5/22/20	10/8/20	5/20/20	10/12/20	5/22/20	10/12/20	5/22/20	10/12/20	5/18/20	10/12/20	5/14/20	10/8/20	5/18/20	10/9/20	5/18/20	10/12/20
PER- & POLY-FLUORINATED ALKYL SUBSTANCES BY MODIFIED 537 - (ng/L)																										
Perfluorobutanoic Acid (PFBA)	---	---	59.6	55.1	46.9	47.5	28.4	22.9	43.1	48.7	1.63 J	3.18 J	43.8	4.43 U	36.7 J	N/A	72.8	40.4	49.5	49.1	9.55	9.03	4.41 U	4.36 U	7.43	6.35
Perfluoropentanoic acid (PFpEA)	---	---	106	100	87.3	84.6	37.9	46.9	91	112	3.21 J	3.48 J	226 J	79.7	69.7	N/A	146	72.3	105	109	15	12	4.41 U	4.36 U	10.9	9.72
Perfluorobutanesulfonic acid (PFBS)	---	---	4.34 J	4.21 J	5.21	4.05 J	28.7	25.1	9.09	8.04	3.26 J	4.38 U	24.2	27.2	2.59 J	N/A	3.40 J	4.69	9.95	13.3	2.2 J	4.49 U	4.41 U	4.36 U	2.6 J	2.54 J
Perfluorohexanoix Acid (PFHxA)	---	---	193	190	138	153	89.8	95.7	185	193	3.81 J	5.06	173	186	92.4	N/A	210	98.1	204	230	25.2	20.4	4.41 U	4.36 U	18.1	21.1
Perfluoroheptanoic acid (PFHpA)	---	---	397	388	294	314	51.6	54.9	406	428	4.40 U	7.19	214	237	190	N/A	422	174	412	452	41.5	40	4.41 U	4.36 U	28	25.5
Perfluorohexanesulfonic acid (PFHxS)	---	18[4]	30	26.7	37.1	35.1	50.7	43.8	60.9	50.6	4.40 U	1.37 J	98.5	89.2	13	N/A	11.7	17.1	58.9	64.2	8.13	7.12	4.41 U	4.36 U	11	9.62
1H, 1H, 2H, 2H-Perfluorooctanesulfonic Acid (6:2FTS)	---	---	4.54 U	4.47 U	4.30 U	4.23 U	4.45 U	4.35 U	4.56 U	4.27 U	4.40 U	4.38 U	4.71 U	4.43 U	4.49 U	N/A	4.66 U	4.40 U	4.52 U	4.39 U	4.45 U	4.49 U	4.41 U	4.36 U	4.37 U	4.34 U
Perfluorooctanoic acid (PFOA)	70	12[4]	**815**	**818**	**695**	**712**	**86.2**	**104**	**577**	**770**	8.99	16.1	**425**	**422**	**553**	N/A	**914**	**416**	**812**	**899**	**96.1**	**76.1**	2.76 J	4.98	**64.4**	**69.6**
Perfluoroheptanesulfonic Acid (PFHpS)	---	---	4.62	2.89 J	2.54 J	2.35 J	4.45 U	4.35 U	7.49	7.29	4.40 U	4.38 U	5.75	7.31	3.34 J	N/A	11.7	3.84 J	10.5	11.7	4.45 U	4.49 U	4.41 U	4.36 U	4.37 U	4.34 U
Perfluorononanoic acid (PFNA)	---	11[4]	39.1	38	35.4	27.6	4.45 U	4.35 U	76	68.7	4.40 U	4.38 U	32.9	14.2	175	N/A	392	107	109	110	10	5.87	4.41 U	4.36 U	1.83 J	2.69 J
Perfluorooctanesulfonamide (PFOSA)	---	---	2.02 J	3.13 J	2.78 J	4.16 J	4.59	3.63 J	16	26.5	8.19	64.6	18.6	5.21	5.25	N/A	23.3	25.9	15	39.8	6.5	13.1	7.14	13.4	7.97	17.5
Perfluorooctanesulfonic (PFOS)	70	15[4]	34.8	38.9	33.6	24.6	16.7	17	**108**	68.2	2.26 J	2.49 J	**223 J**	**199**	**404**	N/A	**819**	**156**	**395**	**350**	10.5	12.5	4.41 U	4.36 U	6.98	10.7
Perfluorodecanoic Acid (PFDA)	---	---	4.54 U	4.47U	4.30 U	4.23 U	4.45 U	4.35 U	4.56 U	4.27 U	4.40 U	4.38 U	4.71 U	4.43 U	19	N/A	81.2	13.8	5.77	5.52	4.45 U	4.49 U	4.41 U	4.36 U	4.37 U	4.34 U
1H, 1H, 2H, 2H-Perfluorodecanesulfonic Acid (8:2FTS)	---	---	4.54 U	4.47U	4.30 U	4.23 U	4.45 U	4.35 U	4.56 U	4.27 U	4.40 U	4.38 U	4.71 U	4.43 U	4.49 U	N/A	4.66 U	4.40 U	4.52 U	4.39 U	4.45 U	4.49 U	4.41 U	4.36 U	4.37 U	4.34 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	---	---	4.54 U	4.47U	4.30 U	4.23 U	4.45 U	4.35 U	4.56 U	4.27 U	4.40 U	4.38 U	4.71 U	4.43 U	4.49 U	N/A	4.66 U	4.40 U	4.52 U	4.39 U	4.45 U	4.49 U	4.41 U	4.36 U	4.37 U	4.34 U
N-Ethyl Perfluorooctanesulfonamidoacetic (EtFOSAA)	---	---	1.76 J	4.47U	4.30 U	4.23 U	4.45 U	4.35 U	4.56 U	4.27 U	4.40 U	4.38 U	4.71 U	4.43 U	4.49 U	N/A	4.66 U	4.40 U	4.52 U	4.39 U	4.45 U	4.49 U	4.41 U	4.36 U	4.37 U	4.34 U
Perfluoroundecanoic Acid (PFUnA)	---	---	4.54 U	4.47U	4.30 U	4.23 U	4.45 U	4.35 U	4.56 U	4.27 U	4.40 U	4.38 U	4.71 U	4.43 U	4.49 U	N/A	4.66 U	4.40 U	4.52 U	4.39 U	4.45 U	4.49 U	4.41 U	4.36 U	4.37 U	4.34 U
Perfluorodecanesulfonic Acid (PFDS)	---	---	4.54 U	4.47U	4.30 U	4.23 U	4.45 U	4.35 U	4.56 U	4.27 U	4.40 U	4.38 U	4.71 U	4.43 U	4.49 U	N/A	4.66 U	4.40 U	4.52 U	4.39 U	4.45 U	4.49 U	4.41 U	4.36 U	4.37 U	4.34 U
Perfluorododecanoic Acid (PFDoA)	---	---	4.54 U	4.47U	4.30 U	4.23 U	4.45 U	4.35 U	4.56 U	4.27 U	4.40 U	4.38 U	4.71 U	4.43 U	4.49 U	N/A	4.66 U	4.40 U	4.52 U	4.39 U	4.45 U	4.49 U	4.41 U	4.36 U	4.37 U	4.34 U
N-Methyl Perfluorooctane Sulfonamide (MeFOSA)	---	---	22.7 U	22.3 U	21.5 U	21.2 U	22.2 U	21.8 U	22.8 U	21.4 U	22.0 U	21.9 U	22.4 UJ	22.2 U	22.5 U	N/A	23.3 U	22.0 U	22.6 U	22.0 U	22.2 U	22.5 U	22.0 U	22.5 U	21.8 U	21.7 U
Perfluorotrodecanoic Acid (PFTrDA)	---	---	4.54 U	4.47U	4.30 U	4.23 U	4.45 U	4.35 U	4.56 U	4.27 U	4.40 U	4.38 U	4.71 U	4.43 U	4.49 U	N/A	4.66 U	4.40 U	4.52 U	4.39 U	4.45 U	4.49 U	4.41 U	4.36 U	4.37 U	4.34 U
Perfluorotetradecanoic Acid (PFTeDa)	---	---	4.54 U	4.47U	4.30 U	4.23 U	4.45 U	4.35 U	4.56 U	4.27 U	4.40 U	4.38 U	4.71 U	4.43 U	4.49 U	N/A	4.66 U	4.40 U	4.52 U	4.39 U	4.45 U	4.49 U	4.41 U	4.36 U	4.37 U	4.34 U
N-Ethyl Perfluorooctane Sulfonamide (EtFOSA)	---	---	22.7 U	22.3 U	21.5 U	21.2 U	22.2 U	21.8 U	22.8 U	21.4 U	22.0 U	21.9 U	22.4 UJ	22.2 U	22.5 U	N/A	23.3 U	22.0 U	22.6 U	22.0 U	22.2 U	22.5 U	22.0 U	22.5 U	21.8 U	21.7 U
Perfluorogexadecanoic Acid (PFHxDA)	---	---	4.54 U	4.47U	4.30 U	4.23 U	4.45 U	4.35 U	4.56 U	4.27 U	4.40 U	4.38 U	4.71 U	4.43 U	4.49 U	N/A	4.66 U	4.40 U	4.52 U	4.39 U	4.45 U	4.49 U	4.41 U	4.36 U	4.37 U	4.34 U
N-Methyl Perfluorooctanesulfonamido Ethanol (MeFOSE)	---	---	22.7 U	22.3 U	21.5 U	21.2 U	22.2 U	21.8 U	22.8 U	21.4 U	22.0 U	21.9 U	23.5 U	22.2 U	22.5 U	N/A	23.3 U	22.0 U	22.6 U	22.0 U	22.2 U	22.5 U	22.0 U	22.5 U	21.8 U	21.7 U
N-Ethyl Perfluorooctanesulfonamido Ethanol (EtFOSE)	---	---	22.7 U	22.3 U	21.5 U	21.2 U	22.2 U	21.8 U	22.8 U	21.4 U	22.0 U	21.9 U	2.35 U	22.2 U	22.5 U	N/A	23.3 U	22.0 U	22.6 U	22.0 U	22.2 U	22.5 U	22.0 U	22.5 U	21.8 U	21.7 U
Combination of PFOA and PFOS	70	---	**849.8**	**856.9**	**728.6**	**736.6**	**102.9**	**121**	**685**	**838.2**	11.25 J	18.59 J	**648 J**	**621**	**957**	N/A	**1,733**	**572**	**1,207**	**1,249**	**106.6**	**88.6**	2.76 J	4.98	**71.38**	**80.3**

Source: 2020 Annual Summary Report. Draft. Prepared by Coakley Landfill Group. May 2021.

Table G-3: OU1 and OU2 Wells – Statistical Trends for Data Collected from 2005 to 2020

	1,4-dioxane		Tertiary-butyl Alcohol (TBA)		Arsenic		Manganese		PFNA		PFHxS		PFOA		PFOS		PFOA/PFOS	
Well	**Statistical Trend**	**Visual Trend**	**Statistical Trend**	**Visual Trend**	**Statistical Trend**	**Visual Trend**	**Statistical Trend**	**Visual Trend**	**Statistical Trend**	**Visual Trend**	**Statistical Trend**	**Visual Trend**	**Statistical Trend**	**Visual Trend**	**Statistical Trend**	**Visual Trend**	**Statistical Trend**	**Visual Trend**
Operating Unit 1 Wells																		
BP-4	Decreasing	Decreasing	NA	NA	Increasing	Decreasing	No Trend	Stable	No Trend	Increasing	No Trend	Decreasing	No Trend	Increasing	No Trend	Increasing	No Trend	Not Stable
MW-4	No Trend	Decreasing	NA	NA	Decreasing	Stable	Decreasing	Stable	No Trend	Decreasing	No Trend	Not Stable	No Trend	Decreasing	No Trend	Decreasing	No Trend	Decreasing
MW-5D	Decreasing	Decreasing	No Trend	Increasing	NP	NP	No Trend	Increasing	ND	ND	No Trend	Decreasing	No Trend	Increasing	Decreasing	Decreasing	No Trend	Increasing
MW-5S	Decreasing	Decreasing	ND	ND	Increasing	Decreasing	Decreasing	Decreasing	No Trend	Decreasing	No Trend	Decreasing	No Trend	Not stable	No Trend	Decreasing	No Trend	Not stable
MW-6	ND	ND	ND	ND	ND	ND	Increasing	Increasing	ND	ND	NP*	NP*	ND	Increasing	No Trend	Decreasing	NP	NP
MW-8	Decreasing	Decreasing	Decreasing	Decreasing	Decreasing	Decreasing	Decreasing	Increasing	Increasing	Decreasing	No Trend	Decreasing	No Trend	Decreasing	NP	NP	No Trend	Decreasing
MW-9	ND	ND	NA	NA	Decreasing	Decreasing	Decreasing	Decreasing	No Trend	Increasing	NP	NP	No Trend	Increasing	Decreasing	Increasing	No Trend	Increasing
MW-10	No Trend	Increasing	NA	NA	No Trend	Decreasing	Decreasing	Decreasing	No Trend	Decreasing	NP	NP	No Trend	Decreasing	No Trend	Decreasing	No Trend	Decreasing
MW-11	Decreasing	Stable	ND	ND	Increasing	Increasing	No Trend	Decreasing	Increasing	Stable	No Trend	Not Stable	Increasing	Increasing	No Trend	Increasing	No Trend	Decreasing
OP-2	No Trend	Not Stable	NA	NA	No Trend	Decreasing	Increasing	Increasing	No Trend	Decreasing	NP	NP	No Trend	Decreasing	NP	NP	No Trend	Increasing
OP-5	ND	ND	NA	NA	No Trend	Decreasing	No Trend	Decreasing	No Trend	No trend	NP	NP	NP	NP	ND	ND	NP	NP
Operating Unit 2 Wells																		
AE-1A	Increasing	Decreasing	NA	NA	Decreasing	Increasing	Increasing	Increasing	ND	ND	NP	NP	NP	NP	ND	ND	NP	NP
AE-1B	No Trend	Decreasing	NA	NA	Increasing	Increasing	Decreasing	Increasing	ND	ND	NP	NP	NP	NP	NP	NP	NP	NP
AE-2A	Decreasing	Decreasing	ND	ND	Decreasing	Stable	Increasing	Stable	No Trend	Decreasing	No Trend	Increasing	No Trend	Decreasing	No Trend	Decreasing	No Trend	Decreasing
AE-2B	Decreasing	Decreasing	ND	ND	Decreasing	Decreasing	Decreasing	Stable	No Trend	Stable	No Trend	Decreasing	No Trend	Decreasing	No Trend	Increasing	No Trend	Decreasing
AE-3A	Decreasing	Increasing	ND	ND	No Trend	Increasing	Increasing	Increasing	No Trend	Decreasing	No Trend	Decreasing	No Trend	Decreasing	No Trend	Stable	No Trend	Decreasing
AE-3B	Decreasing	Increasing	ND	ND	No Trend	Decreasing	Increasing	Decreasing	Decreasing	Decreasing	NP	NP	No Trend	Decreasing	No Trend	Decreasing	No Trend	Decreasing
AE-4A	ND	ND	ND	ND	ND	ND	Decreasing	Decreasing	ND	ND	ND	ND	NP	NP	ND	ND	NP	NP
AE-4B	ND	ND	ND	ND	ND	ND	NP	NP	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
FPC-2A	NP*	NP*	ND	ND	NP*	NP*	NP*	NP*	ND	ND	NP	NP	NP	NP	ND	ND	NP	NP
FPC-2B	NP*	NP*	ND	ND	NP*	NP*	NP*	NP*	ND	ND	ND	ND	NP	NP	NP	NP	NP	NP
FCP-3A	ND	ND	ND	ND	NP	NP	NP	NP	ND	ND	ND	ND	NP	NP	ND	ND	NP	NP
FPC-3B	ND	ND	ND	ND	NP	NP	NP	NP	ND	ND	ND	ND	NP	NP	ND	ND	NP	NP
FPC-3C	No Trend	Decreasing	ND	ND	No Trend	Stable	NP	NP	ND	ND	NP	NP	NP	NP	ND	ND	NP	NP
FPC-4B	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
FPC-5A	NP*	NP*	NA	NA	NP*	NP*	NP*	NP*	No Trend	Decreasing	No Trend	Decreasing	No Trend	NP*	No Trend	NP*	NP*	NP*
FPC-5B	Decreasing	Decreasing	NA	NA	ND	ND	NP	NP	NP	NP	No Trend	Decreasing	No Trend	Decreasing	Decreasing	Decreasing	No Trend	Decreasing
FPC-6A	Decreasing	Decreasing	ND	ND	Increasing	Decreasing	No Trend	Decreasing	NP	NP	NP	NP	No Trend	Decreasing	NP	NP	NP	NP
FPC-6B	Decreasing	Not Stable	ND	ND	ND	ND	Decreasing	Stable	NP	NP	NP	NP	No Trend	Not stable	No Trend	Not stable	No Trend	Not stable
FPC-7A	ND	ND	NA	NA	ND	ND	ND	ND	ND	ND	NP	NP	NP	NP	ND	ND	NP	NP
FPC-7B	NP	NP	NA	NA	ND	ND	ND	ND	NP	NP	NP	NP	No Trend	Decreasing	NP	NP	NP	NP
FPC-8A	Decreasing	Decreasing	ND	ND	ND	ND	ND	ND	NP	NP	NP	NP	No Trend	Not stable	NP	NP	NP	NP
FPC-8B	Decreasing	Decreasing	ND	ND	NP	NP	NP	NP	ND	ND	NP	NP	NP	NP	NP	NP	NP	NP
FPC-9A	No Trend	Decreasing	ND	ND	Increasing	Increasing	NP	NP	ND	ND	NP	NP	Decreasing	Decreasing	Decreasing	Decreasing	Decreasing	Decreasing
FPC-9B	No Trend	Decreasing	ND	ND	NP	NP	NP*	Not Stable	ND	ND	NP	NP	No Trend	Increasing	NP	NP	NP	NP
FPC-11A	Decreasing	Increasing	NA	NA	NP	NP	Increasing	Not Stable	ND	ND	NP	NP	No Trend	Increasing	NP	NP	NP	NP
FPC-11B	Decreasing	Increasing	NA	NA	NP	NP	Decreasing	Increasing	ND	ND	NP	NP	No Trend	Increasing	NP	NP	NP	NP
GZ-105	No Trend	Not Stable	ND	ND	No Trend	Not Stable	Decreasing	Increasing	No Trend	Increasing	No Trend	Increasing	No Trend	Increasing	No Trend	Increasing	No Trend	Increasing
GZ-109	ND	ND	ND	ND	NP	NP	NP	NP	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GZ-117	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NP	NP	NP*	NP*	ND	ND
MW-20S	NP*	NP*	ND	ND	NP*	NP*	NP*	NP*	ND	ND	ND	ND	ND	ND	NP*	NP*	NP*	NP*
MW-20D1	NP*	NP*	ND	ND	NP*	NP*	NP*	NP*	ND	ND	NP*	NP*	NP*	NP*	ND	ND	NP*	NP*
MW-20D2	NP*	NP*	ND	ND	NP*	NP*	NP*	NP*	ND	ND	ND	ND	NP*	NP*	ND	ND	NP*	NP*
MW-21S	NP*	NP*	ND	ND	NP*	NP*	NP*	NP*	NP*	NP*	NP*	NP*	NP*	NP*	NP*	NP*	NP*	NP*
MW-21D1	ND	ND	ND	ND	NP*	NP*	NP*	NP*	ND	ND	ND	ND	NP*	NP*	ND	ND	NP*	NP*
MW-21D2	ND	ND	ND	ND	NP*	NP*	NP*	NP*	ND	ND	ND	ND	NP*	NP*	ND	ND	NP*	NP*
MW-22S	ND	ND	ND	ND	NP*	NP*	NP*	NP*	ND	ND	ND	ND	ND	ND	ND	ND	NP*	NP*
MW-22D1	ND	ND	ND	ND	NP*	NP*	NP*	NP*	ND	ND	ND	ND	NP*	NP*	ND	ND	NP*	NP*
MW-22D2	ND	ND	ND	ND	NP*	NP*	NP*	NP*	ND	ND	ND	ND	NP*	NP*	NP*	NP*	NP*	NP*
Trend Tests Completed		25		2		19		22		14		12		24		16		17
Trends Identified		21		2		15		17		12		10		21		14		14
Increasing Trends		5		1		5		9		3		2		9		5		10
Decreasing Trends		16		1		10		8		9		8		12		9		4
No Trend		4		0		4		5		2		2		3		2		3

Source: 2020 Annual Summary Report. Draft. Prepared by Coakley Landfill Group. May 2021.

Table G-4: OU2 Groundwater Data, 2020

OPERABLE UNIT 2 (OU-2)																								
Sampling Point ID			AE-1A	AE-1A	AE-1B	AE-1B	AE-2A[1]	AE-2A	AE-2B[1]	AE-2B	AE-3A[1]	AE-3A-DUP[1]	AE-3A	AE-3A DUP	AE-3B[1]	AE-3B	AE-4A	AE-4A	AE-4B	AE-4B	FPC-2A[1]	FPC-2A	FPC-2B[1]	FPC-2B
Monitored Unit	USEPA	NHDES	Till	Till	SBR	SBR	Till	Till	SBR	SBR	Till	Till	Till	Till	SBR	SBR	Outwash	Outwash	SBR	SBR	Outwash	Outwash	SBR	SBR
Date of Sample Collection	CL	AGQS	5/15/20	10/13/20	5/15/20	10/13/20	5/21/20	10/12/20	5/21/20	10/12/20	5/20/20	5/20/20	10/7/20	10/7/20	5/20/20	10/7/20	5/12/20	10/6/20	5/12/20	10/6/20	5/19/20	10/8/20	5/19/20	10/8/20
VOLATILE ORGANIC COMPOUNDS BY 8260C - (ug/L)																								
1,2,4-Trimethylbenzene	—	330	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A
1,2-Dichloropropane	5	5	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A
1,4-Dichlorobenzene	—	75	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A
2-Butanone(MEK)	200	4,000	N/A	N/A	N/A	N/A	10 U	N/A	10 U	N/A	10 U	10 U	N/A	N/A	10 U	N/A	10 U	N/A	10 U	N/A	10 U	N/A	10 U	N/A
Acetone	—	6,000	N/A	N/A	N/A	N/A	10 U	N/A	10 U	N/A	13	10 U	N/A	N/A	10 U	N/A	10 U	N/A	10 U	N/A	10 U	N/A	10 U	N/A
Benzene	5	5	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1.3	1.3	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A
Carbon disulfide	—	70	N/A	N/A	N/A	N/A	2 U	N/A	2 U	N/A	2 U	2 U	N/A	N/A	2 U	N/A	2 U	N/A	2 U	N/A	2 U	N/A	2 U	N/A
Chlorobenzene	100	100	N/A	N/A	N/A	N/A	1.6	N/A	1 U	N/A	4.8	4.9	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A
Chloroethane	—	—	N/A	N/A	N/A	N/A	2 U	N/A	2 U	N/A	4.5	4.5	N/A	N/A	2 U	N/A	2 U	N/A	2 U	N/A	2 U	N/A	2 U	N/A
Chloroform	80	—	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A
Diethyl Ether	—	1,400	N/A	N/A	N/A	N/A	2.1	N/A	11	N/A	10	11	N/A	N/A	2 U	N/A	2 U	N/A	2 U	N/A	2 U	N/A	2 U	N/A
IsoPropylbenzene	—	800	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A
Methyl-t-butyl ether(MTBE)	—	13	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A
m&p-Xylene	—	10,000^	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A
o-Xylene	—	10,000^	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A
tert-Butyl Alcohol (TBA)	—	40	N/A	N/A	N/A	N/A	30 U	N/A	30 U	N/A	30 U	30 U	N/A	N/A	30 U	N/A	30 U	N/A	30 U	N/A	30 U	N/A	30 U	N/A
Tetrachloroethene	3.5	5	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A
Tetrahydrofuran(THF)	154	600	N/A	N/A	N/A	N/A	10 U	N/A	12	N/A	10 U	10 U	N/A	N/A	10 U	N/A	10 U	N/A	10 U	N/A	10 U	N/A	10 U	N/A
trans-1,2-Dichloroethene	100	100	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A
1,4-DIOXANE BY 8260B SIM - (ug/L)																								
1,4-Dioxane	3	0.32	0.97	0.96	1.2	1.1	**7**	**5.5**	**48**	**45**	**9.7**	**13**	**16**	**17**	**11**	**18**	0.2 U	0.2 U	0.2 U	0.2 U	0.21	0.2 U	0.2 U	0.2 U
DISSOLVED METALS BY 200.8 - (mg/L)																								
Dissolved Antimony	0.006	0.006	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	0.001 U	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A
Dissolved Arsenic	0.01	0.01	**0.018**	N/A	N/A	N/A	**0.14**	N/A	N/A	N/A	**0.1**	**0.11**	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A
Dissolved Barium	—	2	0.019	N/A	N/A	N/A	0.019	N/A	N/A	N/A	0.059	0.058	N/A	N/A	N/A	N/A	0.0038	N/A	N/A	N/A	0.019	N/A	N/A	N/A
Dissolved Beryllium	0.004	0.004	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	0.001 U	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A
Dissolved Calcium	—	—	40 J+	N/A	N/A	N/A	27 J+	N/A	N/A	N/A	44 J+	46 J+	N/A	N/A	N/A	N/A	7.2 J+	N/A	N/A	N/A	28 J+	N/A	N/A	N/A
Dissolved Chromium	0.05	0.1	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	0.001 U	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A
Dissolved Iron	—	—	0.42 J+	N/A	N/A	N/A	21 J+	N/A	N/A	N/A	30 J+	30 J+	N/A	N/A	N/A	N/A	0.05 U	N/A	N/A	N/A	5.6 J+	N/A	N/A	N/A
Dissolved Lead	0.015	0.015	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	0.001 U	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A
Dissolved Magnesium	—	—	14	N/A	N/A	N/A	7.9	N/A	N/A	N/A	18	18	N/A	N/A	N/A	N/A	5.8	N/A	N/A	N/A	15	N/A	N/A	N/A
Dissolved Manganese	0.3	0.84	**0.6**	N/A	N/A	N/A	**1.1**	N/A	N/A	N/A	**1.9**	**2**	N/A	N/A	N/A	N/A	0.012	N/A	N/A	N/A	**1.2**	N/A	N/A	N/A
Dissolved Nickel	0.1	0.1	0.001 U	N/A	N/A	N/A	0.0071	N/A	N/A	N/A	0.0073	0.0074	N/A	N/A	N/A	N/A	0.001U	N/A	N/A	N/A	0.0012	N/A	N/A	N/A
Dissolved Potassium	—	160	4.1	N/A	N/A	N/A	13	N/A	N/A	N/A	16	17	N/A	N/A	N/A	N/A	2.4	N/A	N/A	N/A	4.9	N/A	N/A	N/A
Dissolved Sodium	—	—	21	N/A	N/A	N/A	25	N/A	N/A	N/A	56	59	N/A	N/A	N/A	N/A	7.7	N/A	N/A	N/A	15	N/A	N/A	N/A
Dissolved Vanadium	0.26	—	0.005 U	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A	0.005 U	0.005 U	N/A	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A
TOTAL METALS BY 200.8																								
Total Antimony	0.006	0.006	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A
Total Arsenic	0.01	0.01	N/A	N/A	0.0082	N/A	N/A	N/A	0.0051	N/A	N/A	N/A	N/A	N/A	**0.052**	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.0021	N/A
Total Barium	—	2	N/A	N/A	0.036	N/A	N/A	N/A	0.075	N/A	N/A	N/A	N/A	N/A	0.11	N/A	N/A	N/A	0.0077	N/A	N/A	N/A	0.012	N/A
Total Beryllium	0.004	0.004	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A
Total Calcium	—	—	N/A	N/A	35 J+	N/A	N/A	N/A	39 J+	N/A	N/A	N/A	N/A	N/A	48 J+	N/A	N/A	N/A	7.9 J+	N/A	N/A	N/A	9.9 J+	N/A
Total Chromium	0.05	0.1	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A
Total Iron	—	—	N/A	N/A	2.4 J+	N/A	N/A	N/A	2.2 J+	N/A	N/A	N/A	N/A	N/A	9.6 J+	N/A	N/A	N/A	0.05 U	N/A	N/A	N/A	0.057 J+	N/A
Total Lead	0.015	0.015	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A
Total Magnesium	—	—	N/A	N/A	16	N/A	N/A	N/A	28	N/A	N/A	N/A	N/A	N/A	22	N/A	N/A	N/A	6.5	N/A	N/A	N/A	1.2	N/A
Total Manganese	0.3	0.84	N/A	N/A	**0.59**	N/A	N/A	N/A	**1.2**	N/A	N/A	N/A	N/A	N/A	**1.2**	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A	0.005 U	N/A
Total Nickel	0.1	0.1	N/A	N/A	0.001 U	N/A	N/A	N/A	0.0085	N/A	N/A	N/A	N/A	N/A	0.0082	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A
Total Potassium	—	160	N/A	N/A	5.9	N/A	N/A	N/A	11	N/A	N/A	N/A	N/A	N/A	18	N/A	N/A	N/A	3.7	N/A	N/A	N/A	4.5	N/A
Total Sodium	—	—	N/A	N/A	26	N/A	N/A	N/A	140	N/A	N/A	N/A	N/A	N/A	76	N/A	N/A	N/A	14	N/A	N/A	N/A	37	N/A
Total Vanadium	0.26	—	N/A	N/A	0.005 U	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A	0.005 U	N/A

OPERABLE UNIT 2 (OU-2)														
Sampling Point ID			AE-1A	AE-1A	AE-1B	AE-1B	AE-2A[1]	AE-2A	AE-2B[1]	AE-2B	AE-3A[1]	AE-3A-DUP[1]	AE-3A	AE-3A DUP
Monitored Unit	USEPA	NHDES	Till	Till	SBR	SBR	Till	Till	SBR	SBR	Till	Till	Till	Till
Date of Sample Collection	CL	AGQS	5/15/20	10/13/20	5/15/20	10/13/20	5/21/20	10/12/20	5/21/20	10/12/20	5/20/20	5/20/20	10/7/20	10/7/20
PER- & POLY-FLUORINATED ALKYL SUBSTANCES BY MODIFIED 537 - (ng/L)														
Perfluorobutanoic Acid (PFBA)	—	—	1.5 J	0.91 J	2.01 J	0.846 J	24.8	24.9	47.1	49.8	20.2	20.2	14.6	18.6
Perfluoropentanoic acid (PFpEA)	—	—	2.02 J	2.01 J	4.54 U	2.12 J	50.2	50.9	106	103	43.1	40.5	30.2	31.4
Perfluorobutanesulfonic acid (PFBS)	—	—	4.27 U	4.32 U	4.54 U	4.38 U	4.77	4.34	14	13.2	6.55	5.94	5.92	4.97
Perfluorohexanoix Acid (PFHxA)	—	—	2.64 J	3.36 J	2.8 J	3.9 J	109	98.3	206	183	68.5	64.1	53	55.4
Perfluoroheptanoic acid (PFHpA)	—	—	4.27 U	0.947 J	4.54 U	1.1 J	244	205	383	338	103	105	70.4	92.4
Perfluorohexanesulfonic acid (PFHxS)	—	18[2]	1.8 J	1.87 J	1.88 J	2.52 J	22.8	23.9	89.4	74.4	20.1	19.4	16	9.84
1H, 1H, 2H, 2H-Perfluorooctanesulfonic Acid (6:2FTS)	—	—	4.27 U	4.32 U	4.54 U	4.38 U	4.62 U	4.34 U	2.11 U	4.30 U	4.59 U	4.59 U	4.47 U	4.31 U
Perfluorooctanoic acid (PFOA)	70	12[2]	4.47	5.52	5.61	6.67	**558**	**483**	**766**	**733**	**302**	**288**	**180**	**212**
Perfluoroheptanesulfonic Acid (PFHpS)	—	—	4.27 U	4.32 U	4.54 U	4.38 U	6.69	4.94	13.6	13.8	1.23 J	4.59 U	4.47 U	1.45 J
Perfluorononanoic acid (PFNA)	—	11[4]	4.27 U	4.32 U	4.54 U	4.38 U	142	116	120	110	55.6	49.3	29.1	36.9
Perfluorooctanesulfonamide (PFOSA)	—	—	4.27 U	4.32 U	4.54 U	2.19 J	13.1	19.3	7.83	18.2	19.7 J	31.4 J	26.6	13.7
Perfluorooctanesulfonic (PFOS)	70	15[2]	4.27 U	4.32 U	4.54 U	1.32 J	**413**	**280**	**445**	**526**	**104 J**	**100**	**74.6**	**93.1**
Perfluorodecanoic Acid (PFDA)	—	—	4.27 U	4.32 U	4.54 U	4.38 U	18.5	20	9.01	8.91	7.86	7.57	5.8	8.15
1H, 1H, 2H, 2H-Perfluorodecanesulfonic Acid (8:2FTS)	—	—	4.27 U	4.32 U	4.54 U	4.38 U	4.62 U	4.34 U	2.11 U	4.30 U	4.59 U	4.59 U	4.47 U	4.31 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (M	—	—	4.27 U	4.32 U	4.54 U	4.38 U	4.62 U	4.34 U	2.11 U	4.30 U	4.59 U	4.59 U	4.47 U	4.31 U
N-Ethyl Perfluorooctanesulfonamidoacetic (EtFOSAA)	—	—	4.27 U	4.32 U	4.54 U	4.38 U	4.62 U	4.34 U	2.11 U	4.30 U	2.74 J	2.81 J	4.47 U	3.65 J
Perfluoroundecanoic Acid (PFUnA)	—	—	4.27 U	4.32 U	4.54 U	4.38 U	4.62 U	4.34 U	2.11 U	4.30 U	4.59 U	4.59 U	4.47 U	4.31 U
Perfluorodecanesulfonic Acid (PFDS)	—	—	4.27 U	4.32 U	4.54 U	4.38 U	4.62 U	4.34 U	2.11 U	4.30 U	4.59 U	4.59 U	4.47 U	4.31 U
Perfluorododecanoic Acid (PFDoA)	—	—	4.27 U	4.32 U	4.54 U	4.38 U	4.62 U	4.34 U	2.11 U	4.30 U	4.59 U	4.59 U	4.47 U	4.31 U
N-Methyl Perfluorooctane Sulfonamide (MeFOSA)	—	—	21.6 UJ	21.6 U	22.2 UJ	21.9 U	23.1 U	21.7 U	10.5 U	21.5 U	22.9 U	22.9 U	22.4 U	21.5 U
Perfluorotrodecanoic Acid (PFTrDA)	—	—	4.27 U	4.32 U	4.54 U	4.38 U	4.62 U	4.34 U	2.11 U	4.30 U	4.59 U	4.59 U	4.47 U	4.31 U
Perfluorotetradecanoic Acid (PFTeDa)	—	—	4.27 U	4.32 U	4.54 U	4.38 U	4.62 U	4.34 U	2.11 U	4.30 U	4.59 U	4.59 U	4.47 U	4.31 U
N-Ethyl Perfluorooctane Sulfonamide (EtFOSA)	—	—	21.6 UJ	21.6 U	22.2 UJ	21.9 U	23.1 U	21.7 U	10.5 U	21.5 U	22.9 U	22.9 U	22.4 U	21.5 U
Perfluorogexadecanoic Acid (PFHxDA)	—	—	4.27 U	4.32 U	4.54 U	4.38 U	4.62 U	4.34 U	2.11 U	4.30 U	4.59 U	4.59 U	4.47 U	4.31 U
N-Methyl Perfluorooctanesulfonamido Ethanol (MeFC	—	—	21.3 U	21.6 U	22.7 U	21.9 U	23.1 U	21.7 U	10.5 U	21.5 U	22.9 U	22.9 U	22.4 U	21.5 U
N-Ethyl Perfluorooctanesulfonamido Ethanol (EtFOSE)	—	—	21.3 U	21.6 U	22.7 U	21.9 U	23.1 U	21.7 U	10.5 U	21.5 U	22.9 U	22.9 U	22.4 U	21.5 U
Combination of PFOA and PFOS	70	—	4.47	5.52	5.61	7.99 J	**971**	**763**	**1,211**	**1,259**	**406 J**	**388**	**254.6**	**305.1**
FIELD PARAMETERS														
Dissolved Oxygen (mg/l)	—	—	N/A	N/A	N/A	N/A	1.3	1.9	1.3	1.9	1.3	N/A	2	N/A
Oxidation Reduction Potential (mV)	—	—	N/A	N/A	N/A	N/A	-96	-95	-113	-130	-106	N/A	-105	N/A
pH (standard units)	—	—	N/A	N/A	N/A	N/A	6.7	6.8	7.3	7.3	6.5	N/A	6.4	N/A
Specific Conductance (us/cm)	—	—	N/A	N/A	N/A	N/A	491	458	1,010	979	830	N/A	983	N/A
Temperature (degrees Celcius)	—	—	N/A	N/A	N/A	N/A	12	12	12	12	12	N/A	14	N/A
Turbidity (NTU)	—	—	N/A	N/A	N/A	N/A	< 5	<5	< 5	<5	< 5	N/A	<5	N/A

OPERABLE UNIT 2 (OU-2)										
Sampling Point ID	AE-3B[1]	AE-3B	AE-4A	AE-4A	AE-4B	AE-4B	FPC-2A[1]	FPC-2A	FPC-2B[1]	FPC-2B
Monitored Unit	SBR	SBR	Outwash	Outwash	SBR	SBR	Outwash	Outwash	SBR	SBR
Date of Sample Collection	5/20/20	10/7/20	5/12/20	10/6/20	5/12/20	10/6/20	5/19/20	10/8/20	5/19/20	10/8/20
PER- & POLY-FLUORINATED ALKYL SUBSTANCES BY MODIFIED 537 - (ng/L)										
Perfluorobutanoic Acid (PFBA)	19.6	14.3	4.42 U	4.46 U	4.14 U	4.47 U	1.46 J	1.70 J	3.11 J	4.03 J
Perfluoropentanoic acid (PFpEA)	37.4	28.9	4.42 U	4.46 U	4.14 U	4.47 U	4.61 U	4.44 U	5.51	4.54
Perfluorobutanesulfonic acid (PFBS)	4.09 J	5.73	4.42 U	4.46 U	4.14 U	4.47 U	3.59 J	4.88	4.57 U	4.36 U
Perfluorohexanoix Acid (PFHxA)	67.1	50.5	4.42 U	4.46 U	4.14 U	4.47 U	4.61 U	4.44 U	4.57 U	4.36 U
Perfluoroheptanoic acid (PFHpA)	96.8	64.9	4.42 U	4.46 U	4.14 U	4.47 U	2.81 J	2.08 J	1.42 J	1.30 J
Perfluorohexanesulfonic acid (PFHxS)	13.4	16.7	4.42 U	4.46 U	4.14 U	4.47 U	1.48 J	4.44 U	4.57 U	4.36 U
1H, 1H, 2H, 2H-Perfluorooctanesulfonic Acid (6:2FTS)	4.55 U	4.40 U	4.42 U	4.46 U	4.14 U	4.47 U	4.61 U	4.44 U	4.57 U	4.36 U
Perfluorooctanoic acid (PFOA)	**261**	**164**	4.42 U	1.50 J	4.14 U	4.47 U	7.18	6.13	0.902 J	3.43 J
Perfluoroheptanesulfonic Acid (PFHpS)	1.91 J	4.40 U	4.42 U	4.46 U	4.14 U	4.47 U	4.61 U	4.44 U	4.57 U	4.36 U
Perfluorononanoic acid (PFNA)	43.4	28.1	4.42 U	4.46 U	4.14 U	4.47 U	4.61 U	4.44 U	4.57 U	4.36 U
Perfluorooctanesulfonamide (PFOSA)	11.3	27.6	4.42 U	7.00	4.14 U	4.47 U	5.24	63.6	4.57 U	5.01
Perfluorooctanesulfonic (PFOS)	**92.7**	**71.5**	4.42 U	4.46 U	4.14 U	4.47 U	4.61 U	4.44 U	1.47 J	1.90 J
Perfluorodecanoic Acid (PFDA)	7.68	5.33	4.42 U	4.46 U	4.14 U	4.47 U	4.61 U	4.44 U	4.57 U	4.36 U
1H, 1H, 2H, 2H-Perfluorodecanesulfonic Acid (8:2FTS)	4.55 U	4.40 U	4.42 U	4.46 U	4.14 U	4.47 U	4.61 U	4.44 U	4.57 U	4.36 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (M	4.55 U	4.40 U	4.42 U	4.46 U	4.14 U	4.47 U	4.61 U	4.44 U	4.57 U	4.36 U
N-Ethyl Perfluorooctanesulfonamidoacetic (EtFOSAA)	3.12 J	4.40 U	4.42 U	4.46 U	4.14 U	4.47 U	4.61 U	4.44 U	4.57 U	4.36 U
Perfluoroundecanoic Acid (PFUnA)	4.55 U	4.40 U	4.42 U	4.46 U	4.14 U	4.47 U	4.61 U	4.44 U	4.57 U	4.36 U
Perfluorodecanesulfonic Acid (PFDS)	4.55 U	4.40 U	4.42 U	4.46 U	4.14 U	4.47 U	4.61 U	4.44 U	4.57 U	4.36 U
Perfluorododecanoic Acid (PFDoA)	4.55 U	4.40 U	4.42 U	4.46 U	4.14 U	4.47 U	4.61 U	4.44 U	4.57 U	4.36 U
N-Methyl Perfluorooctane Sulfonamide (MeFOSA)	22.7 U	22.0 U	22.1 U	22.3 U	20.7 U	22.3 U	23.1 U	22.2 U	21.0 UJ	21.8 U
Perfluorotrodecanoic Acid (PFTrDA)	4.55 U	4.40 U	4.42 U	4.46 U	4.14 U	4.47 U	4.61 U	4.44 U	4.57 U	4.36 U
Perfluorotetradecanoic Acid (PFTeDa)	4.55 U	4.40 U	4.42 U	4.46 U	4.14 U	4.47 U	4.61 U	4.44 U	4.57 U	4.36 U
N-Ethyl Perfluorooctane Sulfonamide (EtFOSA)	22.7 U	22.0 U	22.1 U	22.3 U	20.7 R	22.3 U	23.1 U	22.2 U	21.0 UJ	21.8 U
Perfluorogexadecanoic Acid (PFHxDA)	4.55 U	4.40 U	4.42 U	4.46 U	4.14 U	4.47 U	4.61 U	4.44 U	4.57 U	4.36 U
N-Methyl Perfluorooctanesulfonamido Ethanol (MeFC	22.7 U	22.0 U	22.1 U	22.3 U	20.7 U	22.3 U	23.1 U	22.2 U	22.8 U	21.8 U
N-Ethyl Perfluorooctanesulfonamido Ethanol (EtFOSE)	22.7 U	22.0 U	22.1 U	22.3 U	20.7 U	22.3 U	23.1 U	22.2 U	22.8 U	21.8 U
Combination of PFOA and PFOS	**353.7**	**235.5**	ND	1.50 J	ND	ND	7.18	6.13	2.372 J	5.33 J
FIELD PARAMETERS										
Dissolved Oxygen (mg/l)	1.4	2.3	2.7	3.1	6	2.2	1	1.7	1.6	2.4
Oxidation Reduction Potential (mV)	107	-99	150	15	173	145	-68	-27	-15	-140
pH (standard units)	6.9	6.1	6.6	6.6	7.0	7.1	6.8	6.7	8.1	8.2
Specific Conductance (us/cm)	804	1,002	132	137	169	178	395	417	233	238
Temperature (degrees Celcius)	13	14	10	14	10	14	10	13	12	13
Turbidity (NTU)	< 5	<5	< 5	<5	< 5	<5	61	7	< 5	<5

Note:

The CLG reports that the 70 ng/L for PFOA and PFOS is an EPA cleanup goal, however, EPA has not selected these contaminants as COCs or established cleanup goals for the PFAS for this Site. The value listed above as the EPA CL is a federal health advisory and used to evaluate the monitoring results but should not be misinterpreted as a cleanup goal.

OPERABLE UNIT 2 (OU-2)																																		
Sampling Point ID			FPC-3A[1]	FPC-3A	FPC-3B[1]	FPC-3B	FPC-3C[1]	FPC-3C	FPC-4B	FPC-4B	FPC-5A	FPC-5A	FPC-5B	FPC-5B	FPC-6A	FPC-6A	FPC-6B	FPC-6B	FPC-7A[1]	FPC-7A	FPC-7B[1]	FPC-7B	FPC-8A[1]	FPC-8A	FPC-8B[1]	FPC-8B	FPC-9A	FPC-9A	FPC-9B[1]	FPC-9B	FPC-11A	FPC-11A	FPC-11B	FPC-11B
Monitored Unit	USEPA	NHDES	Till	Till	SBR	SBR	Outwash	Outwash	SBR	SBR	Till	Till	SBR	SBR	Till	Till	SBR	SBR	Till	Till	Till	Till	Till	Till	SBR	SBR	Till	Till	SBR	SBR	Till	Till	SBR	SBR
Date of Sample Collection	CL	AGQS	5/19/20	10/8/20	5/19/20	10/8/20	5/19/20	10/8/20	5/12/20	10/6/20	5/22/20	10/12/20	5/22/20	10/12/20	5/13/20	10/7/20	5/13/20	10/7/20	5/20/20	10/12/20	5/20/20	10/12/20	5/21/20	10/9/20	5/21/20	10/9/20	5/14/20	10/8/20	5/21/20	10/8/20	5/14/20	10/9/20	5/14/20	10/9/20
VOLATILE ORGANIC COMPOUNDS BY 8260C - (ug/L)																																		
1,2,4-Trimethylbenzene	—	330	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A
1,2-Dichloropropane	5	5	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A
1,4-Dichlorobenzene	—	75	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A
2-Butanone(MEK)	200	4,000	10 U	N/A	10 U	N/A	10 U	N/A	10 U	N/A	N/A	N/A	N/A	N/A	10 U	N/A	10 U	N/A	N/A	N/A	N/A	N/A	10 U	N/A	10 U	N/A	10 U	N/A	10 U	N/A	N/A	N/A	N/A	N/A
Acetone	—	6,000	10 U	N/A	10 U	N/A	10 U	N/A	10 U	N/A	N/A	N/A	N/A	N/A	10 U	N/A	10 U	N/A	N/A	N/A	N/A	N/A	10 U	N/A	10 U	N/A	10 U	N/A	10 U	N/A	N/A	N/A	N/A	N/A
Benzene	5	5	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A
Carbon disulfide	—	70	2 U	N/A	2 U	N/A	2 U	N/A	2 U	N/A	N/A	N/A	N/A	N/A	2 U	N/A	2 U	N/A	N/A	N/A	N/A	N/A	2 U	N/A	2 U	N/A	2 U	N/A	2U	N/A	N/A	N/A	N/A	N/A
Chlorobenzene	100	100	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A
Chloroethane	—	—	2 U	N/A	2 U	N/A	2 U	N/A	2 U	N/A	N/A	N/A	N/A	N/A	2 U	N/A	2 U	N/A	N/A	N/A	N/A	N/A	2 U	N/A	2 U	N/A	2 U	N/A	2 U	N/A	N/A	N/A	N/A	N/A
Chloroform	80	—	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A
Diethyl Ether	—	1,400	2 U	N/A	2 U	N/A	2 U	N/A	2 U	N/A	N/A	N/A	N/A	N/A	4.3	N/A	2 U	N/A	N/A	N/A	N/A	N/A	2 U	N/A	2 U	N/A	2 U	N/A	6.6	N/A	N/A	N/A	N/A	N/A
IsoPropylbenzene	—	800	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A
Methyl-t-butyl ether(MTBE)	—	13	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A
m&p-Xylene	—	10,000^	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A
o-Xylene	—	10,000^	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A
tert-Butyl Alcohol (TBA)	—	40	30 U	N/A	30 U	N/A	30 U	N/A	30 U	N/A	N/A	N/A	N/A	N/A	30 U	N/A	30 U	N/A	N/A	N/A	N/A	N/A	30 U	N/A	30 U	N/A	30 U	N/A	30 U	N/A	N/A	N/A	N/A	N/A
Tetrachloroethene	3.5	5	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A
Tetrahydrofuran(THF)	154	600	10 U	N/A	10 U	N/A	10 U	N/A	10 U	N/A	N/A	N/A	N/A	N/A	10 U	N/A	10 U	N/A	N/A	N/A	N/A	N/A	10 U	N/A	10 U	N/A	10 U	N/A	10 U	N/A	N/A	N/A	N/A	N/A
trans-1,2-Dichloroethene	100	100	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	N/A	N/A	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	2 U	N/A	N/A	N/A	N/A	N/A
1,4-DIOXANE BY 8260B SIM - (ug/L)																																		
1,4-Dioxane	3	0.32	0.2 U	0.2 U	0.2 U	0.2 U	0.25	0.32	0.2 U	0.2 U	21	21	37	37	7.1	N/A	3.4	12	0.2 U	0.2 U	0.2 U	0.21	0.41	0.5	0.38	0.41	13	10	3.7	3.9	0.84	0.96	0.27	0.57
DISSOLVED METALS BY 200.8 - (mg/L)																																		
Dissolved Antimony	0.006	0.006	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A
Dissolved Arsenic	0.01	0.01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.038	N/A	N/A	N/A	0.014	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.049	N/A	N/A	N/A	0.0061	N/A	N/A	N/A
Dissolved Barium	—	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.07	N/A	N/A	N/A	0.015	N/A	N/A	N/A	0.0085	N/A	N/A	N/A	0.0078	N/A	N/A	N/A	0.072	N/A	N/A	N/A	0.023	N/A	N/A	N/A
Dissolved Beryllium	0.004	0.004	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A
Dissolved Calcium	—	—	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	55 J+	N/A	N/A	N/A	16 J+	N/A	N/A	N/A	35 J+	N/A	N/A	N/A	27 J+	N/A	N/A	N/A	46 J+	N/A	N/A	N/A	36 J+	N/A	N/A	N/A
Dissolved Chromium	0.05	0.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A
Dissolved Iron	—	—	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6 J+	N/A	N/A	N/A	1.1 J+	N/A	N/A	N/A	0.05 U	N/A	N/A	N/A	0.05 U	N/A	N/A	N/A	6.1 J+	N/A	N/A	N/A	0.36 J+	N/A	N/A	N/A
Dissolved Lead	0.015	0.015	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A
Dissolved Magnesium	—	—	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	26	N/A	N/A	N/A	6.8	N/A	N/A	N/A	11	N/A	N/A	N/A	5.4	N/A	N/A	N/A	23	N/A	N/A	N/A	12	N/A	N/A	N/A
Dissolved Manganese	0.3	0.84	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.28	N/A	N/A	N/A	1.4	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A	0.17	N/A	N/A	N/A	0.35	N/A	N/A	N/A
Dissolved Nickel	0.1	0.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0081	N/A	N/A	N/A	0.0036	N/A	N/A	N/A	0.011	N/A	N/A	N/A	0.0011	N/A	N/A	N/A	0.0037	N/A	N/A	N/A	0.025	N/A	N/A	N/A
Dissolved Potassium	—	160	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	21	N/A	N/A	N/A	4.4	N/A	N/A	N/A	3.2	N/A	N/A	N/A	2.4	N/A	N/A	N/A	9.1	N/A	N/A	N/A	4.3	N/A	N/A	N/A
Dissolved Sodium	—	—	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	110	N/A	N/A	N/A	37	N/A	N/A	N/A	15	N/A	N/A	N/A	17	N/A	N/A	N/A	76	N/A	N/A	N/A	150	N/A	N/A	N/A
Dissolved Vanadium	0.26	—	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A
TOTAL METALS BY 200.8																																		
Total Antimony	0.006	0.006	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A
Total Arsenic	0.01	0.01	0.0068	N/A	0.0028	N/A	0.013	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.0013	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.0069	N/A	N/A	N/A	0.0019	N/A	N/A	N/A	0.0039	N/A
Total Barium	—	2	0.0025	N/A	0.005	N/A	0.0066	N/A	0.0034	N/A	N/A	N/A	0.03	N/A	N/A	N/A	0.015	N/A	N/A	N/A	0.0059	N/A	N/A	N/A	0.0068	N/A	N/A	N/A	0.054	N/A	N/A	N/A	0.18	N/A
Total Beryllium	0.004	0.004	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A
Total Calcium	—	—	4.6 J+	N/A	2.1 J+	N/A	28 J+	N/A	3.9 J+	N/A	N/A	N/A	4.8 J+	N/A	N/A	N/A	5.2 J+	N/A	N/A	N/A	36 J+	N/A	N/A	N/A	24 J+	N/A	N/A	N/A	25 J+	N/A	N/A	N/A	61 J+	N/A
Total Chromium	0.05	0.1	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A
Total Iron	—	—	0.089 J+	N/A	0.05 U	N/A	0.05 U	N/A	0.05 U	N/A	N/A	N/A	0.22 J+	N/A	N/A	N/A	1.2 J+	N/A	N/A	N/A	0.05 U	N/A	N/A	N/A	0.11 J+	N/A	N/A	N/A	0.77 J+	N/A	N/A	N/A	15 J+	N/A
Total Lead	0.015	0.015	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A
Total Magnesium	—	—	0.58	N/A	0.98	N/A	7.8	N/A	2.6	N/A	N/A	N/A	3	N/A	N/A	N/A	2.9	N/A	N/A	N/A	11	N/A	N/A	N/A	5.2	N/A	N/A	N/A	19	N/A	N/A	N/A	21	N/A
Total Manganese	0.3	0.84	0.0094	N/A	0.017	N/A	0.14	N/A	0.005 U	N/A	N/A	N/A	0.054	N/A	N/A	N/A	0.55	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A	0.024	N/A	N/A	N/A	0.18	N/A	N/A	N/A	2.1	N/A
Total Nickel	0.1	0.1	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	N/A	N/A	0.0061	N/A	N/A	N/A	0.0012	N/A	N/A	N/A	0.0029	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A
Total Potassium	—	160	4.1	N/A	2.4	N/A	2.9	N/A	1.5	N/A	N/A	N/A	6.3	N/A	N/A	N/A	3.5	N/A	N/A	N/A	2.9	N/A	N/A	N/A	3	N/A	N/A	N/A	7.1	N/A	N/A	N/A	15	N/A
Total Sodium	—	—	62	N/A	70	N/A	13	N/A	5.2	N/A	N/A	N/A	230	N/A	N/A	N/A	42	N/A	N/A	N/A	16	N/A	N/A	N/A	18	N/A	N/A	N/A	37	N/A	N/A	N/A	800	N/A
Total Vanadium	0.26	—	0.005 U	N/A	0.005 U	N/A	0.005 U	N/A	0.005 U	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A	0.005 U	N/A
PER- & POLY-FLUORINATED ALKYL SUBSTANCES BY MODIFIED 537 - (ng/L)																																		
Perfluorobutanoic Acid (PFBA)	—	—	4.63 UJ	4.48 U	4.41 U	4.39 U	4.48 U	4.37 U	4.36 U	4.46 U	21.6 J	22.5	23.4	19.7	3.7 J	N/A	0.964 J	6.46	10 J	12.1	9.31	10.7	3.00 J	3.92 J	1.76 J	1.93 J	6	5.37	3.00 J	3.28 J	1.93 J	2.12 J	4.5 U	4.45 U
Perfluoropentanoic acid (PFpEA)	—	—	4.63 U	4.48 U	4.41 U	4.39 U	4.48 U	4.37 U	4.36 U	4.46 U	46.6	42.2	36.7	33.5	7.74	N/A	3.47 J	13.1	31	36.4	24.9	28.8	1.45 J	2.90 J	4.66 U	4.18 U	9.65	7.71	5.53	5.89	5.88	8.12	4.5 U	4.45 U
Perfluorobutanesulfonic acid (PFBS)	—	—	4.63 U	4.48 U	4.41 U	4.39 U	4.48 U	4.37 U	4.36 U	4.46 U	6.7	8.16	13.2	11.6	2.69 J	N/A	4.45 U	3.65 J	6	5.68	4.56	5.32	3.34 J	2.89 J	4.66 U	4.18 U	4.57	4.83	3.19 J	4.15 J	4.43 U	4.55 U	4.5 U	4.45 U
Perfluorohexanoix Acid (PFHxA)	—	—	4.63 U	4.48 U	4.41 U	4.39 U	4.48 U	4.37 U	4.36 U	4.46 U	73.9	67	57.5	54.5	15.3	N/A	5.5	23.5	28	26.7	21.5	23.7	4.97	5.11	3.24 J	4.18 U	25.6	22	13.8	11.9	8.83	11.8	4.5 U	6.32
Perfluoroheptanoic acid (PFHpA)	—	—	4.63 U	4.48 U	4.41 U	4.39 U	4.48 U	4.37 U	4.36 U	4.46 U	105	100	28.4	29.5	16.4	N/A	6.04	28.1	5.4	4.62	5.8	4.29 J	4.11 J	6.61	4.66 U	0.749 J	20	18.4	8.02	8.18	4.43 U	4.85	4.5 U	1.08 J
Perfluorohexanesulfonic acid (PFHxS)	—	18[2]	4.63 U	4.48 U	4.41 U	4.39 U	1.55 J	4.37 U	4.36 U	4.46 U	23.3	18.6	39.1	32.4	9.04	N/A	3.84 J	12	2.08 J	1.43 J	1.36 J	1.91 J	2.62 J	2.92 J	1.57 J	4.18 U	14.3	10.4	8.00	7.48	2.87 J	3.84 J	4.5 U	2.32 J
1H, 1H, 2H, 2H-Perfluorooctanesulfonic Acid (6:2FTS)	—	—	4.63 U	4.48 U	4.41 U	4.39 U	4.48 U	4.37 U	4.36 U	4.46 U	4.64 U	4.33 U	4.49 U	4.29 U	4.43 U	N/A	4.45 U	4.32 U	4.50 U	4.18 U	4.25 U	4.35 U	4.46 U	4.48 U	4.66 U	4.18 U	4.26 U	4.34 U	4.44 U	4.45 U	4.43 U	4.55 U	4.5 U	4.45 U
Perfluorooctanoic acid (PFOA)	70	12[2]	1.07 J	1.48 J	0.854 J	4.39 U	2.64 J	3.59 J	4.36 U	4.46 U	310	284	152	149	52.4	N/A	20.8	84.4	11.8	10.6	12.6	11.5	11.5	20.7	4.42 J	2.02 J	67.8	58	39.2	36.3	18.1	22.3	2.59 J	13.3
Perfluoroheptanesulfonic Acid (PFHpS)	—	—	4.63 U	4.48 U	4.41 U	4.39 U	4.48 U	4.37 U	4.36 U	4.46 U	1.75 J	2.75 J	1.20 J	4.29 U	4.43 U	N/A	4.45 U	4.32 U	4.50 U	4.18 U	4.25 U	4.35 U	4.46 U	4.48 U	4.66 U	4.18 U	4.26 U	4.34 U	4.44 U	4.45 U	4.43 U	4.55 U	4.5 U	4.45 U
Perfluorononanoic acid (PFNA)	—	11[2]	4.63 U	4.48 U	4.41 U	4.39 U	4.48 U	4.37 U	4.36 U	4.46 U	35.2	32.3	4.49 U	1.52 J	3.65 J	N/A	4.45 U	4.61	4.50 U	4.18 U	1.14 J	4.35 U	1.39 J	1.04 J	4.66 U	4.18 U	4.26 U	4.34 U	4.44 U	4.45 U	4.43 U	4.55 U	4.5 U	4.45 U
Perfluorooctanesulfonamide (PFOSA)	—	—	7.01	4.57	3.88 J	4.59	4.48 U	4.37 U	10.3	6.03	9.89	24.6	4.49 U	3.68 J	5.85	N/A	6.99	21.1	3.89 J	3.13 J	3.15 J	4.35 U	4.46 U	4.48 U	7.89	2.11 J	9.94	9.76	3.11 J	3.40 J	17.7	4.19 J	4.5 U	9.3
Perfluorooctanesulfonic (PFOS)	70	15[2]	4.63 U	4.48 U	4.41 U	4.39 U	4.48 U	4.37 U	4.36 U	4.46 U	58.4	64.1	17.1	18.7	11.5	N/A	2.67 J	17	4.50 U	4.18 U	2.41 J	1.43 J	1.17 J	3.80 J	4.66 U	1.42 J	15.4	12.2	5.04	6.22	2.53 J	5.64	4.5 U	2.19 J
Perfluorodecanoic Acid (PFDA)	—	—	4.63 U	4.48 U	4.41 U	4.39 U	4.48 U	4.37 U	4.36 U	4.46 U	3.07 J	3.14 J	4.49 U	4.29 U	4.43 U	N/A	4.45 U	4.32 U	4.50 U	4.18 U	4.25 U	4.35 U	4.46 U	4.48 U	4.66 U	4.18 U	4.26 U	4.34 U	4.44 U	4.45 U	4.43 U	4.55 U	4.5 U	4.45 U
1H, 1H, 2H, 2H-Perfluorodecanesulfonic Acid (8:2FTS)	—	—	4.63 U	4.48 U	4.41 U	4.39 U	4.48 U	4.37 U	4.36 U	4.46 U	4.64 U	4.33 U	4.49 U	4.29 U	4.43 U	N/A	4.45 U	4.32 U	4.50 U	4.18 U	4.25 U	4.35 U	4.46 U	4.48 U	4.66 U	4.18 U	4.26 U	4.34 U	4.44 U	4.45 U	4.43 U	4.55 U	4.5 U	4.45 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	—	—	4.63 U	4.48 U	4.41 U	4.39 U	4.48 U	4.37 U	4.36 U	4.46 U	4.64 U	4.33 U	4.49 U	4.29 U	4.43 U	N/A	4.45 U	4.32 U	4.50 U	4.18 U	4.25 U	4.35 U	4.46 U	4.48 U	4.66 U	4.18 U	4.26 U	4.34 U	4.44 U	4.45 U	4.43 U	4.55 U	4.5 U	4.45 U
N-Ethyl Perfluorooctanesulfonamidoacetic (EtFOSAA)	—	—	4.63 U	4.48 U	4.41 U	4.39 U	4.48 U	4.37 U	4.36 U	4.46 U	4.85	3.89 J	4.49 U	4.29 U	4.43 U	N/A	4.45 U	4.32 U	4.50 U	4.18 U	4.25 U	4.35 U	4.46 U	4.48 U	4.66 U	4.18 U	4.26 U	4.34 U	4.44 U	4.45 U	4.43 U	4.55 U	4.5 U	4.45 U
Perfluoroundecanoic Acid (PFUnA)	—	—	4.63 U	4.48 U	4.41 U	4.39 U	4.48 U	4.37 U	4.36 U	4.46 U	4.64 U	4.33 U	4.49 U	4.29 U	4.43 U	N/A	4.45 U	4.32 U	4.50 U	4.18 U	4.25 U	4.35 U	4.46 U	4.48 U	4.66 U	4.18 U	4.26 U	4.34 U	4.44 U	4.45 U	4.43 U	4.55 U	4.5 U	4.45 U
Perfluorodecanesulfonic Acid (PFDS)	—	—	4.63 U	4.48 U	4.41 U	4.39 U	4.48 U	4.37 U	4.36 U	4.46 U	4.64 U	4.33 U	4.49 U	4.29 U	4.43 U	N/A	4.45 U	4.32 U	4.50 U	4.18 U	4.25 U	4.35 U	4.46 U	4.48 U	4.66 U	4.18 U	4.26 U	4.34 U	4.44 U	4.45 U	4.43 U	4.55 U	4.5 U	4.45 U
Perfluorododecanoic Acid (PFDoA)	—	—	4.63 U	4.48 U	4.41 U	4.39 U	4.48 U	4.37 U	4.36 U	4.46 U	4.64 U	4.33 U	4.49 U	4.29 U	4.43 U	N/A	4.45 U	4.32 U	4.50 U	4.18 U	4.25 U	4.35 U	4.46 U	4.48 U	4.66 U	4.18 U	4.26 U	4.34 U	4.44 U	4.45 U	4.43 U	4.55 U	4.5 U	4.45 U
N-Methyl Perfluorooctane Sulfonamide (MeFOSA)	—	—	23.2 U	22.4 U	22.0 U	21.9 U	22.4 U	21.9 U	21.8 R	22.3 U	23.2 U	21.6 U	22.4 U	21.4 U	22.1 U	N/A	22.3 U	21.6 U	22.3 UJ	20.9 U	21.4 UJ	21.7 U	22.3 U	22.4 U	23.3 U	20.9 U	21.3 U	21.7 U	22.2 U	22.3 U	22.2 U	22.8 U	22.5 UJ	22.2 U
Perfluorotrodecanoic Acid (PFTrDA)	—	—	4.63 U	4.48 U	4.41 U	4.39 U	4.48 U	4.37 U	4.36 U	4.46 U	4.64 U	4.33 U	4.49 U	4.29 U	4.43 U	N/A	4.45 U	4.32 U	4.50 U	4.18 U	4.25 U	4.35 U	4.46 U	4.48 U	4.66 U	4.18 U	4.26 U	4.34 U	4.44 U	4.45 U	4.43 U	4.55 U	4.5 U	4.45 U
Perfluorotetradecanoic Acid (PFTeDa)	—	—	4.63 U	4.48 U	4.41 U	4.39 U	4.48 U	4.37 U	4.36 U	4.46 U	4.64 U	4.33 U	4.49 U	4.29 U	4.43 U	N/A	4.45 U	4.32 U	4.50 U	4.18 U	4.25 U	4.35 U	4.46 U	4.48 U	4.66 U	4.18 U	4.26 U	4.34 U	4.44 U	4.45 U	4.43 U	4.55 U	4.5 U	4.45 U
N-Ethyl Perfluorooctane Sulfonamide (EtFOSA)	—	—	23.2 U	22.4 U	22.0 U	21.9 U	22.4 U	21.9 U	21.8 R	22.3 U	23.2 U	21.6 U	22.4 U	21.4 U	22.1 U	N/A	22.3 U	21.6 U	22.3 UJ	20.9 U	21.4 UJ	21.7 U	22.3 R	22.4 U	23.3 U	20.9 U	21.3 U	21.7 U	22.2 U	22.3 U	22.2 U	22.8 U	22.5 UJ	22.2 U
Perfluorogexadecanoic Acid (PFHxDA)	—	—	4.63 U	4.48 U	4.41 U	4.39 U	4.48 U	4.37 U	4.36 U	4.46 U	4.64 U	4.33 U	4.49 UJ	4.29 U	4.43 U	N/A	4.45 U	4.32 U	4.50 R	4.18 U	4.25 U	4.35 U	4.46 U	4.48 U	4.66 UJ	4.18 U	4.26 U	4.34 U	4.44 U	4.45 U	4.43 U	4.55 U	4.5 U	4.45 U
N-Methyl Perfluorooctanesulfonamido Ethanol (MeFOSE)	—	—	23.2 U	22.4 U	22.0 U	21.9 U	22.4 U	21.9 U	21.8 U	22.3 U	23.2 U	21.6 U	22.4 U	21.4 U	22.1 U	N/A	22.3 U	21.6 U	22.5 U	20.9 U	21.2 U	21.7 U	22.3 U	22.4 U	22.3 U	20.9 U	21.3 U	21.7 U	22.2 U	22.3 U	22.2 U	22.8 U	22.5 U	22.2 U
N-Ethyl Perfluorooctanesulfonamido Ethanol (EtFOSE)	—	—	23.2 U	22.4 U	22.0 U	21.9 U	22.4 U	21.9 U	21.8 U	22.3 U	23.2 U	21.6 U	22.4 U	21.4 U	22.1 U	N/A	22.3 U	21.6 U	22.5 U	20.9 U	21.2 U	21.7 U	22.3 U	22.4 U	22.3 U	20.9 U	21.3 U	21.7 U	22.2 U	22.3 U	22.2 U	22.8 U	22.5 U	22.2 U
Combination of PFOA and PFOS	70	—	1.07 J	1.48 J	0.854 J	ND	2.64 J	3.59 J	ND	ND	368.4	348.1	169.1	167.7	63.9	N/A	23.47 J	101.4	11.8	10.6	15.01 J	12.93 J	12.67 J	24.5 J	4.42 J	3.44 J	83.2	70.2	44.24	42.52	20.63 J	27.94	2.59 J	15.49 J
FIELD PARAMETERS																																		
Dissolved Oxygen (mg/l)	—	—	1	2.1	0.7	1.4	0.6	1.4	6.4	1.3	1.5	1.9	1.6	1.2	1.1	N/A	1	1	4.5	5.3	4.1	4.5	2.2	0.9	1.1	1.2	0.7	0.7	1	1.4	1.4	1.2	1.8	1.8
Oxidation Reduction Potential (mV)	—	—	-118	-163	-127	-116	-52	32	134	152	-134	-120	-146	-165	-42	N/A	-57	-107	197	176	153	150	125	182	-131	-113	-126	-135	-153	-129	-16	-142	-89	-96
pH (standard units)	—	—	9.1	8.7	8.7	8.3	8.2	7.7	6.1	6.4	7.2	7.1	8.1	8	7.0	N/A	7.1	6.8	6.1	6.1	6.2	6.3	6.5	6.5	8.1	9.0	7.1	7.4	7.6	7.9	7	7.4	6.9	7.0
Specific Conductance (us/cm)	—	—	295	302	325	322	256	259	74	97	1,108	1,050	1,093	1,034	353	N/A	248	532	395	435	393	430	291	358	245	233	847	827	456	437	1,120	1,140	5,271	2,142
Temperature (degrees Celcius)	—	—	10	12	10	13	9	12	8	11	14	10	16	12	10	N/A	10	13	10	11	12	12	11	11	11	12	11	10	12	11	14	13	14	15
Turbidity (NTU)	—	—	< 5	<5	< 5	<5	< 5	<5	< 5	<5	< 5	<5	< 5	<5	< 5	N/A	< 5	<5	< 5	<5	< 5	<5	< 5	<5	< 5	<5	< 5	<5	< 5	<5	< 5	<5	< 5	<5
Notes on Last Page of Table																																		

			OPERABLE UNIT 2 (OU-2)																											
Sampling Point ID			GZ-105[1]	GZ-105-DUP[1]	GZ-105	GZ-105-DUP	GZ-109	GZ-109	GZ-117	GZ-117	MW-20S	MW-20S	MW-20D1	MW-20D1 DUP	MW-20D1	MW-20D1 DUP	MW-20D2	MW-20D2	MW-21S	MW-21S	MW-21D1	MW-21D1	MW-21D2	MW-21D2	MW-22S	MW-22S	MW-22D1	MW-22D1	MW-22D2	MW-22D2
Monitored Unit	USEPA	NHDES	SBR	SBR	SBR	SBR	OBH-BR	OBH-BR	TIII	TIII	Outwash	Outwash	DBR	DBR	DBR	DBR	DBR	DBR	TIII	TIII	DBR	DBR	DBR	DBR	TIII	TIII	DBR	DBR	DBR	DBR
Date of Sample Collection	CL	AGQS	5/21/20	5/21/20	10/12/20	10/12/20	5/14/20	10/8/20	5/14/20	10/8/20	5/18/20	10/8/20	5/18/20	5/18/20	10/7/20	10/7/20	5/18/20	10/7/20	5/13/20	10/7/20	5/13/20	10/7/20	5/13/20	10/7/20	5/12/20	10/6/20	5/12/20	10/6/20	5/12/20	10/6/20
VOLATILE ORGANIC COMPOUNDS BY 8260C - (ug/L)																														
1,2,4-Trimethylbenzene	—	330	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A
1,2-Dichloropropane	5	5	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A
1,4-Dichlorobenzene	—	75	1.7	1.8	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A
2-Butanone(MEK)	200	4,000	10 U	10 U	N/A	N/A	10 U	N/A	10 U	N/A	10 U	N/A	10 U	10 U	N/A	N/A	10 U	N/A	10 U	N/A	10 U	N/A	10 U	N/A	10 U	N/A	10 U	N/A	10 U	N/A
Acetone	—	6,000	10 U	10 U	N/A	N/A	10 U	N/A	10 U	N/A	10 U	N/A	10 U	10 U	N/A	N/A	26	N/A	10 U	N/A	24	N/A	10 U	N/A	10 U	N/A	10 U	N/A	10 U	N/A
Benzene	5	5	2.5	2.7	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	1 U	N/A	N/A	1 U	N/A	1.6	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A
Carbon disulfide	—	70	2 U	2 U	N/A	N/A	2 U	N/A	2 U	N/A	2 U	N/A	2 U	2 U	N/A	N/A	7.3	N/A	2 U	N/A	2 U	N/A	2 U	N/A	2 U	N/A	2 U	N/A	2 U	N/A
Chlorobenzene	100	100	4.2	4.4	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	1 U	N/A	N/A	1 U	N/A	3.6	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A
Chloroethane	—	—	3.1	3.1	N/A	N/A	2 U	N/A	2 U	N/A	2 U	N/A	2 U	2 U	N/A	N/A	2 U	N/A	4.7	N/A	2 U	N/A	2 U	N/A	2 U	N/A	2 U	N/A	2 U	N/A
Chloroform	80	—	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1.9	N/A	1 U	N/A	1 U	N/A
Diethyl Ether	—	1400	25	26	N/A	N/A	2 U	N/A	2 U	N/A	2 U	N/A	2 U	2 U	N/A	N/A	2 U	N/A	24	N/A	2 U	N/A	2 U	N/A	2 U	N/A	2 U	N/A	2 U	N/A
IsoPropylbenzene	—	800	1 U	1	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A
Methyl-t-butyl ether(MTBE)	—	13	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A
m&p-Xylene	—	10,000^	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A
o-Xylene	—	10,000^	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A
tert-Butyl Alcohol (TBA)	—	40	30 U	30 U	N/A	N/A	30 U	N/A	30 U	N/A	30 U	N/A	30 U	30 U	N/A	N/A	30 U	N/A	30 U	N/A	30 U	N/A	30 U	N/A	30 U	N/A	30 U	N/A	30 U	N/A
Tetrachloroethene	3.5	5	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A
Tetrahydrofuran(THF)	154	600	17	18	N/A	N/A	10 U	N/A	10 U	N/A	10 U	N/A	10 U	10 U	N/A	N/A	10 U	N/A	10 U	N/A	10 U	N/A	10 U	N/A	10 U	N/A	10 U	N/A	10 U	N/A
trans-1,2-Dichloroethene	100	100	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	1 U	N/A	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A	1 U	N/A
1,4-DIOXANE BY 8260B SIM - (ug/L)																														
1,4-Dioxane	3	0.32	**31**	**35**	**45**	**42**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.26	0.2 U	0.54	0.58	0.64	0.74	**28**	**29**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
DISSOLVED METALS BY 200.8 - (mg/L)																														
Dissolved Antimony	0.006	0.006	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A
Dissolved Arsenic	0.01	0.01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0087	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A
Dissolved Barium	—	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0038	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.026	N/A	N/A	N/A	N/A	N/A	0.0023	N/A	N/A	N/A	N/A	N/A
Dissolved Beryllium	0.004	0.004	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A
Dissolved Calcium	—	—	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8.1 J+	N/A	N/A	N/A	N/A	N/A	N/A	N/A	59 J+	N/A	N/A	N/A	N/A	N/A	5.8 J+	N/A	N/A	N/A	N/A	N/A
Dissolved Chromium	0.05	0.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A
Dissolved Iron	—	—	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.1 J+	N/A	N/A	N/A	N/A	N/A	0.05 U	N/A	N/A	N/A	N/A	N/A
Dissolved Lead	0.015	0.015	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A
Dissolved Magnesium	—	—	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19	N/A	N/A	N/A	N/A	N/A	3	N/A	N/A	N/A	N/A	N/A
Dissolved Manganese	0.3	0.84	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0079	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**0.34**	N/A	N/A	N/A	N/A	N/A	0.0082	N/A	N/A	N/A	N/A	N/A
Dissolved Nickel	0.1	0.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0013	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0064	N/A	N/A	N/A	N/A	N/A	0.001 U	N/A	N/A	N/A	N/A	N/A
Dissolved Potassium	—	160	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8.5	N/A	N/A	N/A	N/A	N/A	2.1	N/A	N/A	N/A	N/A	N/A
Dissolved Sodium	—	—	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	110	N/A	N/A	N/A	N/A	N/A	6.8	N/A	N/A	N/A	N/A	N/A
Dissolved Vanadium	0.26	—	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A	N/A	N/A
TOTAL METALS BY 200.8																														
Total Antimony	0.006	0.006	0.001 U	0.001 U	N/A	N/A	0.001 U	N/A	0.001 U	N/A	N/A	N/A	0.001 U	0.001 U	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	0.001 U	N/A
Total Arsenic	0.01	0.01	**0.01**	0.0097	N/A	N/A	0.001 U	N/A	0.001 U	N/A	N/A	N/A	0.0011	0.0012	N/A	N/A	0.0011	N/A	N/A	N/A	**0.024**	N/A	0.001 U	N/A	N/A	N/A	0.0032	N/A	0.001 U	N/A
Total Barium	—	2	0.039	0.038	N/A	N/A	0.0023	N/A	0.046	N/A	N/A	N/A	0.032	0.031	N/A	N/A	0.043	N/A	N/A	N/A	0.0061	N/A	0.0011	N/A	N/A	N/A	0.017	N/A	0.13	N/A
Total Beryllium	0.004	0.004	0.001 U	0.001 U	N/A	N/A	0.001 U	N/A	0.001 U	N/A	N/A	N/A	0.001 U	0.001 U	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	0.001 U	N/A
Total Calcium	—	—	45 J+	43 J+	N/A	N/A	0.42 J+	N/A	90 J+	N/A	N/A	N/A	35 J+	35 J+	N/A	N/A	27 J+	N/A	N/A	N/A	7.3 J+	N/A	2.3 J+	N/A	N/A	N/A	12 J+	N/A	240 J+	N/A
Total Chromium	0.05	0.1	0.001 U	0.001 U	N/A	N/A	0.001U	N/A	0.001 U	N/A	N/A	N/A	0.001 U	0.001	N/A	N/A	**0.085**	N/A	N/A	N/A	0.01	N/A	0.0019	N/A	N/A	N/A	0.001 U	N/A	0.028	N/A
Total Iron	—	—	3.2 J+	3 J+	N/A	N/A	0.069 J+	N/A	0.24 J+	N/A	N/A	N/A	0.05 UJ	0.91 J+	N/A	N/A	0.15 J+	N/A	N/A	N/A	0.49 J+	N/A	0.051 J+	N/A	N/A	N/A	0.05 U	N/A	0.1 J+	N/A
Total Lead	0.015	0.015	0.001 U	0.001 U	N/A	N/A	0.001U	N/A	0.001 U	N/A	N/A	N/A	0.001 U	0.001 U	N/A	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	0.001 U	N/A
Total Magnesium	—	—	18	18	N/A	N/A	0.24	N/A	12	N/A	N/A	N/A	0.37	0.39	N/A	N/A	0.05 U	N/A	N/A	N/A	0.2	N/A	0.26	N/A	N/A	N/A	3.1	N/A	0.056	N/A
Total Manganese	0.3	0.84	**0.41**	**0.4**	N/A	N/A	0.014	N/A	0.005 U	N/A	N/A	N/A	0.005 U	0.006	N/A	N/A	0.005 U	N/A	N/A	N/A	0.0065	N/A	0.005 U	N/A	N/A	N/A	0.005 U	N/A	0.005 U	N/A
Total Nickel	0.1	0.1	0.0064	0.0062	N/A	N/A	0.001 U	N/A	0.001 U	N/A	N/A	N/A	0.001 U	0.001 U	N/A	N/A	0.001 U	N/A	N/A	N/A	0.0011	N/A	0.001	N/A	N/A	N/A	0.001 U	N/A	0.0027	N/A
Total Potassium	—	160	6.3	6.1	N/A	N/A	1.8	N/A	4.8	N/A	N/A	N/A	4.8	4.7	N/A	N/A	51	N/A	N/A	N/A	9.1	N/A	5.3	N/A	N/A	N/A	4.9	N/A	52	N/A
Total Sodium	—	—	120	120	N/A	N/A	68	N/A	280	N/A	N/A	N/A	71	68	N/A	N/A	130	N/A	N/A	N/A	82	N/A	89	N/A	N/A	N/A	34	N/A	95	N/A
Total Vanadium	0.26	—	0.005 U	0.005 U	N/A	N/A	0.005 U	N/A	0.005 U	N/A	N/A	N/A	0.005 U	0.005 U	N/A	N/A	0.011	N/A	N/A	N/A	0.015	N/A	0.005 U	N/A	N/A	N/A	0.005 U	N/A	0.005 U	N/A
PER- & POLY-FLUORINATED ALKYL SUBSTANCES BY MODIFIED 537 - (ng/l)																														
Perfluorobutanoic Acid (PFBA)	—	—	31.5	27	26	24.7	4.39 U	4.64 U	1.68 J	1.64 J	4.42 U	4.51 U	4.36 R	4.37 R	4.30 U	4.40 U	4.33 R	4.35 U	18	13.5	4.39 UJ	4.30 U	4.54 R	4.26 U	4.25 U	4.26 U	4.37 UJ	4.38 U	4.24 R	4.21 U
Perfluoropentanoic acid (PFpEA)	—	—	61.6	52.7	50.5	47.1	4.39 U	4.64 U	1.96 J	4.41 U	4.42 U	4.51 U	4.36 UJ	4.37 UJ	4.30 U	4.40 U	2.94 J	2.14 J	29.7	24.9	4.39 UJ	4.30 U	4.54 UJ	4.26 U	4.25 U	4.26 U	4.37 U	4.38 U	4.24 UJ	4.21 U
Perfluorobutanesulfonic acid (PFBS)	—	—	17	13.2	10.5	13	4.39 U	4.64 U	4.16 U	2.10 J	4.42 U	4.51 U	4.36 U	4.37 U	4.30 U	4.40 U	4.33 U	4.35 U	7.85	4.86	4.39 U	4.30 U	4.54 U	4.26 U	4.25 U	4.26 U	4.37 U	4.38 U	4.24 UJ	4.21 U
Perfluorohexanoic Acid (PFHxA)	—	—	101	97.9	85	87.3	4.39 U	4.64 U	4.16 U	4.41 U	4.42 U	4.51 U	4.36 U	4.37 U	4.30 U	4.40 U	3.15 J	3.2 J	55.3	47.8	4.39 U	4.30 U	4.54 U	4.26 U	4.25 U	4.26 U	4.37 U	4.38 U	4.24 UJ	4.21 U
Perfluoroheptanoic acid (PFHpA)	—	—	138	132	122	123	4.39 U	4.64 U	0.925 J	4.41 U	4.42 U	4.51 U	1.29 J	0.944 J	2.96 J	2.99 J	3.19 J	2.58 J	61.5	48.7	4.39 U	4.30 U	4.54 U	4.26 U	4.25 U	4.26 U	4.37 U	4.38 U	4.24 U	4.21 U
Perfluorohexanesulfonic acid (PFHxS)	—	18[2]	68.3	64.9	54.9	41	4.39 U	4.64 U	4.16 U	4.41 U	4.42 U	4.51 U	4.36 U	4.37 U	1.55 J	4.40 U	2.48 J	1.38 J	27.4	20.4	4.39 U	4.30 U	4.54 U	4.26 U	4.25 U	4.26 U	4.37 U	4.38 U	4.24 U	4.21 U
1H, 1H, 2H, 2H-Perfluorooctanesulfonic Acid (6:2FTS)	—	—	4.6 U	4.71 U	4.28 U	4.26 U	4.39 U	4.64 U	4.16 U	4.41 U	4.42 U	4.51 U	4.36 U	4.37 U	4.30 U	4.40 U	4.33 U	4.35 U	4.3 U	4.33 U	4.39 U	4.30 U	3.0 J	2.97 J	4.25 U	4.26 U	4.37 U	4.38 U	4.24 U	4.21 U
Perfluorooctanoic acid (PFOA)	70	12[2]	**324**	**279**	**277**	**266**	4.39 U	4.64 U	5.06	3.71 J	4.42 U	4.51 U	2.6 J	2.32 J	10.1	13.8	11.2	13.4	**192**	**155**	4.39 U	1.15 J	4.54 U	9.36	4.25 U	4.26 U	4.37 U	5.42	4.24 U	1.98 J
Perfluoroheptanesulfonic Acid (PFHpS)	—	—	5.58	4.28 J	4.22 J	6.14	4.39 U	4.64 U	4.16 U	4.41 U	4.42 U	4.51 U	4.36 U	4.37 U	4.30 U	4.40 U	4.33 U	4.35 U	4.3 U	4.33 U	4.39 U	4.30 U	4.54 U	4.26 U	4.25 U	4.26 U	4.37 U	4.38 U	4.24 U	4.21 U
Perfluorononanoic acid (PFNA)	—	11[2]	30.8	29.9	29.5	23	4.39 U	4.64 U	4.16 U	4.41 U	4.42 U	4.51 U	4.36 U	4.37 U	4.30 U	4.40 U	4.33 U	4.35 U	13.4	10.8	4.39 U	4.30 U	4.54 U	4.26 U	4.25 U	4.26 U	4.37 U	4.38 U	4.24 U	4.21 U
Perfluorooctanesulfonamide (PFOSA)	—	—	10.2	7.73	8.32	10	4.39 U	2.86 J	4.16 U	2.23 J	4.42 U	4.51 U	4.49	2.72 J	4.30 U	3.69 J	4.33 U	4.35 U	16	10.6	4.39 U	4.30 U	4.54 U	3.92 J	4.25 U	4.26 U	4.37 U	4.38 U	4.24 U	2.97 J
Perfluorooctanesulfonic (PFOS)	70	15[2]	**168**	**146**	**147**	**137**	4.39 U	4.64 U	11.4	8.31	4.42 U	2.04 J	4.36 U	4.37 U	4.30 U	4.40 U	4.33 U	4.35 U	29	28.1	4.39 U	4.30 U	4.54 U	4.26 U	4.25 U	4.26 U	4.37 U	4.38 U	4.24 U	1.04 J
Perfluorodecanoic Acid (PFDA)	—	—	2.40 J	2.43 J	1.95 J	1.81 J	4.39 U	4.64 U	4.16 U	4.41 U	4.42 U	4.51 U	4.36 U	4.37 U	4.30 U	4.40 U	4.33 U	4.35 U	4.3 U	4.33 U	4.39 U	4.30 U	4.54 U	4.26 U	4.25 U	4.26 U	4.37 U	4.38 U	4.24 U	4.21 U
1H, 1H, 2H, 2H-Perfluorodecanesulfonic Acid (8:2FTS)	—	—	4.6 U	4.71 U	4.28 U	4.26 U	4.39 U	4.64 U	4.16 U	4.41 U	4.42 U	4.51 U	4.36 U	4.37 U	4.30 U	4.40 U	4.33 U	4.35 U	4.3 U	4.33 U	4.39 U	4.30 U	4.54 U	4.26 U	4.25 U	4.26 U	4.37 U	4.38 U	4.24 U	4.21 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	—	—	4.6 U	4.71 U	4.28 U	4.26 U	4.39 U	4.64 U	4.16 U	4.41 U	4.42 U	4.51 U	4.36 U	4.37 U	4.30 U	4.40 U	4.33 U	4.35 U	4.3 U	4.33 U	4.39 U	4.30 U	4.54 U	4.26 U	4.25 U	4.26 U	4.37 U	4.38 U	4.24 U	4.21 U
N-Ethyl Perfluorooctanesulfonamidoacetic (EtFOSAA)	—	—	4.6 U	4.71 U	4.28 U	4.26 U	4.39 U	4.64 U	4.16 U	4.41 U	4.42 U	4.51 U	4.36 U	4.37 U	4.30 U	4.40 U	4.33 U	4.35 U	4.3 U	4.33 U	4.39 U	4.30 U	4.54 U	4.26 U	4.25 U	4.26 U	4.37 U	4.38 U	4.24 U	4.21 U
Perfluoroundecanoic Acid (PFUnA)	—	—	4.6 U	4.71 U	4.28 U	4.26 U	4.39 U	4.64 U	4.16 U	4.41 U	4.42 U	4.51 U	4.36 U	4.37 U	4.30 U	4.40 U	4.33 U	4.35 U	4.3 U	4.33 U	4.39 U	4.30 U	4.54 U	4.26 U	4.25 U	4.26 U	4.37 U	4.38 U	4.24 U	4.21 U
Perfluorodecanesulfonic Acid (PFDS)	—	—	4.6 U	4.71 U	4.28 U	4.26 U	4.39 U	4.64 U	4.16 U	4.41 U	4.42 U	4.51 U	4.36 U	4.37 U	4.30 U	4.40 U	4.33 U	4.35 U	4.3 U	4.33 U	4.39 U	4.30 U	4.54 U	4.26 U	4.25 U	4.26 U	4.37 U	4.38 U	4.24 U	4.21 U
Perfluorododecanoic Acid (PFDoA)	—	—	4.6 U	4.71 U	4.28 U	4.26 U	4.39 U	4.64 U	4.16 U	4.41 U	4.42 U	4.51 U	4.36 U	4.37 U	4.30 U	4.40 U	4.33 U	4.35 U	4.3 U	4.33 U	4.39 U	4.30 U	4.54 U	4.26 U	4.25 U	4.26 U	4.37 U	4.38 U	4.24 U	4.21 U
N-Methyl Perfluorooctane Sulfonamide (MeFOSA)	—	—	22.5 UJ	23.6 U	21.4 U	21.3 U	22.0 U	23.2 U	20.8 U	22.0 U	22.1 U	22.5 U	21.8 UJ	21.7 UJ	21.5 U	22.0 U	21.7 U	21.8 U	21.5 U	21.6 U	21.9 U	21.5 U	22.7 U	21.3 U	21.2 U	21.3 U	21.9 U	21.9 U	21.2 U	21.1 U
Perfluorotridecanoic Acid (PFTrDA)	—	—	4.6 U	4.71 U	4.28 U	4.26 U	4.39 U	4.64 U	4.16 U	4.41 U	4.42 U	4.51 U	4.36 U	4.37 U	4.30 U	4.40 U	4.33 U	4.35 U	4.3 U	4.33 U	4.39 U	4.30 U	4.54 U	4.26 U	4.25 U	4.26 U	4.37 U	4.38 U	4.24 U	4.21 U
Perfluorotetradecanoic Acid (PFTeDa)	—	—	4.6 U	4.71 U	4.28 U	4.26 U	4.39 U	4.64 U	4.16 U	4.41 U	4.42 U	4.51 U	4.36 U	4.37 U	4.30 U	4.40 U	4.33 U	4.35 U	4.3 U	4.33 U	4.39 U	4.30 U	4.54 U	4.26 U	4.25 U	4.26 U	4.37 U	4.38 U	4.24 U	4.21 U
N-Ethyl Perfluorooctane Sulfonamide (EtFOSA)	—	—	22.5 UJ	23.6 U	21.4 U	21.3 U	22.0 U	23.2 U	20.8 U	22.0 U	22.1 U	22.5 U	21.8 UJ	21.7 UJ	21.5 U	22.0 U	21.7 U	21.8 U	21.5 U	21.6 U	21.9 U	21.5 U	22.7 U	21.3 U	21.2 U	21.3 U	21.9 U	21.9 U	21.2 U	21.1 U
Perfluorogexadecanoic Acid (PFHxDA)	—	—	4.6 U	4.71 U	4.28 U	4.26 U	4.39 U	4.64 U	4.16 U	4.41 U	4.42 U	4.51 U	4.36 U	4.37 U	4.30 U	4.40 U	4.33 U	4.35 U	4.3 U	4.33 U	4.39 U	4.30 U	4.54 UJ	4.26 U	4.25 U	4.26 U	4.37 U	4.38 U	4.24 U	4.21 U
N-Methyl Perfluorooctanesulfonamido Ethanol (MeFOSE)	—	—	23.0 U	23.6 U	21.4 U	21.3 U	22.0 U	23.2 U	20.8 U	22.0 U	22.1 U	22.5 U	21.8 U	21.8 U	21.5 U	22.0 U	21.7 U	21.8 U	21.5 U	21.6 U	21.9 U	21.5 U	22.7 U	21.3 U	21.2 U	21.3 U	21.9 U	21.9 U	21.2 U	21.1 U
N-Ethyl Perfluorooctanesulfonamido Ethanol (EtFOSE)	—	—	23.0 U	23.6 U	21.4 U	21.3 U	22.0 U	23.2 U	20.8 U	22.0 U	22.1 U	22.5 U	21.8 U	21.8 U	21.5 U	22.0 U	21.7 U	21.8 U	21.5 U	21.6 U	21.9 U	21.5 U	22.7 U	21.3 U	21.2 U	21.3 U	21.9 U	21.9 U	21.2 U	21.1 U
Combination of PFOA and PFOS	70	—	**492**	**425**	**424**	**403**	ND	ND	16.46	12.02 J	ND	2.04 J	2.6 J	2.32 J	10.1	13.8	11.2	13.4	**221**	**183.1**	ND	1.15 J	ND	9.36	ND	ND	ND	5.42	ND	3.02 J
FIELD PARAMETERS																														
Dissolved Oxygen (mg/l)	—	—	0.9	N/A	1.1	N/A	0.6	0.8	6.1	4.5	8.7	5.6	0.6	N/A	0.7	N/A	1.1	1.5	1.5	1.5	1.7	0.9	3.0	1.6	5.3	1.9	0.6	1.9	1.4	1.7
Oxidation Reduction Potential (mV)	—	—	-147	N/A	-162	N/A	-171	-180	117	86	199	203	-170	N/A	-163	N/A	-121	-133	-103	-133	-68	73	-22	87	146	149	-71	-72	-87	-149
pH (standard units)	—	—	7.5	N/A	7.5	N/A	8.4	8.8	6.6	7	6.3	6.1	11.6	N/A	12.1	N/A	11.9	12.2	7.5	7.4	10.5	10.2	10.5	10.6	6.3	6.4	9.8	10.6	12.7	12.7
Specific Conductance (us/cm)	—	—	829	N/A	851	N/A	338	335	2,019	2,001	215	292	730	N/A	717	N/A	1,373	1,295	941	985	467	432	443	463	98	122	239	252	5,267	3,537
Temperature (degrees Celcius)	—	—	10	N/A	10	N/A	13	13	13	15	8	12	9	N/A	12	N/A	10	14	11	16	10	13	8	13	9	13	9	13	10	13
Turbidity (NTU)	—	—	<5	N/A	<5	N/A	<5	<5	<5	<5	<5	<5	<5	N/A	<5	N/A	<5	<5	<5	<5	<5	11	<5	<5	9	65	<5	<5	<5	<5

Source: 2020 Annual Summary Report. Draft. Prepared by Coakley Landfill Group. May 2021.

Table G-5: Surface Water Monitoring Data, 2020

SAMPLE IDENTIFICATION	NHDES Surface Water Standard		SW-4	SW-5	SW-5Dup	SW-103	SW-110	SW-111	SW-111	SW-LR	SW-LR	SW-LR Dup	SW-BB1	SW-BB2				
DATE SAMPLED	Acute	Chronic	5/14/2020	5/14/2020	5/14/2020	5/14/2020	5/14/2020	5/15/2020	10/8/2020	5/14/2020	10/9/2020	10/9/2020	5/14/2020	5/15/2020				
VOLATILE ORGANIC COMPOUNDS BY 8260B (ug/L)																		
Acetone	—	—	10 U	10 R	10 U	10 U	10 U	10 U	Not analyzed	10 U	Not analyzed	Not analyzed	10 U	10 U				
METALS BY 200.8 (mg/L)																		
TOTAL OR DISSOLVED (METALS ONLY)			Dissolved	Dissolved	Dissolved	Dissolved	Dissolved	Dissolved	Dissolved	Dissolved	Dissolved	Dissolved	Dissolved	Dissolved				
Aluminum	0.75	0.087	0.061	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.058	0.15	0.05 U	0.05 U	0.05 U	0.05 U				
Antimony	9	1.6	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U				
Arsenic*	0.34	0.15	0.001 U	0.0043	0.0046	0.001 U	0.001 U	0.001 U	0.0017	0.001 U	0.001 U	0.001 U	0.0017	0.001 U				
Barium	—	—	0.0043	0.024	0.027	0.0077	0.0048	0.0066	0.022	0.0073	0.015	0.016	0.0094	0.0065				
Beryllium	0.13	0.0053	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U				
Cadmium*	0.00039	0.00021	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U				
Calcium	—	—	9.9 J+	25 J+	29 J+	25 J+	15 J+	11 J+	25	14 J+	34	35	14 J+	21 J+				
Chromium (Cr+3 + Cr+6)*	0.152 (Cr+3) 0.016 (Cr+6)	0.0198 (Cr+3) 0.011 (Cr+6)	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U				
Cobalt	—	—	0.001 U	0.0017	0.002	0.001 U	0.001 U	0.001 U	0.0011	0.001 U	0.001 U	0.001 U	0.0015	0.001 U				
Copper*	0.0029	0.0023	**0.013**	0.001 U	0.001 U	0.0011	0.001 U	0.0015	0.0021	0.001 U	0.001 U	0.001 U	0.001 U	0.0016				
Iron	—	1	0.15	3.8	4.6	0.15	0.32	0.36	0.76	0.34	0.32	0.30	1.2	0.21				
Lead*	0.0105	0.00041	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.0014	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U				
Magnesium	—	—	2.9	5.9	6.5	6.1	3.6	3.0	5.4	3.6	7.5	7.6	3.5	5.1				
Manganese	—	—	0.061	0.93	1.1	0.019	0.13	0.14	0.95	0.079	0.20	0.21	0.40	0.068				
Mercury*	0.0014	0.00077	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U				
Nickel*	0.12	0.0133	0.0011	0.0029	0.003	0.0023	0.0014	0.0021	0.0016	0.0015	0.001 U	0.001 U	0.0015	0.0044				
Potassium	—	—	1.5	6.8	6.7	6.8	2.1	1.8	8.3	1.4	4.0	4.2	2.2	2.8				
Selenium	—	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U				
Silver*	0.0002	—	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U				
Sodium	—	—	9	19	18	16	19	26	130	23	42	42	20	21				
Thallium	1.4	0.04	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U				
Vanadium	—	—	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U				
Zinc*	0.03	0.03	0.0095	0.005 U	0.005 U	0.005 U	0.0057	0.0067	0.0066	0.005 U	0.005 U	0.005 U	0.005 U	0.0072				
1,4-Dioxane by 8260B SIM ug/L																		
1,4-Dioxane	—	—	0.2	1.7	1.8	0.86	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U				
GENERAL CHEMISTRY															USEPA Screening Levels		USEPA Screening Levels	
Ammonia** (mg/L)	pH Dependent		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	Adult Recreator	Child Recreator	Adult Recreator	Child Recreator
PERFLUORINATED CHEMICALS BY MODIFIED 537 - (ng/L)															EF = 45 Days		EF = 120 Days	
Perfluorobutanoic Acid (PFBA)	—	—	5.4	45.4	49.2	32.9	10.3	5.9	4.30 U	3.49 J	3.22 J	3.01 J	8.82	19	—	—	—	—
Perfluoropentanoic acid (PFpEA)	—	—	8.28	91.7	92.2	77.5	22.9	7.64	7.16	4.02 J	4.18 J	4.41	16.7	39.2	—	—	—	—
Perfluorobutanesulfonic acid (PFBS)	—	—	4.28 U	4.33	3.37 J	3.27 J	2.20 J	4.53 U	2.24 J	4.42 U	4.32	3.09 J	4.48 U	2.99 J	18,300,000	2,030,000	6,850,000	760,000
Perfluorohexanoix Acid (PFHxA)	—	—	19.5	155	135	108	28.4	11.7	6.34	4.92	4.95	4.63	24.5	51.5	—	—	—	—
Perfluoroheptanoic acid (PFHpA)	—	—	41.7	276 J	282	219	67.6	23.6	11.9	6.27	2.97 J	2.89 J	54.1	111	—	—	—	—
Perfluorohexanesulfonic acid (PFHxS)	—	—	7.23	10.6 J	14.9 J	11.2	5.64	1.57 J	4.30 U	1.20 J	1.70 J	2.41 J	5.66	8.78	—	—	—	—
1H, 1H, 2H, 2H-Perfluorooctanesulfonic Acid (6:2FTS)	—	—	4.28 U	4.63 U	4.52 U	4.67 U	4.74 U	4.53 U	4.30 U	4.42 U	4.20 U	4.29 U	4.48 U	4.46 U	—	—	—	—
Perfluorooctanoic acid (PFOA)	—	—	114	709 J	719	594	160	50.1	22.2 J	13.6	9.05 J	9.18 J	118	280	18,300	2,030	6,850	760
Perfluoroheptanesulfonic Acid (PFHpS)	—	—	1.67 J	6.94	8.14	7.53	2.11 J	4.53 U	4.30 U	4.42 U	4.20 U	4.29 U	1.90 J	2.47 J	—	—	—	—
Perfluorononanoic acid (PFNA)	—	—	39.6	424 J	427	399	81	21	8.36	3.21 J	1.76 J	1.48 J	69.2	162	—	—	—	—
Perfluorooctanesulfonamide (PFOSA)	—	—	8.76	4.63 U	7.86	4.67 U	24.2	15.6	10.3	17.4	32.8 J+	31.2	3.59 J	17.2	—	—	—	—
Perfluorooctanesulfonic (PFOS)	—	—	35.6	1,060 J	1,060	1,080	149	43.7	20.6	3.45 J	13.5	13.2	91.1	300	18,300	2,030	6,850	760
Perfluorodecanoic Acid (PFDA)	—	—	4.28 U	259 J	186 J	291	19.9	4.76	2.94 J	4.42 U	4.20 U	4.29 U	10.4	62.6	—	—	—	—
1H, 1H, 2H, 2H-Perfluorodecanesulfonic Acid (8:2FTS)	—	—	4.28 U	4.63 U	4.52 U	4.67 U	4.74 U	4.53 U	4.30 U	4.42 U	4.20 U	4.29 U	4.48 U	4.46 U	—	—	—	—
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	—	—	4.28 U	4.63 U	4.52 U	4.67 U	4.74 U	4.53 U	4.30 U	4.42 U	4.20 U	4.29 U	4.48 U	4.46 U	—	—	—	—
N-Ethyl Perfluorooctanesulfonamidoacetic (EtFOSAA)	—	—	4.28 U	4.63 U	4.52 U	4.67 U	4.74 U	4.53 U	4.30 U	4.42 U	4.20 U	4.29 U	4.48 U	4.46 U	—	—	—	—
Perfluoroundecanoic Acid (PFUnA)	—	—	4.28 U	20.1 J	7.94 J	26.7	4.74 U	4.53 U	4.30 U	4.42 U	4.20 U	4.29 U	4.48 U	4.46 U	—	—	—	—
Perfluorodecanesulfonic Acid (PFDS)	—	—	4.28 U	4.63 U	4.52 U	4.67 U	4.74 U	4.53 U	4.30 U	4.42 U	4.20 U	4.29 U	4.48 U	4.46 U	—	—	—	—
Perfluorododecanoic Acid (PFDoA)	—	—	4.28 U	4.63 U	4.52 U	4.67 U	4.74 U	4.53 U	4.30 U	4.42 U	4.20 U	4.29 U	4.48 U	4.46 U	—	—	—	—
N-Methyl Perfluorooctane Sulfonamide (MeFOSA)	—	—	21.4 R	23.1 U	22.6 UJ	23.3 U	23.7 U	22.1 UJ	21.5 U	19.6 UJ	21.0 U	21.4 U	22.4 U	22.3 U	—	—	—	—
Perfluorotrodecanoic Acid (PFTrDA)	—	—	4.28 U	4.63 U	4.52 U	4.67 U	4.74 U	4.53 U	4.30 U	4.42 U	4.20 U	4.29 U	4.48 U	4.46 U	—	—	—	—
Perfluorotetradecanoic Acid (PFTeDa)	—	—	4.28 U	4.63 U	4.52 U	4.67 U	4.74 U	4.53 U	4.30 U	4.42 U	4.20 U	4.29 U	4.48 U	4.46 U	—	—	—	—
N-Ethyl Perfluorooctane Sulfonamide (EtFOSA)	—	—	21.4 R	23.1 U	22.6 U	23.3 U	23.7 U	22.1 UJ	21.5 U	19.6 UJ	21.0 U	21.4 U	22.4 U	22.3 U	—	—	—	—
Perfluorogexadecanoic Acid (PFHxDA)	—	—	4.28 U	4.63 U	4.52 U	4.67 U	4.74 U	4.53 U	4.30 U	4.42 U	4.20 U	4.29 U	4.48 U	4.46 U	—	—	—	—
N-Methyl Perfluorooctanesulfonamido Ethanol (MeFOSE)	—	—	21.4 U	23.1 U	22.6 U	23.3 U	23.7 U	22.7 U	21.5 U	22.1 U	21.0 U	21.4 U	22.4 U	22.3 U	—	—	—	—
N-Ethyl Perfluorooctanesulfonamido Ethanol (EtFOSE)	—	—	28.6	23.1 U	22.6 U	23.3 U	23.7 U	22.7 U	21.5 U	22.1 U	21.0 U	21.4 U	22.4 U	22.3 U	—	—	—	—
Combination of PFOA and PFOS	—	—	149.6	1,769 J	1,779	1,674	309	93.8	42.8	17.05 J	22.55	22.38	209.1	580	—	—	—	—

Source: 2020 Annual Summary Report. Draft. Prepared by Coakley Landfill Group. May 2021.

Table G-6: Sediment Concentrations, 2020

Sampling Point ID	SQuiRT TEC	SED-4	SED-5	SED-5-DUP	SED-110	SED-111	SED-LR	SED-BB1	SED-BB2				
Date of Sample Collection	(Dry Weight)	5/14/2020	5/14/2020	5/14/2020	5/14/2020	5/15/2020	5/15/2020	5/14/2020	5/14/2020				
TOTAL METALS BY 6020 - (mg/kg)													
Total Aluminum	---	8,000 EB	8,600 EB	8,700 EB	9,700 EB	12,000 EB	17,000 EB	22,000 EB	5,900 EB				
Total Antimony	---	0.5 U	1.7	1.7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U				
Total Arsenic	9.79	4.4	13	13	9.5	6	18	18	9.8				
Total Barium	---	58 EB	66 EB	75 EB	33 EB	46 EB	67 EB	89 EB	34 EB				
Total Beryllium	---	0.5 U	0.55	0.5 U	0.5 U	0.5 U	0.82	1.1	0.5 U				
Total Cadmium	0.99	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U				
Total Calcium	---	11,000 EB	5,600 EB	5,700 EB	1,100 EB	1,200 EB	2,700 EB	690 EB	1,100 EB				
Total Chromium	43.4	12	23	28	29	32	56	36	14				
Total Cobalt	---	1.4	8.8	8.5	7.4	7.3	14	16	4.1				
Total Copper	31.6	12	47	49	18	11	24	22	13				
Total Iron	---	2,500 EB	18,000 EB	20,000 EB	15,000 EB	14,000 EB	25,000 EB	30,000 EB	13,000 EB				
Total Lead	35.8	29	63	63	24	8.9	38	12	13				
Total Magnesium	---	1,600	2,600	3,000	4,000	4,200	7,500	6,400	2,000				
Total Manganese	---	410	380	430	300	180	530	720	180				
Total Mercury	0.18	0.21	0.54	0.59	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U				
Total Nickel	22.7	6.1	22	23	24	21	41	38	11				
Total Potassium	---	1,300 EB	1,500 EB	1,700 EB	830 EB	1,600 EB	2,600 EB	3,700 EB	1,200 EB				
Total Selenium	---	1.4	0.5 U	0.9	0.5 U	0.5 U	0.87	0.56	0.5 U				
Total Silver	---	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U				
Total Sodium	---	240	210	200	92	200	290	100	100 U				
Total Thallium	---	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U				
Total Vanadium	---	20	33	36	20	27	40	41	15				
Total Zinc	121	66	75	75	49	37	99	61	32				
1,4-Dioxane by 8260B SIM mg/kg										USEPA Screening Levels		USEPA Screening Levels	
1,4-Dioxane	---	0.9 UJ	0.5 U	0.6 UJ	0.1 U	0.1 U	0.3 U	0.1 U	0.2 U	Adult Recreator	Child Recreator	Adult Recreator	Child Recreator
PERFLUORINATED CHEMICALS BY MODIFIED 537 - (mg/kg)										EF = 45 days		EF = 120 days	
Perfluorobutanoic Acid (PFBA)	---	0.000499 U	0.000499 U	0.000497 U	0.000484 U	0.000488 U	0.000491 U	0.000493 U	0.000494 U	---	---	---	---
Perfluoropentanoic acid (PFpEA)	---	0.000499 U	0.000537	0.000549	0.000484 U	0.000488 U	0.000491 U	0.000493 U	0.000494 U	---	---	---	---
Perfluorobutanesulfonic acid (PFBS)	---	0.000499 U	0.000499 U	0.000497 U	0.000484 U	0.000488 U	0.000491 U	0.000493 U	0.000494 U	9,120	983	3,420	369
Perfluorohexanoix Acid (PFHxA)	---	0.000499 UJ	0.000499 UJ	0.000613 J	0.000484 U	0.000488 U	0.000491 U	0.000493 U	0.000494 UJ	---	---	---	---
Perfluoroheptanoic acid (PFHpA)	---	0.000885	0.00195	0.00179	0.000484 U	0.000488 U	0.000491 U	0.000493 U	0.000494 U	---	---	---	---
Perfluorohexanesulfonic acid (PFHxS)	---	0.000499 U	0.000499 U	0.000497 U	0.000484 U	0.000488 U	0.000491 U	0.000493 U	0.000494 U	---	---	---	---
1H, 1H, 2H, 2H-Perfluorooctanesulfonic Acid (6:2FTS)	---	0.000997 U	0.000997 U	0.000995 U	0.000969 U	0.000976 U	0.000982 U	0.000987 U	0.000989 U	---	---	---	---
Perfluorooctanoic acid (PFOA)	---	0.00226	0.00896	0.00806	0.000484 U	0.000488 U	0.000491 U	0.000493 U	0.00107	9.12	0.98	3.42	0.369
Perfluoroheptanesulfonic Acid (PFHpS)	---	0.000997U	0.000997 U	0.000995 U	0.000969 U	0.000976 U	0.000982 U	0.000987 U	0.000989 U	---	---	---	---
Perfluorononanoic acid (PFNA)	---	0.00148	0.0119	0.0111	0.000484 U	0.000488 U	0.000491 U	0.000493 U	0.00134	---	---	---	---
Perfluorooctanesulfonamide (PFOSA)	---	0.0015 U	0.0015 U	0.00149 U	0.00145 U	0.00146 U	0.00147 U	0.00148 U	0.00148 U	---	---	---	---
Perfluorooctanesulfonic (PFOS)	---	0.00293	0.0906	0.0984	0.00246	0.000488 U	0.000836	0.000493 U	0.0126	9.12	0.98	3.42	0.369
Perfluorodecanoic Acid (PFDA)	---	0.000499 UJ	0.0197 J	0.0187	0.000484 U	0.000488 U	0.000491 U	0.000493 UJ	0.00252 J	---	---	---	---
1H, 1H, 2H, 2H-Perfluorodecanesulfonic Acid (8:2FTS)	---	0.000997U	0.000997 U	0.000995 U	0.000969 U	0.000976 U	0.000982 U	0.000987 U	0.000989 U	---	---	---	---
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSA	---	0.000997U	0.000997 U	0.000995 U	0.000969 UJ	0.000976 U	0.000982 U	0.000987 U	0.000989 U	---	---	---	---
N-Ethyl Perfluorooctanesulfonamidoacetic (EtFOSAA)	---	0.000997U	0.00175	0.00172	0.000969 UJ	0.000976 U	0.000982 U	0.000987 UJ	0.000989 U	---	---	---	---
Perfluoroundecanoic Acid (PFUnA)	---	0.000499 UJ	0.00539	0.00564	0.000484 UJ	0.000488 UJ	0.000491 U	0.000493 UJ	0.000979 J	---	---	---	---
Perfluorodecanesulfonic Acid (PFDS)	---	0.000997U	0.00116	0.00118	0.000969 U	0.000976 U	0.000982 U	0.000987 U	0.000989 U	---	---	---	---
Perfluorododecanoic Acid (PFDoA)	---	0.000499 U	0.000538	0.000513	0.000484 U	0.000488 U	0.000491 U	0.000493 U	0.000494 U	---	---	---	---
N-Methyl Perfluorooctane Sulfonamide (MeFOSA)	---	0.00997 U	0.00991 U	0.010 U	0.00975 U	0.00976 U	0.00982 U	0.00965 U	0.00989 U	---	---	---	---
Perfluorotrodecanoic Acid (PFTrDA)	---	0.000499 U	0.000499 U	0.000497 U	0.000484 U	0.000488 U	0.000491 U	0.000493 U	0.000494 U	---	---	---	---
Perfluorotetradecanoic Acid (PFTeDa)	---	0.000499 U	0.000499 U	0.000497 U	0.000484 U	0.000488 U	0.000491 U	0.000493 U	0.000494 U	---	---	---	---
N-Ethyl Perfluorooctane Sulfonamide (EtFOSA)	---	0.00997 U	0.00991 U	0.010 U	0.00975 U	0.00976 U	0.00982 U	0.00965 U	0.00989 U	---	---	---	---
Perfluorogexadecanoic Acid (PFHxDA)	---	0.000499 U	0.000496 U	0.000502 U	0.000488 U	0.000488 UJ	0.000491 U	0.000493 UJ	0.000494 UJ	---	---	---	---
N-Methyl Perfluorooctanesulfonamido Ethanol (MeFOSE)	---	0.00997 U	0.00997 U	0.00995 U	0.00969 U	0.00976 U	0.00982 U	0.00987 U	0.00989 U	---	---	---	---
N-Ethyl Perfluorooctanesulfonamido Ethanol (EtFOSE)	---	0.00997 U	0.00997 U	0.00995 U	0.00969 U	0.00976 U	0.00982 U	0.00987 U	0.00989 U	---	---	---	---
Combination of PFOA and PFOS	---	0.00519	0.09956	0.10646	0.00246	ND	0.000836	ND	0.01367	---	---	---	---

Notes:
- U = Not detected above the reporting limit indicated.
- J = Estimated
- UJ = Undetected estimated
- EB = Parameter detected in associated equipment blank.
- EF = Effective Days
- ND = Not detcted
- mg/kg = Milligrams per kilogram
- --- no standard has been established for the indicated parameter

Source: 2020 Annual Summary Report. Draft. Prepared by Coakley Landfill Group. May 2021.

Table G-7: Summary of PFAS Fish Tissue Analytical Data, June 2018

	Lafayette			Lang		Sagamore		Brackett						Site Specific Risk-Based Screening Levels [1]	
Sampling Point ID	Eel No. 1,2,3,4,5	Eel No. 1,2,3,4,5 Dup	Shiner No. 2,3,4,5,6	Shiner No. 2,4,5,8,10	Pickerel No. 2,4,6,8,15	Shiner No. 1,2,6,11,14	Pickerel No. 2,3,5,15,19	Eel No. 1,2,3,4,6	Pickerel No. 2,3,4,5,8	Individual Trout 1	Composite Trout No. 2,3,4	NDHControl.01-05 (ng/g)	NDHControl.01-05 Duplicate (ng/g)	Adult Consumption (ng/g)	Child Consumption (ng/g)
Date of Sample Collection	6/12/18	6/12/18	6/12/18	6/13/18	6/13/18	6/14/18	6/14/18	6/15/18	6/15/18	6/15/18	6/15/18	4/16/2018	4/16/2018		
PER- and POLYFLUOROALKYL SUBSTANCES BY MODIFIED 537 - ng/g															
Perfluorobutanesulfonic acid (PFBS)	0.465U	0.467U	0.472U	0.474U	0.469U	0.472U	0.469U	0.462U	0.467U	0.462U	0.465U	0.462U	0.465U	72200	5210
Perfluoroheptanoic acid (PFHpA)	0.210U	0.211U	0.213U	0.214U	0.212U	0.213U	0.212U	0.209U	0.211U	0.209U	0.210U	0.209U	0.210U	---	---
Perfluorohexanesulfonic acid (PFHxS)	0.475U	0.477U	0.482U	0.484U	0.479U	0.482U	0.479U	0.472U	0.477U	0.472U	0.475U	0.472U	0.475U	---	---
Perfluorooctanoic acid (PFOA)	0.763	0.665	0.120U	0.121U	0.120U	0.120U	0.205J	0.256	0.337	0.118U	0.133J	0.118U	0.119U	72.2	52.1
Perfluorononanoic acid (PFNA)	1.72	1.27	0.634	0.543	0.224	0.197U	0.481	0.648	1.69	0.194U	1.69	0.194U	0.195U	---	---
Perfluorooctanesulfonic (PFOS)	19.2	15.7	17	12.2	2.63	1.97	4.13	11.2	9.42	2.38	6.1	0.295U	0.296U	72.2	52.1

ABBREVIATIONS

SL	Screening Level
ng/g	nanograms per gram
U	Not detected
J	Estimated concentration

Notes:

1. Screening levels are based on EPA's Risk Assessment for a single contaminant (PFAS). This has been determined to be the appropriate screening level, because PFAS are the only bioaccumulative contaminant of concern known to be present in Berry's Brook.

Source: Berrys Brook Fish Tissue Sampling Results. Prepared by CES, Inc. September 2018.

APPENDIX H – ARARS REVIEW

CERCLA Section 121(d)(1) requires that Superfund remedial actions attain "a degree of cleanup of hazardous substance, pollutants, and contaminants released into the environment and control of further release at a minimum which assures protection of human health and the environment." The remedial action must achieve a level of cleanup that at least attains those requirements that are legally applicable or relevant and appropriate. In performing the FYR for compliance with ARARs, only those ARARs that address the protectiveness of the remedy are reviewed.

Groundwater

EPA selected cleanup goals based on MCLs established under the federal Safe Drinking Water Act, or more conservative AGQSs (Table H-1). As shown below, the only COC where an MCL or AGQS has become more conservative for 1,4-dioxane. In September 2018, NHDES lowered the AGQS for 1,4-dioxane from 3 µg/L to 0.32 µg/L. Since then, the CLG has adopted the lower AGQS in the monitoring reports.

Table H-1: Groundwater ARARs Review for OU1 and OU2 Groundwater

COC	Groundwater Cleanup Goals (µg/L)	EPA MCL[a] (µg/L)	NHDES[b] AGQS (µg/L)	ARAR Change
Benzene	5	5	5	No change
Chlorobenzene	100	100	100	No change
Tetrachloroethylene	3.5	5	5	Less conservative
Tetrahydrofuran	154	-	600	Less conservative
1,2-Dichloropropane	5	5	5	No change
2-Butanone	200[c]	-	4,000	Less conservative
Diethyl phthalate	2,800[c]	-	-	No change
Trans-1,2-dichloroethylene	100	100	100	No change
Phenol	280[c]	-	2,000	Less conservative
1,4-Dioxane	3	-	0.32	More conservative
Antimony	6	6	6	No change
Arsenic	10	10	10	No change
Beryllium	4	4	4	No change
Chromium	100	100	100	No change
Lead	15	15	15	No change
Manganese	300[c]	-	840	Less conservative
Nickel	100	-	100	No change
Vanadium	260[c]	-	-	No change

Notes:

a. Federal MCLs available at https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations (accessed 3/29/21).

b. New Hampshire Administrative Code https://pdf4pro.com/view/new-hampshire-code-of-administrative-rules-table-5bb4fc.html (accessed 3/29/21).

c. The ROD or ESD selected a health-based value as a cleanup goal in the absence of an MCL or AGQS.

- = An MCL or AGQS has not been established for this COC.

APPENDIX I – QUESTION B SUPPORT INFORMATION

Screening-Level Vapor Intrusion Evaluation

A screening-level vapor intrusion risk evaluation was conducted to evaluate if the presence of volatile COCs in groundwater poses a potential indoor air risk. There are no buildings in OU1 and there are buildings in OU2 that are within the interpreted overburden and bedrock contaminant plumes. In order to provide a conservative evaluation, the maximum concentrations observed in OU1 and OU2 in the overburden and bedrock aquifers were identified and entered into EPA's VISL calculator. The VISL calculator is an empirical model that predicts indoor air concentrations from groundwater concentrations using conservative attenuation factors and current toxicity information. These factors reflect worst-case conditions and do not use any site-specific conditions such as site soil strata, depth to water table or building properties that may reduce the transport of vapors from groundwater through the soil column. Table I-1 shows that the cumulative cancer risk is within EPA's acceptable cancer risk range of 10^{-4} to 10^{-6}, while the total non-cancer hazard index (HI) is below 1.0. These results confirm that the vapor intrusion pathway does not pose a risk to human health based on groundwater concentrations in OU1 and OU2. With levels of VOCs remaining stable or decreasing, this pathway is not likely to pose a health concern based on available lines of evidence.

Table I-1: Screening-level Vapor Intrusion Evaluation

COC	Maximum Groundwater Concentration 2020 (µg/L)[a]		2020 VISL Calculator[a] Residential Exposure (average groundwater temperature 25° Celsius)	
	Concentration	Well	Cancer Risk	Noncancer HQ
Benzene	3.0	MW-8	1.9×10^{-6}	0.02
2-Butanone (Methyl ethyl ketone)	<10	NA	-	0.000004
Chlorobenzene	5.6	MW-8	-	0.01
1,2-Dichloropropane	< 1	NA	1.5×10^{-7}	0.03
1,4-Dioxane	130	MW-8	4.5×10^{-8}	0.0008
Tetrachloroethylene	< 1	NA	6.7×10^{-8}	0.02
Tetrahydrofuran	88	MW-8	-	0.0001
Trans-1,2-Dichloroethylene	<1	NA	-	0.009
TBA	55	MW-5D	-	-
		Totals	2.2×10^{-6}	0.09

Notes:
a. Maximum detected in May or October 2020.
b. VISL calculator at: https://epa-visl.ornl.gov/cgi-bin/visl_search (accessed 7/1/2021).
- = cancer risk or noncancer HQ could not be calculated because EPA has not established a toxicity value for the inhalation exposure pathway.
NA – no wells contained detected concentrations so the detection limit in all wells sampled is listed.
µg/L – micrograms per liter

Risk screening and evaluation of PFAS concentrations in surface water

In May 2021, EPA conducted a risk screening and evaluation of PFAS concentration in surface water using data collected during this FYR period. The memorandum documenting the results of this analysis is provided below.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Region 1

5 Post Office Square, Suite 100

BOSTON, MA 02109-3912

To: Richard Hull
From: Courtney Carroll
Date: May 12, 2021
RE: Risk screening and evaluation of PFAS concentrations in surface water for the recreational pathway at the Coakley Landfill NPL Site

The purpose of this memorandum is to provide a screening and risk evaluation for the most recent available surface water data for Perfluorooctanoic acid (PFOA), Perfluorooctane sulfonate (PFOS) and Perfluorobutane sulfonate (PFBS) for the recreational exposure pathway at the Coakley Landfill NPL Site. This screening and risk evaluation was performed using the surface water analytical data for 2018, 2019 and 2020.

A child recreator was selected as the receptor for this risk screening and evaluation. The recreator is an exposure scenario for a person who spends time wading in Berry's Brook. The most conservative exposure scenario assumes an exposure frequency of 120 days per year while the less conservative exposure scenario assumes an exposure frequency of 45 days per year. The recreator is assumed to be exposed to contaminants via incidental ingestion of surface water.

<u>Screening of PFAS data:</u>

The maximum concentrations of PFOA, PFOS and PFBS were selected from the surface water analytical data for 2018, 2019 and 2020. The maximum surface water detection for each compound was compared to the corresponding surface water screening level. The EPA Regional Screening Level (RSL) Calculator was used in a site-specific mode to obtain the screening levels for PFOA, PFOS and PFBS. Table 1 below shows the comparison of the maximum concentrations in surface water to the screening levels. Only surface water near the landfill exceeded the most conservative (protective) site-specific screening levels for a child recreator exposed to PFOA and PFOS in surface water. There were no detections of PFBS that exceeded the surface water RSL.

Table 1 – Screening of Surface Water Data

PFAS compound	Maximum Concentration (ng/L)	Surface Water RSL (ng/L)
PFOA	961	760
PFOS	1,080	760
PFBS	4.8	1,130

*The RSLs are site-specific and assume EF of 120 days/year, 1 event/day, and 1 hour/event

<u>Risk evaluation of PFAS data:</u>

PFOA and PFOS had detections above the conservative surface water screening level (760 ng/L) and were therefore carried forward for risk evaluation. A risk ratio approach was used to estimate risks for being exposed, which compares the maximum detected concentration to the RSL. The EPA RSL calculator was used to obtain risk estimates for PFOA and PFOS for the child recreator exposed to surface water. Default assumptions were used in the calculator, except for exposure frequency (EF), exposure time per event (ET), and exposure events per day (EV). The calculator requires that these exposure parameters be entered as site-specific values. A conservative EF of 120 days/year was used to reflect a reasonable maximum exposure of 7 days/week from May to August. ET was set at 1 hour per event and EV was set at 1 event per day. Table 2 below shows the results of the risk evaluation for PFOA and PFOS. Table 2 shows that the non-cancer risk estimates for PFOA and PFOS, as well as PFOA and PFOS combined, are all below the EPA acceptable HQ of 1. Therefore, there are currently no unacceptable risks to a child recreator through exposure to surface water.

Table 2 – Risk evaluation of surface water data

PFAS compound	Maximum Concentration (ng/L)	Site-specific Surface Water RSL (ng/L)	Risk Estimate (HQ)
PFOA	961	760	0.12
PFOS	1,080	760	0.14
PFOA+PFOS combined	2,041	760	0.27