



Hakes C&D Disposal, Inc.

2019 – ANNUAL OPERATIONS REPORT

HAKES C&D DISPOSAL

**4376 Manning Ridge Road
Painted Post, New York 14870**

Prepared for:

**Casella Waste Management of NY, Inc.
25 Greens Hill Lane
Rutland, VT 05701**

Prepared by:

**McMahon & Mann Consulting Engineering and Geology, P.C.
2495 Main Street
Suite 432
Buffalo, New York 14214**

**Permit Number: 8-4630-00010/00001-0
Facility Number SW # 51D03**

FEBRUARY 2020

ACTIVE CONSTRUCTION AND DEMOLITION (C&D) DEBRIS LANDFILL ANNUAL/QUARTERLY REPORT

Submit the Annual Report no later than March 1, 2020

- A. This annual report is for the year of operation from January 01, 2019 to December 31, 2019
 B. Quarterly Report for: Quarter 1 Quarter 2 Quarter 3 Quarter 4

SECTION 1 – FACILITY INFORMATION

FACILITY INFORMATION			
FACILITY NAME: Hakes C&D Landfill			
FACILITY LOCATION ADDRESS: 4376 Manning Ridge Road	FACILITY CITY: Painted Post	STATE: NY	ZIP CODE: 14870
FACILITY TOWN: Campbell	FACILITY COUNTY: Steuben	FACILITY PHONE NUMBER: 607-937-6044	
FACILITY NYS PLANNING UNIT: (A list of NYS Planning Units can be found at the end of this report). Steuben County			NYSDEC REGION #: 8
360 PERMIT #: 8-4630-00010/00001-0	DATE ISSUED: Nov. 11, 2013	DATE EXPIRES: Nov. 10, 2023	NYS DEC ACTIVITY CODE OR REGISTRATION NUMBER: 51D03
FACILITY CONTACT: Larry Shilling	<input type="checkbox"/> public <input checked="" type="checkbox"/> private	CONTACT PHONE NUMBER: 585-466-7271	CONTACT FAX NUMBER: 585-466-3206
CONTACT EMAIL ADDRESS: Larry.Shilling@casella.com			
OWNER INFORMATION			
OWNER NAME: Hakes C&D Disposal, Inc.	OWNER PHONE NUMBER: 607-937-6044	OWNER FAX NUMBER: 607-937-6089	
OWNER ADDRESS: 4376 Manning Ridge Road	OWNER CITY: Painted Post	STATE: NY	ZIP CODE: 14870
OWNER CONTACT: Larry Shilling	OWNER CONTACT EMAIL ADDRESS: Larry.Shilling@casella.com		
OPERATOR INFORMATION			
OPERATOR NAME: <input checked="" type="checkbox"/> same as owner		<input type="checkbox"/> public <input checked="" type="checkbox"/> private	
PREFERENCES			
Preferred address to receive correspondence: <input checked="" type="checkbox"/> Facility location address <input type="checkbox"/> Owner address <input type="checkbox"/> Other (provide):			
Preferred email address: <input checked="" type="checkbox"/> Facility Contact <input type="checkbox"/> Owner Contact <input type="checkbox"/> Other (provide):			
Preferred individual to receive correspondence: <input checked="" type="checkbox"/> Facility Contact <input type="checkbox"/> Owner Contact <input type="checkbox"/> Other (provide):			

Did you operate in 2019? Yes; Complete this form.
 No; Complete and submit Sections 1 and 18. If you no longer plan to operate and wish to relinquish your permit/registration associated with this solid waste management activity, also complete the "Inactive Solid Waste Management Facility or Activity Notification Form" located at:
<http://www.dec.ny.gov/chemical/52706.html> .

SECTION 2 - SITE LIFE

1. Landfill Capacity Utilized Last Year (reporting year).

- a. What is the estimated landfill capacity that was utilized during the reporting year?

544,038

Cubic Yards of Airspace

- b. What is the estimated in-situ waste density for the reporting year?

0.71

Tons/Cubic Yard

Please do not report units as pounds per cubic yard.

2. Remaining Constructed Capacity

- a. What is the remaining capacity of the landfill that is already constructed?

292,804

Cubic Yards of Airspace

- b. What is the estimated remaining life of the constructed capacity?

0 Years 5 Months

at 466,000 Tons/Year.*

* Please note that this tonnage rate must include all materials placed in the landfill, i.e., waste, soil, cover, alternative daily covers, etc.

- c. The tonnage rate reported under 2.b. is based on (select one):

The amount of materials placed in the landfill in the reporting year

Estimated future disposal

Permit limit

Other (explain): _____

3. Permitted Capacity Still to be Constructed

- a. What is the remaining but not yet constructed landfill capacity that is authorized by a Part 360 permit?

2,688,000

Cubic Yards of Airspace

- b. What is the projected life of capacity reported in 3a.?

4 Years 1 Months

at 466,000 Tons/Year.*

* Please note that this tonnage rate must include all materials disposed in the landfill, i.e., waste, and soil and alternative daily covers.

- c. The tonnage rate reported under 3.b. is based on (select one):

The amount of materials placed in the landfill in the reporting year

Estimated future disposal

Permit limit

Other (explain): _____

4. Capacity Proposed in a Part 360 Permit Application

What is the capacity of any expansion proposed in a Part 360 permit application that has been submitted to the Department but not authorized by a permit as of the end of the reporting period?

0 Cubic Yards of Airspace

5. Estimated Potential Future Capacity Not Permitted or in an Application (optional)

What is the estimated capacity of any potential future expansion at the facility that is not yet authorized by a permit or proposed in a Part 360 permit application that has been submitted to the Department?

_____ Cubic Yards of Airspace

SECTION 3 - PRIMARY LEACHATE

Name of off-site leachate treatment facility(s) utilized: Steuben County WWTP

Does the landfill have a constructed liner and a leachate collection system? Yes No

Enter the quantity of primary leachate that was collected, removed for on-site and off-site treatment, and recirculated each month, and the corresponding **Acreage, by Cell**:
(Note: For double-lined landfills this should not include the volume of leachate collected from secondary leachate collection and removal systems.)

For **each cell**, please report the **acreage** and the **primary leachate** amount.

	PRIMARY LEACHATE COLLECTED (GALLONS)						PRIMARY LEACHATE TREATED OFF SITE (GALLONS)					
	Cells 1 through 8						Cells 1 through 8					
January	208,592.74						159,273.38					
February	202,894.95						247,925.67					
March	191,104.86						129,455.66					
April	236,402.67						237,474.83					
May	214,371.48						268,515.56					
June	170,625.06						192,604.34					
July	169,139.51						131,613.91					
August	131,594.97						183,594.73					
September	146,846.76						133,980.84					
October	154,060.40						140,122.32					
November	164,187.27						139,527.59					
December	226,662.15						260,971.27					
ANNUAL	2,216,482.82						2,225,060.10					

	PRIMARY LEACHATE RECIRCULATED (GALLONS)						PRIMARY LEACHATE TREATED ON SITE (GALLONS)					
	Cells 1 through 8						Cells 1 through 8					
January	0						0					
February	0						0					
March	0						0					
April	0						0					
May	0						0					
June	0						0					
July	0						0					
August	0						0					
September	0						0					
October	0						0					
November	0						0					
December	0						0					
ANNUAL	0						0					

Submit (attached to this form) a copy of the maintenance logs which document compliance with the Operation and Maintenance Manual's schedule for the routine annual flushing and inspection of the primary leachate collection and removal system. List required submissions that have been attached to this form or the reason for not attaching a required piece of information:

Jamko Technical Solutions, Inc. cleaned the leachate lines, tanks, manholes, sumps, and load out pads in September and October 2019. This information is included in Attachment 1.

Submit (attached to this form) a tabulated compilation of the semi-annual primary leachate quality data collected throughout the year including a summary comparing this year's data with the previous year's data and a summary discussion of results. This list should identify sample location(s) and method of analysis. List required submissions that have been attached to this form or the reason for not attaching a required piece of information:

On-Site Geological Services, D.P.C. (On-Site) provided a tabulated compilation of the semi-annual primary leachate quality data and the other monitoring data required in Sections 12 through 16. This information is included in Attachment 2.

Please report total cost for the year, not cost/gal.

Leachate Cost: (including transportation if appropriate) during the calendar year for leachate treatment: \$ 181,812.40

Total quantity treated: 2,225,060.10 gal

SECTION 4 – BENEFICIAL USE DETERMINATION MATERIALS AND ALTERNATIVE OPERATING COVER MATERIALS

For each type of waste material that the Department has approved for use as alternative operating cover (AOC), intermediate cover, or other landfill material, provide the annual weight in tons, use (i.e., operating cover, intermediate cover, etc.), and source of material. (If material is from a solid waste facility also provide facility name, address, NYS Planning Unit, County/ Province, and State/Country.) Refer to the list of NYS Planning Units that can be found at the end of this report.

Type of Solid Waste	Weight (tons/year)	Use	NYS Planning Unit (See Attached List of NYS Planning Units)	County or Province	State or Country	Source (Facility and Address)
Aggregate/Concrete	0					
Processed C&D	0					
Contaminated Soil	0					
Other (specify)						
Total AOC	0					
Total Beneficial Use Determination Materials	0					

Percent Alternative Operating Cover (AOC) Calculation

AOC Calculations: Total Tons AOC/Total Tons Waste Disposed x 100 = _____

Please note the calculation **is**: Tons AOC (from table above)/Tons Solid Waste (from table in Section 6) x 100 and **Not**: Tons AOC / (Tons Solid Waste + AOC) x 100

SECTION 6 – SERVICE AREA OF C&D DEBRIS RECEIVED

Please identify where the waste is coming from. The total tons received reported below should equal the total tons received in Section 5 (Construction & Demolition (CD) Debris Disposed). **DO NOT REPORT IN CUBIC YARDS!**

- If the waste **WAS** received from another solid waste management facility, please write in the name *and address* of the facility along with the appropriate state, county and planning unit/municipality.
- If the waste **WAS NOT** received from another solid waste management facility, please write in “**Direct Haul**” along with the appropriate state, county and planning unit/municipality where the waste was generated.

Specify transport method and percentages of total waste transported by each:

100 % Road _____ % Rail
 _____ % Water _____ % Other (specify: _____)

Explain which waste types and service areas below are included in these transport methods _____

SERVICE AREA OF SOLID WASTE RECEIVED					
TYPE OF SOLID WASTE	SOLID WASTE MANAGEMENT FACILITY FROM WHICH IT WAS RECEIVED (Name & Address) OR “Direct Haul”	SERVICE AREA STATE OR COUNTRY	SERVICE AREA COUNTY OR PROVINCE	SERVICE AREA NYS PLANNING UNIT (See Attached List of NYS Planning Units)	TONS RECEIVED
Construction and Demolition Debris (mixed)	See Attachment 3 - Waste Origin				
Other (specify)					
TOTAL RECEIVED (tons): _____					

SECTION 7 – UNAUTHORIZED SOLID WASTE

Has unauthorized solid waste been received at the facility during the reporting period?

Yes No If yes, give information below for each incident (attach additional sheets if necessary):

Date Received	Type Received	Date Disposed	Disposal Method & Location
March 11, 2019	Bags and Carpet	This material was rejected from disposal when observed at the scale house.	
July 8, 2019	Bags	This material was rejected from disposal when observed at the working face.	
Between 1/1/19 and 12/31/19	Tires	Tires were removed and placed in a dumpster and disposed of off-site.	

SECTION 8 - COST ESTIMATES AND FINANCIAL ASSURANCE DOCUMENTS

Are there required cost estimates and financial assurance documents for closure and post-closure care?

Yes No If yes, attach additional sheets reflecting annual adjustments for inflation and any changes to the Closure Plan? Previously submitted to NYSDEC Region 8 and no changes are required.

SECTION 9 – PROBLEMS

Were any problems encountered during the reporting period (e.g., specific occurrences which have led to changes in facility procedures)?

Yes No If yes, attach additional sheets identifying each problem and the methods for resolution of the problem.

SECTION 10 – CHANGES

Were there any changes from approved reports, plans, specifications, and permit conditions?

Yes No If yes, attach additional sheets identifying changes with a justification for each change.

SECTION 11 – LANDFILL OPERATOR TRAINING

Name of trained landfill operator: Charles Plank

Name and location of training course: Landfill Operator Certification at Sheraton in Niagara Falls, NY

Date completed: 3/18/18

SECTION 12 - ANALYTICAL RESULTS

Submit (attached to this form) tables showing the sample collection date, the analytical results [including all peaks even if below the Method Detection Limits (MDL)], designation of upgradient wells and location number for each environmental monitoring point sampled, applicable water quality standards, and groundwater protection standards if established, MDL's, and Chemical Abstracts Service (CAS) numbers on all parameters. List submissions (required by this section) that have been attached to this form or the reasons for not attaching a required piece of information:

On-Site provided a tabulated compilation of the monitoring data required in Sections 12 through 16. This information is included in Attachment 2.

SECTION 13 - COMPARING DATA

Submit (attached to this form) tables or graphical representations comparing current water quality with existing water quality and with upgradient water quality. These comparisons may include Piper diagrams, Stiff diagrams, tables, or other analyses. List submissions (required by this section) that have been attached to this form or the reasons for not attaching a required piece of information:

On-Site provided a tabulated compilation of the monitoring data required in Sections 12 through 16. This information is included in Attachment 2.

SECTION 14 - DISCUSSION OF RESULTS

Submit (attached to this form) a summary of any contraventions of State water quality standards, significant increases in concentrations above existing water quality, any exceedances of groundwater protection standards, and discussion of results, and any proposed modifications to the sampling and analysis schedule necessary to meet the Existing, Operational and Contingency water quality monitoring requirements. List submissions (required by this section) that have been attached to this form or the reasons for not attaching a required piece of information:

On-Site provided a tabulated compilation of the monitoring data required in Sections 12 through 16. This information is included in Attachment 2.

SECTION 15 - DATA QUALITY ASSESSMENT

Submit (attached to this form) any required data quality assessment reports. List submissions (required by this section) that have been attached to this form or the reasons for not attaching a required piece of information:

On-Site provided a tabulated compilation of the monitoring data required in Sections 12 through 16. This information is included in Attachment 2.

SECTION 16 - SUMMARIES OF MONITORING DATA

Submit (attached to this form) a summary of the water quality information presented in Sections 13 and 14 for the year of operation for which the Annual Report is made, noting any changes in water quality which have occurred throughout the year. List submissions (required by this section) that have been attached to this form or the reasons for not attaching a required piece of information:

On-Site provided a tabulated compilation of the monitoring data required in Sections 12 through 16. This information is included in Attachment 2.

SECTION 17 - SURFACE IMPOUNDMENTS

Does this landfill have a surface impoundment?

Yes No If yes, repeat Sections 12 through 15 above for Quarterly Reports and Section 16 above for Annual report. Attach additional submissions required by this section.

SECTION 18 - PERMIT/CONSENT ORDER REPORTING REQUIREMENTS

Are there any additional permit/consent order reporting requirements not covered by the previous sections of this form?

Yes No If yes, attach additional sheets identifying the reporting requirements with their respective responses.

SECTION 19 - SIGNATURE AND DATE BY OWNER OR OPERATOR

Owner or Operator must sign, date and submit one completed form to the appropriate Regional Office (See attachment for Regional Office addresses, email addresses and Materials Management Contacts).

The Owner or Operator must also submit one copy by email, fax or mail to:

**New York State Department of Environmental Conservation
Division of Materials Management
Bureau of Solid Waste Management
625 Broadway
Albany, New York 12233-7260
Fax 518-402-9041
Email address: SWMFannualreport@dec.ny.gov**

I certify, under penalty of law, that the data and other information identified in this report have been prepared under my direction and supervision in compliance with a system designed to ensure that qualified personnel properly and accurately gather and evaluate this information. I am aware that any false statement I make in such report is punishable pursuant to section 71-2703(2) of the Environmental Conservation Law and section 210.45 of the Penal Law.

_____ Signature	2/20/2020 _____ Date
Russell Anderson _____ Name (Print or Type)	Landfill Compliance Mgr _____ Title (Print or Type)
russell.anderson@casella.com _____ Email (Print or Type)	
26 Pleasant Street, Suite 2D _____ Address	Concord _____ City
New Hampshire 03301 _____ State and Zip	(603) 290 - 5846 _____ Phone Number

ATTACHMENTS: YES

ATTACHMENT 1 – LEACHATE LINE CLEANING LOG

ATTACHMENT 2 – WATER QUALITY DATA



HAKES C&D DISPOSAL

4th QUARTER/ANNUAL 2019 ENVIRONMENTAL MONITORING REPORT

NYSDEC Permit No.: 8-4630-00010/00001-0

February 2019

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Figure 1 – Sampling Locations
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Appendix A – Field Sampling Forms

Appendix B – Laboratory Analytical Reports

Overview

This report summarizes calendar year 2019 and details the fourth quarter 2019 operational water quality monitoring activities completed at the Hakes C & D Landfill, located in the town of Campbell, New York. Sampling and reporting activities were performed by On-Site Geological Services, D.P.C. (On-Site) of Wellsville, New York. Sample analysis was performed by ALS Environmental (ALS), located in Rochester, New York. 2019 quarterly monitoring was conducted as required in accordance with the *Hakes Construction and Demolition Debris Landfill Environmental Monitoring Plan*, dated April 2015.

On December 19, 2019, an updated solid waste management permit was issued for the Hakes facility. Therefore starting first quarter 2020, as required by the new permit, environmental monitoring will transition to 6 NYCRR Part 363 regulations as detailed in *Hakes Construction and Demolition Debris Landfill Expansion Project 6 NYCRR Part 360 Permit Modification Application Appendix C – Environmental Monitoring Plan*, dated September 2019.

This report addresses Sections 1, 3, and 11 through 18 of the New York State Department of Environmental Conservation (NYSDEC) annual report form and includes the following.

- Tables
- Figures
- Appendix A – Field Sampling Forms
- Appendix B – Laboratory Analytical Reports

Section 1 – Owner/Facility Information

Facility Name: Hakes C&D Landfill Town: Campbell County: Steuben NYSDEC Region #: 8

Facility Location: 4376 Manning Ridge Road, Campbell State: NY Zip: 14870

Facility Contact: Chuck Plank Phone #: (607) 937-6044 Fax #: (607) 937-6089

360 Permit #: 8-4630-00010/00001-0 Issued: 11/11/2013 Expires: 11/10/2023

Owner Name: Hakes C&D, Inc. Phone #: (607) 937-6044

Mailing Address: Same as above

Section 3 – Primary Leachate (Analytical Results Only)

2019 primary leachate sampling was conducted during the second and fourth quarterly monitoring events. A second quarter leachate sample was collected and analyzed for parameters included in 6 NYCRR Part 360 Expanded Parameter List (expanded parameters). A fourth quarter leachate sample was collected and analyzed for parameters included in 6 NYCRR Part 363 Expanded Parameter List (363 expanded parameters). The samples were collected directly from a leachate tank with analytical results typical of historic Site leachate samples. Site leachate generally exhibits significantly lower contaminate concentrations than observed at typical

municipal solid waste landfills. Analytical results for the last five leachate samples are presented in Table 1. Primary leachate organic detections for 2019 are shown in the table below.

Date Sampled	Parameter	Result mg/L
01-May-19	2,4-Dimethylphenol	0.015
01-May-19	Dibenzofuran	0.0021 J
01-May-19	Acetophenone	0.0097
01-May-19	Acenaphthene	0.0051 J
01-May-19	3/4-Methylphenol	0.082
01-May-19	2-Methylphenol	0.0097
01-May-19	2-Methylnaphthalene	0.0047 J
01-May-19	1,2-Dichloroethane	0.0021 J
01-May-19	Phenol	0.041
01-May-19	m&p-Xylene	0.0041 J
01-May-19	Toluene	0.0031 J
01-May-19	Ethyl benzene	0.0026 J
01-May-19	Carbon disulfide	0.0026 J
01-May-19	Benzene	0.0037 J
01-May-19	Acetone	1.2
01-May-19	4-Methyl-2-pentanone	0.06 J
01-May-19	2-Hexanone	0.013 J
01-May-19	2-Butanone (MEK)	0.55
01-May-19	o-Xylene	0.0023 J
20-Nov-19	2-Methylnaphthalene	0.009 J
20-Nov-19	2-Chloronaphthalene	0.0013 J
20-Nov-19	1,4-Dioxane	0.12 *
20-Nov-19	2-Methylphenol	0.0079 J
20-Nov-19	3/4-Methylphenol	0.096 D
20-Nov-19	Acenaphthene	0.0089 J
20-Nov-19	Acetophenone	0.012
20-Nov-19	bis(2-Chloroethyl) ether	0.0052 J
20-Nov-19	Dibenzofuran	0.0037 J
20-Nov-19	Diethylphthalate	0.0013 J
20-Nov-19	Fluorene	0.0023 J
20-Nov-19	2,4-Dimethylphenol	0.015
20-Nov-19	m&p-Xylene	0.0074 J
20-Nov-19	Toluene	0.008 J
20-Nov-19	Ethyl benzene	0.0037 J
20-Nov-19	Carbon disulfide	0.0027 J
20-Nov-19	Benzene	0.0069 J
20-Nov-19	Acetone	3 D
20-Nov-19	4-Methyl-2-pentanone	0.12

Date Sampled	Parameter	Result mg/L
20-Nov-19	2-Hexanone	0.019 J
20-Nov-19	Phenol	0.072
20-Nov-19	o-Xylene	0.0043 J
20-Nov-19	2-Butanone (MEK)	1.3

Section 11 – Analytical Results

The fourth quarter 2019 quarterly sampling event was conducted between November 18 and 20, 2019. Landfill gas monitoring was conducted on December 13, 2019. Laboratory analysis was performed by ALS. Tables presenting the fourth quarter 2019 field parameters and analytical results are included with the appropriate NYSDEC water quality standards as follows:

- Table 2 – Fourth Quarter 2019 Groundwater Analytical Results;
- Table 3 – Fourth Quarter 2019 Surface Water Analytical Results; and
- Table 4 – Fourth Quarter 2019 Groundwater Suppression Systems Analytical Results.

A narrative of comparing data to standards is provided in Section 12 and a discussion of results is presented in Section 13. A data quality assessment is provided in Section 14 and a summary of data is referenced in Section 15.

Section 12 – Comparing Data

Site specific Existing Water Quality Values (EWQVs) have been established for the facility since 2000 with periodic revisions associated with landfill expansions. The current EWQVs were submitted to the NYSDEC on May 28, 2008. These most recent EWQVs incorporate previous pre-operational data with the addition of pre-operational data from Cells 5 and 6 wells MW-L, MW-M and MW-N. The table below presents a summary of the pre-operational data collection associated with the current EWQVs. The current EWQVs are utilized for data comparison beginning in the second quarter 2008.

Wells	Parameter Group	Number of Samples	Date Range
MW-1, MW-2, MW-3D, MW-6 ¹	Wet Chemistry	83	3/94-6/99
MW-A, MW-B, MW-C, MW-D ¹	Field Parameters	8	12/99-3/00
	Inorganic Compounds		
	Wet Chemistry		
MW-E ¹	Field Parameters	3	2/02-8/02
	Inorganic Compounds		
	Wet Chemistry		
MW-F, MW-G ¹	Field Parameters	6	8/03-5/04
	Inorganic Compounds		
	Wet Chemistry		
Wells	Parameter Group	Number of Samples	Date Range
MW-L, MW-M, MW-N ^{2, 3}	Field Parameters	19	5/07-2/08
	Inorganic Compounds		
	Wet Chemistry		

Notes:

¹ – Pre-operational groundwater data from monitoring wells associated with Cells 1 through 4.

² – Pre-operational groundwater data from monitoring wells associated with Cell 5.

³ – Due to insufficient water recovery, not all samples were tested for metals and wet chemistry.

According to 6 NYCRR Part 360-2.11 (c) (5) (ii) (d) (2) a significant increase has occurred if the current water quality for a parameter at a monitoring well exceeds the EWQV of that parameter by three standard deviations or the test result for a parameter at a monitoring well exceeds the water quality standard for that parameter. It is noted that there are instances where parameters exceed the 6 NYCRR Part 360 criteria due to natural conditions.

A comparison of groundwater analytical results to EWQVs and Class GA Standards is provided in Table 5. Parameters that may indicate a significant increase are shaded in color in Table 5. If the value exceeded both the EWQV (mean) and the Class GA Standard, then the value is shaded in yellow. Test results were also compared to the mean plus three standard deviations. If an analytical result exceeds these criteria, then it is shaded in green. If the test result exceeded both of criteria mentioned above, the value is shaded in blue. Additionally, results in bold but not color shaded exceed Class GA Standards but are below EWQVs. A discussion of results is provided in Section 13.

Section 13 – Discussion of Results

This section includes a narrative pertaining to results greater than EWQVs and/or Class GA Standards, significant changes in water quality and a general discussion of results.

Operational water quality monitoring has been ongoing at the Site since December 1999. The fourth quarter 2019 quarterly operational water quality event is a NYSDEC 6 NYCRR Part 360 Routine Parameter List (routine parameters) event. Representatives of On-Site conducted this monitoring event with scheduled sampling of groundwater, surface water and groundwater suppression systems. Please see Figure 1 for sampling locations. Non-dedicated bladder pumps were utilized following low-flow purging techniques for monitoring well purging and sampling with the following exceptions. Low yielding monitoring wells MW-D, MW-GR and MW-N were each purged to the bottom with a dedicated bailer and allowed time to recover prior to sampling with a dedicated bailer. Field sampling forms are included in Appendix A. The table below provides the locations and dates sampled for the fourth quarter 2019 sampling event.

Hakes C&D Landfill Fourth Quarter 2019 Sample Summary		
Location	Description	Sample Date
Upgradient Monitoring Wells		
MW-L	Upgradient well	11/18/2019
MW-H	Upgradient well	11/18/2019
MW-Q	Upgradient well	11/20/2019
Downgradient Monitoring Wells		
MW-CR	Downgradient well	11/18/2019
MW-D	Downgradient well	11/18 & 11/19/2019
MW-E	Downgradient well	11/19/2019
MW-F	Downgradient well	11/19/2019
MW-GR	Downgradient well	11/18 & 11/19/2019
MW-J	Downgradient well	11/19/2019
MW-N	Downgradient well	11/18 & 11/19/2019
MW-O	Downgradient well	11/18/2019
MW-P	Downgradient well	11/19/2019
Surface Water		
SW-1	Tributary 4 Upstream of landfill	11/18/2019
SW-1A	Tributary 4 upstream of landfill at property line	11/18/2019
SW-2	Tributary 4 downgradient	11/18/2019
SW-2A	Erwin Hollow Creek down-stream Tributary 4 convergence	11/18/2019
SW-3A	Pond 5 discharge	11/18/2019
SW-4 ²	Pond 1 discharge	11/18/2019
SW-4A ²	Pond 1 discharge to sand filter	11/18/2019
SW-5A ²	Pond 3 discharge	11/18/2019
SW-6 ²	Pond 4 discharge	11/18/2019
SW-7	Erwin Hollow Creek Tributary 4upstream Convergence	11/18/2019
SW-8 ¹	Tributary 4 Ditch convergence	11/18/2019
SW-9 ¹	East pond discharge	11/18/2019
Groundwater Suppression System		
GSS-1 ¹	Gravity pipe to Pond 1	11/18/2019
GSS-1A	Hose in riser pipe	11/18/2019
GSS-2 ¹	Gravity pipe to creek	11/18/2019
GSS-3	Gravity pipe to creek	11/18/2019
GSS-4	Gravity pipe to creek	11/18/2019
GSS-5	Gravity pipe to creek	11/18/2019
GSS-6	Discharge pipe while pumping	11/18/2019
GSS-8	Discharge pipe while pumping	11/18/2019

¹ Dry or insufficient water volume. No sample collected.

² No flow at pond discharge location as flow is diverted to next pond. No sample collected.

Tables 2, 3 and 4 provide analytical results for the fourth quarter 2019 sampling event. Analytical results for the last five quarters are presented in Tables 5 through 7. Analytical results from the fourth quarter 2019 sampling event appear generally consistent with historic results. Some sampling locations, including upgradient monitoring wells, continue to exhibit concentrations above EWQVs and/or NYSDEC Standards. These exceedances do not appear to be a result of site operations but rather a factor of ambient water quality.

The fourth quarter 2019 landfill gas monitoring was conducted on December 13, 2019 in general accordance with *Hakes C&D Landfill, Landfill Gas Monitoring Plan* dated April 2010. Locations monitored include: 1) gas wells GW-1 through GW-19; 2) gas vents GV-1 through GV-11; 3) horizontal gas wells GH-1 through GH-5; 4) one upwind and three downwind landfill perimeter locations; and 5) one location at cell 6 west side. Monitoring was conducted using a GEM 5000 landfill gas meter to measure Oxygen, Methane, Carbon Dioxide, Balance gas, gas temperature, barometric pressure, relative pressure, Hydrogen Sulfide (H₂S) and Carbon Monoxide (CO). Hydrogen Sulfide RAE detector tubes with a range of 0.1-2% were used at locations where the GEM 5000 indicated Hydrogen Sulfide over instrument limit.

Please see Table 10 for fourth quarter 2019 landfill gas monitoring results and Figure 2 for gas monitoring locations.

Discussion of Fourth Quarter Groundwater Monitoring Results

Groundwater samples were scheduled to be collected and analyzed for routine parameters at 12 operational wells during the fourth quarter 2019. These samples were collected between November 18 and 19, 2019. With the exception of low-yielding wells MW-D, MW-GR and MW-N, groundwater sampling was conducted following low-flow sampling procedures utilizing non-dedicated bladder pumps. The low-yielding wells were purged dry with dedicated bailers and allowed time to recover prior to bailing samples. Fourth quarter monitoring results are consistent with historic data. A discussion of results is provided below.

Upgradient Monitoring Wells

Upgradient monitoring well MW-H fourth quarter 2019 results are consistent with previous analytical results. MW-H fourth quarter results show Sodium at 32.5 mg/L exceeding Class GA Standards and EWQVs. The remaining results are within EWQVs and Class GA Standards.

Fourth quarter 2019 upgradient monitoring well MW-L analytical results are generally consistent with previous samplings. MW-L analytical results show Turbidity at 11.6 NTU and Iron at 0.77 mg/L exceeding the Class GA Standards. Sodium at 29.8 mg/L, exceeds Class GA Standard and EWQV. Remaining MW-L results are below Class GA Standards and EWQVs.

Upgradient monitoring well MW-Q shows fourth quarter 2019 results comparable to previous samplings. Fourth quarter results exhibit Sodium at 57.6 mg/L and Chloride at 112 mg/L, which are above the EWQVs and the Class GA Standards. Field pH at 5.37 S.U. is not within Class GA Standard and EWQV plus three standard deviations. Remaining results at MW-Q are within Class GA Standards and EWQVs.

Downgradient Monitoring Wells

Downgradient monitoring well MW-CR fourth quarter 2019 results are consistent with previous analytical results and with the exception of Turbidity are within EWQVs and Class GA Standards. Turbidity at 5.52 NTU exceeds Class GA Standard.

Monitoring well MW-D is low-yielding and is sampled with a dedicated bailer. Fourth quarter 2019 downgradient well MW-D results are consistent with previous data and show Iron at 0.38 mg/L, exceeding Class GA Standard while remaining below EWQV. The remaining results are below EWQVs and Class GA Standards.

Fourth quarter 2019 analytical results from downgradient well MW-E are comparable to previous samplings. Sodium at 22.2 exceeds the Class GA Standard but remains below the EWQV. The remaining results are below EWQVs and Class GA Standards.

Fourth quarter 2019 analytical results from downgradient well MW-F are generally consistent with historic results. Turbidity at 11 NTU and Iron at 0.43 mg/L, both exceeded Class GA Standards but remain below EWQVs. Field pH at 6.34 S.U. is not within Class GA Standard and EWQV. The remaining results are within EWQVs and Class GA Standards.

During the fourth quarter 2019, downgradient well MW-GR was sampled using a dedicated bailer. MW-GR fourth quarter results are within EWQVs and Class GA Standards.

Fourth quarter 2019 downgradient well MW-J results are consistent with historic data and show Turbidity, Iron and Manganese exceeding Class GA Standards at 7.62 NTU, 0.81 mg/L and 0.316 mg/L, respectively. Total Dissolved Solids at 662 mg/L exceeds EWQV and Class GA Standard. Chloride exceeds the EWQV plus three standard deviations at a concentration of 166 mg/L. Sodium at 114 mg/L exceeds the Class GA Standard and EWQV plus three standard deviations. The remaining results are within EWQVs and Class GA Standards.

Downgradient monitoring well MW-N was sampled during the fourth quarter 2019 using a dedicated bailer. Results are consistent with previous samplings. Field pH and Turbidity both exceed Class GA Standards at concentrations of 6.37 S.U. and 19.7 NTU, respectively. Iron at 2.4 mg/L and Total Dissolved Solids at 579 mg/L exceed both the EWQVs and Class GA Standards. Alkalinity exceeds EWQV plus three standard deviations at a concentration of 492 mg/L. Manganese at 4.35 mg/L exceeds the Class GA Standard and EWQV plus three standard deviations. The remaining results are within EWQVs and Class GA Standards.

Downgradient well MW-O fourth quarter 2019 results are below EWQVs and Class GA Standards, and are consistent with past samplings.

Fourth quarter 2019 analytical results from downgradient well MW-P show Manganese at 0.98 mg/L and Sodium at 23.2 mg/L, both exceeding Class GA Standards. The remaining results are within EWQVs and Class GA Standards.

Discussion of Fourth Quarter Surface Water Monitoring Results

In November 2019, surface water locations were tested and analyzed for field parameters, air temperature, routine parameters and Total Suspended Solids (TSS) from two location (SW-1A, SW-2); three locations (SW-1, SW-2A, SW-7) for field parameters, air temperature and TSS; and one location (SW-3A) for field parameters, air temperature, routine parameters, oil and grease, Total Nitrogen and TSS. No flow conditions were observed at two surface water sampling locations (SW-8, SW-9) and therefore not sampled. Four locations (SW-4, SW-4A, SW-5A and SW-6) were not sampled due to no flow conditions attributed to the pond discharge being diverted to the inlet of the next pond. Locations SW-1, SW-1A, SW-2, SW-2A, SW-7 and SW-8 are stream sampling locations, while SW-3A, SW-4, SW-4A, SW-5A, SW-6 and SW-9 are pond discharge locations (please see Figure 1).

Surface water discharge locations were monitored for visual contrast between the discharge water and water in the stream. There was no evidence of visual contrast between the discharge water and the stream. With the exception of site upstream location SW-1A Field pH at 8.62 S.U., fourth quarter 2019 surface water results are within Class C Surface Water Standards. Fourth quarter 2019 surface water analytical results are presented in Table 3; while current plus historic results are shown in Table 6.

Discussion of Fourth Quarter Groundwater Suppression System Monitoring Results

As part of the fourth quarter 2019 sampling event, water samples were scheduled to be collected from groundwater suppression systems GSS-1, GSS-1A, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6 and GSS-8 for routine parameters. The gravity drain pipes from GSS-1 and GSS-2 were dry as typical and therefore not sampled. The remainders of the groundwater suppression system samples were collected as scheduled. Fourth quarter 2019 groundwater suppression system analytical results are consistent with historic results and show exceedances of Class GA Standards as follows.

- GSS-1A showed Turbidity at 21.9 NTU and Iron at 0.99 mg/L.
- GSS-3 results remain below Class GA Standards.
- GSS-4 displayed Sodium at 36.3 mg/L.
- GSS-5 results remain below Class GA Standards.
- GSS-6 Turbidity and Iron both exceed Class GA Standards at concentrations of 6.54 NTU and 1.13 mg/L, respectively.
- GSS-8 results show Sodium at 48.8 mg/L exceeding the Class GA Standard.

Section 14 – Data Quality Assessment

The fourth quarter 2019 sampling event is a routine parameter list event; therefore third party data validation is not required. The laboratory performed internal validation in accordance with NELAC Standards. Laboratory quality control standards were met no significant analyses anomalies were reported. Please see Appendix B for additional details.

The laboratory results were reviewed for compliance with the sampling program including laboratory sample receipt, holding times, matrix spike results and duplicate sample results. Data presented in this report should be considered technically correct and usable.

A discussion of field duplicate and field equipment blank sampling is provided below.

Field Duplicate Sample

A field duplicate sample was collected from groundwater well sample location MW-CR, labeled DUP1-1119, and analyzed by the laboratory for routine parameters. Results from MW-CR and the associated duplicate sample compare favorably indicating good sampling and analysis precision. Results are presented in Table 8.

Field Equipment Blank Sample

One equipment blank sample was collected to confirm proper cleaning of the bladder pump and tubing used to purge and sample monitoring wells MW-CR, MW-H, MW-L, MW-O, and MW-Q. The equipment blank sample was collected by pumping laboratory provided deionized water through the pump and tubing into laboratory provided sample containers. With the exception of estimated low-level detections of Sodium and Chemical Oxygen Demand, equipment blank results are non-detect. Results are presented in Table 9.

Section 15 – Summaries of Monitoring Data

Quarterly monitoring was conducted as required in 2019 in accordance with the April 2015 EMP. First, second and fourth quarter 2019 sampling events were conducted for routine parameter analysis, while the third quarter 2019 event was a baseline parameter monitoring event. Please refer to Tables 5 through 7 for water quality results from the last five monitoring events. Each quarterly monitoring event is summarized separately below.

First Quarter 2019

First quarter 2019 routine sampling of groundwater, groundwater suppression system and surface water sampling was completed as required. Surface water locations SW-4, SW-4A, SW-5A, SW-6, and SW-8 were not sampled either due to dry conditions or water being diverted to a

downstream retention pond. Groundwater suppression system sampling locations GSS-1 and GSS-2 were not sampled due to insufficient water. First quarter results for locations sampled are consistent with historic results.

Second Quarter 2019

Second quarter 2019 routine sampling of groundwater, groundwater suppression system and surface water was completed as required. Additionally, sampling and analysis of leachate for expanded parameters was completed. Surface water sampling locations SW-4, SW-4A, SW-5A, SW-6 and SW-8 were not sampled in April 2019 due to dry conditions or water being diverted to a downstream retention pond. A sample was not collected from GSS-1 and GSS-2 due to insufficient water. Second quarter 2019 monitoring results are consistent with historic data.

Third Quarter 2019

Third quarter 2019 baseline monitoring was completed as required. Surface water sampling locations SW-3A, SW-4, SW-4A, SW-5A, SW-6 and SW-8 were not sampled in August 2019 due to dry conditions or water being diverted to a downstream retention pond. Also GSS-1 and GSS-2 were dry therefore not sampled. Third quarter 2019 monitoring results are historically consistent. Third quarter baseline sampling results showed Volatile Organic Compound (VOC) results as non-detect with the exception of a low-level detection of Carbon disulfide (0.0006 J mg/L) at groundwater suppression system GSS-1A. This low-level estimated concentration is likely a sampling and analysis artifact and not representative of site conditions.

Fourth Quarter 2019

Fourth Quarter 2019 routine parameter sampling and analysis of groundwater, surface water and groundwater suppression systems was completed as required. Additionally, sampling and analysis of leachate for expanded parameters was completed. Surface water sampling locations SW-4, SW-4A, SW-5A, SW-6, SW-8 and SW-9 were not sampled in November 2019 due to either dry conditions or pond flow diverted to a downstream retention pond. Also GSS-1 and GSS-2 were dry and therefore not sampled. Fourth quarter 2019 monitoring results are historically consistent.

Section 16 – Surface Impoundments

This landfill does not have leachate surface impoundments.

Section 17 – Permit/Consent Order Reporting Requirements

A separate quarterly surface water report and a separate quarterly landfill gas monitoring report are required to be submitted in addition to this report.

Section 18 – Signature and Date by Owner or Operator

I hereby affirm under penalty of perjury that information provided on this form and attached statement and exhibits was prepared by me or under my supervision and direction and is true to the best of my knowledge and belief, and that I have the authority to sign this report form pursuant of 6 NYCRR Part 360. I am aware that any false statement made herein is punishable as a Class A misdemeanor pursuant to Section 210.45 of the Penal Law.

_____ Signature	2/18/2020 _____ Date
Russell Anderson _____ Name	Manager of Compliance _____ Title
4376 Manning Ridge Road _____ Address	Campbell _____ City
New York 14870 _____ State and Zip	(603) 545-7125 _____ Phone Number

Tables

Table 1

**Current and Historic Leachate Analytical Results
Hakes C and D Landfill
Campbell, New York
(mg/L except where noted)**

Parameter	LCS 11/15/2017	LCS 5/9/2018	LCS 11/8/2018	LCS 5/1/2019	LCS 11/20/2019
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Field Parameters

Field pH (std. units)	7.06	7.35	7.01	7.12	7.19
ORP (mV)	14	128.7	-2.3	-133	-78.8
Specific Conductivity (us/cm)	3584	6684	6632	7495	6909
Temperature (deg. C)	7.4	18.6	9.7	15.4	9
Turbidity (NTU)	25	58.5	13.1	60.2	88

Inorganic Compounds

Aluminum	1.26	0.304	0.422	0.252	0.395
Antimony	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U
Arsenic	0.0394	0.0245	0.0551	0.0689	0.0882
Barium	0.763	0.444	1.5	1.64	1.67
Beryllium	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U
Boron	7.4 E	10.9	13.2	13.7	13.4
Cadmium	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Calcium	206	398	319	275	258
Chromium	0.0361	0.0404	0.0605	0.0719	0.0733
Chromium, hexavalent	0.01 U	0.01 U	0.1 U	0.1 U,*	0.1 U,*
Cobalt	0.05 U	0.0046 J	0.05 U	0.0023 J	0.0021 J
Copper	0.0141 J	0.0095 J	0.02 U	0.02 U	0.0064 J
Iron	3.17	5.21	2.5	1.42	2.51
Lead	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Magnesium	133	257	266	256	229
Manganese	4.08	5.22	3.95	3.4	2.86
Mercury	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Nickel	0.04 U	0.0167 J	0.0028 J	0.04 U	0.0041 J
Potassium	68.6	109	142	138	146
Selenium	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Silver	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sodium	402	811	1020	871	873
Thallium	0.01 U	0.0121	0.0079 J	0.0109	0.01 U
Tin	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vanadium	0.0183 J	0.0151 J	0.0269 J	0.0271 J	0.0273 J
Zinc	0.0326	0.0321	0.0097 J	0.0105 J	0.0246

PCB's

Aroclor-1016	0.00094 U	0.00094 U	0.00094 U	0.00094 U	0.00093 U
Aroclor-1221	0.0019 U	0.0019 U	0.0019 U	0.0019 U	0.0019 U
Aroclor-1232	0.00094 U	0.00094 U	0.00094 U	0.00094 U	0.00093 U
Aroclor-1242	0.00094 U	0.00094 U	0.00094 U	0.00094 U	0.00093 U
Aroclor-1248	0.00094 U	0.00094 U	0.00094 U	0.00094 U	0.00093 U
Aroclor-1254	0.00094 U	0.00094 U	0.00094 U	0.00094 U	0.00093 U
Aroclor-1260	0.00094 U	0.00094 U	0.00094 U	0.00094 U	0.00093 U

Pesticides and Herbicides

4,4'-DDD	0.000047 U	0.000047 U	0.000047 U	0.000047 U	0.000046 U
4,4'-DDE	0.000047 U	0.000047 U	0.000047 U	0.000047 U	0.000046 U
4,4'-DDT	0.000047 U	0.000047 U	0.000047 U	0.000047 U	0.000046 U

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Pesticides and Herbicides (con't)

Aldrin	0.000047 U	0.000047 U	0.000047 U	0.000047 U	0.000046 U
alpha-BHC	0.000047 U	0.000047 U	0.000047 U	0.000047 U	0.000046 U
alpha-Chlordane	0.000047 U	0.000047 U	0.000047 U	0.000047 U	0.000046 U
beta-BHC	0.000047 U	0.000047 U	0.000047 U	0.000047 U	0.000046 U
Chlorobenzilate	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
delta-BHC	0.000047 U	0.000047 U	0.000047 U	0.000047 U	0.000046 U
Dieldrin	0.000047 U	0.000047 U	0.000047 U	0.000047 U	0.000046 U
Dinoseb	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Endosulfan I	0.000047 U	0.000047 U	0.000047 U	0.000047 U	0.000046 U
Endosulfan II	0.000047 U	0.000047 U	0.000047 U	0.000047 U	0.000046 U
Endosulfan sulfate	0.000047 U	0.000047 U	0.000047 U	0.000047 U	0.000046 U
Endrin	0.000047 U	0.000047 U	0.000047 U	0.000047 U	0.000046 U
Endrin aldehyde	0.000047 U	0.000047 U	0.000047 U	0.000047 U	0.000046 U
gamma-BHC (Lindane)	0.000047 U	0.000047 U	0.000047 U	0.000047 U	0.000046 U
gamma-Chlordane	0.000047 U	0.000047 U	0.000038 J	0.000047 U	0.000046 U
Heptachlor	0.000047 U	0.000047 U	0.000047 U	0.000047 U	0.000046 U
Heptachlor epoxide	0.000047 U	0.000047 U	0.000047 U	0.000047 U	0.000046 U
Methoxychlor	0.000047 U	0.000047 U	0.000047 U	0.000047 U	0.000046 U
Methyl parathion	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Parathion	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Toxaphene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
2,4,5-T	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
2,4,5-TP	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
2,4-D	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U

Per- and Polyfluoralkyl Substances (PFAS)

6:2 Fluorotelomer sulfonate					0.00022
8:2 Fluorotelomer sulfonic acid (8:2 FTS)					0.0000081 J
N-ethylperfluoro-1-octanesulfonamidoacetic acid					0.000012 J
N-methylperfluoro-1-octanesulfonamidoacetic acid					0.000046
Perfluorobutanesulfonic Acid					0.00033
Perfluorobutanoic Acid					0.00072
Perfluorodecane Sulfonate					0.000031 U
Perfluorodecanoic Acid					0.000015 J
Perfluorododecanoic Acid					0.000031 U
Perfluoroheptane sulfonate					0.000031 U
Perfluoroheptanoic Acid					0.00058
Perfluorohexanesulfonic Acid					0.00022
Perfluorohexanoic Acid					0.0016
Perfluorononanoic Acid					0.000046
Perfluoro-n-tridecanoic acid					0.000031 U
Perfluorooctanesulfonamide					0.000031 U
Perfluorooctanesulfonic Acid					0.00012
Perfluorooctanoic Acid					0.00094
Perfluoropentanoic Acid					0.0022
Perfluorotetradecanoic acid (PFTeDA)					0.000031 U
Perfluoroundecanoic Acid					0.000031 U

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Campbell, New York
(mg/L except where noted)**

Parameter	LCS 11/15/2017	LCS 5/9/2018	LCS 11/8/2018	LCS 5/1/2019	LCS 11/20/2019
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Semi-Volatile Organic Compounds (SVOCs)

1,2,4,5-Tetrachlorobenzene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
1,3,5-Trinitrobenzene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
1,3-Dinitrobenzene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
1,4-Dioxane					0.12 *
1,4-Naphthoquinone	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U
1,4-Phenylenediamine	0.047 UX	0.047 UX	0.047 UX	0.047 UX	0.048 UX
1-Naphthylamine	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U
2,3,4,6-Tetrachlorophenol	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
2,4,5-Trichlorophenol	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
2,4,6-Trichlorophenol	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
2,4-Dichlorophenol	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
2,4-Dimethylphenol	0.0016 J	0.0094 U	0.0094 U	0.015	0.015
2,4-Dinitrophenol	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U
2,4-Dinitrotoluene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
2,6-Dichlorophenol	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
2,6-Dinitrotoluene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
2-Acetylaminofluorene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
2-Chloronaphthalene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0013 J
2-Chlorophenol	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
2-Methyl-5-nitroaniline	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
2-Methylnaphthalene	0.0094 U	0.0094 U	0.0094 U	0.0047 J	0.009 J
2-Methylphenol	0.0094 U	0.0094 U	0.0094 U	0.0097	0.0079 J
2-Naphthylamine	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U
2-Nitroaniline	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U
2-Nitrophenol	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
3,3-Dichlorobenzidine	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
3,3-Dimethylbenzidine	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U
3/4-Methylphenol	0.0094 U	0.0094 U	0.0094 U	0.082	0.096 D
3-Methylcholanthrene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
3-Nitroaniline	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U
4,6-Dinitro-2-methylphenol	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U
4-Aminobiphenyl	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U
4-Bromophenyl-phenylether	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
4-Chloro-3-methylphenol	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
4-Chloroaniline	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
4-Chlorophenyl-phenylether	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
4-Nitroaniline	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U
4-Nitrophenol	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U
7,12-Dimethylbenz(a)anthracene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Acenaphthene	0.0094 U	0.0094 U	0.0094 U	0.0051 J	0.0089 J
Acenaphthylene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Acetophenone	0.0094 U	0.0024 J	0.0028 J	0.0097	0.012
Anthracene	0.0094 U	0.0094 U	0.0015 J	0.0094 U	0.0095 U
Benzo(a)anthracene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Benzo(a)pyrene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Benzo(b)fluoranthene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Benzo(g,h,i)perylene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Benzo(k)fluoranthene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Benzyl alcohol	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Bis(1-chloroisopropyl) Ether	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U

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Hakes C and D Landfill
Campbell, New York
(mg/L except where noted)**

Parameter	LCS 11/15/2017	LCS 5/9/2018	LCS 11/8/2018	LCS 5/1/2019	LCS 11/20/2019
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SVOCs Continued

bis(2-Chloroethoxy) methane	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
bis(2-Chloroethyl) ether	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0052 J
bis(2-Ethylhexyl) phthalate	0.0099	0.0094 U	0.0097 U	0.0097 U	0.0097 U
Butylbenzylphthalate	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Chrysene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Diallate	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Dibenzo(a,h)anthracene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Dibenzofuran	0.0094 U	0.0094 U	0.0094 U	0.0021 J	0.0037 J
Diethylphthalate	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0013 J
Dimethoate	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U
Dimethylphthalate	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Di-n-butylphthalate	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Di-n-octylphthalate	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Diphenylamine	0.0094 UX	0.0094 UX	0.0094 UX	0.0094 U	0.0095 U
Disulfoton	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Ethyl methanesulfonate	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Famphur	0.00094 U	0.00094 U	0.00094 U	0.00094 U	0.00093 U
Fluoranthene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Fluorene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0023 J
Hexachlorobenzene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Hexachlorocyclopentadiene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Hexachloroethane	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Hexachloropropene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Indeno(1,2,3-cd)pyrene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Isodrin	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Isophorone	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Isosafrole	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Kepone	0.0047 U	0.0047 U	0.0047 U	0.0047 U	0.0046 U
Methapyrilene	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U
Methyl methanesulfonate	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Nitrobenzene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
N-Nitrosodibutylamine	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
N-Nitrosodiethylamine	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
N-Nitrosodimethylamine	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
N-Nitrosodi-n-propylamine	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
N-Nitrosodiphenylamine/Diphenylamine	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
N-Nitrosomethylethylamine	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
N-Nitrosopiperidine	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
N-Nitrosopyrrolidine	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
o,o,o-Triethyl phosphorothioate	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
o-Toluidine	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
p-(Dimethylamino)azobenzene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Pentachlorobenzene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Pentachloronitrobenzene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Pentachlorophenol	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U
Phenacetin	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Phenanthrene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Phorate	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Pronamide	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Pyrene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U

Table 1

**Current and Historic Leachate Analytical Results
Hakes C and D Landfill
Campbell, New York
(mg/L except where noted)**

Parameter	LCS 11/15/2017	LCS 5/9/2018	LCS 11/8/2018	LCS 5/1/2019	LCS 11/20/2019
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SVOCs Continued

Safrole	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Thionazin	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U

Volatile Organic Compounds (VOCs)

1,1,1,2-Tetrachloroethane	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
1,1,1-Trichloroethane	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
1,1,2,2-Tetrachloroethane	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
1,1,2-Trichloroethane	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
1,1-Dichloroethane	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
1,1-Dichloroethene	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
1,1-Dichloropropene	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2,3-Trichloropropane	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dibromo-3-chloropropane	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dibromoethane	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dichlorobenzene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
1,2-Dichloroethane	0.0023 J	0.05 U	0.0026 J	0.0021 J	0.05 U
1,2-Dichloropropane	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
1,3-Dichlorobenzene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
1,3-Dichloropropane	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
1,4-Dichlorobenzene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
2,2-Dichloropropane	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
2-Butanone (MEK)	0.0052 J	0.023 J	0.072 J	0.55	1.3
2-Chloro-1,3-butadiene	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
2-Hexanone	0.05 U	0.1 U	0.1 U	0.013 J	0.019 J
4-Methyl-2-pentanone	0.05 U	0.1 U	0.008 J	0.06 J	0.12
Acetone	0.024 J	0.058 J	0.13	1.2	3 D
Acetonitrile	0.5 U	1 U	1 U	1 U	1 U
Acrolein	0.5 U	1 U	1 U	1 U	1 U
Acrylonitrile	0.5 U	1 U	1 U	1 U	1 U
Allyl chloride	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzene	0.0079 J	0.05 U	0.0035 J	0.0037 J	0.0069 J
Bromochloromethane	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
Bromodichloromethane	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
Bromoform	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
Bromomethane	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
Carbon disulfide	0.05 U	0.1 U	0.1 U	0.0026 J	0.0027 J
Carbon tetrachloride	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
Chlorobenzene	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
Chloroethane	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
Chloroform	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
Chloromethane	0.0013 J	0.05 U	0.05 U	0.05 U	0.05 U
cis-1,2-Dichloroethene	0.0015 J	0.05 U	0.05 U	0.05 U	0.05 U
cis-1,3-Dichloropropene	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
Dibromochloromethane	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
Dibromomethane	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
Dichlorodifluoromethane	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
Dichloromethane (Methylene chloride)	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
Ethyl benzene	0.0017 J	0.05 U	0.05 U	0.0026 J	0.0037 J
Ethyl methacrylate	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U

Table 1

**Current and Historic Leachate Analytical Results
Hakes C and D Landfill
Campbell, New York
(mg/L except where noted)**

Parameter	LCS 11/15/2017	LCS 5/9/2018	LCS 11/8/2018	LCS 5/1/2019	LCS 11/20/2019
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VOCs Continued

Iodomethane	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U
Isobutyl alcohol	0.5 U	1 U	1 U	1 U	1 U
m&p-Xylene	0.0023 J	0.05 U	0.0029 J	0.0041 J	0.0074 J
Methacrylonitrile	0.1 U	0.2 U	0.2 U	0.2 U	0.2 U
Methyl methacrylate	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U
o-Xylene	0.0015 J	0.05 U	0.05 U	0.0023 J	0.0043 J
Phenol	0.0094 U	0.0094 U	0.0094 U	0.041	0.072
Propionitrile	0.5 U	1 U	1 U	1 U	1 U
Styrene	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
Tetrachloroethene	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
Toluene	0.0035 J	0.05 U	0.0029 J	0.0031 J	0.008 J
trans-1,2-Dichloroethene	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
trans-1,3-Dichloropropene	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
trans-1,4-Dichloro-2-butene	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
Trichloroethene	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
Trichlorofluoromethane	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
Vinyl acetate	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U
Vinyl chloride	0.025 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2,4-Trichlorobenzene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Hexachlorobutadiene	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
Naphthalene	0.0094 U	0.0094 U	0.0094 U	0.023	0.053

Wet Chemistry

Alkalinity	1220	1540	1910	2000	1840
Ammonia Nitrogen	80.2	94.2	125	142	287
Biochemical Oxygen Demand	36 X	37	57.4	58.2	96.6
Bromide	2.2	5.2	6.2	6.9	6.4
Chemical Oxygen Demand	420	672	870	826	982
Chloride	568	1390	1720	1810	1620
Color (True) (C.U.)	160	340	400	390	250
Cyanide	0.009 J	0.06 U	0.003 J	0.013	0.145
Hardness	1060	2050	1890	1740	1590
Nitrate Nitrogen	1 U	1 U	1 U	1 U	1 U
pH of Color Analysis	7.16	7.35 *	7.19	7.73 *	7.71 *
Sulfate	163	869	295	349	223
Sulfide	5 U	1.1 BJ	2 U	5 U	
Total Dissolved Solids	2270	4510	5100	4580	4660
Total Kjeldahl Nitrogen	74.1	110	138	176	88.4
Total Organic Carbon (TOC)	220	242	31.1	12.8	280
Total Phenolics	0.094	0.128	0.03	0.363	0.426

Notes:

U - Concentration not detected at specified detection limit

J/UJ - Estimated value

X/UX - Refer to laboratory analytical report for details

E - Inorganics - Estimated due to serial dilution outside control limits

B/BJ - Analyte was detected in the method blank that may have contributed to the sample result

* - Quality control parameter exceeds laboratory limits

Table 2

Fourth Quarter 2019 Groundwater Analytical Results
Hakes C and D Landfill
Campbell, New York
(mg/L except where noted)

Parameter	MW-CR 11/18/2019	MW-D 11/19/2019	MW-E 11/19/2019	MW-F 11/19/2019	MW-GR 11/19/2019	MW-H 11/18/2019	MW-J 11/19/2019	MW-L 11/18/2019	MW-N 11/19/2019	MW-O 11/18/2019	MW-P 11/19/2019	MW-Q 11/20/2019	Class GA Standard
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Field Parameters

Depth to Groundwater (ft)	10.05	26.09	18.73	25.33	37.61	5.15	15.73	10.41	22.58	19.71	19.24	6.36	
Dissolved Oxygen	1.44		3.44	3.52		3.15	1.84	1.29		1.01	0.41	1.63	
Field pH (std. units)	6.67	7.09	6.81	6.34	6.58	6.56	7.03	7.4	6.37	7.45	7.55	5.37	6.5 - 8.5
ORP (mV)	153	25.9	90.9	111.6	221.1	183.3	91.7	171.1	31	161	27.4	186.2	
Specific Conductivity (us/cm)	542.8	487.1	679.8	680.6	570	563.1	1074	525.4	864	363.8	483.4	453.9	
Temperature (deg. C)	8.7	11.3	6.9	8.1	12.5	8.2	6.2	6.2	11.8	7.6	8.1	6.5	
Turbidity (NTU)	5.52	4.77	3.81	11	4.71	1.32	7.62	11.6	19.7	4.14	2.8	2.2	5

Inorganic Compounds

Arsenic	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.025
Cadmium	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	0.005
Calcium	92.8	71.7	99.1	104	96.3	56.2	101	54.4	141	44.2	62.3	21.4	
Iron	0.17 B	0.38	0.28	0.43	0.24	0.07 BJ	0.81	0.77	2.4	0.22 B	0.17 B	0.11	0.3
Lead	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	0.025
Magnesium	28.9	16.7	31.2	28.7	17.5	25.3	24.9	25.6	33	14.7	18.4	7.9	
Manganese	0.053	0.006 J	0.298	0.059	0.005 J	0.009 J	0.316	0.07	4.35	0.03	0.98	0.015	0.3
Potassium	3.1	2 J	1.3 J	2.3	1.2 J	0.8 J	3.3	4.5	6.8	2.8	2 J	1.7 J	
Sodium	14.5	12	22.2	18	9.2	32.5	114	29.8	19.6	15.8	23.2	57.6	20

Wet Chemistry

Alkalinity	322	232	314	274	297	114	319	254	492	182	211	42.8	
Ammonia Nitrogen	0.05 U	0.016 J	0.05 U	0.05 U	0.05 U	0.05 U	0.006 J	0.05 U	0.247	0.05 U	0.018 J	0.05 U	2
Biochemical Oxygen Demand	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3.5	2 U	2 U	2 U	
Bromide	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
Chemical Oxygen Demand	4.2 J	5 U	5 U	7.4	5 U	5 U	5.3	5.3	11.9	5 U	5 U	5 U	
Chloride	17	11.7	10.1	32.8	5.6	14	166	5.4	3.2	1.8 J	9.3	112	250
Hardness	351	248	376	377	313	244	355	241	487	171	231	85.9	
Nitrate Nitrogen	0.4 J	0.6 J	0.8 J	1 U	0.5 J	0.7 J	1 U	1 U	0.4 J	1 U	1 U	0.5 J	10
Sulfate	27.5	21.8	67.9	78.3	25.7	176	50.7	38.7	29.7	20.5	52.7	21.3	250
Total Dissolved Solids	411	303	453	454	375	426	662	335	579	231	318	264	500
Total Kjeldahl Nitrogen	0.11 J	0.2 U	0.2 J	0.15 J	0.2 U	0.2 U	0.2 U	0.2 U	0.96	0.2 U	0.2 U	0.13 J	
Total Organic Carbon (TOC)	1.1	0.6 J	2	3.5	0.7 J	0.6 J	1.6	1 U	4.7	1 U	1 U	1.9	
Total Phenolics	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	0.001

Notes:

Class GA Standard - NYSDEC Class GA Groundwater Standard
Concentrations in **bold** exceed Class GA Standards

U - Concentration not detected at specified detection limit

J/UJ - Estimated value

B/BJ - Analyte was detected in the method blank that may have contributed to the sample result

Table 3

**Fourth Quarter 2019 Surface Water Analytical Results
Hakes C and D Landfill
Campbell, New York
(mg/L except where noted)**

Parameter	SW-1 11/18/2019	SW-1A 11/18/2019	SW-2 11/18/2019	SW-2A 11/18/2019	SW-3A 11/18/2019	SW-7 11/18/2019	Class C Standard
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Field Parameters

Dissolved Oxygen	12.82	11.79	12.87	13.91		12.48	Not < 5
Field pH (std. units)	8.42	8.62	7.26	7.27	7.67	7.69	6.5 - 8.5
ORP (mV)	103	125.9	132	122.3	143.2	142.2	
Specific Conductivity (us/cm)	87.3	86.7	130.7	157	347.7	73.9	
Temperature (deg. C)	1.2	1.4	1.7	2.4	4.4	2	
Turbidity (NTU)	3.42	6.03	6.64	4.81	43.3	3.37	

Inorganic Compounds

Arsenic		0.01 U	0.01 U		0.01 U		
Cadmium		0.005 U	0.005 U		0.005 U		
Calcium		6.1	12.7		51.4		
Iron		0.14 B	0.31		2.45		
Lead		0.005 U	0.005 U		0.005 U		0.008
Magnesium		2.1	3.7		9.6		
Manganese		0.005 J	0.009 J		0.122		
Potassium		0.7 J	1.1 J		5.9		
Sodium		7.2	6.2		11.4		

Oil & Grease

Oil & Grease					2.1 J		
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Wet Chemistry

Alkalinity		16	34.8		112		
Ammonia Nitrogen		0.003 J	0.05 U		0.011 J		2
Biochemical Oxygen Demand		2 U	2 U		2 U		
Bromide		1 U	1 U		1 U		
Chemical Oxygen Demand		7.7	8.4		11.5		
Chloride		10.7	8.3		20.8		
Hardness		23.8	47		168		
Nitrate Nitrogen		1 U	1 U		1 U		
Nitrate-Nitrite					0.003 J		
Sulfate		8.2	15.4		58		
Total Dissolved Solids		68	91		272		500
Total Kjeldahl Nitrogen		0.1 J	0.16 J		0.3		
Total Nitrogen					0.31		
Total Organic Carbon (TOC)		3.4	2.7		4.2		
Total Phenolics		0.005 U	0.005 U		0.005 U		
Total Suspended Solids	3.6	2.5	1.2	1.9	18.5	1 U	

Notes:

Class C Standard - NYSDEC Class C Surface Water Standard

Concentrations in **bold** exceed Class C Standards

U - Concentration not detected at specified detection limit

J - Estimated value

Table 4

Fourth Quarter 2019 Groundwater Suppression System Analytical Results
Hakes C and D Landfill
Campbell, New York
(mg/L except where noted)

Parameter	GSS-1A 11/18/2019	GSS-3 11/18/2019	GSS-4 11/18/2019	GSS-5 11/18/2019	GSS-6 11/18/2019	GSS-8 11/18/2019	Class GA Text ppm
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Field Parameters

Field pH (std. units)	6.78	8.3	8.46	8.44	8.01	6.96	6.5 - 8.5
ORP (mV)	114.2	96.2	95.1	101.7	112.5	175.2	
Specific Conductivity (us/cm)	308.8	409.7	502.2	405.3	801.8	724	
Temperature (deg. C)	9.9	10.4	11.1	10.7	3	14.2	
Turbidity (NTU)	21.9	2.15	0.81	0.41	6.54	4.34	5

Inorganic Compounds

Arsenic	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.025
Cadmium	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005
Calcium	39	56.6	42.9	43.9	58.7	89.9	
Iron	0.99	0.05 BJ	0.03 BJ	0.03 BJ	1.13	0.1 B	0.3
Lead	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.025
Magnesium	11.5	13.9	14.9	14.4	17.4	18.8	
Manganese	0.072	0.01 U	0.01 U	0.01 U	0.158	0.046	0.3
Potassium	1.7 J	1.8 J	3.2	2.5	2.5	2.2	
Sodium	4.9	14.1	36.3	19.7	17.7	48.8	20

Wet Chemistry

Alkalinity	94.8	177	70.4	110	190	206	
Ammonia Nitrogen	0.024 J	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	2
Biochemical Oxygen Demand	2 U	2 U	2 U	2 U	2 U	2 U	
Bromide	1 U	1 U	1 U	1 U	1 U	1 U	
Chemical Oxygen Demand	16.2	5 U	5 U	5 U	6	9.5	
Chloride	1.7 J	28.3	120	51.7	30.3	105	250
Hardness	145	199	168	169	218	302	
Nitrate Nitrogen	0.8 J	1 U	0.5 J	0.4 J	1 U	0.6 J	10
Sulfate	62.3	18	20	35.9	77	57.9	250
Total Dissolved Solids	224	272	296	261	408	485	500
Total Kjeldahl Nitrogen	0.4	0.2 U	0.2 U	0.2 U	0.2 U	0.11 J	
Total Organic Carbon (TOC)	6.3	0.7 J	0.6 J	1 J	1.4	3.1	
Total Phenolics	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.001

Notes:

Class GA Standard - NYSDEC Class GA Groundwater Standards

Concentrations in **bold** exceed Class GA Standards

U - Concentration not detected at specified detection limit

J / BJ - Estimated value

Current and Historic Groundwater Analytical Results
Hakes C and D Landfill
Campbell, New York
(mg/L except where noted)

Parameter	Upgradient Wells													
	MW-H 11/8/2018	MW-H 2/14/2019	MW-H 4/30/2019	MW-H 8/13/2019	MW-H 11/18/2019	MW-L 11/7/2018	MW-L 2/11/2019	MW-L 4/30/2019	MW-L 8/12/2019	MW-L 11/18/2019	MW-Q 11/7/2018	MW-Q 4/30/2019	MW-Q 8/13/2019	MW-Q 11/20/2019

Field Parameters

Depth to Groundwater (ft)	4.12	4.12	4.26	4.5	5.15	8.86	9.13	8	9.17	10.41	2.17	2.82	8.5	6.36
Dissolved Oxygen	4.16	5.19	2.4	2.72	3.15	0.52	4.96	2.38	0.61	1.29	1.2	4.23	2.55	1.63
Field pH (std. units)	6.62	6.63	6.57	6.36	6.56	7.52	7.71	7.56	7.33	7.4	5.58	5.57	5.47	5.37
ORP (mV)	36.8	140.9	158	193.8	183.3	178.9	99.2	121.1	87.6	171.1	234.6	171.6	208.9	186.2
Specific Conductivity (us/cm)	667.5	627	563.1	543.6	563.1	522.8	508.3	518.1	505.3	525.4	236.4	420.8	397.4	453.9
Temperature (deg. C)	9.4	4	7.8	17.6	8.2	13.3	5.6	7.9	17.9	6.2	15	7.8	17.4	6.5
Turbidity (NTU)	3.12	1.01	0.71	0.97	1.32	6.73	6.76	10.3	6.08	11.6	0.61	1.27	1.35	2.2

Inorganic Compounds

Aluminum				0.0273 J					0.157				0.0538 J	
Antimony				0.06 U					0.06 U				0.06 U	
Arsenic				0.01 U	0.01 U				0.01 U	0.01 U			0.01 U	0.01 U
Barium				0.0159 J					0.024				0.0306	
Beryllium				0.003 U					0.003 U				0.003 U	
Boron				0.0192 J					0.0622 J				0.0321 J	
Cadmium	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	0.005 U	0.005 U
Calcium	70.8	72.2	58.3	53.4	56.2	55.3	55.9	55.4	51.9	54.4	8.4	19.1	18.3	21.4
Chromium				0.01 U					0.0013 J				0.01 U	
Chromium, hexavalent				0.01 U,*					0.01 U,*				0.01 U,*	
Cobalt				0.05 U					0.05 U				0.05 U	
Copper				0.02 U					0.02 U				0.02 U	
Iron	0.06 J	0.1 U	0.1 U	0.1 U	0.07 BJ	0.2	0.32	0.39	0.215	0.77	0.1 U	0.04 J	0.0381 J	0.11
Lead	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	0.005 U	0.005 U
Magnesium	30.9	30.7	26.3	24	25.3	25.9	25.8	25.7	24	25.6	3.2	7.3	6.78	7.9
Manganese	0.073	0.009 J	0.01 U	0.01 U	0.009 J	0.081	0.06	0.06	0.0509	0.07	0.01 U	0.004 J	0.0197	0.015
Mercury				0.0002 U					0.0002 U				0.0002 U	
Nickel				0.04 U					0.04 U				0.04 U	
Potassium	0.9 J	0.9 J	0.7 J	0.699 J	0.8 J	4.2	4.8	4.5	3.75	4.5	1.1 J	1.3 J	1.66 J	1.7 J
Selenium				0.01 U					0.009 J				0.01 U	
Silver				0.01 U					0.01 U				0.01 U	
Sodium	39.1	35.3	31.6	30.8	32.5	31.3	30.9	31.2	30.3	29.8	35.3	48.9	48.5	57.6
Thallium				0.01 U					0.01 U				0.01 U	
Vanadium				0.05 U					0.05 U				0.05 U	
Zinc				0.02 U					0.02 U				0.02 U	

Wet Chemistry

Alkalinity	132	126	120	111	114	247	248	257	238	254	26	16.4	38	42.8
Ammonia Nitrogen	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	0.05 U	0.05 U
Biochemical Oxygen Demand	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Bromide	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
Chemical Oxygen Demand	5 U	8.5	5 U	5 U	5 U	5 U	5.1	5 U	5 U	5.3	5 U	5 U	5 U	5 U
Chloride	52	38	23.3	10.1	14	4.4	4.7	4.4	4.8	5.4	45.3	108	81.7	112
Color (True) (C.U.)				19					13				18	
Cyanide				0.005 U					0.005 U				0.005 U	
Hardness	304	307	254	232	244	245	246	244	229	241	34.3	77.9	73.6	85.9
Nitrate Nitrogen	0.5 J	0.4 J	0.4 J	0.5 J	0.7 J	1 U	1 U	1 U	1 U	1 U	0.4 J	1 U	0.5 J	0.5 J
pH of Color Analysis				6.89					7.47				6.02	
Sulfate	142	165	126	148	176	32.5	39.3	37.5	34.5	38.7	15.6	14.1	20.4	21.3
Total Dissolved Solids	452	450	396	407	426	315	331	323	339	335	141	232	240	264
Total Kjeldahl Nitrogen	0.15 BJ	0.2 U	0.2 U	0.22	0.2 U	0.12 BJ	0.1 J	0.11 J	0.2 U	0.2 U	0.15 BJ	0.15 J	0.2 J	0.13 J
Total Organic Carbon (TOC)	0.7 J	0.8 BJ	0.5 J	0.5 J	0.6 J	0.6 J	0.8 BJ	0.7 J	0.8 J	1 U	1.6	1 J	2	1.9
Total Phenolics	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.0028 J	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U

Current and Historic Groundwater Analytical Results
Hakes C and D Landfill
Campbell, New York
(mg/L except where noted)

Parameter	Downgradient Wells														
	MW-CR 11/7/2018	MW-CR 2/13/2019	MW-CR 5/1/2019	MW-CR 8/14/2019	MW-CR 11/18/2019	MW-D 11/7-8/2018	MW-D 2/13/2019	MW-D 5/1/2019	MW-D 8/12-13/2019	MW-D 11/19/2019	MW-E 11/8/2018	MW-E 2/13/2019	MW-E 5/1/2019	MW-E 8/12/2019	MW-E 11/19/2019
Field Parameters															
Depth to Groundwater (ft)	9.6	9.83	9.92	9.81	10.05	25.33	25.97	25.46	25.34	26.09	16.36	16.74	17.35	19.31	18.73
Dissolved Oxygen	1.98	3.15	2.38	1.26	1.44						3.9	1.45	1.01	0.55	3.44
Field pH (std. units)	7.05	7.24	7.07	6.86	6.67	7.08	7.25	7.14	7.38	7.09	6.74	6.73	6.67	6.34	6.81
ORP (mV)	64.9	107.1	90.7	185.9	153	214.2	164.4	142.1	191.9	25.9	28.1	146.6	99.8	155.8	90.9
Specific Conductivity (us/cm)	691	607.7	671	664	542.8	473.2	453.9	491.9	491.5	487.1	685.6	637.2	659	682	679.8
Temperature (deg. C)	13	7.7	12	17.3	8.7	13.1	11	10.9	12.7	11.3	9.3	7.7	16.3	21.4	6.9
Turbidity (NTU)	2.33	1.83	2.08	3.47	5.52	2.24	6.03	10	6.24	4.77	5.72	4.48	4.76	3.7	3.81
Inorganic Compounds															
Aluminum				0.0498 J					0.042 J					0.115	
Antimony				0.06 U					0.06 U					0.06 U	
Arsenic				0.01 U	0.01 U				0.01 U	0.01 U				0.01 U	0.01 U
Barium				0.0624					0.087					0.0831	
Beryllium				0.003 U					0.003 U					0.003 U	
Boron				0.0289 J					0.0175 J					0.0219 J	
Cadmium	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	0.005 U	0.005 U	0.005 U
Calcium	105	99.9	102	96.9	92.8	78.3	79.7	77.1	68	71.7	110	109	102	97	99.1
Chromium				0.01 U					0.01 U					0.01 U	
Chromium, hexavalent				0.01 U,*					0.01 U,*					0.01 U,*	
Cobalt				0.05 U					0.05 U					0.05 U	
Copper				0.02 U					0.02 U					0.02 U	
Iron	0.3	0.1 U	0.03 J	0.0489 J	0.17 B	0.1 U	0.37	0.2	0.0451 J	0.38	0.09 J	0.12	0.24	0.128	0.28
Lead	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	0.005 U	0.005 U	0.005 U
Magnesium	32.1	30.5	31.5	29.7	28.9	17.6	18.1	18.2	15.7	16.7	33.2	31.9	30.6	30.5	31.2
Manganese	0.132	0.015	0.013	0.0248	0.053	0.01 U	0.028	0.005 J	0.01 U	0.006 J	0.314	0.584	0.864	0.532	0.298
Mercury				0.0002 U					0.0002 U					0.0002 U	
Nickel				0.04 U					0.04 U					0.04 U	
Potassium	3.8	3.5	3.3	3.21	3.1	2	2.1	1.9 J	1.74 J	2 J	1.2 J	1 J	1 J	0.959 J	1.3 J
Selenium				0.0056 J					0.01 U					0.0048 J	
Silver				0.01 U					0.01 U					0.01 U	
Sodium	15.6	14.9	15.3	14.5	14.5	10.6	10.8	11.5	10.9	12	16.3	15.2	16.6	14.3	22.2
Thallium				0.01 U					0.01 U					0.01 U	
Vanadium				0.05 U					0.05 U					0.05 U	
Zinc				0.02 U					0.02 U					0.02 U	
Wet Chemistry															
Alkalinity	330	309	342	318	322	226	224	235	224	232	314	301	310	299	314
Ammonia Nitrogen	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U	0.05 U	0.036 J	0.05 U	0.05 U	0.016 J	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Biochemical Oxygen Demand	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Bromide	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	1 U
Chemical Oxygen Demand	5 U	5 U	5 U	5 U	4.2 J	5 U	7.5	5 U	5 U	5 U	4.1 J	4.8 J	7.5	6	5 U
Chloride	15.4	16.3	16.7	17.6	17	10.1	10.7	10.2	10.9	11.7	8	8.2	7.9	7.8	10.1
Color (True) (C.U.)				6					17					14	
Cyanide				0.005 U					0.005 U					0.005 U	
Hardness	394	375	385	364	351	268	274	267	235	248	410	404	381	368	376
Nitrate Nitrogen	1 U	1 U	0.3 J	1 U	0.4 J	0.6 J	0.6 J	0.5 J	0.5 J	0.6 J	1 U	1 U	0.4 J	1 U	0.8 J
pH of Color Analysis				7.92					7.62					6.66	
Sulfate	24.5	27.5	27.3	28.1	27.5	17.8	20.3	20.3	20	21.8	62.9	69.1	67.5	62.4	67.9
Total Dissolved Solids	398	391	419	413	411	291	293	290	321	303	440	440	422	464	453
Total Kjeldahl Nitrogen	0.16 BJ	0.14 J	0.14 J	0.1 J	0.11 J	0.21 B	0.35	0.2 U	0.1 J	0.2 U	0.26 B	0.18 J	0.23 B	0.2 U	0.2 J
Total Organic Carbon (TOC)	1.2	1.4 B	1.4	1.3	1.1	1.5	1.6 B	0.8 J	1 U	0.6 J	3	2.5 B	2.4	2	2
Total Phenolics	0.005 U		0.0017 J	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.002 J	0.005 U	0.005 U	0.005 U

Current and Historic Groundwater Analytical Results
Hakes C and D Landfill
Campbell, New York
(mg/L except where noted)

Parameter	Downgradient Wells														
	MW-F 11/8/2018	MW-F 2/14/2019	MW-F 5/1/2019	MW-F 8/14/2019	MW-F 11/19/2019	MW-GR 11/7-8/2018	MW-GR 2/13/2019	MW-GR 5/1/2019	MW-GR 8/12-13/2019	MW-GR 11/19/2019	MW-J 11/7/2018	MW-J 2/11/2019	MW-J 5/1/2019	MW-J 8/13/2019	MW-J 11/19/2019
Field Parameters															
Depth to Groundwater (ft)	21.48	19.18	18.33	24.82	25.33	36.76	36.44	36.63	38.05	37.61	15.04	15.19	14.92	15.17	15.73
Dissolved Oxygen	2.03	3.19	0.58	2.51	3.52						1.65	3.52	2.14	2.16	1.84
Field pH (std. units)	6.3	6.34	6.4	5.97	6.34	7.01	7.03	5.98	6.85	6.58	6.93	7.26	7	6.96	7.03
ORP (mV)	46.7	172.2	99.9	208.8	111.6	201.4	183.4	151.6	203.4	221.1	99.6	114.7	112.4	169.3	91.7
Specific Conductivity (us/cm)	1005	811	794	721	680.6	555.2	519	565	596.9	570	1110	1091	1113	1111	1074
Temperature (deg. C)	9.4	6.9	14.6	17.3	8.1	13.1	11.6	12.1	13.7	12.5	9.6	2.8	9	20.7	6.2
Turbidity (NTU)	5.96	2.42	4.69	3.09	11	5.26	1.37	6.82	8.22	4.71	15.8	10.1	47.8	13.6	7.62
Inorganic Compounds															
Aluminum				0.132					0.227					0.638	
Antimony				0.06 U					0.06 U					0.06 U	
Arsenic				0.01 U	0.01 U				0.01 U	0.01 U				0.01 U	0.01 U
Barium				0.138					0.113					0.0773	
Beryllium				0.003 U					0.003 U					0.003 U	
Boron				0.0198 J					0.0158 J					0.0429 J	
Cadmium	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	0.005 U	0.005 U	0.005 U
Calcium	170	143	131	103	104	97.4	102	104	96.9	96.3	105	116	108	105	101
Chromium				0.01 U					0.01 U					0.001 J	
Chromium, hexavalent				0.01 U,*					0.01 U,*					0.01 U,*	
Cobalt				0.05 U					0.05 U					0.05 U	
Copper				0.02 U					0.02 U					0.02 U	
Iron	0.12	0.09 J	0.06 J	0.151	0.43	0.2	0.1 U	0.2	0.256	0.24	0.57	0.64	2.4	0.775	0.81
Lead	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	0.005 U	0.005 U	0.005 U
Magnesium	41.8	37.5	33	28.9	28.7	17.2	17.7	18.3	17.3	17.5	26.3	32.5	28.8	29.2	24.9
Manganese	0.061	0.061	0.008 J	0.0461	0.059	0.01 U	0.01 U	0.01 J	0.0057 J	0.005 J	0.323	0.191	0.421	0.0683	0.316
Mercury				0.0002 U					0.0002 U					0.0002 U	
Nickel				0.04 U					0.04 U					0.04 U	
Potassium	3.6	3	2.3	1.84 J	2.3	1.9 J	1.4 J	1.4 J	1.21 J	1.2 J	3.6	4.6	4.3	3.86	3.3
Selenium				0.0074 J					0.01 U					0.01 U	
Silver				0.01 U					0.01 U					0.01 U	
Sodium	23.6	20.9	17.2	17	18	9.8	9.4	9.9	9	9.2	125	94.3	104	91.2	114
Thallium				0.01 U					0.01 U					0.01 U	
Vanadium				0.05 U					0.05 U					0.05 U	
Zinc				0.02 U					0.02 U					0.02 U	
Wet Chemistry															
Alkalinity	430	338	335	276	274	276	266	300	297	297	306	303	317	308	319
Ammonia Nitrogen	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	0.05 U	0.05 U	0.006 J
Biochemical Oxygen Demand	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Bromide	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	1 U
Chemical Oxygen Demand	6.8	12.4	9.1	5 U	7.4	5 U	5 U	5 U	5 U	5 U	5 U	8.8	4.8 J	5 U	5.3
Chloride	38.9	36.6	17.7	29.9	32.8	3.4	3.9	3.9	4.3	5.6	158	162	161	153	166
Color (True) (C.U.)				9					19					25	
Cyanide				0.005 U					0.005 U					0.005 U	
Hardness	596	511	463	377	377	314	327	335	313	313	371	423	388	383	355
Nitrate Nitrogen	1 U	0.4 J	0.4 J	1 U	1 U	0.5 J	1 U	0.3 J	0.3 J	0.5 J	1 U	1 U	1 U	1 U	1 U
pH of Color Analysis				6.88 *					7.29					7.54	
Sulfate	80.6	96.1	97.8	81.6	78.3	29.9	26.2	26	25.9	25.7	49.3	56.2	53.1	51.1	50.7
Total Dissolved Solids	643	569	523	486	454	354	342	354	398	375	684	672	665	681	662
Total Kjeldahl Nitrogen	0.24 B	0.23	0.25 B	0.18 J	0.15 J	0.15 BJ	0.15 J	0.15 BJ	0.2 U	0.2 U	0.2 BJ	0.14 J	0.18 J	0.2 U	0.2 U
Total Organic Carbon (TOC)	4.7	4.2	4.4	3.2	3.5	0.8 J	0.9 BJ	1.1	0.6 J	0.7 J	2.2	1.4 B	1.6	1.3	1.6
Total Phenolics	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.0021 J	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.0034 J	0.005 U	0.005 U

Table 5 Continued

Groundwater Pre-Operational Water Quality Data and NYSDEC Water Quality Standards
Hakes C and D Landfill
Campbell New York
(mg/L)

Parameter	Number Samples	Number Detects	Minimum	Maximum	Existing Water Quality Value (Mean)	Standard Deviation	Mean +3 Standard Deviations	Class GA Standard
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Field Parameters

Field pH (std. units)	36	36	5.94	8.77	7.25	0.62	5.39-9.11	6.5-8.5
ORP (mV)	36	36	-110.2	310	38.3	128.1	422.7	
Specific Conductivity (us/cm)	36	36	178	1800	611	376	1740	
Turbidity (NTU)	35	35	3.8	94	26.7	23	96	5

Inorganic Compounds

Aluminum	14	11	0.038	6.8	1.37	2.09	7.66	
Antimony	14	1	0.0005	0.061	0.0063	0.016	0.0544	0.003
Arsenic	14	4	0.0005	0.0193	0.0027	0.005	0.0179	0.025
Barium	14	13	0.008	0.118	0.049	0.026	0.127	1
Beryllium	14	0	0.002	0.003	0.0022	0.0004	0.0035	
Boron	14	2	0.024	0.25	0.084	0.096	0.372	1
Cadmium	34	2	0.0005	0.004	0.0018	0.0011	0.0051	0.005
Calcium	34	34	17.4	196	64	45	199	
Chromium	14	6	0.001	0.012	0.0039	0.004	0.016	0.05
Chromium, hexavalent	13	0	0.01	0.01	0.01	0	0.01	
Cobalt	14	1	0.005	0.013	0.007	0.003	0.015	
Copper	14	2	0.005	0.0148	0.0091	0.0025	0.0166	0.2
Iron	34	34	0.051	3.76	1.38	1.27	5.2	0.3
Lead	34	17	0.0005	0.021	0.0033	0.0048	0.018	0.025
Magnesium	34	34	4.8	75.8	21.2	16.3	70	
Manganese	34	34	0.032	4.69	0.98	1.06	4.15	0.3
Mercury	14	0	0.0002	0.0002	0.0002	0	0.0002	0.0007
Nickel	14	1	0.006	0.015	0.008	0.004	0.02	0.1
Potassium	34	32	0.5	20	8.2	7.3	30.1	
Selenium	14	1	0.0005	0.004	0.0012	0.0012	0.0047	0.01
Silver	14	0	0.001	0.01	0.0032	0.0038	0.0147	0.05
Sodium	34	34	4.45	87.6	25.7	19.2	83.2	20
Thallium	14	0	0.001	0.01	0.0029	0.0038	0.0144	
Vanadium	14	0	0.005	0.03	0.01	0.011	0.042	
Zinc	14	7	0.01	0.052	0.022	0.015	0.067	

Wet Chemistry

Alkalinity	115	115	12.4	520	131	98.3	426	
Ammonia Nitrogen	117	66	0.01	2.61	0.174	0.29	1.04	2
Biochemical Oxygen Demand	51	4	1.5	6	2	1.1	5.3	
Bromide	31	0	0.1	1	0.6	0.3	1.5	
Chemical Oxygen Demand	116	37	5	891	26.6	91.2	300	
Chloride	117	117	0.5	290	21.7	28.3	106	250
Color (True) (C.U.)	32	28	2.5	1250	148	306	1066	15
Cyanide	34	1	0.003	0.006	0.003	0.001	0.006	0.2
Hardness	118	118	35.2	802	206	131	598	
Nitrate Nitrogen	114	63	0.05	1.49	0.191	0.226	0.869	10
Sulfate	117	115	2.5	550	59	69	266	250
Total Dissolved Solids	117	117	60	1220	273	185	828	500
Total Kjeldahl Nitrogen	50	18	0.25	10.2	1.17	1.68	6.22	
Total Organic Carbon (TOC)	118	99	0.4	151	6.7	18.9	63.3	
Total Phenolics	115	28	0.001	0.017	0.003	0.003	0.012	0.001

Notes:

Existing Water Quality Values updated May 28, 2008 for Cell 5 operations

The water quality standards are Class GA Groundwater Standards from NYSDEC Water Quality Regulations Parts 700-705

Current and Historic Surface Water Analytical Results
Hakes C and D Landfill
Campbell, New York
(mg/L except where noted)

Parameter	SW-1 11/8/2018	SW-1 2/14/2019	SW-1 4/30/2019	SW-1 8/14/2019	SW-1 11/18/2019	SW-1A 11/8/2018	SW-1A 2/14/2019	SW-1A 4/30/2019	SW-1A 8/14/2019	SW-1A 11/18/2019	SW-2 11/8/2018	SW-2 2/14/2019	SW-2 4/30/2019	SW-2 8/14/2019	SW-2 11/18/2019
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Field Parameters

Dissolved Oxygen	11.4	12.4	11.22	7.95	12.82	11.24	12.04	11.34	7.53	11.79	11.52	11.63	13.08	8.49	12.87
Field pH (std. units)	7.71	8.23	7.97	8.49	8.42	7.37	7.73	7.03	6.87	8.62	7.28	7.1	6.83	6.56	7.26
ORP (mV)	100.4	135.9	136.7	47.2	103	98	124.3	144.9	81.6	125.9	107.6	200.1	111.8	102.8	132
Specific Conductivity (us/cm)	61.8	64.1	65.6	127.3	87.3	70.6	82.4	81.2	109.2	86.7	77.3	82	90.2	137.1	130.7
Temperature (deg. C)	6.2	0.3	6.2	17.2	1.2	6.2	0.2	6	16.7	1.4	6.3	0.4	6.4	17.2	1.7
Turbidity (NTU)	5.02	3.64	5.35	16.4	3.42	2.34	3.01	6.56	4.49	6.03	6.97	8.84	8.43	9.94	6.64

Inorganic Compounds

Aluminum									0.174						0.574
Antimony									0.06 U						0.06 U
Arsenic									0.01 U	0.01 U					0.01 U 0.01 U
Barium									0.0276						0.0349
Beryllium									0.003 U						0.003 U
Boron									0.0167 J						0.0272 J
Cadmium						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
Calcium						5.8	5.7	5.1	9.25	6.1	7.8	8.1		14.5	12.7
Chromium									0.01 U						0.0008 J
Chromium, hexavalent									0.01 U,*						0.01 U,*
Cobalt									0.05 U						0.05 U
Copper									0.02 U						0.02 U
Iron						0.14	0.11	0.12	0.201	0.14 B	0.3	0.39		0.633	0.31
Lead						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
Magnesium						1.9	2	1.7	2.99	2.1	2.4	2.5		4.34	3.7
Manganese						0.01 U	0.01 U	0.005 J	0.0104	0.005 J	0.013	0.009 J		0.0205	0.009 J
Mercury									0.0002 U						0.0002 U
Nickel									0.04 U						0.04 U
Potassium						0.6 J	0.5 BJ	0.5 BJ	0.936 J	0.7 J	0.7 J	0.7 BJ		1.33 J	1.1 J
Selenium									0.01 U						0.01 U
Silver									0.01 U						0.01 U
Sodium						6.2	7.5	7.8	7.69	7.2	4.6	5		6.07	6.2
Thallium									0.01 U						0.01 U
Vanadium									0.05 U						0.05 U
Zinc									0.02 U						0.02 U

Oil & Grease

Oil & Grease															
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Volatile Organic Compounds (VOCs)

1,1,1,2-Tetrachloroethane									0.005 U						0.005 U
1,1,1-Trichloroethane									0.005 U						0.005 U
1,1,2,2-Tetrachloroethane									0.005 U						0.005 U
1,1,2-Trichloroethane									0.005 U						0.005 U
1,1-Dichloroethane									0.005 U						0.005 U
1,1-Dichloroethene									0.005 U						0.005 U
1,2,3-Trichloropropane									0.005 U						0.005 U
1,2-Dibromo-3-chloropropane									0.005 U						0.005 U
1,2-Dibromoethane									0.005 U						0.005 U
1,2-Dichlorobenzene									0.005 U						0.005 U
1,2-Dichloroethane									0.005 U						0.005 U
1,2-Dichloropropane									0.005 U						0.005 U
1,4-Dichlorobenzene									0.005 U						0.005 U
2-Butanone (MEK)									0.01 U						0.01 U
2-Hexanone									0.01 U						0.01 U
4-Methyl-2-pentanone									0.01 U						0.01 U

Current and Historic Surface Water Analytical Results
Hakes C and D Landfill
Campbell, New York
(mg/L except where noted)

Parameter	SW-1 11/8/2018	SW-1 2/14/2019	SW-1 4/30/2019	SW-1 8/14/2019	SW-1 11/18/2019	SW-1A 11/8/2018	SW-1A 2/14/2019	SW-1A 4/30/2019	SW-1A 8/14/2019	SW-1A 11/18/2019	SW-2 11/8/2018	SW-2 2/14/2019	SW-2 4/30/2019	SW-2 8/14/2019	SW-2 11/18/2019
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VOCs Continued

Acetone									0.011 U					0.01 U	
Acrylonitrile									0.1 U					0.1 U	
Benzene									0.005 U					0.005 U	
Bromochloromethane									0.005 U					0.005 U	
Bromodichloromethane									0.005 U					0.005 U	
Bromoform									0.005 U					0.005 U	
Bromomethane									0.005 U					0.005 U	
Carbon disulfide									0.01 U					0.01 U	
Carbon tetrachloride									0.005 U					0.005 U	
Chlorobenzene									0.005 U					0.005 U	
Chloroethane									0.005 U					0.005 U	
Chloroform									0.005 U					0.005 U	
Chloromethane									0.005 U					0.005 U	
cis-1,2-Dichloroethene									0.005 U					0.005 U	
cis-1,3-Dichloropropene									0.005 U					0.005 U	
Dibromochloromethane									0.005 U					0.005 U	
Dibromomethane									0.005 U					0.005 U	
Dichloromethane (Methylene chloride)									0.005 U					0.005 U	
Ethyl benzene									0.005 U					0.005 U	
Iodomethane									0.01 U					0.01 U	
m&p-Xylene									0.005 U					0.005 U	
o-Xylene									0.005 U					0.005 U	
Styrene									0.005 U					0.005 U	
Tetrachloroethene									0.005 U					0.005 U	
Toluene									0.005 U					0.005 U	
trans-1,2-Dichloroethene									0.005 U					0.005 U	
trans-1,3-Dichloropropene									0.005 U					0.005 U	
trans-1,4-Dichloro-2-butene									0.005 U					0.005 U	
Trichloroethene									0.005 U					0.005 U	
Trichlorofluoromethane									0.005 U					0.005 U	
Vinyl acetate									0.01 U					0.01 U	
Vinyl chloride									0.005 U					0.005 U	

Wet Chemistry

Alkalinity						15.6	11.6	14	24	16	20.4	16.8		41.2	34.8
Ammonia Nitrogen						0.05 U	0.05 U	0.05 U	0.05 U	0.003 J	0.05 U	0.05 U		0.05 U	0.05 U
Biochemical Oxygen Demand						2 U	2 U	2 U	2 U	2 U	2 U	2 U		2 U	2 U
Bromide						1 U	1 U	1 U	1 U	1 U	1 U	1 U		1 U	1 U
Chemical Oxygen Demand						14	15	12.4	17	7.7	8.1	5.8		13.6	8.4
Chloride						8	13.2	11.3	14.3	10.7	5.1	8.2		6	8.3
Color (True) (C.U.)									40					41	
Cyanide									0.005 U					0.005 U	
Hardness						22.4	22.5	20	35.4	23.8	29.4	30.3		54.2	47
Nitrate Nitrogen						1 U	0.2 J	1 U	1 U	1 U	1 U	0.2 J		1 U	1 U
Nitrate-Nitrite								0.045 J							
pH of Color Analysis									7.03					7.16 *	
Sulfate						3.8	5.4	4.4	5.9	8.2	7	10.1		13.4	15.4
Total Dissolved Solids						56	65	59	86	68	61	65		99	91
Total Kjeldahl Nitrogen						0.28	0.23	0.25	0.28	0.1 J	0.26	0.25		0.22	0.16 J
Total Nitrogen								0.3							
Total Organic Carbon (TOC)						5.4	3.1	4.3	6.5	3.4	4.4	2.5		5.1	2.7
Total Phenolics						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
Total Suspended Solids	2.7	1 U	2.6	13.5	3.6	1 U	1 U	1.8	5.9	2.5	2.1	2 U	3.1	11.7	1.2

Current and Historic Surface Water Analytical Results
Hakes C and D Landfill
Campbell, New York
(mg/L except where noted)

Parameter	SW-2A 11/8/2018	SW-2A 2/14/2019	SW-2A 4/30/2019	SW-2A 8/14/2019	SW-2A 11/18/2019	SW-3A 11/8/2018	SW-3A 2/14/2019	SW-3A 11/18/2019	SW-7 11/8/2018	SW-7 2/14/2019	SW-7 4/30/2019	SW-7 8/14/2019	SW-7 11/18/2019	SW-9 11/8/2018	SW-9 2/14/2019	SW-9 4/30/2019	Class C Standard
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Field Parameters

Dissolved Oxygen	11.44	11.15	13.66	8.45	13.91				11.13	12.45	12.41	5.73	12.48				Not < 5
Field pH (std. units)	6.95	7.47	6.75	6.48	7.27	7.83	7.32	7.67	7.09	7.19	6.72	6.31	7.69	7.98	7.83	7.77	6.5 - 8.5
ORP (mV)	125.1	118.7	181	140.6	122.3	117.7	162	143.2	108.1	148.6	126.8	147	142.2	100.9	122.8	88.3	
Specific Conductivity (us/cm)	68.7	72.2	75.1	132.4	157	395	449.5	347.7	55.3	52.8	63.4	122.9	73.9	203.5	84	96.9	
Temperature (deg. C)	6.7	0.4	6.6	16.9	2.4	6.9	0.8	4.4	6.6	0.3	6.5	16.6	2	6.2	0.7	9.5	
Turbidity (NTU)	4.49	5.71	5.13	9.76	4.81	9.41	6.81	43.3	4.31	4.26	3.47	8.75	3.37	79.2	8.36	9.33	

Inorganic Compounds

Aluminum																	
Antimony																	
Arsenic								0.01 U									
Barium																	
Beryllium																	
Boron																	1
Cadmium			0.005 U			0.005 U	0.005 U	0.005 U						0.005 U	0.005 U	0.005 U	
Calcium			60.9			58	73.3	51.4						28.9	6.3	6.5	
Chromium																	
Chromium, hexavalent																	
Cobalt																	0.005
Copper																	
Iron			0.33			0.3	0.29	2.45						3.88	0.16	0.3	
Lead			0.005 U			0.005 U	0.005 U	0.005 U						0.005 U	0.005 U	0.005 U	0.008
Magnesium			13.1			12.3	14.7	9.6						7.8	2	2.1	
Manganese			0.019			0.015	0.211	0.122						0.07	0.01 U	0.008 J	
Mercury																	0.000007
Nickel																	0.0082
Potassium			2.1 B			2.6	2.8 B	5.9						4.1	0.5 BJ	0.6 BJ	
Selenium																	
Silver																	
Sodium			24			19.6	28	11.4						3.7	4.5	4.8	
Thallium																	0.008
Vanadium																	0.014
Zinc																	

Oil & Grease

Oil & Grease			4.7 U			4.7 U	4.7 U	2.1 J						4.7 U	4.8 U	4.7 U	
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Volatile Organic Compounds (VOCs)

1,1,1,2-Tetrachloroethane																	
1,1,1-Trichloroethane																	
1,1,2,2-Tetrachloroethane																	
1,1,2-Trichloroethane																	
1,1-Dichloroethane																	
1,1-Dichloroethene																	
1,2,3-Trichloropropane																	
1,2-Dibromo-3-chloropropane																	
1,2-Dibromoethane																	
1,2-Dichlorobenzene																	
1,2-Dichloroethane																	
1,2-Dichloropropane																	
1,4-Dichlorobenzene																	
2-Butanone (MEK)																	
2-Hexanone																	
4-Methyl-2-pentanone																	

Current and Historic Surface Water Analytical Results
Hakes C and D Landfill
Campbell, New York
(mg/L except where noted)

Parameter	SW-2A 11/8/2018	SW-2A 2/14/2019	SW-2A 4/30/2019	SW-2A 8/14/2019	SW-2A 11/18/2019	SW-3A 11/8/2018	SW-3A 2/14/2019	SW-3A 11/18/2019	SW-7 11/8/2018	SW-7 2/14/2019	SW-7 4/30/2019	SW-7 8/14/2019	SW-7 11/18/2019	SW-9 11/8/2018	SW-9 2/14/2019	SW-9 4/30/2019	Class C Standard
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VOCs Continued

Acetone																	
Acrylonitrile																	
Benzene																	
Bromochloromethane																	
Bromodichloromethane																	
Bromoform																	
Bromomethane																	
Carbon disulfide																	
Carbon tetrachloride																	
Chlorobenzene																	0.005
Chloroethane																	
Chloroform																	
Chloromethane																	
cis-1,2-Dichloroethene																	
cis-1,3-Dichloropropene																	
Dibromochloromethane																	
Dibromomethane																	
Dichloromethane (Methylene chloride)																	0.2
Ethyl benzene																	
Iodomethane																	
m&p-Xylene																	
o-Xylene																	
Styrene																	
Tetrachloroethene																	
Toluene																	6
trans-1,2-Dichloroethene																	
trans-1,3-Dichloropropene																	
trans-1,4-Dichloro-2-butene																	
Trichloroethene																	0.04
Trichlorofluoromethane																	
Vinyl acetate																	
Vinyl chloride																	

Wet Chemistry

Alkalinity			96.4			107	131	112						63.2	12.4	18	
Ammonia Nitrogen			0.05 U			0.05 U	0.076	0.011 J						0.05 U	0.05 U	0.05 U	2
Biochemical Oxygen Demand			2 U			2 U	2 U	2 U						2 U	2 U	2 U	
Bromide			1 U			1 U	1 U	1 U						1 U	1 U	1 U	
Chemical Oxygen Demand			14			9.5	14.3	11.5						16.2	9.5	10.8	
Chloride			48.4			28.2	56.5	20.8						2.5	7.5	5.7	
Color (True) (C.U.)																	
Cyanide																	9
Hardness			206			196	244	168						104	24	24.8	
Nitrate Nitrogen			1 U			1 U	0.3 J	1 U						1 U	0.2 J	1 U	
Nitrate-Nitrite			0.007 J			0.006 J	0.196	0.003 J						0.106	0.137	0.06	
pH of Color Analysis																	
Sulfate			94.5			73.1	78	58						33.1	8.3	9.1	
Total Dissolved Solids			320			269	355	272						159	52	67	500
Total Kjeldahl Nitrogen			0.38			0.28	0.41	0.3						0.55	0.32	0.27	
Total Nitrogen			0.39			0.28	0.61	0.31						0.65	0.46	0.33	
Total Organic Carbon (TOC)			4.7			4	3.6	4.2						5.4	2.8	3.3	
Total Phenolics			0.005 U			0.005 U	0.0027 J	0.005 U						0.005 U	0.005 U	0.005 U	
Total Suspended Solids	1 U	1 U	2.3	7.3	1.9	2.5	2.9	18.5	1 U	1 U	1	3	1 U	24.9	1 U	1.6	

Notes:

Class C Standard - NYSDEC Class C Surface Water Standard
Concentrations in **bold** exceed Class C Standards

U - Concentration not detected at specified detection limit
B - Analyte detected in associated method blank

J/UJ - Estimated value
* - Quality control parameter exceeds laboratory limits

Current and Historic Groundwater Suppression System Analytical Results
 Hakes C and D Landfill
 Campbell, New York
 (mg/L except where noted)

Parameter	GSS-1A 11/8/2018	GSS-1A 4/30/2019	GSS-1A 8/14/2019	GSS-1A 11/18/2019	GSS-3 11/8/2018	GSS-3 2/14/2019	GSS-3 4/30/2019	GSS-3 8/14/2019	GSS-3 11/18/2019	GSS-4 11/8/2018	GSS-4 2/14/2019	GSS-4 4/30/2019	GSS-4 8/14/2019	GSS-4 11/18/2019
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Field Parameters

Field pH (std. units)	6.33	6.43	6.32	6.78	8.52	8.4	8.3	7.25	8.3	8.4	8.42	8.41	7.94	8.46
ORP (mV)	11	128.1	-74.7	114.2	68.6	127	99.2	86.8	96.2	80.1	130.9	105.1	69.4	95.1
Specific Conductivity (us/cm)	484.5	568	604	308.8	426.8	393	229.9	615	409.7	486.4	453.2	243.7	543	502.2
Temperature (deg. C)	11.9	10.5	21.8	9.9	12.8	9.9	11.7	18.1	10.4	13.6	10.7	13.7	19.9	11.1
Turbidity (NTU)	29	25.3	3.73	21.9	3.75	2.39	0.82	1.05	2.15	1.05	1.39	0.24	0.34	0.81

Inorganic Compounds

Aluminum			0.0983 J					0.0456 J					0.1 U	
Antimony			0.06 U					0.06 U					0.06 U	
Arsenic			0.01 U	0.01 U				0.01 U	0.01 U				0.01 U	0.01 U
Barium			0.0802					0.109					0.0654	
Beryllium			0.003 U					0.003 U					0.003 U	
Boron			0.0316 J					0.0396 J					0.0273 J	
Cadmium	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	0.005 U	0.005 U
Calcium	85.6	101	95.2	39	65.1	64.4	60.5	94.6	56.6	40.6	38	36.2	45.9	42.9
Chromium			0.01 U					0.01 U					0.01 U	
Chromium, hexavalent			0.01 U,*					0.01 U,*					0.01 U,*	
Cobalt			0.05 U					0.05 U					0.05 U	
Copper			0.02 U					0.02 U					0.02 U	
Iron	4.05	0.87	0.468	0.99	0.48	0.1 U	0.1 U	0.0294 J	0.05 BJ	0.1 U	0.1 U	0.1 U	0.1 U	0.03 BJ
Lead	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	0.005 U	0.005 U
Magnesium	18.6	20.2	19.2	11.5	15.2	14.8	14.1	17.7	13.9	13.6	13.2	12.4	15.1	14.9
Manganese	7.68	0.428	0.387	0.072	0.011	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Mercury			0.0002 U					0.0002 U					0.0002 U	
Nickel			0.04 U					0.04 U					0.04 U	
Potassium	2.9	2.2 B	2.13	1.7 J	2.2	2 BJ	1.9 BJ	2.1	1.8 J	3.2	2.9	2.8 B	2.99	3.2
Selenium			0.0049 J					0.0047 J					0.0047 J	
Silver			0.01 U					0.01 U					0.01 U	
Sodium	6.3	5.1	4.92	4.9	14.7	13.6	13.9	14.7	14.1	37.9	35	32.2	33.6	36.3
Thallium			0.01 U					0.01 U					0.01 U	
Vanadium			0.05 U					0.05 U					0.05 U	
Zinc			0.02 U					0.02 U					0.02 U	

Volatile Organic Compounds (VOCs)

1,1,1,2-Tetrachloroethane			0.005 U					0.005 U					0.005 U	
1,1,1-Trichloroethane			0.005 U					0.005 U					0.005 U	
1,1,2,2-Tetrachloroethane			0.005 U					0.005 U					0.005 U	
1,1,2-Trichloroethane			0.005 U					0.005 U					0.005 U	
1,1-Dichloroethane			0.005 U					0.005 U					0.005 U	
1,1-Dichloroethene			0.005 U					0.005 U					0.005 U	
1,2,3-Trichloropropane			0.005 U					0.005 U					0.005 U	
1,2-Dibromo-3-chloropropane			0.005 U					0.005 U					0.005 U	
1,2-Dibromoethane			0.005 U					0.005 U					0.005 U	
1,2-Dichlorobenzene			0.005 U					0.005 U					0.005 U	
1,2-Dichloroethane			0.005 U					0.005 U					0.005 U	
1,2-Dichloropropane			0.005 U					0.005 U					0.005 U	
1,4-Dichlorobenzene			0.005 U					0.005 U					0.005 U	
2-Butanone (MEK)			0.01 U					0.01 U					0.01 U	
2-Hexanone			0.01 U					0.01 U					0.01 U	
4-Methyl-2-pentanone			0.01 U					0.01 U					0.01 U	
Acetone			0.01 U					0.011 U					0.01 U	

Current and Historic Groundwater Suppression System Analytical Results
Hakes C and D Landfill
Campbell, New York
(mg/L except where noted)

Parameter	GSS-1A 11/8/2018	GSS-1A 4/30/2019	GSS-1A 8/14/2019	GSS-1A 11/18/2019	GSS-3 11/8/2018	GSS-3 2/14/2019	GSS-3 4/30/2019	GSS-3 8/14/2019	GSS-3 11/18/2019	GSS-4 11/8/2018	GSS-4 2/14/2019	GSS-4 4/30/2019	GSS-4 8/14/2019	GSS-4 11/18/2019
VOCs Continued														
Acrylonitrile			0.1 U					0.1 U					0.1 U	
Benzene			0.005 U					0.005 U					0.005 U	
Bromochloromethane			0.005 U					0.005 U					0.005 U	
Bromodichloromethane			0.005 U					0.005 U					0.005 U	
Bromoform			0.005 U					0.005 U					0.005 U	
Bromomethane			0.005 U					0.005 U					0.005 U	
Carbon disulfide			0.0006 J					0.01 U					0.01 U	
Carbon tetrachloride			0.005 U					0.005 U					0.005 U	
Chlorobenzene			0.005 U					0.005 U					0.005 U	
Chloroethane			0.005 U					0.005 U					0.005 U	
Chloroform			0.005 U					0.005 U					0.005 U	
Chloromethane			0.005 U					0.005 U					0.005 U	
cis-1,2-Dichloroethene			0.005 U					0.005 U					0.005 U	
cis-1,3-Dichloropropene			0.005 U					0.005 U					0.005 U	
Dibromochloromethane			0.005 U					0.005 U					0.005 U	
Dibromomethane			0.005 U					0.005 U					0.005 U	
Dichloromethane (Methylene chloride)			0.005 U					0.005 U					0.005 U	
Ethyl benzene			0.005 U					0.005 U					0.005 U	
Iodomethane			0.01 U					0.01 U					0.01 U	
m&p-Xylene			0.005 U					0.005 U					0.005 U	
o-Xylene			0.005 U					0.005 U					0.005 U	
Styrene			0.005 U					0.005 U					0.005 U	
Tetrachloroethene			0.005 U					0.005 U					0.005 U	
Toluene			0.005 U					0.005 U					0.005 U	
trans-1,2-Dichloroethene			0.005 U					0.005 U					0.005 U	
trans-1,3-Dichloropropene			0.005 U					0.005 U					0.005 U	
trans-1,4-Dichloro-2-butene			0.005 U					0.005 U					0.005 U	
Trichloroethene			0.005 U					0.005 U					0.005 U	
Trichlorofluoromethane			0.005 U					0.005 U					0.005 U	
Vinyl acetate			0.01 U					0.01 U					0.01 U	
Vinyl chloride			0.005 U					0.005 U					0.005 U	

Wet Chemistry														
Alkalinity	215	258	311	94.8	169	169	177	263	177	59.6	57.2	61.2	89.6	70.4
Ammonia Nitrogen	0.095	0.05 U	0.21	0.024 J	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
Biochemical Oxygen Demand	2	2 U	3.9	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Bromide	1 U	1 U	1 U	1 U	1 U	0.8 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chemical Oxygen Demand	27.1	24.8	36	16.2	5 U	4.8 J	5 U	5 U	5 U	5 U	7.5	5 U	5 U	5 U
Chloride	2.6	2.7	3.3	1.7 J	28.9	28	28.3	27.7	28.3	105	102	88.8	100	120
Color (True) (C.U.)			36					11					13	
Cyanide			0.005 U					0.005 U					0.005 U	
Hardness	290	335	317	145	225	222	209	309	199	157	149	142	177	168
Nitrate Nitrogen	1 U	0.5 J	1 U	0.8 J	1 U	1 U	1 U	1 U	1 U	0.4 J	0.4 J	0.4 J	1 U	0.5 J
pH of Color Analysis			6.94					7.54 *					7.92	
Sulfate	56.8	59.4	5.1	62.3	18.7	19.1	18.4	17.8	18	22.5	24	21.7	18.8	20
Total Dissolved Solids	347	388	373	224	268	269	264	369	272	270	268	253	300	296
Total Kjeldahl Nitrogen	0.84	0.7	0.73 J	0.4	0.15 J	0.1 J	0.15 J	0.2 U	0.2 U	0.13 J	0.12 J	0.12 J	0.13 J	0.2 U
Total Organic Carbon (TOC)	11.7	9.8	11.1	6.3	0.9 J	1	0.7 J	1 U	0.7 J	1 J	1	0.8 J	0.8 J	0.6 J
Total Phenolics	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	0.005 U	0.005 U

Current and Historic Groundwater Suppression System Analytical Results
 Hakes C and D Landfill
 Campbell, New York
 (mg/L except where noted)

Parameter	GSS-5 11/8/2018	GSS-5 2/14/2019	GSS-5 4/30/2019	GSS-5 8/14/2019	GSS-5 11/18/2019	GSS-6 11/8/2018	GSS-6 2/14/2019	GSS-6 5/7/2019	GSS-6 8/14/2019	GSS-6 11/18/2019	GSS-8 11/8/2018	GSS-8 2/14/2019	GSS-8 4/30/2019	GSS-8 8/13/2019	GSS-8 11/18/2019	Class GA Text ppm
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Field Parameters

Field pH (std. units)	8.4	8.4	8.34	8.41	8.44	7.21	6.42	5.66	6.58	8.01	6.95	6.83	6.94	6.81	6.96	6.5 - 8.5
ORP (mV)	49	118.6	107.2	44.5	101.7	84.9	161.8	130.3	53.6	112.5	110.1	118.6	138.9	186.4	175.2	
Specific Conductivity (us/cm)	300.3	313.1	355.7	493.1	405.3	948	462.1	547	556	801.8	658	678	806	810	724	
Temperature (deg. C)	15.5	13	14	15.6	10.7	12.7	16.4	21	23.7	3	13.6	15.7	15.8	18.7	14.2	
Turbidity (NTU)	0.49	0.81	0.39	0.61	0.41	3.77	3.16	51.2	1.91	6.54	1.33	1.15	1.21	0.97	4.34	5

Inorganic Compounds

Aluminum				0.1 U					0.106					0.0354 J		
Antimony				0.06 U					0.06 U					0.06 U		0.003
Arsenic				0.01 U	0.01 U				0.01 U	0.01 U				0.01 U	0.01 U	0.025
Barium				0.0713					0.0547					0.0737		1
Beryllium				0.003 U					0.003 U					0.003 U		
Boron				0.0324 J					0.051 J					0.178 J		1
Cadmium	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	0.005 U	0.005 U	0.005 U	0.005
Calcium	31.1	32.2	33.7	53	43.9	73.8	51.1	59.2	73.5	58.7	90.7	94.6	92	95.7	89.9	
Chromium				0.01 U					0.01 U					0.01 U		0.05
Chromium, hexavalent				0.01 U,*					0.01 UJ					0.01 U,*		
Cobalt				0.05 U					0.05 U					0.05 U		
Copper				0.02 U					0.02 U					0.02 U		0.2
Iron	0.1 U	0.1 U	0.1 U	0.1 U	0.03 BJ	0.1 U	0.08 J	3.07	0.263	1.13	0.1 U	0.1 U	0.1 U	0.0452 J	0.1 B	0.3
Lead	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	0.005 U	0.005 U	0.005 U	0.025
Magnesium	9.7	10.6	10.9	15.7	14.4	19.4	14.7	19.1	20	17.4	16.9	18.7	18.9	19.9	18.8	
Manganese	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	1.14	0.302	0.439	0.123	0.158	0.131	0.007 J	0.008 J	0.304	0.046	0.3
Mercury				0.0002 U					0.0002 U					0.0002 U		0.0007
Nickel				0.04 U					0.04 U					0.04 U		0.1
Potassium	2.5	2.4 B	2.5 B	2.6	2.5	2.8	2.4 B	3.2	2.65	2.5	3	2.8	2.5 B	2.54	2.2	
Selenium				0.01 U					0.01 U					0.01 U		0.01
Silver				0.01 U					0.01 U					0.01 U		0.05
Sodium	17.1	17.3	18.8	20.5	19.7	17.8	16.7	19.3	18.4	17.7	44	47.2	52.3	54	48.8	20
Thallium				0.01 U					0.01 U					0.01 U		
Vanadium				0.05 U					0.05 U					0.05 U		
Zinc				0.02 U					0.02 U					0.02 U		

Volatile Organic Compounds (VOCs)

1,1,1,2-Tetrachloroethane				0.005 U					0.005 U					0.005 U		0.005
1,1,1-Trichloroethane				0.005 U					0.005 U					0.005 U		0.005
1,1,2,2-Tetrachloroethane				0.005 U					0.005 U					0.005 U		0.005
1,1,2-Trichloroethane				0.005 U					0.005 U					0.005 U		0.001
1,1-Dichloroethane				0.005 U					0.005 U					0.005 U		0.005
1,1-Dichloroethene				0.005 U					0.005 U					0.005 U		0.005
1,2,3-Trichloropropane				0.005 U					0.005 U					0.005 U		0.00004
1,2-Dibromo-3-chloropropane				0.005 U					0.005 U					0.005 U		0.00004
1,2-Dibromoethane				0.005 U					0.005 U					0.005 U		0.005
1,2-Dichlorobenzene				0.005 U					0.005 U					0.005 U		0.003
1,2-Dichloroethane				0.005 U					0.005 U					0.005 U		0.0006
1,2-Dichloropropane				0.005 U					0.005 U					0.005 U		0.001
1,4-Dichlorobenzene				0.005 U					0.005 U					0.005 U		0.003
2-Butanone (MEK)				0.01 U					0.01 U					0.01 U		0.005
2-Hexanone				0.01 U					0.01 U					0.01 U		0.005
4-Methyl-2-pentanone				0.01 U					0.01 U					0.01 U		0.005
Acetone				0.011 U					0.012 U					0.011 U		0.005

Current and Historic Groundwater Suppression System Analytical Results
Hakes C and D Landfill
Campbell, New York
(mg/L except where noted)

Parameter	GSS-5 11/8/2018	GSS-5 2/14/2019	GSS-5 4/30/2019	GSS-5 8/14/2019	GSS-5 11/18/2019	GSS-6 11/8/2018	GSS-6 2/14/2019	GSS-6 5/7/2019	GSS-6 8/14/2019	GSS-6 11/18/2019	GSS-8 11/8/2018	GSS-8 2/14/2019	GSS-8 4/30/2019	GSS-8 8/13/2019	GSS-8 11/18/2019	Class GA Text ppm
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VOCs Continued

Acrylonitrile				0.1 U					0.1 U					0.1 U		0.005
Benzene				0.005 U					0.005 U					0.005 U		0.001
Bromochloromethane				0.005 U					0.005 U					0.005 U		0.005
Bromodichloromethane				0.005 U					0.005 U					0.005 U		0.005
Bromoform				0.005 U					0.005 U					0.005 U		0.005
Bromomethane				0.005 U					0.005 U					0.005 U		0.005
Carbon disulfide				0.01 U					0.01 U					0.01 U		0.005
Carbon tetrachloride				0.005 U					0.005 U					0.005 U		0.005
Chlorobenzene				0.005 U					0.005 U					0.005 U		0.005
Chloroethane				0.005 U					0.005 U					0.005 U		0.005
Chloroform				0.005 U					0.005 U					0.005 U		0.007
Chloromethane				0.005 U					0.005 U					0.005 U		0.005
cis-1,2-Dichloroethene				0.005 U					0.005 U					0.005 U		0.005
cis-1,3-Dichloropropene				0.005 U					0.005 U					0.005 U		0.0004
Dibromochloromethane				0.005 U					0.005 U					0.005 U		0.005
Dibromomethane				0.005 U					0.005 U					0.005 U		0.005
Dichloromethane (Methylene chloride)				0.005 U					0.005 U					0.005 U		0.005
Ethyl benzene				0.005 U					0.005 U					0.005 U		0.005
Iodomethane				0.01 U					0.01 U					0.01 U		0.005
m&p-Xylene				0.005 U					0.005 U					0.005 U		0.005
o-Xylene				0.005 U					0.005 U					0.005 U		0.005
Styrene				0.005 U					0.005 U					0.005 U		0.005
Tetrachloroethene				0.005 U					0.005 U					0.005 U		0.005
Toluene				0.005 U					0.005 U					0.005 U		0.005
trans-1,2-Dichloroethene				0.005 U					0.005 U					0.005 U		0.005
trans-1,3-Dichloropropene				0.005 U					0.005 U					0.005 U		0.0004
trans-1,4-Dichloro-2-butene				0.005 U					0.005 U					0.005 U		0.005
Trichloroethene				0.005 U					0.005 U					0.005 U		0.005
Trichlorofluoromethane				0.005 U					0.005 U					0.005 U		0.005
Vinyl acetate				0.01 U					0.01 U					0.01 U		0.005
Vinyl chloride				0.005 U					0.005 U					0.005 U		0.002

Wet Chemistry

Alkalinity	61.2	62.4	70	125	110	194	129	141	199	190	196	186	181	216	206	
Ammonia Nitrogen	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.079	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	2
Biochemical Oxygen Demand	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	
Bromide	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	1 U	
Chemical Oxygen Demand	5 U	8.5	5 U	5 U	5 U	5 U	5 U	5 U	4.3 J	6	9.1	9.8	5.8	5 U	9.5	
Chloride	40.6	45.4	55.8	56.6	51.7	21.6	28.3	39.9	34.6	30.3	73.4	97.3	137	102	105	250
Color (True) (C.U.)				14					15					28		15
Cyanide				0.005 U					0.005 U					0.005 U		0.2
Hardness	118	124	129	197	169	264	188	226	266	218	296	313	308	321	302	
Nitrate Nitrogen	0.3 J	0.3 J	1 U	1 U	0.4 J	1 U	1 U	1 U	1 U	1 U	0.5 J	0.5 J	0.5 J	1 U	0.6 J	10
pH of Color Analysis				8.08					7.47					7.19		
Sulfate	26.8	31.6	28.5	32.7	35.9	89.6	58.9	57.5	61.4	77	52.7	53.6	50.2	55.1	57.9	250
Total Dissolved Solids	184	196	203	292	261	444	301	287	357	408	427	452	479	513	485	500
Total Kjeldahl Nitrogen	0.13 J	0.31	0.12 J	0.18 J	0.2 U	0.18 J	0.15 J	0.27	0.19 J	0.2 U	0.3	0.22	0.23	0.39	0.11 J	
Total Organic Carbon (TOC)	1.1	1.1	1	1 U	1 J	1.6	1.6	1.5	1.2	1.4	3.9	2.9	2.4	3.2	3.1	
Total Phenolics	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	0.005 U	0.005 U	0.005 U	0.001

Notes:
Class GA Standard - NYSDEC Class GA Groundwater Standards
Concentrations in **bold** exceed Class GA Standards

U - Concentration not detected at specified detection limit
J/UJ - Estimated value
B/BJ - Analyte detected in associated method blank

* - Quality control parameter exceeds laboratory limits

Table 8

Fourth Quarter 2019 Field Duplicate Comparison
Hakes C and D Landfill
Campbell, New York
(mg/L)

Parameter	MWCR-1119	DUP1-1119
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Inorganic Compounds

Arsenic	0.01 U	0.01 U
Cadmium	0.005 U	0.005 U
Calcium	92.8	92
Iron	0.17 B	0.12 B
Lead	0.005 U	0.005 U
Magnesium	28.9	28.6
Manganese	0.053	0.05
Potassium	3.1	3.1
Sodium	14.5	14.3

Wet Chemistry

Alkalinity	322	324
Ammonia Nitrogen	0.05 U	0.05 U
Biochemical Oxygen Demand	2 U	2 U
Bromide	1 U	1 U
Chemical Oxygen Demand	4.2 J	5 U
Chloride	17	17.2
Hardness	351	347
Nitrate Nitrogen	0.4 J	0.4 J
Sulfate	27.5	27.9
Total Dissolved Solids	411	408
Total Kjeldahl Nitrogen	0.11 J	0.11 J
Total Organic Carbon (TOC)	1.1	1.1
Total Phenolics	0.005 U	0.005 U

Notes:

U - Concentration not detected at specified detection limit

J - Estimated value

B - Analyte was detected in the method blank that may have contributed to the sample result

Table 9

**Fourth Quarter 2019 Field Equipment Blank Analytical Results
Hakes C and D Landfill
Campbell, New York
(mg/L)**

Parameter	EB1-1119
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Inorganic Compounds

Arsenic	0.01 U
Cadmium	0.005 U
Calcium	1 U
Iron	0.1
Lead	0.005 U
Magnesium	1 U
Manganese	0.01 U
Potassium	2 U
Sodium	0.2 J

Wet Chemistry

Alkalinity	2 U
Ammonia Nitrogen	0.05 U
Biochemical Oxygen Demand	2 U
Bromide	1 U
Chemical Oxygen Demand	3.9 J
Chloride	2 U
Hardness	6.62 U
Nitrate Nitrogen	1 U
Sulfate	2 U
Total Dissolved Solids	10 U
Total Kjeldahl Nitrogen	0.2 U
Total Organic Carbon (TOC)	1 U
Total Phenolics	0.005 U

Notes:

U - Concentration not detected at specified detection limit.

J - Estimated value

Table 10

Fourth Quarter 2019 Landfill Gas Monitoring Results
Hakes C and D Landfill
Campbell, New York

Parameter	Units	Landfill Perimeter				Cell 6 West Top (Open Air)
		Upwind (Background)	Downwind 1	Downwind 2	Downwind 3	
Date	M/D/Y	12/13/2019	12/13/2019	12/13/2019	12/13/2019	12/13/2019
Time	24 hour	1026	1016	1022	1031	1011

GEM 5000+ Readings

Relative Pressure (Rel.)	in. H ₂ O	0.21	0.20	0.19	0.20	0.18
Barometric Pressure (Bar.)	in. Hg	28.31	28.31	28.31	28.58	28.26
Methane (CH ₄)	%	0.0	0.0	0.0	0.1	0.1
Carbon Dioxide (CO ₂)	%	0.1	0.1	0.1	0.1	0.1
Oxygen (O ₂)	%	21.0	20.8	20.9	21.1	20.8
Gas Temperature	°F	36.5	36.9	36.3	36.8	33.6
Balance Gas (BAL)	%	78.9	79.1	79.0	78.8	79.1
Hydrogen Sulfide (H ₂ S)	ppm	0	0	0	0	0
Carbon Monoxide (CO)	ppm	0	0	0	0	0

RAE Detector Tube Readings

Hydrogen Sulfide Range: 0.1-2%	%	NM	NM	NM	NM	NM
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Footnotes:

- ¹ Gas well readings measured from port at top of well
- ² Gas vent reading measured from port near base of vent
- ³ Reading represents value above instrument background
- * GW-15 unable to get RAE H₂S reading. Sample port full of water.

Monitored by: K. Dye/S. Watson
 Weather: Cloudy, 36° F
 Wind Direction: From SE. at approximately 5-15 mph, w/c
 Meter: Gem 5000+ . RAE H₂S color metric tubes

Acronyms

NM - Not measured
 OL - Over instrument limit

Table 10

**Fourth Quarter 2019 Landfill Gas Monitoring Results
Hakes C and D Landfill
Campbell, New York**

Parameter	Units	Gas Wells ¹									
		GW-1	GW-2	GW-3	GW-4	GW-5	GW-6	GW-7	GW-8	GW-9	GW-10
Date	M/D/Y	12/13/2019	12/13/2019	12/13/2019	12/13/2019	12/13/2019	12/13/2019	12/13/2019	12/13/2019	12/13/2019	12/13/2019
Time	24 hour	1111	1108	1115	1119	1124	1133	1139	1144	1150	1153

GEM 5000+ Readings

Relative Pressure (Rel.)	in. H ₂ O	-0.64	0.27	-0.15	0.07	0.22	0.28	1.60	0.61	0.31	0.29
Barometric Pressure (Bar.)	in. Hg	28.47	28.51	28.43	28.44	28.38	28.38	28.30	28.30	28.30	28.25
Methane (CH ₄)	%	15.5	14.5	17.8	23.7	26.3	26.5	34.6	54.6	0.1	44.5
Carbon Dioxide (CO ₂)	%	33.0	41.4	30.7	36.0	36.5	34.2	35.7	38.8	0.1	41.8
Oxygen (O ₂)	%	5.5	1.6	2.5	0.9	5.8	11.9	20.8	5.4	22.9	13.7
Gas Temperature	°F	88	35	80	92	90	96	89	33	101	96
Balance Gas (BAL)	%	45.9	42.5	49.1	39.4	31.4	27.4	8.9	1.2	76.8	0.0
Hydrogen Sulfide (H ₂ S)	ppm	439	218	300	405	OL	OL	OL	OL	0	OL
Carbon Monoxide (CO)	ppm	3	4	2	3	4	3	3	6	0	4

RAE Detector Tube Readings

Hydrogen Sulfide Range: 0.1-2%	%	NM	NM	NM	NM	0.1	0.2	0.3	0.7	NM	1.3
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Footnotes:

- ¹ Gas well readings measured from port at top of well
² Gas vent reading measured from port near base of vent
³ Reading represents value above instrument background dusts
* GW-15 unable to get RAE H₂S reading. Sample port full

Acronyms

NM - Not measured
OL - Over instrument limit

Table 10

**Fourth Quarter 2019 Landfill Gas Monitoring Results
Hakes C and D Landfill
Campbell, New York**

Parameter	Units	Gas Wells ¹								
		GW-11	GW-12	GW-13	GW-14	GW-15	GW-16	GW-17	GW-18	GW-19
Date	M/D/Y	12/13/2019	12/13/2019	12/13/2019	12/13/2019	12/13/2019	12/13/2019	12/13/2019	12/13/2019	12/13/2019
Time	24 hour	1317	1307	1301	1309	1246	1240	1234	1226	1328

GEM 5000+ Readings

Relative Pressure (Rel.)	in. H ₂ O	-0.59	0.31	0.10	-0.02	-0.80	0.06	-0.25	0.32	0.21
Barometric Pressure (Bar.)	in. Hg	28.09	28.10	28.12	28.10	28.23	28.23	28.23	28.34	28.09
Methane (CH ₄)	%	39.3	0.1	35.6	19.0	39.4	38.5	23.2	3.9	12.4
Carbon Dioxide (CO ₂)	%	44.0	0.2	56.1	37.4	47.4	54.6	52.8	15.3	42.0
Oxygen (O ₂)	%	2.5	22.7	3.5	15.7	4.5	2.1	1.3	15.0	1.3
Gas Temperature	°F	33.8	33.6	33.9	33.6	33.5	33.5	33.6	33.1	36.5
Balance Gas (BAL)	%	14.0	77.1	4.8	27.9	8.7	4.7	22.7	65.8	44.3
Hydrogen Sulfide (H ₂ S)	ppm	456	0 ³	OL	408	OL	OL	OL	OL	192
Carbon Monoxide (CO)	ppm	13	0 ³	24	10	18	23	15	3	11

RAE Detector Tube Readings

Hydrogen Sulfide Range: 0.1-2%	%	NM	NM	0.9	NM	*	0.2	0.2	0.1	NM
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Footnotes:

- ¹ Gas well readings measured from port at top of well
² Gas vent reading measured from port near base of vent
³ Reading represents value above instrument background
* GW-15 unable to get RAE H₂S reading. Sample port full

Acronyms

NM - Not measured
OL - Over instrument limit

Table 10

Fourth Quarter 2019 Landfill Gas Monitoring Results
 Hakes C and D Landfill
 Campbell, New York

Parameter	Units	Gas Vents ²										
		GV-1	GV-2	GV-3	GV-4	GV-5	GV-6	GV-7	GV-8	GV-9	GV-10	GV-11
Date	M/D/Y	12/13/2019	12/13/2019	12/13/2019	12/13/2019	12/13/2019	12/13/2019	12/13/2019	12/13/2019	12/13/2019	12/13/2019	12/13/2019
Time	24 hour	1105	1102	1100	1058	1056	1054	1051	1049	1046	1043	1040

GEM 5000+ Readings

Relative Pressure (Rel.)	in. H ₂ O	0.28	0.28	0.26	0.23	0.24	0.23	0.23	0.23	0.18	0.20	0.18
Barometric Pressure (Bar.)	in. Hg	28.49	28.48	28.46	28.49	28.46	28.46	28.47	28.47	28.45	28.43	28.40
Methane (CH ₄)	%	0.9	0.5	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Carbon Dioxide (CO ₂)	%	4.1	0.9	0.2	3.0	0.1	0.9	0.1	0.1	0.1	0.1	0.1
Oxygen (O ₂)	%	21.4	22.9	23.4	20.7	23.2	22.4	22.6	22.3	22.0	21.7	21.9
Gas Temperature	°F	33.0	33.1	33.6	33.7	33.6	32.8	33.0	33.6	34.3	32.8	33.8
Balance Gas (BAL)	%	73.6	75.7	76.3	76.0	76.5	76.6	77.2	77.5	77.8	78.2	78.5
Hydrogen Sulfide (H ₂ S)	ppm	0	0	0	0	0	0	0	0	0	0	0
Carbon Monoxide (CO)	ppm	0	0	0	0	0	0	0	0	0	0	0

RAE Detector Tube Readings

Hydrogen Sulfide Range: 0.1-2%	%	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
--------------------------------	---	----	----	----	----	----	----	----	----	----	----	----

Footnotes:

- ¹ Gas well readings measured from port at top of well
- ² Gas vent reading measured from port near base of vent
- ³ Reading represents value above instrument background
- * GW-15 unable to get RAE H₂S reading. Sample port full

Acronyms

- NM - Not measured
- OL - Over instrument limit

Table 10

Fourth Quarter 2019 Landfill Gas Monitoring Results
 Hakes C and D Landfill
 Campbell, New York

Parameter	Units	Horizontal Wells				
		GH-1	GH-2	GH-3	GH-4	GH-5
Date	M/D/Y	12/13/2019	12/13/2019	12/13/2019	12/13/2019	12/13/2019
Time	24 hour	1321	1313	1253	1258	1315

GEM 5000+ Readings

		GH-1	GH-2	GH-3	GH-4	GH-5
Relative Pressure (Rel.)	in. H ₂ O	0.35	0.39	0.34	0.35	0.34
Barometric Pressure (Bar.)	in. Hg	28.10	28.10	28.23	28.12	28.09
Methane (CH ₄)	%	34.8	24.2	21.2	22.1	28.2
Carbon Dioxide (CO ₂)	%	36.0	40.5	37.1	37.4	39.6
Oxygen (O ₂)	%	2.6	3.1	2.8	6.1	3.6
Gas Temperature	° F	34.3	33.9	33.4	33.7	33.7
Balance Gas (BAL)	%	26.6	32.3	39.0	34.5	28.6
Hydrogen Sulfide (H ₂ S)	ppm	106	332	OL	OL	435
Carbon Monoxide (CO)	ppm	9	11	8	7	8

RAE Detector Tube Readings

		GH-1	GH-2	GH-3	GH-4	GH-5
Hydrogen Sulfide Range: 0.1-2%	%	NM	NM	0.6	1.7	NM

Footnotes:

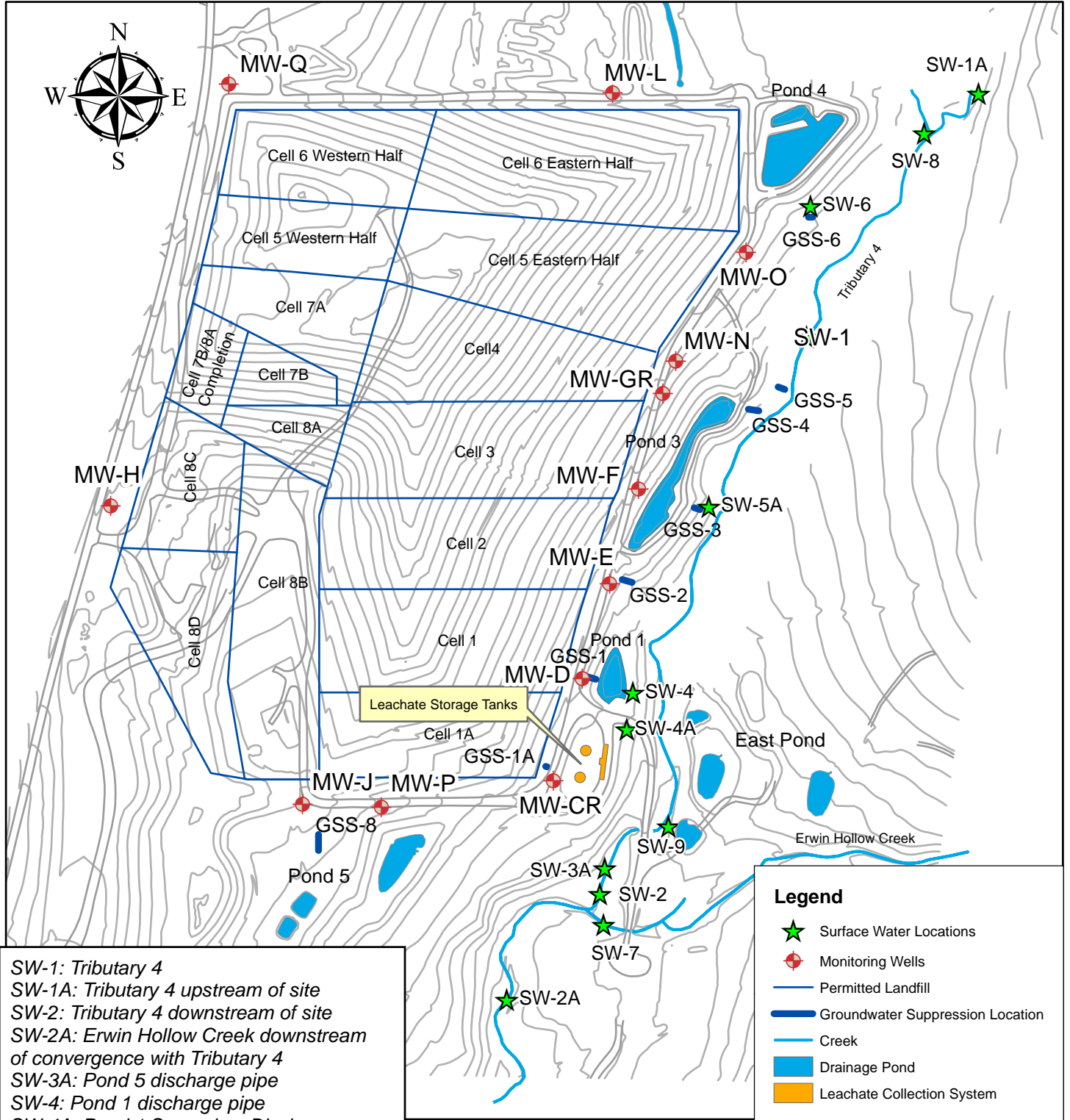
- ¹ Gas well readings measured from port at top of well
- ² Gas vent reading measured from port near base of vent
- ³ Reading represents value above instrument background
- * GW-15 unable to get RAE H₂S reading. Sample port full

Acronyms

NM - Not measured
 OL - Over instrument limit

Figures

Sampling Locations



SW-1: Tributary 4
 SW-1A: Tributary 4 upstream of site
 SW-2: Tributary 4 downstream of site
 SW-2A: Erwin Hollow Creek downstream of convergence with Tributary 4
 SW-3A: Pond 5 discharge pipe
 SW-4: Pond 1 discharge pipe
 SW-4A: Pond 1 Secondary Discharge
 SW-5A: Pond 3 discharge pipe
 SW-6: Pond 4 Discharge
 SW-7: Erwin Hollow Creek upstream of convergence with Tributary 4
 SW-8: North Ditch at Tributary 4
 SW-9: East pond discharge pipe

Note: July 19, 2017 Topography

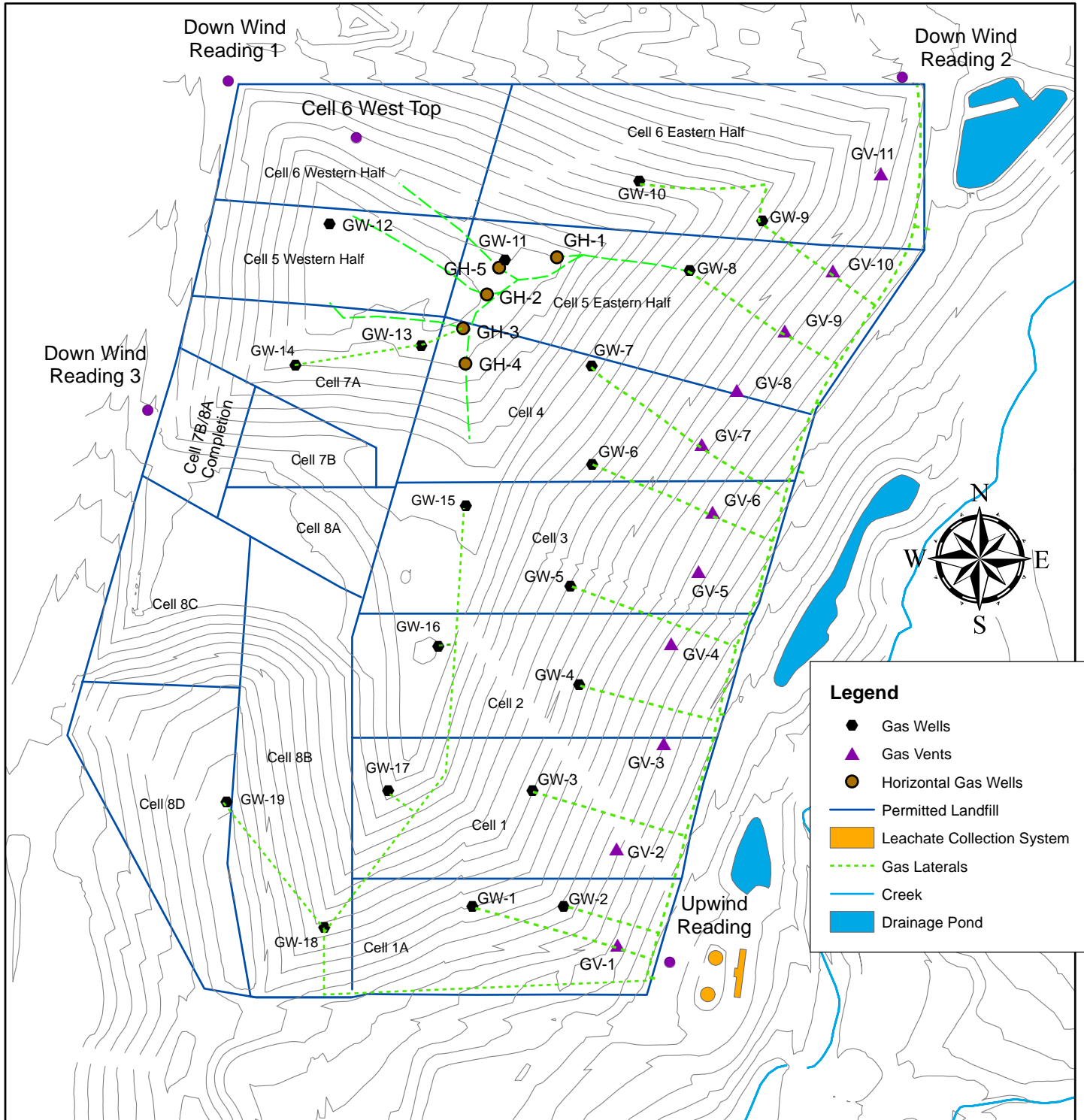
Legend

- Surface Water Locations
- Monitoring Wells
- Permitted Landfill
- Groundwater Suppression Location
- Creek
- Drainage Pond
- Leachate Collection System

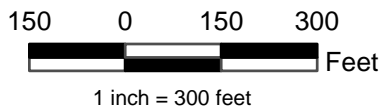


<i>On-Site Geological Services</i> 72 Railroad Ave. Wellsville, New York	
FIGURE:	1
PROJECT:	HAKES
DOCUMENT:	MONITORING REPORT
FILE/DATE:	SAMPLE LOC.MXD/11.20.19

Landfill Gas Monitoring Locations



Landfill gas monitoring conducted on December 13, 2019.
Wind from Southeast at approximately 5 to 15 mph.



On-Site Geological Services
72 Railroad Ave. Wellsville, New York

FIGURE: 2

PROJECT: HAKES

DOCUMENT: MONITORING REPORT

FILE/DATE: GASLOCS.MXD 02.11.20

Appendix A

Field Forms

Dupl

Groundwater Purging and Sampling Field Form On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York Date: 11-18-19

Monitoring Well: MW-CR Sample ID: MWCR-1119 Arrival Time: 0807

Weather Conditions

Temp. 36° F () Sunny () Partly Cloudy (X) Cloudy () Light Rain () Hvy. Rain () Snow
Wind Conditions: 0-5mph

Well Condition Checklist

Bump posts: N/A Pro. casing/lock: OK Surface pad: OK
Well Visibility (paint): OK Well Label: OK

Comment: _____

Depth & Purging Information

TD: 32.86 ft - SWL: 10.05 ft x 0.16 if 2" or 0.65 if 4" = 1 Well Volume: 3.6 gals
Start Purge: 0815 Purging Method: () Bail () Peristaltic (X) Bladder Pump # 3 () Grundfos Pump
Pumping Rate: 500ml/130^{sec} Start Sampling: 0915 Purge Duration: 1hr Purge Vol: 3.0 gals.

Field Parameters

Meters: YSI (sn: 17D108273), Hach 2100P (sn: 12410) Measured in: (X) Flow Cell () Cup

Purge (gal)	Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)	DTW (ft)
<u>1.1</u>	<u>0855</u>	<u>6.62</u>	<u>645.5</u>	<u>2.89</u>	<u>1.64</u>	<u>8.4</u>	<u>147.9</u>	<u>16.74</u>
<u>2.25</u>	<u>0900</u>	<u>6.64</u>	<u>640.7</u>	<u>3.61</u>	<u>1.59</u>	<u>9.0</u>	<u>151.9</u>	<u>17.53</u>
<u>2.5</u>	<u>0905</u>	<u>6.65</u>	<u>542.9</u>	<u>3.26</u>	<u>1.50</u>	<u>8.8</u>	<u>152.5</u>	<u>18.42</u>
<u>2.8</u>	<u>0910</u>	<u>6.65</u>	<u>542.5</u>	<u>4.53</u>	<u>1.45</u>	<u>8.8</u>	<u>152.8</u>	<u>18.85</u>
<u>3.0</u>	<u>0915</u>	<u>6.67</u>	<u>542.8</u>	<u>5.52</u>	<u>1.44</u>	<u>8.7</u>	<u>153.0</u>	<u>19.12</u>

Stabilization Criteria: 1) field parameters ± 0.1 pH, ±3% conductivity, ±10 mv ORP, ±10% DO, ±10% Turbidity; 2) 3 well volumes or dry

Sample Collection Method: Bladder Pump Sample clarity/color: Clear

Sample Odor (Y) or (N) Explain: _____ Other Observations/Comments: _____

Analysis Requested: Routine Number of Containers: 6+Dupl

Well Sampling Completion: Time 0936 Date 11-18-19 Samplers K Dye

Groundwater Purging and Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York

Date: 11-18-19

Monitoring Well: MWD-D Sample ID: MWD-1119 Arrival Time: 0940

Weather Conditions

Temp. 34 ° F () Sunny () Partly Cloudy Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5mph

Well Condition Checklist

Bump posts: NA Pro. casing/lock: OK Surface pad: OK
Well Visibility (paint): OK Well Label: OK

Comment: _____

Depth & Purging Information

TD: 35.05 ft – SWL: 26.09 ft x 0.16 if 2" or 0.65 if 4" = 1 Well Volume: 1.4 gals

Start Purge: 0945 Purging Method: Bail () Peristaltic () Bladder Pump # _____ () Grundfos Pump

Pumping Rate: NA Start Sampling: 1015 Purge Duration: 6min Purge Vol: 1.25 gals.

Field Parameters

Meters: YSI (sn: 17D108273), Hach 2100P (sn: 12410) Measured in: () Flow Cell Cup

Purge (gal)	Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)	DTW (ft)
<u>1.25</u>	<u>0951</u>	<u>Bailed to Bottom</u>						
<u>11.949</u>	<u>1015</u>	<u>7.09</u>	<u>487.1</u>	<u>4.77</u>	<u>NA</u>	<u>11.3</u>	<u>25.9</u>	

Stabilization Criteria: 1) field parameters ± 0.1 pH, ±3% conductivity, ±10 mv ORP, ±10% DO, ±10% Turbidity; 2) 3 well volumes or dry

Sample Collection Method: Bailer Sample clarity/color: Clear No color

Sample Odor (Y) or (N) Explain: _____ Other Observations/Comments: _____

Analysis Requested: Routine Number of Containers: 6

Well Sampling Completion: Time 1024 Date 11-19-19 Samplers K Dye

Groundwater Purging and Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York

Date: 11-19-17

Monitoring Well: MW-E Sample ID: MWE-1119 Arrival Time: 1205

Weather Conditions

Temp. 39 ° F () Sunny () Partly Cloudy (X) Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5mph

Well Condition Checklist

Bump posts: NA Pro. casing/lock: OK Surface pad: OK

Well Visibility (paint): OK Well Label: OK

Comment: _____

Depth & Purging Information

TD: 25.04 ft – SWL: 18.73 ft x 0.16 if 2" or 0.65 if 4" = 1 Well Volume: 1.0 gals

Start Purge: 1215 Purging Method: () Bail () Peristaltic (X) Bladder Pump # 2 () Grundfos Pump

Pumping Rate: 163 sec/500ml Start Sampling: 1305 Purge Duration: 50 min. Purge Vol: 1.1 gals.

Field Parameters

Meters: YSI (sn: 15J102969), Hach 2100P (sn: C011331) Measured in: (X) Flow Cell () Cup

Purge (gal)	Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)	DTW (ft)
<u>.50</u>	<u>1235</u>	<u>6.86</u>	<u>695.3</u>	<u>4.98</u>	<u>2.24</u>	<u>6.9</u>	<u>91.0</u>	<u>20.15</u>
<u>.70</u>	<u>1245</u>	<u>6.84</u>	<u>684.4</u>	<u>4.92</u>	<u>2.75</u>	<u>6.9</u>	<u>91.6</u>	<u>20.64</u>
<u>.80</u>	<u>1250</u>	<u>6.83</u>	<u>683.4</u>	<u>3.85</u>	<u>3.09</u>	<u>6.9</u>	<u>92.5</u>	<u>21.00</u>
<u>.9</u>	<u>1255</u>	<u>6.82</u>	<u>681.8</u>	<u>3.75</u>	<u>3.25</u>	<u>7.0</u>	<u>92.2</u>	<u>21.33</u>
<u>1.0</u>	<u>1300</u>	<u>6.82</u>	<u>681.0</u>	<u>3.90</u>	<u>3.50</u>	<u>6.9</u>	<u>92.0</u>	<u>21.66</u>
<u>1.1</u>	<u>1305</u>	<u>6.81</u>	<u>679.8</u>	<u>3.81</u>	<u>3.44</u>	<u>6.9</u>	<u>90.9</u>	<u>21.89</u>

Stabilization Criteria: 1) field parameters ±0.1 pH, ±3% conductivity, ±10 mv ORP, ±10% DO, ±10% Turbidity; 2) 3 well volumes or dry

Sample Collection Method: bladder pump Sample clarity/color: clear/colorless

Sample Odor (Y) or (N) Explain: _____ Other Observations/Comments: _____

10/60

Analysis Requested: Routine + AS Number of Containers: 6

Well Sampling Completion: Time 1330 Date 11-19-19 Samplers S. WARD

Groundwater Purging and Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York

Date: 11-19-19

Monitoring Well: MW-F Sample ID: MWF-1119 Arrival Time: 1335

Weather Conditions

Temp. 39 ° F () Sunny () Partly Cloudy (X) Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5mph

Well Condition Checklist

Bump posts: NA Pro. casing/lock: OK Surface pad: OK

Well Visibility (paint): OK Well Label: OK

Comment: _____

Depth & Purging Information

TD: 38.80 ft – SWL: 25.33 ft x 0.16 if 2" or 0.65 if 4" = 1 Well Volume: 2.1 gals

Start Purge: 1340 Purging Method: () Bail () Peristaltic (X) Bladder Pump # 2 () Grundfos Pump

Pumping Rate: 196sec/500ml Start Sampling: 1445 Purge Duration: 1hr. 5min. Purge Vol: 2.3 gals.

Field Parameters

Meters: YSI (sn: 155102969), Hach 2100P (sn: CO11331) Measured in: (X) Flow Cell () Cup

Purge (gal)	Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)	DTW (ft)
<u>1.1</u>	<u>1415</u>	<u>6.33</u>	<u>686.6</u>	<u>36.3</u>	<u>3.76</u>	<u>5.9</u>	<u>115.5</u>	<u>26.89</u>
<u>1.5</u>	<u>1425</u>	<u>6.35</u>	<u>683.2</u>	<u>26.5</u>	<u>3.67</u>	<u>7.6</u>	<u>109.6</u>	<u>27.21</u>
<u>1.7</u>	<u>1430</u>	<u>6.35</u>	<u>682.6</u>	<u>21.8</u>	<u>3.64</u>	<u>7.6</u>	<u>109.3</u>	<u>27.74</u>
<u>1.9</u>	<u>1435</u>	<u>6.35</u>	<u>682.0</u>	<u>16.5</u>	<u>3.50</u>	<u>7.7</u>	<u>108.6</u>	<u>28.01</u>
<u>2.1</u>	<u>1440</u>	<u>6.34</u>	<u>681.4</u>	<u>11.8</u>	<u>3.45</u>	<u>8.0</u>	<u>109.9</u>	<u>28.31</u>
<u>2.3</u>	<u>1445</u>	<u>6.34</u>	<u>680.6</u>	<u>11.0</u>	<u>3.52</u>	<u>8.1</u>	<u>111.6</u>	<u>28.67</u>

Stabilization Criteria: 1) field parameters ± 0.1 pH, ±3% conductivity, ±10 mv ORP, ±10% DO, ±10% Turbidity; 2) 3 well volumes or dry

Sample Collection Method: bladder pump Sample clarity/color: clear / colorless

Sample Odor (Y) or (N) Explain: _____ Other Observations/Comments: _____

Turbidity @ start 137 NTU - not on bottom

Analysis Requested: Routine + AS Number of Containers: 6

Well Sampling Completion: Time 1510 Date 11-19-19 Samplers S. Watson

Groundwater Purging and Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York Date: 11-18-19

Monitoring Well: MW-GR Sample ID: MWGR-1119 Arrival Time: 0959

Weather Conditions

Temp. 34 ° F () Sunny () Partly Cloudy (X) Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5mph

Well Condition Checklist

Bump posts: NA Pro. casing/lock: OK Surface pad: OK
Well Visibility (paint): OK Well Label: OK

Comment: _____

Depth & Purging Information

TD: 46.91 ft - SWL: 37.61 ft x 0.16 if 2" or 0.65 if 4" = 1 Well Volume: 1.4 gals
Start Purge: 1004 Purging Method: (X) Bail () Peristaltic () Bladder Pump # _____ () Grundfos Pump
Pumping Rate: NA Start Sampling: _____ Purge Duration: 6 min Purge Vol: 1.1 gals.

Field Parameters

Meters: YSI (sn: 17D108273), Hach 2100P (sn: 12410) Measured in: () Flow Cell (X) Cup

Purge (gal)	Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)	DTW (ft)
<u>1.1</u>	<u>1010</u>	<u>Bailed to bottom</u>	<u>570.0</u>	<u>4.71</u>	<u>NA</u>	<u>12.5</u>	<u>221.1</u>	
<u>11/19/19</u>	<u>0850</u>	<u>6.58</u>						

Stabilization Criteria: 1) field parameters ± 0.1 pH, ±3% conductivity, ±10 mv ORP, ±10% DO, ±10% Turbidity; 2) 3 well volumes or dry

Sample Collection Method: Bailer Sample clarity/color: Clear No color

Sample Odor (Y) or (N) Explain: _____ Other Observations/Comments: _____

Sample got silty with light amber fin on BOD + Phenols

Analysis Requested: Routine Number of Containers: 6

Well Sampling Completion: Time 0916 Date 11-19-19 Samplers R D/E

Groundwater Purging and Sampling Field Form

On-Site Technical Services, Inc.

MS/MSD

Project: Hakes C&D Landfill, Campbell, New York

Date: 11-18-19

Monitoring Well: MW-H **Sample ID:** MWH-1119 **Arrival Time:** 1325

Weather Conditions

Temp. 42° F () Sunny () Partly Cloudy (X) Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5 mph

Well Condition Checklist

Bump posts: NA Pro. casing/lock: OK Surface pad: OK
 Well Visibility (paint): OK Well Label: OK

Comment: _____

Depth & Purging Information

TD: 20.28 ft – SWL: 5.15 ft x 0.16 if 2" or 0.65 if 4" = 1 Well Volume: 2.4 gals

Start Purge: 1330 Purging Method: () Bail () Peristaltic (X) Bladder Pump # 3 () Grundfos Pump

Pumping Rate: 500 ml / 121 sec Start Sampling: 1430 Purge Duration: 1 hr Purge Vol: 2.75 gals.

Field Parameters

Meters: YSI (sn: 17D108273), Hach 2100P (sn: 12410) Measured in: (X) Flow Cell () Cup

Purge (gal)	Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)	DTW (ft)
<u>1.8</u>	<u>1410</u>	<u>6.56</u>	<u>563.4</u>	<u>2.06</u>	<u>3.28</u>	<u>7.9</u>	<u>183.8</u>	<u>6.00</u>
<u>2.0</u>	<u>1415</u>	<u>6.56</u>	<u>564.3</u>	<u>1.68</u>	<u>3.22</u>	<u>7.9</u>	<u>183.5</u>	<u>6.01</u>
<u>2.3</u>	<u>1420</u>	<u>6.56</u>	<u>563.2</u>	<u>1.21</u>	<u>3.27</u>	<u>7.9</u>	<u>183.4</u>	<u>6.00</u>
<u>2.5</u>	<u>1425</u>	<u>6.54</u>	<u>562.7</u>	<u>1.18</u>	<u>3.17</u>	<u>8.1</u>	<u>183.4</u>	<u>6.04</u>
<u>2.75</u>	<u>1430</u>	<u>6.54</u>	<u>563.1</u>	<u>1.32</u>	<u>3.15</u>	<u>8.2</u>	<u>183.3</u>	<u>6.02</u>

Stabilization Criteria: 1) field parameters ± 0.1 pH, ±3% conductivity, ±10 mv ORP, ±10% DO, ±10% Turbidity; 2) 3 well volumes or dry

Sample Collection Method: Bladder Pump Sample clarity/color: Clear, No Color

Sample Odor (Y) or (N) Explain: _____ Other Observations/Comments: _____

Analysis Requested: Routine MS/MSD Number of Containers: 12

Well Sampling Completion: Time 1500 Date 11/18/19 Samplers KDYE

Groundwater Purging and Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York

Date: 11-19-19

Monitoring Well: MW-J Sample ID: MWJ-1119

Arrival Time: 0830

Weather Conditions

Temp. 32 ° F () Sunny () Partly Cloudy (X) Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5 mph

Well Condition Checklist

Bump posts: OK Pro. casing/lock: OK Surface pad: OK

Well Visibility (paint): OK Well Label: OK

Comment: _____

Depth & Purging Information

TD: 29.56 ft – SWL: 15.73 ft x 0.16 if 2" or 0.65 if 4" = 1 Well Volume: 2.2 gals

Start Purge: 0850 Purging Method: () Bail () Peristaltic (X) Bladder Pump # 2 () Grundfos Pump

Pumping Rate: 198 gal / 500 mL Start Sampling: 0950 Purge Duration: 1 hr. Purge Vol: 2.5 gals.

Field Parameters

Meters: YSI (sn: 155102969), Hach 2100P (sn: C011331) Measured in: (X) Flow Cell () Cup

Purge (gal)	Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)	DTW (ft)
<u>1.3</u>	<u>0920</u>	<u>7.07</u>	<u>1076</u>	<u>7.44</u>	<u>1.80</u>	<u>7.6</u>	<u>93.7</u>	<u>18.98</u>
<u>1.5</u>	<u>0925</u>	<u>7.06</u>	<u>1075</u>	<u>8.11</u>	<u>1.70</u>	<u>8.0</u>	<u>91.9</u>	<u>19.31</u>
<u>1.7</u>	<u>0930</u>	<u>7.06</u>	<u>1074</u>	<u>8.28</u>	<u>1.65</u>	<u>8.4</u>	<u>90.6</u>	<u>19.74</u>
<u>1.9</u>	<u>0935</u>	<u>7.05</u>	<u>1073</u>	<u>7.97</u>	<u>1.75</u>	<u>8.3</u>	<u>88.9</u>	<u>20.14</u>
<u>2.1</u>	<u>0940</u>	<u>7.04</u>	<u>1074</u>	<u>7.90</u>	<u>1.77</u>	<u>7.3</u>	<u>90.5</u>	<u>20.70</u>
<u>2.3</u>	<u>0945</u>	<u>7.03</u>	<u>1074</u>	<u>7.86</u>	<u>1.92</u>	<u>6.1</u>	<u>91.1</u>	<u>20.98</u>
<u>2.5</u>	<u>0950</u>	<u>7.03</u>	<u>1074</u>	<u>7.62</u>	<u>1.84</u>	<u>6.2</u>	<u>91.7</u>	<u>21.29</u>

Stabilization Criteria: 1) field parameters ± 0.1 pH, ±3% conductivity, ±10 mv ORP, ±10% DO, ±10% Turbidity; 2) 3 well volumes or dry

Sample Collection Method: bladder pump Sample clarity/color: clear/colorless

Sample Odor (Y) or (N) Explain: _____ Other Observations/Comments: _____

15/60

Analysis Requested: Routine + AS Number of Containers: 6

Well Sampling Completion: Time 1015 Date 11-19-19 Samplers S. Watson

Groundwater Purging and Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York

Date: 11-18-19

Monitoring Well: MW-L Sample ID: MWL-1119 Arrival Time: 1158

Weather Conditions

Temp. 38 ° F () Sunny () Partly Cloudy () Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5mph

Well Condition Checklist

Bump posts: NA Pro. casing/lock: OK Surface pad: OK

Well Visibility (paint): OK Well Label: OK

Comment: _____

Depth & Purging Information

TD: 30.53 ft – SWL: ^{kp} 10.41 ft x 0.16 if 2" or 0.65 if 4" = 1 Well Volume: 3.2 gals

Start Purge: 1205 Purging Method: () Bail () Peristaltic () Bladder Pump # 3 () Grundfos Pump

Pumping Rate: 500ml/150^{sec} Start Sampling: 1305 Purge Duration: 1hr Purge Vol: 2.9 gals.

Field Parameters

Meters: YSI (sn: 17D108273), Hach 2100P (sn: 12410) Measured in: () Flow Cell () Cup

Purge (gal)	Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)	DTW (ft)
<u>2.0</u>	<u>1245</u>	<u>7.39</u>	<u>529.8</u>	<u>12.8</u>	<u>1.24</u>	<u>5.5</u>	<u>172.2</u>	<u>17.47</u>
<u>2.3</u>	<u>1250</u>	<u>7.39</u>	<u>528.0</u>	<u>12.2</u>	<u>1.19</u>	<u>5.9</u>	<u>172.0</u>	<u>18.63</u>
<u>2.4</u>	<u>1255</u>	<u>7.39</u>	<u>527.1</u>	<u>12.2</u>	<u>1.32</u>	<u>6.0</u>	<u>171.7</u>	<u>19.89</u>
<u>2.79</u>	<u>1300</u>	<u>7.39</u>	<u>526.7</u>	<u>11.0</u>	<u>1.41</u>	<u>6.1</u>	<u>171.4</u>	<u>20.79</u>
<u>2.9</u>	<u>1305</u>	<u>7.40</u>	<u>525.4</u>	<u>11.6</u>	<u>1.29</u>	<u>6.2</u>	<u>171.1</u>	<u>21.88</u>

Stabilization Criteria: 1) field parameters ± 0.1 pH, ±3% conductivity, ±10 mv ORP, ±10% DO, ±10% Turbidity; 2) 3 well volumes or dry

Sample Collection Method: Bladder Pump Sample clarity/color: Clear No color

Sample Odor (Y) or (N) Explain: _____ Other Observations/Comments: _____

Analysis Requested: Routine Number of Containers: 6

Well Sampling Completion: Time 1317 Date 11-18-19 Samplers R J/E

Groundwater Purging and Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York Date: 11-18-19
 Monitoring Well: MW-N Sample ID: MWN-1119 Arrival Time: 1012

Weather Conditions

Temp. 34 ° F () Sunny () Partly Cloudy (X) Cloudy () Light Rain () Hvy. Rain () Snow
 Wind Conditions: 0-5mph

Well Condition Checklist

Bump posts: NA Pro. casing/lock: OK Surface pad: OK
 Well Visibility (paint): OK Well Label: OK

Comment: _____

Depth & Purging Information

TD: 35.00 ft – SWL: 22.58 ft x 0.16 if 2" or 0.65 if 4" = 1 Well Volume: 1.9 gals
 Start Purge: 1015 Purging Method: (X) Bail () Peristaltic () Bladder Pump # _____ () Grundfos Pump
 Pumping Rate: NA Start Sampling: 0930 Purge Duration: 9min Purge Vol: 2.0 gals.

Field Parameters

Meters: YSI (sn: 170106273), Hach 2100P (sn: 12410) Measured in: () Flow Cell (X) Cup

Purge (gal)	Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)	DTW (ft)
<u>2.0</u>	<u>1024</u>	<u>Bailed</u>	<u>to Bottom</u>					
<u>11-19-19</u>	<u>0930</u>	<u>6.37</u>	<u>864</u>	<u>19.7</u>	<u>NA</u>	<u>11.8</u>	<u>31.0</u>	

Stabilization Criteria: 1) field parameters ± 0.1 pH, ±3% conductivity, ±10 mv ORP, ±10% DO, ±10% Turbidity; 2) 3 well volumes or dry

Sample Collection Method: Bailer Sample clarity/color: Clear Slight Yellow tint
 Sample Odor (Y) or (N) Explain: (N) Other Observations/Comments: _____

Analysis Requested: Routine Number of Containers: 6
 Well Sampling Completion: Time 0954 Date 11-19-19 Samplers K Dye

Groundwater Purging and Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York

Date: 11-18-19

Monitoring Well: MW-0 Sample ID: MW0-1119 Arrival Time: 1030

Weather Conditions

Temp. 34 ° F () Sunny () Partly Cloudy (X) Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5mph

Well Condition Checklist

Bump posts: NA Pro. casing/lock: OK Surface pad: OK
 Well Visibility (paint): OK Well Label: OK

Comment: _____

Depth & Purging Information

TD: 41.26 ft - SWL: 19.71 ft x 0.16 if 2" or 0.65 if 4" = 1 Well Volume: 3.4 gals

Start Purge: 1035 Purging Method: () Bail () Peristaltic () Bladder Pump # 3 () Grundfos Pump

Pumping Rate: 500ml/143^{sec} Start Sampling: 1130 Purge Duration: 55min Purge Vol: 3.4 gals.

Field Parameters

Meters: YSI (sn: 17D108273), Hach 2100P (sn: 12410) Measured in: (X) Flow Cell () Cup

Purge (gal)	Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)	DTW (ft)
<u>2.3</u>	<u>1105</u>	<u>7.43</u>	<u>364.8</u>	<u>6.29</u>	<u>1.28</u>	<u>7.5</u>	<u>163.9</u>	<u>23.10</u>
<u>2.5</u>	<u>1110</u>	<u>7.42</u>	<u>365.3</u>	<u>4.48</u>	<u>.97</u>	<u>7.7</u>	<u>163.4</u>	<u>24.24</u>
<u>2.75</u>	<u>1115</u>	<u>7.43</u>	<u>367.0</u>	<u>4.10</u>	<u>.87</u>	<u>7.3</u>	<u>162.7</u>	<u>24.74</u>
<u>3.0</u>	<u>1120</u>	<u>7.44</u>	<u>365.8</u>	<u>4.18</u>	<u>.82</u>	<u>7.0</u>	<u>161.9</u>	<u>25.21</u>
<u>3.23</u>	<u>1125</u>	<u>7.45</u>	<u>363.2</u>	<u>4.25</u>	<u>.96</u>	<u>7.4</u>	<u>161.4</u>	<u>25.66</u>
<u>3.4</u>	<u>1130</u>	<u>7.45</u>	<u>363.8</u>	<u>4.74</u>	<u>1.01</u>	<u>7.6</u>	<u>161.0</u>	<u>26.22</u>

Stabilization Criteria: 1) field parameters ± 0.1 pH, ±3% conductivity, ±10 mv ORP, ±10% DO, ±10% Turbidity; 2) 3 well volumes or dry

Sample Collection Method: Bladder Pump Sample clarity/color: clear No color

Sample Odor (Y) or (N) Explain: _____ Other Observations/Comments: _____

Analysis Requested: Routine Number of Containers: 6

Well Sampling Completion: Time 1153 Date 11-18-19 Samplers K Dye

Groundwater Purging and Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York

Date: 11-19-19

Monitoring Well: MW-P Sample ID: MWP-1119 Arrival Time: 1018

Weather Conditions

Temp. 37 ° F () Sunny () Partly Cloudy (X) Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5mph

Well Condition Checklist

Bump posts: NA Pro. casing/lock: OK Surface pad: OK

Well Visibility (paint): OK Well Label: OK

Comment: _____

Depth & Purging Information

TD: 34.53 ft – SWL: 19.24 ft x 0.16 if 2" or 0.65 if 4" = 1 Well Volume: 2.4 gals

Start Purge: 1025 Purging Method: () Bail () Peristaltic (X) Bladder Pump # 2 () Grundfos Pump

Pumping Rate: 138 sec/500ml Start Sampling: 1130 Purge Duration: 1hr. 5min Purge Vol: 2.5 gals.

Field Parameters

Meters: YSI (sn: 155102969), Hach 2100P (sn: C011331) Measured in: (X) Flow Cell () Cup

Purge (gal)	Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)	DTW (ft)
<u>1.1</u>	<u>1055</u>	<u>7.52</u>	<u>485.0</u>	<u>10.9</u>	<u>1.09</u>	<u>6.7</u>	<u>60.9</u>	<u>20.50</u>
<u>1.4</u>	<u>1105</u>	<u>7.53</u>	<u>484.8</u>	<u>8.87</u>	<u>0.78</u>	<u>7.4</u>	<u>43.2</u>	<u>20.70</u>
<u>1.7</u>	<u>1110</u>	<u>7.56</u>	<u>485.6</u>	<u>5.68</u>	<u>0.65</u>	<u>7.4</u>	<u>31.7</u>	<u>20.85</u>
<u>1.9</u>	<u>1115</u>	<u>7.55</u>	<u>486.7</u>	<u>4.60</u>	<u>0.62</u>	<u>7.0</u>	<u>31.4</u>	<u>21.03</u>
<u>2.1</u>	<u>1120</u>	<u>7.54</u>	<u>485.5</u>	<u>4.03</u>	<u>0.49</u>	<u>7.2</u>	<u>30.2</u>	<u>21.14</u>
<u>2.3</u>	<u>1125</u>	<u>7.53</u>	<u>484.4</u>	<u>2.99</u>	<u>0.43</u>	<u>7.7</u>	<u>28.5</u>	<u>21.33</u>
<u>2.5</u>	<u>1130</u>	<u>7.55</u>	<u>483.4</u>	<u>2.80</u>	<u>0.41</u>	<u>8.1</u>	<u>27.4</u>	<u>21.49</u>

Stabilization Criteria: 1) field parameters ± 0.1 pH, ±3% conductivity, ±10 mv ORP, ±10% DO, ±10% Turbidity; 2) 3 well volumes or dry

Sample Collection Method: bladder pump Sample clarity/color: clear/colorless

Sample Odor (Y) or (N) Explain: _____ Other Observations/Comments: _____

15/40

Analysis Requested: Routine Number of Containers: 6

Well Sampling Completion: Time 1200 Date 11-19-19 Samplers S. WATSON

Groundwater Purging and Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York Date: 11-20-19

Monitoring Well: MWQ Sample ID: MWQ-1119 Arrival Time: 0920

Weather Conditions

Temp. 36 ° F () Sunny () Partly Cloudy (X) Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5mph

Well Condition Checklist

Bump posts: NA Pro. casing/lock: OK Surface pad: OK
 Well Visibility (paint): OK Well Label: OK

Comment: _____

Depth & Purging Information

TD: 14.22 ft - SWL: 6.36 ft x 0.16 if 2" or 0.65 if 4" = 1 Well Volume: 1.2 gals

Start Purge: 0925 Purging Method: () Bail () Peristaltic (X) Bladder Pump # 3 () Grundfos Pump

Pumping Rate: 500ml / 143^{sec} Start Sampling: 1020 Purge Duration: 55min Purge Vol: 2.3 gals.

Field Parameters

Meters: YSI (sn: 17D108273), Hach 2100P (sn: 12410) Measured in: (X) Flow Cell () Cup

Purge (gal)	Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)	DTW (ft)
<u>1.4</u>	<u>1000</u>	<u>5.40</u>	<u>455.1</u>	<u>4.66</u>	<u>1.79</u>	<u>6.3</u>	<u>182.1</u>	<u>6.98</u>
<u>1.75</u>	<u>1005</u>	<u>5.39</u>	<u>456.2</u>	<u>4.61</u>	<u>1.83</u>	<u>6.3</u>	<u>184.0</u>	<u>7.00</u>
<u>1.9</u>	<u>1010</u>	<u>5.38</u>	<u>455.5</u>	<u>4.11</u>	<u>1.76</u>	<u>6.2</u>	<u>184.9</u>	<u>6.96</u>
<u>2.1</u>	<u>1015</u>	<u>5.38</u>	<u>454.8</u>	<u>4.20</u>	<u>1.67</u>	<u>6.3</u>	<u>185.5</u>	<u>6.99</u>
<u>2.3</u>	<u>1020</u>	<u>5.37</u>	<u>453.9</u>	<u>2.20</u>	<u>1.63</u>	<u>6.5</u>	<u>186.2</u>	<u>7.01</u>

Stabilization Criteria: 1) field parameters ± 0.1 pH, ±3% conductivity, ±10 mv ORP, ±10% DO, ±10% Turbidity; 2) 3 well volumes or dry

Sample Collection Method: Bladder Pump Sample clarity/color: clear No Color

Sample Odor (Y) or (N) Explain: _____ Other Observations/Comments: _____

Analysis Requested: Routine Number of Containers: 6

Well Sampling Completion: Time 1039 Date 11-20-19 Samplers K Dye

Groundwater Suppression and Leachate Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York

Date: 11-18-19

Sampling Location: G55-1 Sample ID: NO SAMPLE Arrival Time: 1020

Weather Conditions:

Temp. 34.2 ° F () Sunny () Partly Cloudy () Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5 mph

Location Type

() Groundwater Suppression () Leachate () Secondary Leachate () Surface Water/Sediment () Res. Water
() Other _____

Flow and Depth Information (as appropriate)

Depth: NA Estimated Flow: NO FLOW

Comments: _____

Field Parameters (as appropriate)

Meter: YSI (sn: _____), Hach 2100P (sn: _____)

Field Parameters tested in: () Submerged Probe () Cup

Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
_____	_____	_____	_____	_____	_____	_____

Sample Information

Sample Type: () Grab () Composite Sample Location: () Discharge Pipe () Pond () Ditch

Location Description/Condition: HDPE Pipe

Sample Collection Equipment/Method: _____ Sample Time: NA

Sample Description (clarity/color): _____ Sample Odor (Y) or (N) Explain: _____

Other Observations/Comments: _____

Analysis Requested: Routine + AS Number of Containers: NA

Sampling Completion: Time 1024 Date 11-18-19 Samplers S. Watson

Groundwater Suppression and Leachate Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York

Date: 11-18-19

Sampling Location: GSS-1A Sample ID: GSS1A-1119 Arrival Time: 1438

Weather Conditions:

Temp. 35 ° F () Sunny () Partly Cloudy (X) Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5mph

Location Type

(X) Groundwater Suppression () Leachate () Secondary Leachate () Surface Water/Sediment () Res. Water
() Other _____

Flow and Depth Information (as appropriate)

Depth: NA Estimated Flow: 5-8 gpm

Comments: _____

Field Parameters (as appropriate)

Meter: YSI (sn: 155102969), Hach 2100P (sn: 0011311)

Field Parameters tested in: () Submerged Probe (X) Cup

Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
<u>1455</u>	<u>6.78</u>	<u>308.8</u>	<u>21.9</u>	<u>NA</u>	<u>9.9</u>	<u>114.2</u>

Sample Information

Sample Type: (X) Grab () Composite Sample Location: (X) Discharge Pipe () Pond () Ditch

Location Description/Condition: _____

Sample Collection Equipment/Method: bucket Sample Time: 1450

Sample Description (clarity/color): clear/colorless Sample Odor (Y) or (N) Explain: Earthy odor

Other Observations/Comments: _____

Analysis Requested: Routine + AS Number of Containers: 6

Sampling Completion: Time 1505 Date 11-18-19 Samplers J. Watson

Groundwater Suppression and Leachate Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York

Date: 11-18-19

Sampling Location: GSS-2 Sample ID: NO SAMPLE Arrival Time: 1028

Weather Conditions:

Temp. 34.8 ° F () Sunny () Partly Cloudy (X) Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5mph

Location Type

(X) Groundwater Suppression () Leachate () Secondary Leachate () Surface Water/Sediment () Res. Water
() Other _____

Flow and Depth Information (as appropriate)

Depth: NA Estimated Flow: No Flow

Comments: Very slow drip

Field Parameters (as appropriate)

Meter: YSI (sn: _____), Hach 2100P (sn: _____)

Field Parameters tested in: () Submerged Probe () Cup
Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
_____	_____	_____	_____	_____	_____	_____

Sample Information

Sample Type: () Grab () Composite Sample Location: () Discharge Pipe () Pond () Ditch

Location Description/Condition: 4" HDPE clean & clear

Sample Collection Equipment/Method: _____ Sample Time: NA

Sample Description (clarity/color): _____ Sample Odor (Y) or (N) Explain: _____

Other Observations/Comments: _____

Analysis Requested: Routine + AS Number of Containers: NA

Sampling Completion Time 1035 Date 11-18-19 Samplers J. WATSON

Groundwater Suppression and Leachate Sampling Field Form On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York

Date: 11-18-19

Sampling Location: G55-3

Sample ID: G553-1119

Arrival Time: 10:10

Weather Conditions:

Temp. 33.6 ° F () Sunny () Partly Cloudy () Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-Synth

Location Type

() Groundwater Suppression () Leachate () Secondary Leachate () Surface Water/Sediment () Res. Water
() Other _____

Flow and Depth Information (as appropriate)

Depth: NA Estimated Flow: 33 sec / 500 ml.

Comments: _____

Field Parameters (as appropriate)

Meter: YSI (sn: 155102969), Hach 2100P (sn: C011331)

Field Parameters tested in: () Submerged Probe () Cup

Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
<u>1100</u>	<u>8.30</u>	<u>409.7</u>	<u>2.15</u>	<u>NA</u>	<u>10.4</u>	<u>96.2</u>

Sample Information

Sample Type: () Grab () Composite Sample Location: () Discharge Pipe () Pond () Ditch

Location Description/Condition: _____

Sample Collection Equipment/Method: dipper Sample Time: 1050

Sample Description (clarity/color): clear/colorless Sample Odor (Y) or () Explain: _____

Other Observations/Comments: _____

Analysis Requested: Routine + AS Number of Containers: 6

Sampling Completion: Time 1105 Date 11-18-19 Samplers S. Watson

Groundwater Suppression and Leachate Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York

Date: 11-18-19

Sampling Location: G55-4 Sample ID: G554-1119 Arrival Time: 1120

Weather Conditions:

Temp. 33.2 ° F () Sunny () Partly Cloudy (X) Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5mph

Location Type

(X) Groundwater Suppression () Leachate () Secondary Leachate () Surface Water/Sediment () Res. Water
() Other _____

Flow and Depth Information (as appropriate)

Depth: NA Estimated Flow: 1/2 gpm

Comments: _____

Field Parameters (as appropriate)

Meter: YSI (sn: 155102469), Hach 2100P (sn: C011331)

Field Parameters tested in: () Submerged Probe (X) Cup

Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
<u>1134</u>	<u>8.46</u>	<u>502.2</u>	<u>0.81</u>	<u>NA</u>	<u>11.1</u>	<u>95.1</u>

Sample Information

Sample Type: (X) Grab () Composite Sample Location: (X) Discharge Pipe () Pond () Ditch

Location Description/Condition: 4" HDPE pipe

Sample Collection Equipment/Method: dipper Sample Time: 1130

Sample Description (clarity/color): clear/colorless Sample Odor (Y) or (N) Explain: _____

Other Observations/Comments: _____

Analysis Requested: Routine + AS Number of Containers: 6

Sampling Completion: Time 1140 Date 11-18-19 Samplers S. Watson

Groundwater Suppression and Leachate Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York

Date: 11-18-19

Sampling Location: GSS-5

Sample ID: GSS5-1119

Arrival Time: 1143

Weather Conditions:

Temp. 34.0 ° F () Sunny () Partly Cloudy (X) Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5mph

Location Type

(X) Groundwater Suppression () Leachate () Secondary Leachate () Surface Water/Sediment () Res. Water
() Other _____

Flow and Depth Information (as appropriate)

Depth: NA Estimated Flow: 1/2 gpm

Comments: _____

Field Parameters (as appropriate)

Meter: YSI (sn: 5J102969), Hach 2100P (sn: C011331)

Field Parameters tested in: () Submerged Probe (X) Cup

Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
<u>1154</u>	<u>8.44</u>	<u>405.3</u>	<u>0.41</u>	<u>NA</u>	<u>10.7</u>	<u>101.7</u>

Sample Information

Sample Type: (X) Grab () Composite Sample Location: (X) Discharge Pipe () Pond () Ditch

Location Description/Condition: 6" HDPE Pipe

Sample Collection Equipment/Method: dipper Sample Time: 1150

Sample Description (clarity/color): clear/colorless Sample Odor (Y) or (N) Explain: _____

Other Observations/Comments: _____

Analysis Requested: Routine + AS Number of Containers: 6

Sampling Completion: Time 1200 Date 11-18-19 Samplers S. W...

Groundwater Suppression and Leachate Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York

Date: 11-18-19

Sampling Location: G55-6 Sample ID: G556-1119 Arrival Time: 1230

Weather Conditions:

Temp. 35.4° F () Sunny () Partly Cloudy (x) Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5mph

Location Type

(x) Groundwater Suppression () Leachate () Secondary Leachate () Surface Water/Sediment () Res. Water
() Other _____

Flow and Depth Information (as appropriate)

Depth: 35.4" Estimated Flow: 3gpm

Comments: _____

Field Parameters (as appropriate)

Meter: YSI (sn: 15J102969), Hach 2100P (sn: CO11321)

Field Parameters tested in: () Submerged Probe (x) Cup

Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
<u>1237</u>	<u>8.01</u>	<u>801.8</u>	<u>6.54</u>	<u>NA</u>	<u>3.0</u>	<u>112.5</u>

Sample Information

Sample Type: (x) Grab () Composite Sample Location: (x) Discharge Pipe () Pond () Ditch

Location Description/Condition: _____

Sample Collection Equipment/Method: dipper Sample Time: 1240

Sample Description (clarity/color): clear/colorless Sample Odor (Y) or (N) Explain: _____

Other Observations/Comments: _____

Analysis Requested: Routine + AS Number of Containers: 6

Sampling Completion: Time 1255 Date 11-18-19 Samplers S. WATSON

Groundwater Suppression and Leachate Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York

Date: 11-18-19

Sampling Location: G55-8 Sample ID: G558-1119 Arrival Time: 1415

Weather Conditions:

Temp. 35 ° F () Sunny () Partly Cloudy (X) Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5mph

Location Type

(X) Groundwater Suppression () Leachate () Secondary Leachate () Surface Water/Sediment () Res. Water
() Other _____

Flow and Depth Information (as appropriate)

Depth: NA Estimated Flow: 5gpm

Comments: _____

Field Parameters (as appropriate)

Meter: YSI (sn: 15J102969), Hach 2100P (sn: 2011331)

Field Parameters tested in: () Submerged Probe (X) Cup
Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
<u>1428</u>	<u>6.96</u>	<u>724</u>	<u>4.34</u>	<u>NA</u>	<u>14.2</u>	<u>175.2</u>

Sample Information

Sample Type: (X) Grab () Composite Sample Location: (X) Discharge Pipe () Pond () Ditch

Location Description/Condition: 4" HDPE pipe

Sample Collection Equipment/Method: dipper Sample Time: 1425

Sample Description (clarity/color): clear/colorless Sample Odor (Y) or (N) Explain: _____

Other Observations/Comments: _____

Analysis Requested: Routine + AS Number of Containers: 6

Sampling Completion: Time 1435 Date 11-18-19 Samplers S. Watson

Surface Water Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill- Campbell, New York

Date: 11-18-19

Sampling Location: SW-1 Sample ID: SW1-1119 Arrival Time: 1200

Weather Conditions

Measured Ambient Temp. 32.9° F () Sunny () Partly Cloudy (X) Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5mph

Depth and Flow Information

Sample Location Water Depth: 5" Flow: 10 gpm Flow Measurement Method: eye

Is pond discharging to stream () Yes () No (X) NA If Yes collect sample

Field Parameters

Multi Meter: YSI (sn: 15J102969) Turbidity Meter: Hach 2100P (sn: C011321)

Field Parameters tested in: (X) Directly Submerged Probe () Cup

Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
<u>1210</u>	<u>8.42</u>	<u>87.3</u>	<u>3.42</u>	<u>12.82</u>	<u>1.2</u>	<u>103.0</u>

Sample Information

Sample Location: () Pond Discharge Pipe (X) Stream

Grab Sample Collection Equipment/Method: dipper Sample Time: 1205

Visual Contrast Entering Stream: (X) NA () Yes () No; If yes, **notify project manager**, explain below and take photograph

Sample Description (clarity/color): clear/colorless Sample Odor (Y) or (N) Explain: _____ Other

Observations/Comments: _____

Analysis Requested: Precipitates + TSS Number of Containers: 1

Sampling Completion: Time 1225 Date 11-18-19 Samplers J. Waters

Surface Water Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill- Campbell, New York

Date: 11-18-19

Sampling Location: SW-1A Sample ID: SW1A-019 Arrival Time: 1310

Weather Conditions

Measured Ambient Temp. 33.0° F. () Sunny () Partly Cloudy () Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: None

Depth and Flow Information

Sample Location Water Depth: 4" Flow: 10 gpm Flow Measurement Method: eye

Is pond discharging to stream () Yes () No () NA If Yes collect sample

Field Parameters

Multi Meter: YSI (sn: 155102969) Turbidity Meter: Hach 2100P (sn: C011331)

Field Parameters tested in: () Directly Submerged Probe () Cup

Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
<u>1323</u>	<u>8.62</u>	<u>86.7</u>	<u>6.03</u>	<u>11.79</u>	<u>1.4</u>	<u>125.9</u>
_____	_____	_____	_____	_____	_____	_____

Sample Information

Sample Location: () Pond Discharge Pipe () Stream

Grab Sample Collection Equipment/Method: dipper Sample Time: 1320

Visual Contrast Entering Stream: () NA () Yes () No; If yes, **notify project manager**, explain below and take photograph

Sample Description (clarity/color): clear/colorless Sample Odor (Y) or () N Explain: _____ Other

Observations/Comments: _____

Analysis Requested: Routine + TSS + AS Number of Containers: 7

Sampling Completion: Time 1330 Date 11-18-19 Samplers S. WATSON

Surface Water Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill- Campbell, New York

Date: 11-18-19

Sampling Location: SW-2

Sample ID: SW2-1119

Arrival Time: 0910

Weather Conditions

Measured Ambient Temp. 32.7° F () Sunny () Partly Cloudy (x) Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5mph

Depth and Flow Information

Sample Location Water Depth: 4" Flow: 5gpm Flow Measurement Method: eye

Is pond discharging to stream () Yes () No (x) NA If Yes collect sample

Field Parameters

Multi Meter: YSI (sn: 155102969) Turbidity Meter: Hach 2100P (sn: C011331)

Field Parameters tested in: (x) Directly Submerged Probe () Cup

Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
<u>0915</u>	<u>7.26</u>	<u>130.7</u>	<u>6.64</u>	<u>12.87</u>	<u>1.7</u>	<u>132.0</u>

Sample Information

Sample Location: () Pond Discharge Pipe (x) Stream

Grab Sample Collection Equipment/Method: dipper Sample Time: 0920

Visual Contrast Entering Stream: (x) NA () Yes () No; If yes, **notify project manager**, explain below and take photograph

Sample Description (clarity/color): clear/colorless Sample Odor (Y) or (N) Explain: _____ Other Observations/Comments: _____

Analysis Requested: Routine + TSS + AS Number of Containers: 7

Sampling Completion: Time 0930 Date 11-18-19 Samplers J. Watson

Surface Water Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill- Campbell, New York

Date: 11-18-19

Sampling Location: SW-2A Sample ID: SW2A-1119 Arrival Time: 0830

Weather Conditions

Measured Ambient Temp. 32.4° F () Sunny () Partly Cloudy (X) Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5mph

Depth and Flow Information

Sample Location Water Depth: 6" Flow: 15gpm Flow Measurement Method: eye

Is pond discharging to stream () Yes () No (X) NA If Yes collect sample

Field Parameters

Multi Meter: YSI (sn: 155102965) Turbidity Meter: Hach 2100P (sn: C011331)

Field Parameters tested in: (X) Directly Submerged Probe () Cup

Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
<u>0835</u>	<u>7.27</u>	<u>157.0</u>	<u>4.81</u>	<u>13.91</u>	<u>2.4</u>	<u>122.3</u>

Sample Information

Sample Location: () Pond Discharge Pipe (X) Stream

Grab Sample Collection Equipment/Method: dipper Sample Time: 0830

Visual Contrast Entering Stream: (X) NA () Yes () No; If yes, **notify project manager**, explain below and take photograph

Sample Description (clarity/color): clear/colorless Sample Odor (Y) or (N) Explain: _____ Other

Observations/Comments: _____

Analysis Requested: Parameters & TSS Number of Containers: 1

Sampling Completion: Time 0850 Date 11-18-19 Samplers J. Watzel

Surface Water Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill- Campbell, New York

Date: 11-18-19

Sampling Location: SW-3A Sample ID: SW3A-1119 Arrival Time: 0930

Weather Conditions

Measured Ambient Temp. 32.9° F () Sunny () Partly Cloudy () Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5mph

Depth and Flow Information

Sample Location Water Depth: NA Flow: 1 gpm Flow Measurement Method: eye

Is pond discharging to stream () Yes () No () NA If Yes collect sample

Field Parameters

Multi Meter: YSI (sn: 15J102969) Turbidity Meter: Hach 2100P (sn: C011331)

Field Parameters tested in: () Directly Submerged Probe () Cup

Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
<u>0943</u>	<u>7.67</u>	<u>347.7</u>	<u>43.3</u>	<u>NA</u>	<u>4.4</u>	<u>143.2</u>
_____	_____	_____	_____	_____	_____	_____

Sample Information

Sample Location: () Pond Discharge Pipe () Stream

Grab Sample Collection Equipment/Method: dipper Sample Time: 0940

Visual Contrast Entering Stream: () NA () Yes () No; If yes, **notify project manager**, explain below and take photograph

Sample Description (clarity/color): clear/slightly tanish Sample Odor (Y) or () Explain: _____ Other

Observations/Comments: _____

Analysis Requested: Routine + TSS + OG + TN + AS Number of Containers: 8

Sampling Completion: Time 0950 Date 11-18-19 Samplers S. WATSON

Surface Water Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill- Campbell, New York

Date: 11-18-19

Sampling Location: SW-4 Sample ID: NO SAMPLE Arrival Time: 1010

Weather Conditions

Measured Ambient Temp. 33.4° F () Sunny () Partly Cloudy (X) Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: _____

Diverted to East Pond

Depth and Flow Information

Sample Location Water Depth: NA Flow: NO FLOW Flow Measurement Method: eye

Is pond discharging to stream () Yes () No () NA If Yes collect sample

Field Parameters

Multi Meter: YSI (sn: _____) Turbidity Meter: Hach 2100P (sn: _____)

Field Parameters tested in: () Directly Submerged Probe () Cup

Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

Sample Information

Sample Location: () Pond Discharge Pipe () Stream

Grab Sample Collection Equipment/Method: _____ Sample Time: NA

Visual Contrast Entering Stream: () NA () Yes () No; If yes, **notify project manager**, explain below and take photograph

Sample Description (clarity/color): _____ Sample Odor (Y) or (N) Explain: _____ Other

Observations/Comments: _____

Analysis Requested: Routine + TSS + OG + TN + AS Number of Containers: NA

Sampling Completion: Time 1015 Date 11-18-19 Samplers S. WATSON

Surface Water Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill- Campbell, New York

Date: 11-18-19

Sampling Location: SW-4A Sample ID: NO SAMPLE Arrival Time: 1005

Weather Conditions

Measured Ambient Temp. 33.3 ° F () Sunny () Partly Cloudy (X) Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5 mph

Depth and Flow Information

Sample Location Water Depth: NA Flow: NO FLOW Flow Measurement Method: eye

Is pond discharging to stream () Yes () No () NA If Yes collect sample

Diverted to East Pond

Field Parameters

Multi Meter: YSI (sn: _____) Turbidity Meter: Hach 2100P (sn: _____)

Field Parameters tested in: () Directly Submerged Probe () Cup

Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

Sample Information

Sample Location: () Pond Discharge Pipe () Stream

Grab Sample Collection Equipment/Method: _____ Sample Time: NA

Visual Contrast Entering Stream: () NA () Yes () No; If yes, **notify project manager**, explain below and take photograph

Sample Description (clarity/color): _____ Sample Odor (Y) or (N) Explain: _____ Other

Observations/Comments: _____

Analysis Requested: Parameters + TSS Number of Containers: NA

Sampling Completion: Time 1015 Date 11-18-19 Samplers S. Watson

Surface Water Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill- Campbell, New York

Date: 11-18-19

Sampling Location: SW-SA Sample ID: NO SAMPLE Arrival Time: 1105

Weather Conditions

Measured Ambient Temp. 33.1 ° F () Sunny () Partly Cloudy (X) Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5mph

Depth and Flow Information

Sample Location Water Depth: NA Flow: NO FLOW Flow Measurement Method: eye

Is pond discharging to stream () Yes (X) No () NA If Yes collect sample

Pond is diverted

Field Parameters

Multi Meter: YSI (sn: _____) Turbidity Meter: Hach 2100P (sn: _____)

Field Parameters tested in: () Directly Submerged Probe () Cup

Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

Sample Information

Sample Location: () Pond Discharge Pipe () Stream

Grab Sample Collection Equipment/Method: _____ Sample Time: NA

Visual Contrast Entering Stream: () NA () Yes () No; If yes, **notify project manager**, explain below and take photograph

Sample Description (clarity/color): _____ Sample Odor (Y) or (N) Explain: _____ Other

Observations/Comments: _____

Analysis Requested: Routine + TSS + O₂ + TN + AS Number of Containers: NA

Sampling Completion: Time 1110 Date 1110 Samplers S. Watson

Surface Water Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill- Campbell, New York

Date: 11-18-19

Sampling Location: SW-6 Sample ID: NO SAMPLE Arrival Time: 1255

Weather Conditions

Measured Ambient Temp. 35.1° F () Sunny () Partly Cloudy (X) Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5 mph
Directed to pond 3

Depth and Flow Information

Sample Location Water Depth: NA Flow: NO FLOW Flow Measurement Method: eye

Is pond discharging to stream () Yes () No () NA **If Yes collect sample**

Field Parameters

Multi Meter: YSI (sn: _____) Turbidity Meter: Hach 2100P (sn: _____)

Field Parameters tested in: () Directly Submerged Probe () Cup
Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

Sample Information

Sample Location: (X) Pond Discharge Pipe () Stream

Grab Sample Collection Equipment/Method: _____ Sample Time: _____

Visual Contrast Entering Stream: () NA () Yes () No; If yes, **notify project manager**, explain below and take photograph

Sample Description (clarity/color): _____ Sample Odor (Y) or (N) Explain: _____ Other Observations/Comments: _____

Analysis Requested: Routine + TSS + OG + TN + AS Number of Containers: NA

Sampling Completion: Time 1300 Date 11-18-19 Samplers J. WATSON

Surface Water Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill- Campbell, New York

Date: 11-18-19

Sampling Location: SW-7 Sample ID: SW7-1119 Arrival Time: 0850

Weather Conditions

Measured Ambient Temp. 32.1° F () Sunny () Partly Cloudy () Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5 mph

Depth and Flow Information

Sample Location Water Depth: 6" Flow: 10 gpm Flow Measurement Method: eye

Is pond discharging to stream () Yes () No () NA If Yes collect sample

Field Parameters

Multi Meter: YSI (sn: 155102969) Turbidity Meter: Hach 2100P (sn: C011331)

Field Parameters tested in: () Directly Submerged Probe () Cup
Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
<u>0905</u>	<u>7.69</u>	<u>73.9</u>	<u>3.37</u>	<u>12.48</u>	<u>20</u>	<u>142.2</u>
_____	_____	_____	_____	_____	_____	_____

Sample Information

Sample Location: () Pond Discharge Pipe () Stream

Grab Sample Collection Equipment/Method: dipper Sample Time: 0857

Visual Contrast Entering Stream: () NA () Yes () No; If yes, **notify project manager**, explain below and take photograph

Sample Description (clarity/color): clear/colorless Sample Odor (Y) or () N Explain: _____ Other Observations/Comments: _____

Analysis Requested: Parameters + TSS Number of Containers: 1

Sampling Completion: Time 0910 Date 11-18-19 Samplers S. Watson

Surface Water Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill- Campbell, New York

Date: 11-18-19

Sampling Location: SW-8 North Ditch Sample ID: NO SAMPLE Arrival Time: 1330

Weather Conditions

Measured Ambient Temp. 33.8° F () Sunny () Partly Cloudy (X) Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: None

Depth and Flow Information

Sample Location Water Depth: NA Flow: NO FLOW Flow Measurement Method: eye

Is pond discharging to stream () Yes () No () NA If Yes collect sample

Field Parameters

Multi Meter: YSI (sn: _____) Turbidity Meter: Hach 2100P (sn: _____)

Field Parameters tested in: () Directly Submerged Probe () Cup

Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

Sample Information

Sample Location: () Pond Discharge Pipe () Stream

Grab Sample Collection Equipment/Method: _____ Sample Time: NA

Visual Contrast Entering Stream: () NA () Yes () No; If yes, **notify project manager**, explain below and take photograph

Sample Description (clarity/color): _____ Sample Odor (Y) or (N) Explain: _____ Other

Observations/Comments: Dry ditch - No flow

Analysis Requested: Perameters - TSS Number of Containers: NA

Sampling Completion: Time 1335 Date 11-18-19 Samplers S. WATSON

Surface Water Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill- Campbell, New York

Date: 11-18-19

Sampling Location: SW-9 Sample ID: NO SAMPLE Arrival Time: 0955

Weather Conditions

Measured Ambient Temp. 33.1 ° F () Sunny () Partly Cloudy (X) Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-Smph

Depth and Flow Information

Sample Location Water Depth: NA Flow: dripping slowly Flow Measurement Method: eye

Is pond discharging to stream (X) Yes () No () NA **If Yes collect sample**

Field Parameters

Multi Meter: YSI (sn: 155102969) Turbidity Meter: Hach 2100P (sn: C011331)

Field Parameters tested in: () Directly Submerged Probe (X) Cup

Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

Sample Information

Sample Location: (X) Pond Discharge Pipe () Stream

Grab Sample Collection Equipment/Method: dipper Sample Time: _____

Visual Contrast Entering Stream: () NA () Yes () No; If yes, **notify project manager**, explain below and take photograph

Sample Description (clarity/color): _____ Sample Odor (Y) or (N) Explain: _____ Other

Observations/Comments: Notified Chuck - low pond level

Analysis Requested: Routine + TSS + OG + TN + AS Number of Containers: NA

Sampling Completion: Time 1000 Date 11-18-19 Samplers S. WATSON

Groundwater Suppression and Leachate Sampling Field Form

On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York

Date: 11-20-19

Sampling Location: LCS Sample ID: LCS-1119 Arrival Time: _____

Weather Conditions:

Temp. 40 °F () Sunny () Partly Cloudy Cloudy () Light Rain () Hvy. Rain () Snow

Wind Conditions: 0-5mph

Location Type

() Groundwater Suppression Leachate () Secondary Leachate () Surface Water/Sediment () Res. Water
() Other _____

Flow and Depth Information (as appropriate)

Depth: NA Estimated Flow: NA

Comments: _____

Field Parameters (as appropriate)

Meter: YSI (sn: 17D108273), Hach 2100P (sn: 12410)

Field Parameters tested in: () Submerged Probe Cup

Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
<u>1130</u>	<u>7.19</u>	<u>6909</u>	<u>88.0</u>	<u>NA</u>	<u>9.0</u>	<u>-78.8</u>

Sample Information

Sample Type: Grab () Composite Sample Location: () Discharge Pipe () Pond () Ditch

Location Description/Condition: Collected From J.G. Ultra Hauling Truck
2nd load of the day

Sample Collection Equipment/Method: Ded 5gal Bucket Sample Time: 1130

Sample Description (clarity/color): Cloudy with Sample Odor (Y) or (N) Explain: leachate
Med Gray color

Other Observations/Comments: _____

Analysis Requested: Expanded 363 Number of Containers: 27

Sampling Completion: Time 1243 Date 11-20-19 Samplers K DYE

Appendix B

Laboratory Analytical Reports



December 04, 2019

Service Request No:R1911350

Russell Anderson
Casella Waste Systems - Hakes Billing
4 Chenell Drive Suite 200
Concord, NH 03301

Laboratory Results for: Hakes C&D Landfill - 363 Routine Parameters

Dear Russell,

Enclosed are the results of the sample(s) submitted to our laboratory November 20, 2019
For your reference, these analyses have been assigned our service request number **R1911350**.

All testing was performed according to our laboratory's quality assurance program and met the requirements of the TNI standards except as noted in the case narrative report. Any testing not included in the lab's accreditation is identified on a Non-Certified Analytes report. All results are intended to be considered in their entirety. ALS Environmental is not responsible for use of less than the complete report. Results apply only to the individual samples submitted to the lab for analysis, as listed in the report. The measurement uncertainty of the results included in this report is within that expected when using the prescribed method(s), and represented by Laboratory Control Sample control limits. Any events, such as QC failures or Holding Time exceedances, which may add to the uncertainty are explained in the report narrative or are flagged with qualifiers. The flags are explained in the Report Qualifiers and Definitions page of this report.

Please contact me if you have any questions. My extension is 7472. You may also contact me via email at Janice.Jaeger@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Brady Kalkman
For

Janice Jaeger
Project Manager

CC: Jon Brandes



Narrative Documents

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com



Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water

Service Request: R1911350
Date Received: 11/19/2019 - 11/21/2019

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier II level requested by the client.

Sample Receipt:

Fourteen water samples were received for analysis at ALS Environmental on 11/19/2019 - 11/21/2019. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Metals:

Method 6010C, 11/22/2019: The control limits for matrix spike recovery of one or more of the spiked analytes are not applicable and have been flagged with a "#". The concentration of the analyte(s) in the parent sample is more than 4x the spike concentration. No further corrective action was required.

General Chemistry:

No significant anomalies were noted with this analysis.

A handwritten signature in black ink, appearing to read 'Samantha', is written over a horizontal line.

Approved by _____

Date 12/04/2019



SAMPLE DETECTION SUMMARY

CLIENT ID: MWCR-1119 **Lab ID: R1911350-001**

Analyte	Results	Flag	MDL	MRL	Units	Method
Alkalinity, Total as CaCO3	322		1.8	2.0	mg/L	SM 2320 B-1997 (2011)
Carbon, Total Organic (TOC)	1.1		0.5	1.0	mg/L	SM 5310 C-2000 (2011)
Chemical Oxygen Demand, Total	4.2	J	3.8	5.0	mg/L	410.4
Chloride	17.0		0.5	2.0	mg/L	9056A
Hardness, Total as CaCO3	351			6.62	mg/L	SM 2340 B-1997 (2011)
Nitrate as Nitrogen	0.4	J	0.2	1.0	mg/L	9056A
Nitrogen, Total Kjeldahl (TKN)	0.11	J	0.10	0.20	mg/L	351.2
Solids, Total Dissolved (TDS)	411		9	10	mg/L	SM 2540 C-1997 (2011)
Sulfate	27.5		0.4	2.0	mg/L	9056A
Calcium, Total	92800		300	1000	ug/L	6010C
Iron, Total	170	B	20	100	ug/L	6010C
Magnesium, Total	28900		30	1000	ug/L	6010C
Manganese, Total	53		4	10	ug/L	6010C
Potassium, Total	3100		200	2000	ug/L	6010C
Sodium, Total	14500		200	1000	ug/L	6010C

CLIENT ID: DUP1-1119 **Lab ID: R1911350-002**

Analyte	Results	Flag	MDL	MRL	Units	Method
Alkalinity, Total as CaCO3	324		1.8	2.0	mg/L	SM 2320 B-1997 (2011)
Carbon, Total Organic (TOC)	1.1		0.5	1.0	mg/L	SM 5310 C-2000 (2011)
Chloride	17.2		0.5	2.0	mg/L	9056A
Hardness, Total as CaCO3	347			6.62	mg/L	SM 2340 B-1997 (2011)
Nitrate as Nitrogen	0.4	J	0.2	1.0	mg/L	9056A
Nitrogen, Total Kjeldahl (TKN)	0.11	J	0.10	0.20	mg/L	351.2
Solids, Total Dissolved (TDS)	408		9	10	mg/L	SM 2540 C-1997 (2011)
Sulfate	27.9		0.4	2.0	mg/L	9056A
Calcium, Total	92000		300	1000	ug/L	6010C
Iron, Total	120	B	20	100	ug/L	6010C
Magnesium, Total	28600		30	1000	ug/L	6010C
Manganese, Total	50		4	10	ug/L	6010C
Potassium, Total	3100		200	2000	ug/L	6010C
Sodium, Total	14300		200	1000	ug/L	6010C

CLIENT ID: MWO-1119 **Lab ID: R1911350-003**

Analyte	Results	Flag	MDL	MRL	Units	Method
Alkalinity, Total as CaCO3	182		1.8	2.0	mg/L	SM 2320 B-1997 (2011)
Chloride	1.8	J	0.5	2.0	mg/L	9056A



SAMPLE DETECTION SUMMARY

CLIENT ID: MWO-1119 **Lab ID: R1911350-003**

Analyte	Results	Flag	MDL	MRL	Units	Method
Hardness, Total as CaCO3	171			6.62	mg/L	SM 2340 B-1997 (2011)
Solids, Total Dissolved (TDS)	231		9	10	mg/L	SM 2540 C-1997 (2011)
Sulfate	20.5		0.4	2.0	mg/L	9056A
Calcium, Total	44200		300	1000	ug/L	6010C
Iron, Total	220	B	20	100	ug/L	6010C
Magnesium, Total	14700		30	1000	ug/L	6010C
Manganese, Total	30		4	10	ug/L	6010C
Potassium, Total	2800		200	2000	ug/L	6010C
Sodium, Total	15800		200	1000	ug/L	6010C

CLIENT ID: MWL-1119 **Lab ID: R1911350-004**

Analyte	Results	Flag	MDL	MRL	Units	Method
Alkalinity, Total as CaCO3	254		1.8	2.0	mg/L	SM 2320 B-1997 (2011)
Chemical Oxygen Demand, Total	5.3		3.8	5.0	mg/L	410.4
Chloride	5.4		0.5	2.0	mg/L	9056A
Hardness, Total as CaCO3	241			6.62	mg/L	SM 2340 B-1997 (2011)
Solids, Total Dissolved (TDS)	335		9	10	mg/L	SM 2540 C-1997 (2011)
Sulfate	38.7		0.4	2.0	mg/L	9056A
Calcium, Total	54400		300	1000	ug/L	6010C
Iron, Total	770		20	100	ug/L	6010C
Magnesium, Total	25600		30	1000	ug/L	6010C
Manganese, Total	70		4	10	ug/L	6010C
Potassium, Total	4500		200	2000	ug/L	6010C
Sodium, Total	29800		200	1000	ug/L	6010C

CLIENT ID: MWH-1119 **Lab ID: R1911350-005**

Analyte	Results	Flag	MDL	MRL	Units	Method
Alkalinity, Total as CaCO3	114		1.8	2.0	mg/L	SM 2320 B-1997 (2011)
Carbon, Total Organic (TOC)	0.6	J	0.5	1.0	mg/L	SM 5310 C-2000 (2011)
Chloride	14.0		0.5	2.0	mg/L	9056A
Hardness, Total as CaCO3	244			6.62	mg/L	SM 2340 B-1997 (2011)
Nitrate as Nitrogen	0.7	J	0.2	1.0	mg/L	9056A
Solids, Total Dissolved (TDS)	426		9	10	mg/L	SM 2540 C-1997 (2011)
Sulfate	176		1.2	6.0	mg/L	9056A
Calcium, Total	56200		300	1000	ug/L	6010C
Iron, Total	70	BJ	20	100	ug/L	6010C
Magnesium, Total	25300		30	1000	ug/L	6010C



SAMPLE DETECTION SUMMARY

CLIENT ID: MWH-1119 **Lab ID: R1911350-005**

Analyte	Results	Flag	MDL	MRL	Units	Method
Manganese, Total	9	J	4	10	ug/L	6010C
Potassium, Total	800	J	200	2000	ug/L	6010C
Sodium, Total	32500		200	1000	ug/L	6010C

CLIENT ID: MWGR-1119 **Lab ID: R1911350-006**

Analyte	Results	Flag	MDL	MRL	Units	Method
Alkalinity, Total as CaCO3	297		1.8	2.0	mg/L	SM 2320 B-1997 (2011)
Carbon, Total Organic (TOC)	0.7	J	0.5	1.0	mg/L	SM 5310 C-2000 (2011)
Chloride	5.6		0.5	2.0	mg/L	9056A
Hardness, Total as CaCO3	313			6.62	mg/L	SM 2340 B-1997 (2011)
Nitrate as Nitrogen	0.5	J	0.2	1.0	mg/L	9056A
Solids, Total Dissolved (TDS)	375		9	10	mg/L	SM 2540 C-1997 (2011)
Sulfate	25.7		0.4	2.0	mg/L	9056A
Calcium, Total	96300		300	1000	ug/L	6010C
Iron, Total	240		20	100	ug/L	6010C
Magnesium, Total	17500		30	1000	ug/L	6010C
Manganese, Total	5	J	4	10	ug/L	6010C
Potassium, Total	1200	J	200	2000	ug/L	6010C
Sodium, Total	9200		200	1000	ug/L	6010C

CLIENT ID: MWN-1119 **Lab ID: R1911350-007**

Analyte	Results	Flag	MDL	MRL	Units	Method
Alkalinity, Total as CaCO3	492		1.8	2.0	mg/L	SM 2320 B-1997 (2011)
Ammonia as Nitrogen, undistilled	0.247		0.003	0.050	mg/L	350.1
Biochemical Oxygen Demand (BOD)	3.5			2.0	mg/L	SM 5210 B-2001 (2011)
Carbon, Total Organic (TOC)	4.7		0.5	1.0	mg/L	SM 5310 C-2000 (2011)
Chemical Oxygen Demand, Total	11.9		3.8	5.0	mg/L	410.4
Chloride	3.2		0.5	2.0	mg/L	9056A
Hardness, Total as CaCO3	487			6.62	mg/L	SM 2340 B-1997 (2011)
Nitrate as Nitrogen	0.4	J	0.2	1.0	mg/L	9056A
Nitrogen, Total Kjeldahl (TKN)	0.96		0.10	0.20	mg/L	351.2
Solids, Total Dissolved (TDS)	579		9	10	mg/L	SM 2540 C-1997 (2011)
Sulfate	29.7		0.4	2.0	mg/L	9056A
Calcium, Total	141000		300	1000	ug/L	6010C
Iron, Total	2400		20	100	ug/L	6010C
Magnesium, Total	33000		30	1000	ug/L	6010C
Manganese, Total	4350		4	10	ug/L	6010C



SAMPLE DETECTION SUMMARY

CLIENT ID: MWN-1119 **Lab ID: R1911350-007**

Analyte	Results	Flag	MDL	MRL	Units	Method
Potassium, Total	6800		200	2000	ug/L	6010C
Sodium, Total	19600		200	1000	ug/L	6010C

CLIENT ID: MWD-1119 **Lab ID: R1911350-008**

Analyte	Results	Flag	MDL	MRL	Units	Method
Alkalinity, Total as CaCO3	232		1.8	2.0	mg/L	SM 2320 B-1997 (2011)
Ammonia as Nitrogen, undistilled	0.016	J	0.003	0.050	mg/L	350.1
Carbon, Total Organic (TOC)	0.6	J	0.5	1.0	mg/L	SM 5310 C-2000 (2011)
Chloride	11.7		0.5	2.0	mg/L	9056A
Hardness, Total as CaCO3	248			6.62	mg/L	SM 2340 B-1997 (2011)
Nitrate as Nitrogen	0.6	J	0.2	1.0	mg/L	9056A
Solids, Total Dissolved (TDS)	303		9	10	mg/L	SM 2540 C-1997 (2011)
Sulfate	21.8		0.4	2.0	mg/L	9056A
Calcium, Total	71700		300	1000	ug/L	6010C
Iron, Total	380		20	100	ug/L	6010C
Magnesium, Total	16700		30	1000	ug/L	6010C
Manganese, Total	6	J	4	10	ug/L	6010C
Potassium, Total	2000	J	200	2000	ug/L	6010C
Sodium, Total	12000		200	1000	ug/L	6010C

CLIENT ID: MWJ-1119 **Lab ID: R1911350-009**

Analyte	Results	Flag	MDL	MRL	Units	Method
Alkalinity, Total as CaCO3	319		1.8	2.0	mg/L	SM 2320 B-1997 (2011)
Ammonia as Nitrogen, undistilled	0.006	J	0.003	0.050	mg/L	350.1
Carbon, Total Organic (TOC)	1.6		0.5	1.0	mg/L	SM 5310 C-2000 (2011)
Chemical Oxygen Demand, Total	5.3		3.8	5.0	mg/L	410.4
Chloride	166		0.9	4.0	mg/L	9056A
Hardness, Total as CaCO3	355			6.62	mg/L	SM 2340 B-1997 (2011)
Solids, Total Dissolved (TDS)	662		9	10	mg/L	SM 2540 C-1997 (2011)
Sulfate	50.7		0.4	2.0	mg/L	9056A
Calcium, Total	101000		300	1000	ug/L	6010C
Iron, Total	810		20	100	ug/L	6010C
Magnesium, Total	24900		30	1000	ug/L	6010C
Manganese, Total	316		4	10	ug/L	6010C
Potassium, Total	3300		200	2000	ug/L	6010C
Sodium, Total	114000		200	1000	ug/L	6010C



SAMPLE DETECTION SUMMARY

CLIENT ID: MWP-1119 **Lab ID: R1911350-010**

Analyte	Results	Flag	MDL	MRL	Units	Method
Alkalinity, Total as CaCO3	211		1.8	2.0	mg/L	SM 2320 B-1997 (2011)
Ammonia as Nitrogen, undistilled	0.018	J	0.003	0.050	mg/L	350.1
Chloride	9.3		0.5	2.0	mg/L	9056A
Hardness, Total as CaCO3	231			6.62	mg/L	SM 2340 B-1997 (2011)
Solids, Total Dissolved (TDS)	318		9	10	mg/L	SM 2540 C-1997 (2011)
Sulfate	52.7		0.4	2.0	mg/L	9056A
Calcium, Total	62300		300	1000	ug/L	6010C
Iron, Total	170	B	20	100	ug/L	6010C
Magnesium, Total	18400		30	1000	ug/L	6010C
Manganese, Total	980		4	10	ug/L	6010C
Potassium, Total	2000	J	200	2000	ug/L	6010C
Sodium, Total	23200		200	1000	ug/L	6010C

CLIENT ID: MWE-1119 **Lab ID: R1911350-011**

Analyte	Results	Flag	MDL	MRL	Units	Method
Alkalinity, Total as CaCO3	314		1.8	2.0	mg/L	SM 2320 B-1997 (2011)
Carbon, Total Organic (TOC)	2.0		0.5	1.0	mg/L	SM 5310 C-2000 (2011)
Chloride	10.1		0.5	2.0	mg/L	9056A
Hardness, Total as CaCO3	376			6.62	mg/L	SM 2340 B-1997 (2011)
Nitrate as Nitrogen	0.8	J	0.2	1.0	mg/L	9056A
Nitrogen, Total Kjeldahl (TKN)	0.20	J	0.10	0.20	mg/L	351.2
Solids, Total Dissolved (TDS)	453		9	10	mg/L	SM 2540 C-1997 (2011)
Sulfate	67.9		0.4	2.0	mg/L	9056A
Calcium, Total	99100		300	1000	ug/L	6010C
Iron, Total	280		20	100	ug/L	6010C
Magnesium, Total	31200		30	1000	ug/L	6010C
Manganese, Total	298		4	10	ug/L	6010C
Potassium, Total	1300	J	200	2000	ug/L	6010C
Sodium, Total	22200		200	1000	ug/L	6010C

CLIENT ID: MWF-1119 **Lab ID: R1911350-012**

Analyte	Results	Flag	MDL	MRL	Units	Method
Alkalinity, Total as CaCO3	274		1.8	2.0	mg/L	SM 2320 B-1997 (2011)
Carbon, Total Organic (TOC)	3.5		0.5	1.0	mg/L	SM 5310 C-2000 (2011)
Chemical Oxygen Demand, Total	7.4		3.8	5.0	mg/L	410.4
Chloride	32.8		0.5	2.0	mg/L	9056A
Hardness, Total as CaCO3	377			6.62	mg/L	SM 2340 B-1997 (2011)



SAMPLE DETECTION SUMMARY

CLIENT ID: MWF-1119 **Lab ID: R1911350-012**

Analyte	Results	Flag	MDL	MRL	Units	Method
Nitrogen, Total Kjeldahl (TKN)	0.15	J	0.10	0.20	mg/L	351.2
Solids, Total Dissolved (TDS)	454		9	10	mg/L	SM 2540 C-1997 (2011)
Sulfate	78.3		0.4	2.0	mg/L	9056A
Calcium, Total	104000		300	1000	ug/L	6010C
Iron, Total	430		20	100	ug/L	6010C
Magnesium, Total	28700		30	1000	ug/L	6010C
Manganese, Total	59		4	10	ug/L	6010C
Potassium, Total	2300		200	2000	ug/L	6010C
Sodium, Total	18000		200	1000	ug/L	6010C

CLIENT ID: EB1-1119 **Lab ID: R1911350-013**

Analyte	Results	Flag	MDL	MRL	Units	Method
Chemical Oxygen Demand, Total	3.9	J	3.8	5.0	mg/L	410.4
Iron, Total	100		20	100	ug/L	6010C
Sodium, Total	200	J	200	1000	ug/L	6010C

CLIENT ID: MWQ-1119 **Lab ID: R1911350-014**

Analyte	Results	Flag	MDL	MRL	Units	Method
Alkalinity, Total as CaCO3	42.8		1.8	2.0	mg/L	SM 2320 B-1997 (2011)
Carbon, Total Organic (TOC)	1.9		0.5	1.0	mg/L	SM 5310 C-2000 (2011)
Chloride	112		0.9	4.0	mg/L	9056A
Hardness, Total as CaCO3	85.9			6.62	mg/L	SM 2340 B-1997 (2011)
Nitrate as Nitrogen	0.5	J	0.2	1.0	mg/L	9056A
Nitrogen, Total Kjeldahl (TKN)	0.13	J	0.10	0.20	mg/L	351.2
Solids, Total Dissolved (TDS)	264		9	10	mg/L	SM 2540 C-1997 (2011)
Sulfate	21.3		0.4	2.0	mg/L	9056A
Calcium, Total	21400		300	1000	ug/L	6010C
Iron, Total	110		20	100	ug/L	6010C
Magnesium, Total	7900		30	1000	ug/L	6010C
Manganese, Total	15		4	10	ug/L	6010C
Potassium, Total	1700	J	200	2000	ug/L	6010C
Sodium, Total	57600		200	1000	ug/L	6010C



Sample Receipt Information

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters

Service Request:R1911350

SAMPLE CROSS-REFERENCE

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
R1911350-001	MWCR-1119	11/18/2019	0915
R1911350-002	DUP1-1119	11/18/2019	0925
R1911350-003	MWO-1119	11/18/2019	1130
R1911350-004	MWL-1119	11/18/2019	1305
R1911350-005	MWH-1119	11/18/2019	1430
R1911350-006	MWGR-1119	11/19/2019	0850
R1911350-007	MWN-1119	11/19/2019	0930
R1911350-008	MWD-1119	11/19/2019	1015
R1911350-009	MWJ-1119	11/19/2019	0950
R1911350-010	MWP-1119	11/19/2019	1130
R1911350-011	MWE-1119	11/19/2019	1305
R1911350-012	MWF-1119	11/19/2019	1445
R1911350-013	EB1-1119	11/20/2019	0730
R1911350-014	MWQ-1119	11/20/2019	1020



ALS-Environmental
 1565 Jefferson Rd, Bldg 300, Suite 360
 Rochester, NY 14623
 585.288.5380

Client: **Casella/On-Site**
 4376 Manning Ridge Road
 Campbell, NY 14870

Project Manager: **Russ Anderson/Jon Brandes**

CHAIN of CUSTODY

Project: **Hakes C&D Landfill - 363 Routine Parameters**

Telephone No. 585-593-1824 Email: jonb@on-sitehs.com

Page 1 of 1

Method of Shipment: **FEDEX**

Special Detection Limit/Reporting

PDF to Russ and On-Site, and EDD to On-Site.

Sample I.D.	Lab Sample No.	No. of Containers	Matrix				Prsv.		Sampling Date	Sampling Time	BOD (NP)	Phenols & TOC (H2SO4)	Alkalinity (NP)	NH3, TKN, COD (H2SO4)	T-Metals, Hard. (Routine + As) (HNO3)	TDS, NO3, Br, Cl, SO4 (NP)														
			Soil	Water	Air	Other	Yes	No																						
MWCR-1119		6	X				X	X	11-18-19	0915	X	X	X	X	X	X														
Dup1-1119		6	X				X	X	11-18-19	0925	X	X	X	X	X	X														
MWO-1119		6	X				X	X	11-18-19	1130	X	X	X	X	X	X														
MWL-1119		6	X				X	X	11-18-19	1305	X	X	X	X	X	X														
MWH-1119		12	X				X	X	11-18-19	1430	X	X	X	X	X	X														

REMARKS

ms/msd

Sample Received Intact: Yes No Temperature received: Ice No ice

Relinq. by sampler (Sign & Print Name) <i>Kevin Dye / Kevin Dye</i>	Date Time 11-18-19 1615	Received by (Sign & Print Name)	Lab Work No.
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by Laboratory <i>[Signature]</i> Date 11/19/19 Time 0915	

R1911350 **5**
 Casella Waste Systems - Hakes Billing
 Hakes C&D Landfill - 363 Routine Parameters



Cooler Receipt and Preservation Check Form

R1911350 **5**
Casella Waste Systems - Hokes Billing
Hokes C&D Landfill - 363 Routine Parameters

Project/Client Casella - Hokes Folder Number _____

Cooler received on 11/19/19 by: AM

COURIER: ALS UPS FEDEX VELOCITY CLIENT

1	Were Custody seals on outside of cooler?	<input checked="" type="radio"/> Y <input type="radio"/> N
2	Custody papers properly completed (ink, signed)?	<input checked="" type="radio"/> Y <input type="radio"/> N
3	Did all bottles arrive in good condition (unbroken)?	<input checked="" type="radio"/> Y <input type="radio"/> N
4	Circle: <u>Wet Ice</u> Dry Ice Gel packs present?	<input checked="" type="radio"/> Y <input type="radio"/> N

5a	Perchlorate samples have required headspace?	<input type="radio"/> Y <input type="radio"/> N <input checked="" type="radio"/> NA
5b	Did VOA vials <u>Alk</u> or Sulfide have sig* bubbles?	<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> NA
6	Where did the bottles originate?	<u>ALS/ROC</u> CLIENT
7	Soil VOA received as: Bulk Encore 5035set	<input checked="" type="radio"/> NA

8. Temperature Readings Date: 11/19/19 Time: 1010 ID: IR#7 IR#10 From: Temp Blank Sample Bottle

Observed Temp (°C)	<u>1.3</u>	<u>4.8</u>	<u>2.1</u>				
Within 0-6°C?	<input checked="" type="radio"/> Y <input type="radio"/> N	<input checked="" type="radio"/> Y <input type="radio"/> N	<input checked="" type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N
If <0°C, were samples frozen?	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N

If out of Temperature, note packing/ice condition: _____ Ice melted Poorly Packed (described below) Same Day Rule
& Client Approval to Run Samples: _____ Standing Approval Client aware at drop-off Client notified by: _____

All samples held in storage location: R-02 by AM on 11/19/19 at 1022
5035 samples placed in storage location: _____ by _____ on _____ at _____

Cooler Breakdown/Preservation Check**: Date: 11/19/19 Time: 1545 by: AM

- 9. Were all bottle labels complete (i.e. analysis, preservation, etc.)? YES NO
- 10. Did all bottle labels and tags agree with custody papers? YES NO
- 11. Were correct containers used for the tests indicated? YES NO
- 12. Were 5035 vials acceptable (no extra labels, not leaking)? YES NO N/A
- 13. Air Samples: Cassettes / Tubes Intact with MS? Canisters Pressurized Tedlar® Bags Inflated N/A

pH	Lot of test paper	Reagent	Preserved?		Lot Received	Exp	Sample ID Adjusted	Vol. Added	Lot Added	Final pH
			Yes	No						
≥12		NaOH								
≤2	<u>230078</u>	HNO ₃	<input checked="" type="checkbox"/>		<u>111808</u>	<u>10/20</u>				
≤2	<u>↓</u>	H ₂ SO ₄	<input checked="" type="checkbox"/>		<u>2027301</u>	<u>6</u>				
<4		NaHSO ₄								
5-9		For 608pest			No=Notify for 3day					
Residual Chlorine (-)		For CN, Phenol, 625, 608pest, 522	<input checked="" type="checkbox"/>		If +, contact PM to add Na ₂ S ₂ O ₃ (625, 608, CN), ascorbic (phenol).					
		Na ₂ S ₂ O ₃								
		Zn Acetate								
		HCl	**	**						

**VOAs and 1664 Not to be tested before analysis. Otherwise, all bottles of all samples with chemical preservatives are checked (not just representatives).

Bottle lot numbers: 19-09-03, 80919-04, 092319-1B4C, 090219-2A4C

Explain all Discrepancies/ Other Comments:
all
Mediques on SW 5' GS samples (Routine plus)

HPROD	BULK
HTR	FLDT
SUB	HGFB
ALS	LL3541

Labels secondary reviewed by: AM
PC Secondary Review: _____

*significant air bubbles: VOA > 5-6 mm : WC > 1 in. diameter



Client: **Casella/On-Site**
 4376 Manning Ridge Road
 Campbell, NY 14870

Project: **Hakes C&D Landfill - 363 Routine Parameters**

Project Manager: **Russ Anderson/Jon Brandes**

Telephone No.: 585-593-1824
 Email: jonb@on-sitehs.com

CHAIN of CUSTODY

Method of Shipment
FED EX

Special Detection Limit/Reporting

PDF to Russ and On-Site, and EDD to On-Site.

Sample I.D.	Lab Sample No.	No. of Containers	Matrix				Prsv.		Sampling Date	Sampling Time	BOD (NP)	Phenols & TOC (H2SO4)	Alkalinity (NP)	NH3, TKN, COD (H2SO4)	T-Metals, Hard. (Routine + As) (HNO3)	TDS, NO3, Br, Cl, SO4 (NP)							
			Soil	Water	Air	Other	Yes	No															
MWGR-1119		6	X				X	X	11-19-19	0850	X	X	X	X	X								
MWN-1119		6	X				X	X	11-19-19	0930	X	X	X	X	X								
MWD-1119		6	X				X	X	11-19-19	1015	X	X	X	X	X								

REMARKS

Sample Received Intact: Yes No Temperature received: Ice No ice

Relinq. by sampler (Sign & Print Name)	Date	Time	Received by (Sign & Print Name)		
<i>Kevin Dye / Kevin Dye</i>	11-19-19	1600	<i>Gregory D. Esmeridon</i>		
Relinquished by	Date	Time	Received by		
			ALS 11-20-19 09:40		
Relinquished by	Date	Time	Received by		
Relinquished by	Date	Time	Received by laboratory	Date	Time

Lab Work No.



ALS-Environmental
 1565 Jefferson Rd, Bldg 300, Suite 360
 Rochester, NY 14623
 585.288.5380

Client: **Casella/On-Site**
 4376 Manning Ridge Road
 Campbell, NY 14870

CHAIN of CUSTODY

Project Manager: **Russ Anderson/Jon Brandes**

Project: **Hakes C&D Landfill - 363 Routine Parameters**

Telephone No. 585-593-1824 Email: jonb@on-sitehs.com

Method of Shipment
Fed Ex

Special Detection Limit/Reporting

PDF to Russ and On-Site, and EDD to On-Site.

Sample I.D.	Lab Sample No.	No. of Containers	Matrix				Prsv.		Sampling Date	Sampling Time	BOD (NP)	Phenols & TOC (H2SO4)	Alkalinity (NP)	NH3, TKN, COD (H2SO4)	T-Metals, Hard. (Routine + As) (HNO3)	TDS, NO3, Br, Cl, SO4 (NP)																			
			Soil	Water	Air	Other	Yes	No																											
MWJ-1119		6	X				X	X	11-19-19	0950	X	X	X	X	X	X																			
MWP-1119		6	X				X	X	11-19-19	1130	X	X	X	X	X	X																			
MWE-1119		6	X				X	X	11-19-19	1305	X	X	X	X	X	X																			
MWF-1119		6	X				X	X	11-19-19	1445	X	X	X	X	X	X																			

REMARKS

Sample Received Intact: Yes No Temperature received: Ice No ice

Relinq. by sampler (Sign & Print Name) <i>Scott Watson</i>	Date 11-19-19	Time 1600	Received by (Sign & Print Name)
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory <i>Samuel</i>
	Date	Time	Date 11/20/19
			Time 0910

Lab Work No.



Cooler Receipt and Preservation Check Form

R1911350 5
Casella Waste Systems - Hakes Billing
Hakes C&D Landfill - 383 Routine Parameters



Project/Client Casella - Hakes Folder Number _____

Cooler received on 11/20/19 by: @/AS

COURIER: ALS UPS FEDEX VELOCITY CLIENT

1	Were Custody seals on outside of cooler?	<input checked="" type="radio"/> Y <input type="radio"/> N
2	Custody papers properly completed (ink, signed)?	<input checked="" type="radio"/> Y <input type="radio"/> N
3	Did all bottles arrive in good condition (unbroken)?	<input checked="" type="radio"/> Y <input type="radio"/> N
4	Circle: <input checked="" type="radio"/> Wet Ice <input type="radio"/> Dry Ice <input type="radio"/> Gel packs present?	<input checked="" type="radio"/> Y <input type="radio"/> N

5a	Perchlorate samples have required headspace?	<input type="radio"/> Y <input type="radio"/> N <input checked="" type="radio"/> NA
5b	Did VOA vials, <input checked="" type="radio"/> Alk or Sulfide have sig* bubbles?	<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> NA
6	Where did the bottles originate?	<input checked="" type="radio"/> ALS/ROC <input type="radio"/> CLIENT
7	Soil VOA received as: Bulk Encore 5035set	<input checked="" type="radio"/> NA

8. Temperature Readings Date: 11/20/19 Time: 1005 ID: IR#7 IR#10 From: Temp Blank Sample Bottle

Observed Temp (°C)	<u>12.6</u>	<u>12.9</u>	<u>11.8</u>	<u>13.6</u>	<u>1.8</u>		
Within 0-6°C?	<input checked="" type="radio"/> Y <input type="radio"/> N	<input checked="" type="radio"/> Y <input type="radio"/> N	<input checked="" type="radio"/> Y <input type="radio"/> N	<input checked="" type="radio"/> Y <input type="radio"/> N	<input checked="" type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N
If <0°C, were samples frozen?	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N

If out of Temperature, note packing/ice condition: _____ Ice melted Poorly Packed (described below) Same Day Rule
& Client Approval to Run Samples: _____ Standing Approval Client aware at drop-off Client notified by: _____

All samples held in storage location: Room by @ on 11/20/19 at 1013
5035 samples placed in storage location: _____ by _____ on _____ at _____

Cooler Breakdown/Preservation Check**: Date: 11/20/19 Time: 1710 by shw

- 9. Were all bottle labels complete (i.e. analysis, preservation, etc.)? YES NO
- 10. Did all bottle labels and tags agree with custody papers? YES NO
- 11. Were correct containers used for the tests indicated? YES NO
- 12. Were 5035 vials acceptable (no extra labels, not leaking)? YES NO N/A
- 13. Air Samples: Cassettes / Tubes Intact with MS? Canisters Pressurized Tedlar® Bags Inflated N/A

pH	Lot of test paper	Reagent	Preserved?		Lot Received	Exp	Sample ID Adjusted	Vol. Added	Lot Added	Final pH
			Yes	No						
≥12		NaOH								
≤2	<u>230018</u>	HNO ₃	<input checked="" type="checkbox"/>		<u>118008</u>	<u>10/20</u>				
≤2	<u>↓</u>	H ₂ SO ₄	<input checked="" type="checkbox"/>		<u>202739</u>	<u>↓</u>				
<4		NaHSO ₄								
5-9		For 608pest			No=Notify for 3day					
Residual Chlorine (-)		For CN, Phenol, 625, 608pest, 522			If +, contact PM to add Na ₂ S ₂ O ₃ (625, 608, CN), ascorbic (phenol).					
		Na ₂ S ₂ O ₃								
		Zn Acetate	-	-						
		HCl	**	**						

**VOAs and 1664 Not to be tested before analysis. Otherwise, all bottles of all samples with chemical preservatives are checked (not just representatives).

Bottle lot numbers: A-09-03, 090219-2440, 092319-13MC

Explain all Discrepancies/ Other Comments:

Rad-out of temp only
Wk headspace: - J, P, E, F

HPROD	BULK
HTR	FLDT
SUB	HGFB
ALS	LL3541

Labels secondary reviewed by: sh
PC Secondary Review: _____

*significant air bubbles: VOA > 5-6 mm : WC > 1 in. diameter



ALS-Environmental
1565 Jefferson Rd, Bldg 300, Suite 360
Rochester, NY 14623
585.288.5380

Client: **Casella/On-Site**

4376 Manning Ridge Road
Campbell, NY 14870

Project Manager: **Russ Anderson/Jon Brandes**

CHAIN of CUSTODY

Project: **Hakes C&D Landfill - 363 Routine Parameters**

Telephone No.
585-593-1824

Email: jonb@on-sitehs.com

Method of Shipment

FED EX

Special Detection
Limit/Reporting

PDF to Russ and On-Site, and EDD to On-Site.

Sample I.D.

Lab Sample No.	No. of Containers	Matrix				Prsv.		Sampling Date	Sampling Time	BOD (NP)	Phenols & TOC (H2SO4)	Alkalinity (NP)	NH3, TKN, COD (H2SO4)	T-Metals, Hard. (Routine + As) (HNO3)	TDS, NO3, Br, Cl, SO4 (NP)								
		Soil	Water	Air	Other	Yes	No																
<i>EBI-1119</i>	<i>6</i>	<i>X</i>				<i>X</i>	<i>X</i>	<i>11-20-19</i>	<i>0730</i>	<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>								
<i>MWQ-1119</i>	<i>6</i>	<i>X</i>				<i>X</i>	<i>X</i>	<i>11-20-19</i>	<i>1020</i>	<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>								

REMARKS

Sample Received Intact: Yes No

Temperature received: Ice No ice


Relinquished by (Sign & Print Name): *Kevin Dye Kevin DYE* Date: *11-20-19* Time: *1400*

Relinquished by: _____ Date: _____ Time: _____ Received by: _____

Relinquished by: _____ Date: _____ Time: _____ Received by: *[Signature]* Date: *11/21/19* Time: *0935*

Lab Work No.

R1911350 5
 Casella Waste Systems - Hakes Billing
 Hakes C&D Landfill - 363 Routine Parameters





Cooler Receipt and Preservation Check Form

R1911350 5
 Casella Waste Systems - Hakes Billing
 Hakes C&D Landfill - 363 Routine Parameters

Project/Client Casella - Hakes Folder Number _____

Cooler received on 11/21/19 by: Ⓟ COURIER: ALS UPS PEDEX VELOCITY CLIENT

1	Were Custody seals on outside of cooler?	<input checked="" type="radio"/> Y <input type="radio"/> N
2	Custody papers properly completed (ink, signed)?	<input checked="" type="radio"/> Y <input type="radio"/> N
3	Did all bottles arrive in good condition (unbroken)?	<input checked="" type="radio"/> Y <input type="radio"/> N
4	Circle: <u>Wet Ice</u> Dry Ice Gel packs present?	<input checked="" type="radio"/> Y <input type="radio"/> N

5a	Perchlorate samples have required headspace?	Y N <input checked="" type="radio"/> NA
5b	Did VOA vials, Alk, or Sulfide have sig* bubbles?	Y <input checked="" type="radio"/> NA
6	Where did the bottles originate?	<u>ALS/ROC</u> CLIENT
7	Soil VOA received as: Bulk Encore 5035set	<input checked="" type="radio"/> NA

8. Temperature Readings Date: 11/21/19 Time: 0950 ID: IR#7 IR#10 From: Temp Blank Sample Bottle

Observed Temp (°C)	<u>1.4</u>	<u>1.3</u>	<u>2.7</u>	<u>1.9</u>			
Within 0-6°C?	<input checked="" type="radio"/> Y <input type="radio"/> N	<input checked="" type="radio"/> Y <input type="radio"/> N	<input checked="" type="radio"/> Y <input type="radio"/> N	<input checked="" type="radio"/> Y <input type="radio"/> N	Y N	Y N	Y N
If <0°C, were samples frozen?	Y N	Y N	Y N	Y N	Y N	Y N	Y N

If out of Temperature, note packing/ice condition: _____ Ice melted Poorly Packed (described below) Same Day Rule

& Client Approval to Run Samples: _____ Standing Approval Client aware at drop-off Client notified by: _____

All samples held in storage location: R002 by e on 11/21/19 at 1005
 5035 samples placed in storage location: _____ by _____ on _____ at _____

Cooler Breakdown/Preservation Check**: Date: 11/22/19 Time: 0952 by: Ⓟ

- 9. Were all bottle labels complete (i.e. analysis, preservation, etc.)? YES NO
- 10. Did all bottle labels and tags agree with custody papers? YES NO
- 11. Were correct containers used for the tests indicated? YES NO
- 12. Were 5035 vials acceptable (no extra labels, not leaking)? YES NO
- 13. Air Samples: Cassettes / Tubes Intact with MS? Canisters Pressurized Tedlar® Bags Inflated N/A

pH	Lot of test paper	Reagent	Preserved?		Lot Received	Exp	Sample ID Adjusted	Vol. Added	Lot Added	Final pH
			Yes	No						
≥12		NaOH								
≤2	<u>230018</u>	HNO ₃	<input checked="" type="checkbox"/>		<u>1118081</u>					
≤2		H ₂ SO ₄	<input checked="" type="checkbox"/>		<u>202739</u>	<u>10/20</u>				
<4		NaHSO ₄								
5-9		For 608pest			No=Notify for 3day					
Residual Chlorine (-)		For CN, <u>Phenol</u> 625, 608pest, 522	<input checked="" type="checkbox"/>		If+, contact PM to add Na ₂ S ₂ O ₃ (625, 608, CN), ascorbic (phenol).					
		Na ₂ S ₂ O ₃								
		ZnAcetate	-	-						
		HCl	**	**						

**VOAs and 1664 Not to be tested before analysis. Otherwise, all bottles of all samples with chemical preservatives are checked (not just representatives).

Bottle lot numbers: 19-10-11, 090219-2AAA, 092319-1BMC
 Explain all Discrepancies/ Other Comments: _____

HPROD	BULK
HTR	FLDT
SUB	HGFB
ALS	LL3541

Labels secondary reviewed by: Ⓟ
 PC Secondary Review: _____

*significant air bubbles: VOA > 5-6 mm : WC > 1 in. diameter



Miscellaneous Forms

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

REPORT QUALIFIERS AND DEFINITIONS

<p>U Analyte was analyzed for but not detected. The sample quantitation limit has been corrected for dilution and for percent moisture, unless otherwise noted in the case narrative.</p> <p>J Estimated value due to either being a Tentatively Identified Compound (TIC) or that the concentration is between the MRL and the MDL. Concentrations are not verified within the linear range of the calibration. For DoD: concentration >40% difference between two GC columns (pesticides/Aroclors).</p> <p>B Analyte was also detected in the associated method blank at a concentration that may have contributed to the sample result.</p> <p>E Inorganics- Concentration is estimated due to the serial dilution was outside control limits.</p> <p>E Organics- Concentration has exceeded the calibration range for that specific analysis.</p> <p>D Concentration is a result of a dilution, typically a secondary analysis of the sample due to exceeding the calibration range or that a surrogate has been diluted out of the sample and cannot be assessed.</p> <p>* Indicates that a quality control parameter has exceeded laboratory limits. Under the "Notes" column of the Form I, this qualifier denotes analysis was performed out of Holding Time.</p> <p>H Analysis was performed out of hold time for tests that have an "immediate" hold time criteria.</p> <p># Spike was diluted out.</p>	<p>+ Correlation coefficient for MSA is <0.995.</p> <p>N Inorganics- Matrix spike recovery was outside laboratory limits.</p> <p>N Organics- Presumptive evidence of a compound (reported as a TIC) based on the MS library search.</p> <p>S Concentration has been determined using Method of Standard Additions (MSA).</p> <p>W Post-Digestion Spike recovery is outside control limits and the sample absorbance is <50% of the spike absorbance.</p> <p>P Concentration >40% difference between the two GC columns.</p> <p>C Confirmed by GC/MS</p> <p>Q DoD reports: indicates a pesticide/Aroclor is not confirmed ($\times 100\%$ Difference between two GC columns).</p> <p>X See Case Narrative for discussion.</p> <p>MRL Method Reporting Limit. Also known as:</p> <p>LOQ Limit of Quantitation (LOQ) The lowest concentration at which the method analyte may be reliably quantified under the method conditions.</p> <p>MDL Method Detection Limit. A statistical value derived from a study designed to provide the lowest concentration that will be detected 99% of the time. Values between the MDL and MRL are estimated (see J qualifier).</p> <p>LOD Limit of Detection. A value at or above the MDL which has been verified to be detectable.</p> <p>ND Non-Detect. Analyte was not detected at the concentration listed. Same as U qualifier.</p>
--	--



Rochester Lab ID # for State Certifications¹

Connecticut ID # PH0556	Maine ID #NY0032	Pennsylvania ID# 68-786
Delaware Approved	New Hampshire ID # 2941	Rhode Island ID # 158
DoD ELAP #65817	New York ID # 10145	Virginia #460167
Florida ID # E87674	North Carolina #676	

¹ Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state or agency requirements. The test results meet requirements of the current NELAP/TNI standards or state or agency requirements, where applicable, except as noted in the case narrative. Since not all analyte/method/matrix combinations are offered for state/NELAC accreditation, this report may contain results which are not accredited. For a specific list of accredited analytes, contact the laboratory or go to <https://www.alsglobal.com/locations/americas/north-america/usa/new-york/rochester-environmental>

ALS Laboratory Group

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

ALS Group USA, Corp.
dba ALS Environmental

Analyst Summary report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters/

Service Request: R1911350

Sample Name: MWCR-1119
Lab Code: R1911350-001
Sample Matrix: Water

Date Collected: 11/18/19
Date Received: 11/19/19

Analysis Method	Extracted/Digested By	Analyzed By
350.1		MROGERSON
351.2	STALARICO	GNITAJOUPPI
410.4		SMEDBURY
6010C	AKONZEL	KMCLAEN
9056A		KWONG
9066		BBOWE
SM 2320 B-1997(2011)		KWONG
SM 2540 C-1997(2011)		KAWONG
SM 5210 B-2001(2011)		NSMITH
SM 5310 C-2000(2011)		SMEDBURY

Sample Name: DUP1-1119
Lab Code: R1911350-002
Sample Matrix: Water

Date Collected: 11/18/19
Date Received: 11/19/19

Analysis Method	Extracted/Digested By	Analyzed By
350.1		MROGERSON
351.2	STALARICO	GNITAJOUPPI
410.4		SMEDBURY
6010C	AKONZEL	KMCLAEN
9056A		KWONG
9066		BBOWE
SM 2320 B-1997(2011)		KWONG
SM 2540 C-1997(2011)		KAWONG
SM 5210 B-2001(2011)		NSMITH
SM 5310 C-2000(2011)		SMEDBURY

ALS Group USA, Corp.
dba ALS Environmental

Analyst Summary report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters/

Service Request: R1911350

Sample Name: MWO-1119
Lab Code: R1911350-003
Sample Matrix: Water

Date Collected: 11/18/19
Date Received: 11/19/19

Analysis Method	Extracted/Digested By	Analyzed By
350.1		MROGERSON
351.2	STALARICO	GNITAJOUPPI
410.4		SMEDBURY
6010C	AKONZEL	KMCLAEN
9056A		KWONG
9066		BBOWE
SM 2320 B-1997(2011)		KWONG
SM 2540 C-1997(2011)		KAWONG
SM 5210 B-2001(2011)		NSMITH
SM 5310 C-2000(2011)		SMEDBURY

Sample Name: MWL-1119
Lab Code: R1911350-004
Sample Matrix: Water

Date Collected: 11/18/19
Date Received: 11/19/19

Analysis Method	Extracted/Digested By	Analyzed By
350.1		MROGERSON
351.2	STALARICO	GNITAJOUPPI
410.4		SMEDBURY
6010C	AKONZEL	KMCLAEN
9056A		KWONG
9066		BBOWE
SM 2320 B-1997(2011)		KWONG
SM 2540 C-1997(2011)		KAWONG
SM 5210 B-2001(2011)		NSMITH
SM 5310 C-2000(2011)		SMEDBURY

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Analyst Summary report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters/

Service Request: R1911350

Sample Name: MWH-1119
Lab Code: R1911350-005
Sample Matrix: Water

Date Collected: 11/18/19
Date Received: 11/19/19

Analysis Method	Extracted/Digested By	Analyzed By
350.1		MROGERSON
351.2	GNITAJOUPPI	GNITAJOUPPI
410.4		SMEDBURY
6010C	AKONZEL	KMCLAEN
9056A		KWONG
9066		BBOWE
SM 2320 B-1997(2011)		KWONG
SM 2540 C-1997(2011)		KAWONG
SM 5210 B-2001(2011)		NSMITH
SM 5310 C-2000(2011)		SMEDBURY

Sample Name: MWGR-1119
Lab Code: R1911350-006
Sample Matrix: Water

Date Collected: 11/19/19
Date Received: 11/20/19

Analysis Method	Extracted/Digested By	Analyzed By
350.1		MROGERSON
351.2	GNITAJOUPPI	GNITAJOUPPI
410.4		SMEDBURY
6010C	AKONZEL	KMCLAEN
9056A		KWONG
9066		BBOWE
SM 2320 B-1997(2011)		KWONG
SM 2540 C-1997(2011)		GKNIGHT
SM 5210 B-2001(2011)		NSMITH
SM 5310 C-2000(2011)		SMEDBURY

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Analyst Summary report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters/

Service Request: R1911350

Sample Name: MWN-1119
Lab Code: R1911350-007
Sample Matrix: Water

Date Collected: 11/19/19
Date Received: 11/20/19

Analysis Method	Extracted/Digested By	Analyzed By
350.1		MROGERSON
351.2	GNITAJOUPPI	GNITAJOUPPI
410.4		SMEDBURY
6010C	AKONZEL	KMCLAEN
9056A		KWONG
9066		BBOWE
SM 2320 B-1997(2011)		KWONG
SM 2540 C-1997(2011)		GKNIGHT
SM 5210 B-2001(2011)		NSMITH
SM 5310 C-2000(2011)		SMEDBURY

Sample Name: MWD-1119
Lab Code: R1911350-008
Sample Matrix: Water

Date Collected: 11/19/19
Date Received: 11/20/19

Analysis Method	Extracted/Digested By	Analyzed By
350.1		MROGERSON
351.2	GNITAJOUPPI	GNITAJOUPPI
410.4		SMEDBURY
6010C	AKONZEL	KMCLAEN
9056A		KWONG
9066		BBOWE
SM 2320 B-1997(2011)		KWONG
SM 2540 C-1997(2011)		GKNIGHT
SM 5210 B-2001(2011)		NSMITH
SM 5310 C-2000(2011)		SMEDBURY

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Analyst Summary report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters/

Service Request: R1911350

Sample Name: MWJ-1119
Lab Code: R1911350-009
Sample Matrix: Water

Date Collected: 11/19/19
Date Received: 11/20/19

Analysis Method	Extracted/Digested By	Analyzed By
350.1		MROGERSON
351.2	GNITAJOUPPI	GNITAJOUPPI
410.4		SMEDBURY
6010C	AKONZEL	KMCLAEN
9056A		KWONG
9066		BBOWE
SM 2320 B-1997(2011)		KWONG
SM 2540 C-1997(2011)		GKNIGHT
SM 5210 B-2001(2011)		NSMITH
SM 5310 C-2000(2011)		SMEDBURY

Sample Name: MWP-1119
Lab Code: R1911350-010
Sample Matrix: Water

Date Collected: 11/19/19
Date Received: 11/20/19

Analysis Method	Extracted/Digested By	Analyzed By
350.1		MROGERSON
351.2	GNITAJOUPPI	GNITAJOUPPI
410.4		SMEDBURY
6010C	AKONZEL	KMCLAEN
9056A		KWONG
9066		BBOWE
SM 2320 B-1997(2011)		KWONG
SM 2540 C-1997(2011)		GKNIGHT
SM 5210 B-2001(2011)		NSMITH
SM 5310 C-2000(2011)		SMEDBURY

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Analyst Summary report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters/

Service Request: R1911350

Sample Name: MWE-1119
Lab Code: R1911350-011
Sample Matrix: Water

Date Collected: 11/19/19
Date Received: 11/20/19

Analysis Method	Extracted/Digested By	Analyzed By
350.1		MROGERSON
351.2	GNITAJOUPPI	GNITAJOUPPI
410.4		SMEDBURY
6010C	AKONZEL	KMCLAEN
9056A		KWONG
9066		BBOWE
SM 2320 B-1997(2011)		KWONG
SM 2540 C-1997(2011)		GKNIGHT
SM 5210 B-2001(2011)		NSMITH
SM 5310 C-2000(2011)		SMEDBURY

Sample Name: MWF-1119
Lab Code: R1911350-012
Sample Matrix: Water

Date Collected: 11/19/19
Date Received: 11/20/19

Analysis Method	Extracted/Digested By	Analyzed By
350.1		MROGERSON
351.2	GNITAJOUPPI	GNITAJOUPPI
410.4		SMEDBURY
6010C	AKONZEL	KMCLAEN
9056A		KWONG
9066		BBOWE
SM 2320 B-1997(2011)		KWONG
SM 2540 C-1997(2011)		GKNIGHT
SM 5210 B-2001(2011)		NSMITH
SM 5310 C-2000(2011)		SMEDBURY

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Analyst Summary report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters/

Service Request: R1911350

Sample Name: EB1-1119
Lab Code: R1911350-013
Sample Matrix: Water

Date Collected: 11/20/19
Date Received: 11/21/19

Analysis Method	Extracted/Digested By	Analyzed By
350.1		MROGERSON
351.2	NSMITH	GNITAJOUPPI
410.4		SMEDBURY
6010C	AKONZEL	KMCLAEN
9056A		KWONG
9066		BBOWE
SM 2320 B-1997(2011)		KWONG
SM 2540 C-1997(2011)		GKNIGHT
SM 5210 B-2001(2011)		NSMITH
SM 5310 C-2000(2011)		SMEDBURY

Sample Name: MWQ-1119
Lab Code: R1911350-014
Sample Matrix: Water

Date Collected: 11/20/19
Date Received: 11/21/19

Analysis Method	Extracted/Digested By	Analyzed By
350.1		MROGERSON
351.2	NSMITH	GNITAJOUPPI
410.4		SMEDBURY
6010C	AKONZEL	KMCLAEN
9056A		KWONG
9066		BBOWE
SM 2320 B-1997(2011)		KWONG
SM 2540 C-1997(2011)		GKNIGHT
SM 5210 B-2001(2011)		NSMITH
SM 5310 C-2000(2011)		SMEDBURY



INORGANIC PREPARATION METHODS

The preparation methods associated with this report are found in these tables unless discussed in the case narrative.

Water/Liquid Matrix

Analytical Method	Preparation Method
200.7	200.2
200.8	200.2
6010C	3005A/3010A
6020A	ILM05.3
9014 Cyanide Reactivity	SW846 Ch7, 7.3.4.2
9034 Sulfide Reactivity	SW846 Ch7, 7.3.4.2
9034 Sulfide Acid Soluble	9030B
9056A Bomb (Halogens)	5050A
9066 Manual Distillation	9065
SM 4500-CN-E Residual Cyanide	SM 4500-CN-G
SM 4500-CN-E WAD Cyanide	SM 4500-CN-I

Solid/Soil/Non-Aqueous Matrix

Analytical Method	Preparation Method
6010C	3050B
6020A	3050B
6010C TCLP (1311) extract	3005A/3010A
6010 SPLP (1312) extract	3005A/3010A
7196A	3060A
7199	3060A
9056A Halogens/Halides	5050
300.0 Anions/ 350.1/ 353.2/ SM 2320B/ SM 5210B/ 9056A Anions	DI extraction

For analytical methods not listed, the preparation method is the same as the analytical method reference.



Sample Results

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Metals

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: MWCR-1119
Lab Code: R1911350-001

Service Request: R1911350
Date Collected: 11/18/19 09:15
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/22/19 19:48	11/21/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/22/19 19:48	11/21/19	
Calcium, Total	6010C	92800	ug/L	1000	300	1	11/22/19 19:48	11/21/19	
Iron, Total	6010C	170 B	ug/L	100	20	1	11/22/19 19:48	11/21/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/22/19 19:48	11/21/19	
Magnesium, Total	6010C	28900	ug/L	1000	30	1	11/22/19 19:48	11/21/19	
Manganese, Total	6010C	53	ug/L	10	4	1	11/22/19 19:48	11/21/19	
Potassium, Total	6010C	3100	ug/L	2000	200	1	11/22/19 19:48	11/21/19	
Sodium, Total	6010C	14500	ug/L	1000	200	1	11/22/19 19:48	11/21/19	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: DUP1-1119
Lab Code: R1911350-002

Service Request: R1911350
Date Collected: 11/18/19 09:25
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/22/19 19:51	11/21/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/22/19 19:51	11/21/19	
Calcium, Total	6010C	92000	ug/L	1000	300	1	11/22/19 19:51	11/21/19	
Iron, Total	6010C	120 B	ug/L	100	20	1	11/22/19 19:51	11/21/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/22/19 19:51	11/21/19	
Magnesium, Total	6010C	28600	ug/L	1000	30	1	11/22/19 19:51	11/21/19	
Manganese, Total	6010C	50	ug/L	10	4	1	11/22/19 19:51	11/21/19	
Potassium, Total	6010C	3100	ug/L	2000	200	1	11/22/19 19:51	11/21/19	
Sodium, Total	6010C	14300	ug/L	1000	200	1	11/22/19 19:51	11/21/19	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: MWO-1119
Lab Code: R1911350-003

Service Request: R1911350
Date Collected: 11/18/19 11:30
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/22/19 19:55	11/21/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/22/19 19:55	11/21/19	
Calcium, Total	6010C	44200	ug/L	1000	300	1	11/22/19 19:55	11/21/19	
Iron, Total	6010C	220 B	ug/L	100	20	1	11/22/19 19:55	11/21/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/22/19 19:55	11/21/19	
Magnesium, Total	6010C	14700	ug/L	1000	30	1	11/22/19 19:55	11/21/19	
Manganese, Total	6010C	30	ug/L	10	4	1	11/22/19 19:55	11/21/19	
Potassium, Total	6010C	2800	ug/L	2000	200	1	11/22/19 19:55	11/21/19	
Sodium, Total	6010C	15800	ug/L	1000	200	1	11/22/19 19:55	11/21/19	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: MWL-1119
Lab Code: R1911350-004

Service Request: R1911350
Date Collected: 11/18/19 13:05
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/22/19 19:58	11/21/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/22/19 19:58	11/21/19	
Calcium, Total	6010C	54400	ug/L	1000	300	1	11/22/19 19:58	11/21/19	
Iron, Total	6010C	770	ug/L	100	20	1	11/22/19 19:58	11/21/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/22/19 19:58	11/21/19	
Magnesium, Total	6010C	25600	ug/L	1000	30	1	11/22/19 19:58	11/21/19	
Manganese, Total	6010C	70	ug/L	10	4	1	11/22/19 19:58	11/21/19	
Potassium, Total	6010C	4500	ug/L	2000	200	1	11/22/19 19:58	11/21/19	
Sodium, Total	6010C	29800	ug/L	1000	200	1	11/22/19 19:58	11/21/19	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: MWH-1119
Lab Code: R1911350-005

Service Request: R1911350
Date Collected: 11/18/19 14:30
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/22/19 20:08	11/21/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/22/19 20:08	11/21/19	
Calcium, Total	6010C	56200	ug/L	1000	300	1	11/22/19 20:08	11/21/19	
Iron, Total	6010C	70 BJ	ug/L	100	20	1	11/22/19 20:08	11/21/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/22/19 20:08	11/21/19	
Magnesium, Total	6010C	25300	ug/L	1000	30	1	11/22/19 20:08	11/21/19	
Manganese, Total	6010C	9 J	ug/L	10	4	1	11/22/19 20:08	11/21/19	
Potassium, Total	6010C	800 J	ug/L	2000	200	1	11/22/19 20:08	11/21/19	
Sodium, Total	6010C	32500	ug/L	1000	200	1	11/22/19 20:08	11/21/19	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: MWGR-1119
Lab Code: R1911350-006

Service Request: R1911350
Date Collected: 11/19/19 08:50
Date Received: 11/20/19 09:40

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/22/19 20:24	11/21/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/22/19 20:24	11/21/19	
Calcium, Total	6010C	96300	ug/L	1000	300	1	11/22/19 20:24	11/21/19	
Iron, Total	6010C	240	ug/L	100	20	1	11/22/19 20:24	11/21/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/22/19 20:24	11/21/19	
Magnesium, Total	6010C	17500	ug/L	1000	30	1	11/22/19 20:24	11/21/19	
Manganese, Total	6010C	5 J	ug/L	10	4	1	11/22/19 20:24	11/21/19	
Potassium, Total	6010C	1200 J	ug/L	2000	200	1	11/22/19 20:24	11/21/19	
Sodium, Total	6010C	9200	ug/L	1000	200	1	11/22/19 20:24	11/21/19	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: MWN-1119
Lab Code: R1911350-007

Service Request: R1911350
Date Collected: 11/19/19 09:30
Date Received: 11/20/19 09:40

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/22/19 20:27	11/21/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/22/19 20:27	11/21/19	
Calcium, Total	6010C	141000	ug/L	1000	300	1	11/22/19 20:27	11/21/19	
Iron, Total	6010C	2400	ug/L	100	20	1	11/22/19 20:27	11/21/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/22/19 20:27	11/21/19	
Magnesium, Total	6010C	33000	ug/L	1000	30	1	11/22/19 20:27	11/21/19	
Manganese, Total	6010C	4350	ug/L	10	4	1	11/22/19 20:27	11/21/19	
Potassium, Total	6010C	6800	ug/L	2000	200	1	11/22/19 20:27	11/21/19	
Sodium, Total	6010C	19600	ug/L	1000	200	1	11/22/19 20:27	11/21/19	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: MWD-1119
Lab Code: R1911350-008

Service Request: R1911350
Date Collected: 11/19/19 10:15
Date Received: 11/20/19 09:40

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/22/19 20:30	11/21/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/22/19 20:30	11/21/19	
Calcium, Total	6010C	71700	ug/L	1000	300	1	11/22/19 20:30	11/21/19	
Iron, Total	6010C	380	ug/L	100	20	1	11/22/19 20:30	11/21/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/22/19 20:30	11/21/19	
Magnesium, Total	6010C	16700	ug/L	1000	30	1	11/22/19 20:30	11/21/19	
Manganese, Total	6010C	6 J	ug/L	10	4	1	11/22/19 20:30	11/21/19	
Potassium, Total	6010C	2000 J	ug/L	2000	200	1	11/22/19 20:30	11/21/19	
Sodium, Total	6010C	12000	ug/L	1000	200	1	11/22/19 20:30	11/21/19	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: MWJ-1119
Lab Code: R1911350-009

Service Request: R1911350
Date Collected: 11/19/19 09:50
Date Received: 11/20/19 09:40

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/22/19 20:34	11/21/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/22/19 20:34	11/21/19	
Calcium, Total	6010C	101000	ug/L	1000	300	1	11/22/19 20:34	11/21/19	
Iron, Total	6010C	810	ug/L	100	20	1	11/22/19 20:34	11/21/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/22/19 20:34	11/21/19	
Magnesium, Total	6010C	24900	ug/L	1000	30	1	11/22/19 20:34	11/21/19	
Manganese, Total	6010C	316	ug/L	10	4	1	11/22/19 20:34	11/21/19	
Potassium, Total	6010C	3300	ug/L	2000	200	1	11/22/19 20:34	11/21/19	
Sodium, Total	6010C	114000	ug/L	1000	200	1	11/22/19 20:34	11/21/19	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: MWP-1119
Lab Code: R1911350-010

Service Request: R1911350
Date Collected: 11/19/19 11:30
Date Received: 11/20/19 09:40

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/22/19 20:37	11/21/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/22/19 20:37	11/21/19	
Calcium, Total	6010C	62300	ug/L	1000	300	1	11/22/19 20:37	11/21/19	
Iron, Total	6010C	170 B	ug/L	100	20	1	11/22/19 20:37	11/21/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/22/19 20:37	11/21/19	
Magnesium, Total	6010C	18400	ug/L	1000	30	1	11/22/19 20:37	11/21/19	
Manganese, Total	6010C	980	ug/L	10	4	1	11/22/19 20:37	11/21/19	
Potassium, Total	6010C	2000 J	ug/L	2000	200	1	11/22/19 20:37	11/21/19	
Sodium, Total	6010C	23200	ug/L	1000	200	1	11/22/19 20:37	11/21/19	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: MWE-1119
Lab Code: R1911350-011

Service Request: R1911350
Date Collected: 11/19/19 13:05
Date Received: 11/20/19 09:40

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/22/19 20:47	11/21/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/22/19 20:47	11/21/19	
Calcium, Total	6010C	99100	ug/L	1000	300	1	11/22/19 20:47	11/21/19	
Iron, Total	6010C	280	ug/L	100	20	1	11/22/19 20:47	11/21/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/22/19 20:47	11/21/19	
Magnesium, Total	6010C	31200	ug/L	1000	30	1	11/22/19 20:47	11/21/19	
Manganese, Total	6010C	298	ug/L	10	4	1	11/22/19 20:47	11/21/19	
Potassium, Total	6010C	1300 J	ug/L	2000	200	1	11/22/19 20:47	11/21/19	
Sodium, Total	6010C	22200	ug/L	1000	200	1	11/22/19 20:47	11/21/19	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: MWF-1119
Lab Code: R1911350-012

Service Request: R1911350
Date Collected: 11/19/19 14:45
Date Received: 11/20/19 09:40

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/26/19 18:06	11/25/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/26/19 18:06	11/25/19	
Calcium, Total	6010C	104000	ug/L	1000	300	1	11/26/19 18:06	11/25/19	
Iron, Total	6010C	430	ug/L	100	20	1	11/26/19 18:06	11/25/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/26/19 18:06	11/25/19	
Magnesium, Total	6010C	28700	ug/L	1000	30	1	11/26/19 18:06	11/25/19	
Manganese, Total	6010C	59	ug/L	10	4	1	11/26/19 18:06	11/25/19	
Potassium, Total	6010C	2300	ug/L	2000	200	1	11/26/19 18:06	11/25/19	
Sodium, Total	6010C	18000	ug/L	1000	200	1	11/26/19 18:06	11/25/19	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: EB1-1119
Lab Code: R1911350-013

Service Request: R1911350
Date Collected: 11/20/19 07:30
Date Received: 11/21/19 09:35

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/26/19 18:09	11/25/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/26/19 18:09	11/25/19	
Calcium, Total	6010C	1000 U	ug/L	1000	300	1	11/26/19 18:09	11/25/19	
Iron, Total	6010C	100	ug/L	100	20	1	11/26/19 18:09	11/25/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/26/19 18:09	11/25/19	
Magnesium, Total	6010C	1000 U	ug/L	1000	30	1	11/26/19 18:09	11/25/19	
Manganese, Total	6010C	10 U	ug/L	10	4	1	11/26/19 18:09	11/25/19	
Potassium, Total	6010C	2000 U	ug/L	2000	200	1	11/26/19 18:09	11/25/19	
Sodium, Total	6010C	200 J	ug/L	1000	200	1	11/26/19 18:09	11/25/19	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: MWQ-1119
Lab Code: R1911350-014

Service Request: R1911350
Date Collected: 11/20/19 10:20
Date Received: 11/21/19 09:35

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/26/19 18:12	11/25/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/26/19 18:12	11/25/19	
Calcium, Total	6010C	21400	ug/L	1000	300	1	11/26/19 18:12	11/25/19	
Iron, Total	6010C	110	ug/L	100	20	1	11/26/19 18:12	11/25/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/26/19 18:12	11/25/19	
Magnesium, Total	6010C	7900	ug/L	1000	30	1	11/26/19 18:12	11/25/19	
Manganese, Total	6010C	15	ug/L	10	4	1	11/26/19 18:12	11/25/19	
Potassium, Total	6010C	1700 J	ug/L	2000	200	1	11/26/19 18:12	11/25/19	
Sodium, Total	6010C	57600	ug/L	1000	200	1	11/26/19 18:12	11/25/19	



General Chemistry

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: MWCR-1119
Lab Code: R1911350-001

Service Request: R1911350
Date Collected: 11/18/19 09:15
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	322	mg/L	2.0	1.8	1	11/22/19 09:17	NA	
Ammonia as Nitrogen, undistilled	350.1	0.050	U mg/L	0.050	0.003	1	11/22/19 22:58	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0	U mg/L	2.0	-	1	11/20/19 08:02	NA	
Bromide	9056A	1.0	U mg/L	1.0	0.4	10	11/19/19 17:39	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	1.1	mg/L	1.0	0.5	1	11/22/19 02:24	NA	
Chemical Oxygen Demand, Total	410.4	4.2	J mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	17.0	mg/L	2.0	0.5	10	11/19/19 17:39	NA	
Hardness, Total as CaCO3	SM 2340 B-1997(2011)	351	mg/L	6.62	-	1	NA	NA	
Nitrate as Nitrogen	9056A	0.4	J mg/L	1.0	0.2	10	11/19/19 17:39	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.11	J mg/L	0.20	0.10	1	11/22/19 11:22	11/21/19	
Phenolics, Total Recoverable	9066	0.0050	U mg/L	0.0050	0.0010	1	11/25/19 22:31	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	411	mg/L	10	9	1	11/20/19 14:00	NA	
Sulfate	9056A	27.5	mg/L	2.0	0.4	10	11/19/19 17:39	NA	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: DUP1-1119
Lab Code: R1911350-002

Service Request: R1911350
Date Collected: 11/18/19 09:25
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	324	mg/L	2.0	1.8	1	11/22/19 09:24	NA	
Ammonia as Nitrogen, undistilled	350.1	0.050 U	mg/L	0.050	0.003	1	11/22/19 22:59	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/20/19 08:09	NA	
Bromide	9056A	1.0 U	mg/L	1.0	0.4	10	11/19/19 17:44	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	1.1	mg/L	1.0	0.5	1	11/22/19 03:05	NA	
Chemical Oxygen Demand, Total	410.4	5.0 U	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	17.2	mg/L	2.0	0.5	10	11/19/19 17:44	NA	
Hardness, Total as CaCO3	SM 2340 B-1997(2011)	347	mg/L	6.62	-	1	NA	NA	
Nitrate as Nitrogen	9056A	0.4 J	mg/L	1.0	0.2	10	11/19/19 17:44	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.11 J	mg/L	0.20	0.10	1	11/22/19 11:23	11/21/19	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/25/19 22:35	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	408	mg/L	10	9	1	11/20/19 14:00	NA	
Sulfate	9056A	27.9	mg/L	2.0	0.4	10	11/19/19 17:44	NA	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: MWO-1119
Lab Code: R1911350-003

Service Request: R1911350
Date Collected: 11/18/19 11:30
Date Received: 11/19/19 09:55
Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	182	mg/L	2.0	1.8	1	11/22/19 09:29	NA	
Ammonia as Nitrogen, undistilled	350.1	0.050 U	mg/L	0.050	0.003	1	11/22/19 23:00	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/20/19 08:12	NA	
Bromide	9056A	1.0 U	mg/L	1.0	0.4	10	11/19/19 17:50	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	1.0 U	mg/L	1.0	0.5	1	11/22/19 04:08	NA	
Chemical Oxygen Demand, Total	410.4	5.0 U	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	1.8 J	mg/L	2.0	0.5	10	11/19/19 17:50	NA	
Hardness, Total as CaCO3	SM 2340 B-1997(2011)	171	mg/L	6.62	-	1	NA	NA	
Nitrate as Nitrogen	9056A	1.0 U	mg/L	1.0	0.2	10	11/19/19 17:50	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.20 U	mg/L	0.20	0.10	1	11/22/19 11:24	11/21/19	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/25/19 22:44	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	231	mg/L	10	9	1	11/20/19 14:00	NA	
Sulfate	9056A	20.5	mg/L	2.0	0.4	10	11/19/19 17:50	NA	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: MWL-1119
Lab Code: R1911350-004

Service Request: R1911350
Date Collected: 11/18/19 13:05
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	254	mg/L	2.0	1.8	1	11/22/19 09:36	NA	
Ammonia as Nitrogen, undistilled	350.1	0.050 U	mg/L	0.050	0.003	1	11/22/19 23:02	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/20/19 08:11	NA	
Bromide	9056A	1.0 U	mg/L	1.0	0.4	10	11/19/19 17:56	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	1.0 U	mg/L	1.0	0.5	1	11/22/19 04:29	NA	
Chemical Oxygen Demand, Total	410.4	5.3	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	5.4	mg/L	2.0	0.5	10	11/19/19 17:56	NA	
Hardness, Total as CaCO3	SM 2340 B-1997(2011)	241	mg/L	6.62	-	1	NA	NA	
Nitrate as Nitrogen	9056A	1.0 U	mg/L	1.0	0.2	10	11/19/19 17:56	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.20 U	mg/L	0.20	0.10	1	11/22/19 11:25	11/21/19	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/25/19 22:48	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	335	mg/L	10	9	1	11/20/19 14:00	NA	
Sulfate	9056A	38.7	mg/L	2.0	0.4	10	11/19/19 17:56	NA	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: MWH-1119
Lab Code: R1911350-005

Service Request: R1911350
Date Collected: 11/18/19 14:30
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	114	mg/L	2.0	1.8	1	11/22/19 09:44	NA	
Ammonia as Nitrogen, undistilled	350.1	0.050 U	mg/L	0.050	0.003	1	11/22/19 23:03	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/20/19 08:13	NA	
Bromide	9056A	1.0 U	mg/L	1.0	0.4	10	11/19/19 18:02	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	0.6 J	mg/L	1.0	0.5	1	11/22/19 04:50	NA	
Chemical Oxygen Demand, Total	410.4	5.0 U	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	14.0	mg/L	2.0	0.5	10	11/19/19 18:02	NA	
Hardness, Total as CaCO3	SM 2340 B-1997(2011)	244	mg/L	6.62	-	1	NA	NA	
Nitrate as Nitrogen	9056A	0.7 J	mg/L	1.0	0.2	10	11/19/19 18:02	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.20 U	mg/L	0.20	0.10	1	11/22/19 11:33	11/21/19	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/25/19 23:12	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	426	mg/L	10	9	1	11/20/19 14:00	NA	
Sulfate	9056A	176	mg/L	6.0	1.2	30	11/20/19 18:37	NA	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: MWGR-1119
Lab Code: R1911350-006

Service Request: R1911350
Date Collected: 11/19/19 08:50
Date Received: 11/20/19 09:40

Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	297	mg/L	2.0	1.8	1	11/22/19 10:08	NA	
Ammonia as Nitrogen, undistilled	350.1	0.050 U	mg/L	0.050	0.003	1	11/22/19 23:09	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/20/19 14:16	NA	
Bromide	9056A	1.0 U	mg/L	1.0	0.4	10	11/20/19 13:31	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	0.7 J	mg/L	1.0	0.5	1	11/22/19 06:34	NA	
Chemical Oxygen Demand, Total	410.4	5.0 U	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	5.6	mg/L	2.0	0.5	10	11/20/19 13:31	NA	
Hardness, Total as CaCO3	SM 2340 B-1997(2011)	313	mg/L	6.62	-	1	NA	NA	
Nitrate as Nitrogen	9056A	0.5 J	mg/L	1.0	0.2	10	11/20/19 13:31	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.20 U	mg/L	0.20	0.10	1	11/22/19 11:36	11/21/19	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/25/19 22:52	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	375	mg/L	10	9	1	11/22/19 11:00	NA	
Sulfate	9056A	25.7	mg/L	2.0	0.4	10	11/20/19 13:31	NA	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: MWN-1119
Lab Code: R1911350-007

Service Request: R1911350
Date Collected: 11/19/19 09:30
Date Received: 11/20/19 09:40
Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	492	mg/L	2.0	1.8	1	11/22/19 10:14	NA	
Ammonia as Nitrogen, undistilled	350.1	0.247	mg/L	0.050	0.003	1	11/22/19 23:10	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	3.5	mg/L	2.0	-	1	11/20/19 14:17	NA	
Bromide	9056A	1.0 U	mg/L	1.0	0.4	10	11/20/19 13:37	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	4.7	mg/L	1.0	0.5	1	11/22/19 06:55	NA	
Chemical Oxygen Demand, Total	410.4	11.9	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	3.2	mg/L	2.0	0.5	10	11/20/19 13:37	NA	
Hardness, Total as CaCO3	SM 2340 B-1997(2011)	487	mg/L	6.62	-	1	NA	NA	
Nitrate as Nitrogen	9056A	0.4 J	mg/L	1.0	0.2	10	11/20/19 13:37	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.96	mg/L	0.20	0.10	1	11/22/19 11:37	11/21/19	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/25/19 23:24	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	579	mg/L	10	9	1	11/22/19 11:00	NA	
Sulfate	9056A	29.7	mg/L	2.0	0.4	10	11/20/19 13:37	NA	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: MWD-1119
Lab Code: R1911350-008

Service Request: R1911350
Date Collected: 11/19/19 10:15
Date Received: 11/20/19 09:40

Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date</u> <u>Extracted</u>	<u>Q</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	232	mg/L	2.0	1.8	1	11/22/19 10:21	NA	
Ammonia as Nitrogen, undistilled	350.1	0.016 J	mg/L	0.050	0.003	1	11/22/19 23:11	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/20/19 14:47	NA	
Bromide	9056A	1.0 U	mg/L	1.0	0.4	10	11/20/19 13:55	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	0.6 J	mg/L	1.0	0.5	1	11/22/19 07:16	NA	
Chemical Oxygen Demand, Total	410.4	5.0 U	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	11.7	mg/L	2.0	0.5	10	11/20/19 13:55	NA	
Hardness, Total as CaCO3	SM 2340 B-1997(2011)	248	mg/L	6.62	-	1	NA	NA	
Nitrate as Nitrogen	9056A	0.6 J	mg/L	1.0	0.2	10	11/20/19 13:55	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.20 U	mg/L	0.20	0.10	1	11/22/19 11:37	11/21/19	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/25/19 23:28	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	303	mg/L	10	9	1	11/22/19 11:00	NA	
Sulfate	9056A	21.8	mg/L	2.0	0.4	10	11/20/19 13:55	NA	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: MWJ-1119
Lab Code: R1911350-009

Service Request: R1911350
Date Collected: 11/19/19 09:50
Date Received: 11/20/19 09:40

Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date</u> <u>Extracted</u>	<u>Q</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	319	mg/L	2.0	1.8	1	11/22/19 10:27	NA	
Ammonia as Nitrogen, undistilled	350.1	0.006 J	mg/L	0.050	0.003	1	11/22/19 23:12	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/20/19 14:19	NA	
Bromide	9056A	1.0 U	mg/L	1.0	0.4	10	11/20/19 12:49	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	1.6	mg/L	1.0	0.5	1	11/22/19 08:19	NA	
Chemical Oxygen Demand, Total	410.4	5.3	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	166	mg/L	4.0	0.9	20	11/20/19 12:55	NA	
Hardness, Total as CaCO3	SM 2340 B-1997(2011)	355	mg/L	6.62	-	1	NA	NA	
Nitrate as Nitrogen	9056A	1.0 U	mg/L	1.0	0.2	10	11/20/19 12:49	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.20 U	mg/L	0.20	0.10	1	11/22/19 11:38	11/21/19	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/25/19 23:32	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	662	mg/L	10	9	1	11/22/19 11:00	NA	
Sulfate	9056A	50.7	mg/L	2.0	0.4	10	11/20/19 12:49	NA	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: MWP-1119
Lab Code: R1911350-010

Service Request: R1911350
Date Collected: 11/19/19 11:30
Date Received: 11/20/19 09:40

Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date</u> <u>Extracted</u>	<u>Q</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	211	mg/L	2.0	1.8	1	11/22/19 10:33	NA	
Ammonia as Nitrogen, undistilled	350.1	0.018 J	mg/L	0.050	0.003	1	11/22/19 23:13	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/20/19 14:20	NA	
Bromide	9056A	1.0 U	mg/L	1.0	0.4	10	11/20/19 13:01	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	1.0 U	mg/L	1.0	0.5	1	11/22/19 08:39	NA	
Chemical Oxygen Demand, Total	410.4	5.0 U	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	9.3	mg/L	2.0	0.5	10	11/20/19 13:01	NA	
Hardness, Total as CaCO3	SM 2340 B-1997(2011)	231	mg/L	6.62	-	1	NA	NA	
Nitrate as Nitrogen	9056A	1.0 U	mg/L	1.0	0.2	10	11/20/19 13:01	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.20 U	mg/L	0.20	0.10	1	11/22/19 11:39	11/21/19	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/25/19 23:36	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	318	mg/L	10	9	1	11/22/19 11:00	NA	
Sulfate	9056A	52.7	mg/L	2.0	0.4	10	11/20/19 13:01	NA	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: MWE-1119
Lab Code: R1911350-011

Service Request: R1911350
Date Collected: 11/19/19 13:05
Date Received: 11/20/19 09:40

Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	314	mg/L	2.0	1.8	1	11/22/19 10:39	NA	
Ammonia as Nitrogen, undistilled	350.1	0.050 U	mg/L	0.050	0.003	1	11/22/19 23:14	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/20/19 14:18	NA	
Bromide	9056A	1.0 U	mg/L	1.0	0.4	10	11/20/19 13:19	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	2.0	mg/L	1.0	0.5	1	11/22/19 09:00	NA	
Chemical Oxygen Demand, Total	410.4	5.0 U	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	10.1	mg/L	2.0	0.5	10	11/20/19 13:19	NA	
Hardness, Total as CaCO3	SM 2340 B-1997(2011)	376	mg/L	6.62	-	1	NA	NA	
Nitrate as Nitrogen	9056A	0.8 J	mg/L	1.0	0.2	10	11/20/19 13:19	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.20 J	mg/L	0.20	0.10	1	11/22/19 11:40	11/21/19	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/25/19 23:40	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	453	mg/L	10	9	1	11/22/19 11:00	NA	
Sulfate	9056A	67.9	mg/L	2.0	0.4	10	11/20/19 13:19	NA	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: MWF-1119
Lab Code: R1911350-012

Service Request: R1911350
Date Collected: 11/19/19 14:45
Date Received: 11/20/19 09:40

Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	274	mg/L	2.0	1.8	1	11/22/19 10:46	NA	
Ammonia as Nitrogen, undistilled	350.1	0.050 U	mg/L	0.050	0.003	1	11/22/19 23:16	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/20/19 14:19	NA	
Bromide	9056A	1.0 U	mg/L	1.0	0.4	10	11/20/19 13:25	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	3.5	mg/L	1.0	0.5	1	11/22/19 21:10	NA	
Chemical Oxygen Demand, Total	410.4	7.4	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	32.8	mg/L	2.0	0.5	10	11/20/19 13:25	NA	
Hardness, Total as CaCO3	SM 2340 B-1997(2011)	377	mg/L	6.62	-	1	NA	NA	
Nitrate as Nitrogen	9056A	1.0 U	mg/L	1.0	0.2	10	11/20/19 13:25	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.15 J	mg/L	0.20	0.10	1	11/22/19 11:41	11/21/19	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/25/19 23:44	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	454	mg/L	10	9	1	11/22/19 11:00	NA	
Sulfate	9056A	78.3	mg/L	2.0	0.4	10	11/20/19 13:25	NA	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: EB1-1119
Lab Code: R1911350-013

Service Request: R1911350
Date Collected: 11/20/19 07:30
Date Received: 11/21/19 09:35
Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	2.0 U	mg/L	2.0	1.8	1	11/22/19 20:15	NA	
Ammonia as Nitrogen, undistilled	350.1	0.050 U	mg/L	0.050	0.003	1	11/22/19 23:17	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/22/19 05:45	NA	
Bromide	9056A	1.0 U	mg/L	1.0	0.4	10	11/21/19 21:40	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	1.0 U	mg/L	1.0	0.5	1	11/22/19 22:13	NA	
Chemical Oxygen Demand, Total	410.4	3.9 J	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	2.0 U	mg/L	2.0	0.5	10	11/21/19 21:40	NA	
Hardness, Total as CaCO3	SM 2340 B-1997(2011)	6.62 U	mg/L	6.62	-	1	NA	NA	
Nitrate as Nitrogen	9056A	1.0 U	mg/L	1.0	0.2	10	11/21/19 21:40	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.20 U	mg/L	0.20	0.10	1	11/26/19 11:49	11/25/19	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/25/19 23:48	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	10 U	mg/L	10	9	1	11/22/19 11:00	NA	
Sulfate	9056A	2.0 U	mg/L	2.0	0.4	10	11/21/19 21:40	NA	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: MWQ-1119
Lab Code: R1911350-014

Service Request: R1911350
Date Collected: 11/20/19 10:20
Date Received: 11/21/19 09:35

Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	42.8	mg/L	2.0	1.8	1	11/22/19 20:22	NA	
Ammonia as Nitrogen, undistilled	350.1	0.050 U	mg/L	0.050	0.003	1	11/22/19 23:28	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/22/19 05:44	NA	
Bromide	9056A	1.0 U	mg/L	1.0	0.4	10	11/21/19 21:46	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	1.9	mg/L	1.0	0.5	1	11/22/19 22:33	NA	
Chemical Oxygen Demand, Total	410.4	5.0 U	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	112	mg/L	4.0	0.9	20	11/25/19 17:34	NA	
Hardness, Total as CaCO3	SM 2340 B-1997(2011)	85.9	mg/L	6.62	-	1	NA	NA	
Nitrate as Nitrogen	9056A	0.5 J	mg/L	1.0	0.2	10	11/21/19 21:46	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.13 J	mg/L	0.20	0.10	1	11/26/19 11:50	11/25/19	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/26/19 00:08	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	264	mg/L	10	9	1	11/22/19 11:00	NA	
Sulfate	9056A	21.3	mg/L	2.0	0.4	10	11/21/19 21:46	NA	



QC Summary Forms

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Metals

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: Method Blank
Lab Code: R1911350-MB1

Service Request: R1911350
Date Collected: NA
Date Received: NA
Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/22/19 19:29	11/21/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/22/19 19:29	11/21/19	
Calcium, Total	6010C	1000 U	ug/L	1000	300	1	11/22/19 19:29	11/21/19	
Iron, Total	6010C	20 J	ug/L	100	20	1	11/22/19 19:29	11/21/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/22/19 19:29	11/21/19	
Magnesium, Total	6010C	1000 U	ug/L	1000	30	1	11/22/19 19:29	11/21/19	
Manganese, Total	6010C	10 U	ug/L	10	4	1	11/22/19 19:29	11/21/19	
Potassium, Total	6010C	2000 U	ug/L	2000	200	1	11/22/19 19:29	11/21/19	
Sodium, Total	6010C	1000 U	ug/L	1000	200	1	11/22/19 19:29	11/21/19	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: Method Blank
Lab Code: R1911350-MB2

Service Request: R1911350
Date Collected: NA
Date Received: NA
Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/26/19 17:49	11/25/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/26/19 17:49	11/25/19	
Calcium, Total	6010C	1000 U	ug/L	1000	300	1	11/26/19 17:49	11/25/19	
Iron, Total	6010C	100 U	ug/L	100	20	1	11/26/19 17:49	11/25/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/26/19 17:49	11/25/19	
Magnesium, Total	6010C	1000 U	ug/L	1000	30	1	11/26/19 17:49	11/25/19	
Manganese, Total	6010C	10 U	ug/L	10	4	1	11/26/19 17:49	11/25/19	
Potassium, Total	6010C	2000 U	ug/L	2000	200	1	11/26/19 17:49	11/25/19	
Sodium, Total	6010C	1000 U	ug/L	1000	200	1	11/26/19 17:49	11/25/19	

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water

Service Request:R1911350
Date Collected:11/18/19
Date Received:11/19/19
Date Analyzed:11/22/19

**Duplicate Matrix Spike Summary
Inorganic Parameters**

Sample Name: MWH-1119
Lab Code: R1911350-005

Units:ug/L
Basis:NA

Analyte Name	Method	Sample Result	Result	Matrix Spike R1911350-005MS		Duplicate Matrix Spike R1911350-005DMS		% Rec	Limits	RPD	RPD Limit
				Spike Amount	% Rec	Result	Spike Amount				
Arsenic, Total	6010C	10 U	40	40	100	46	40	115	75-125	14	20
Cadmium, Total	6010C	5.0 U	49.7	50.0	99	49.3	50.0	99	75-125	<1	20
Calcium, Total	6010C	56200	60100	2000	193 #	59900	2000	187 #	75-125	<1	20
Iron, Total	6010C	70 BJ	1050	1000	98	1050	1000	98	75-125	<1	20
Lead, Total	6010C	5.0 U	496	500	99	493	500	99	75-125	<1	20
Magnesium, Total	6010C	25300	27200	2000	98 #	27100	2000	93 #	75-125	<1	20
Manganese, Total	6010C	9 J	506	500	99	503	500	99	75-125	<1	20
Potassium, Total	6010C	800 J	20500	20000	99	20400	20000	98	75-125	<1	20
Sodium, Total	6010C	32500	51800	20000	96	51800	20000	96	75-125	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water

Service Request: R1911350

Date Analyzed: 11/22/19

Lab Control Sample Summary
Inorganic Parameters

Units:ug/L

Basis:NA

Lab Control Sample
R1911350-LCS2

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Arsenic, Total	6010C	43.7	40	109	80-120
Cadmium, Total	6010C	51.5	50.0	103	80-120
Calcium, Total	6010C	2200	2000	108	80-120
Iron, Total	6010C	990	1000	99	80-120
Lead, Total	6010C	501	500	100	80-120
Magnesium, Total	6010C	2000	2000	98	80-120
Manganese, Total	6010C	496	500	99	80-120
Potassium, Total	6010C	19200	20000	96	80-120
Sodium, Total	6010C	19800	20000	99	80-120

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water

Service Request: R1911350
Date Analyzed: 11/26/19

Duplicate Lab Control Sample Summary
Inorganic Parameters

Units:ug/L
Basis:NA

Analyte Name	Lab Control Sample R1911350-LCS1				Duplicate Lab Control Sample R1911350-DLCS1				RPD	RPD Limit
	Analytical Method	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec	% Rec Limits		
Arsenic, Total	6010C	36	40	90	40	40	99	80-120	10	20
Cadmium, Total	6010C	50.9	50.0	102	50.5	50.0	101	80-120	<1	20
Calcium, Total	6010C	1720	2000	86	1670	2000	83	80-120	3	20
Iron, Total	6010C	980	1000	98	1010	1000	101	80-120	3	20
Lead, Total	6010C	500	500	100	494	500	99	80-120	1	20
Magnesium, Total	6010C	1940	2000	97	1930	2000	96	80-120	<1	20
Manganese, Total	6010C	496	500	99	493	500	99	80-120	<1	20
Potassium, Total	6010C	19100	20000	96	19000	20000	95	80-120	<1	20
Sodium, Total	6010C	19600	20000	98	19600	20000	98	80-120	<1	20



General Chemistry

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: Method Blank
Lab Code: R1911350-MB1

Service Request: R1911350
Date Collected: NA
Date Received: NA
Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date</u> <u>Extracted</u>	<u>Q</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	2.0 U	mg/L	2.0	1.8	1	11/22/19 08:36	NA	
Ammonia as Nitrogen, undistilled	350.1	0.050 U	mg/L	0.050	0.003	1	11/22/19 22:27	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/20/19 17:35	NA	
Bromide	9056A	0.10 U	mg/L	0.10	0.04	1	11/19/19 15:03	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	1.0 U	mg/L	1.0	0.5	1	11/21/19 17:41	NA	
Chemical Oxygen Demand, Total	410.4	5.0 U	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	0.20 U	mg/L	0.20	0.05	1	11/19/19 15:03	NA	
Nitrate as Nitrogen	9056A	0.10 U	mg/L	0.10	0.02	1	11/19/19 15:03	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.20 U	mg/L	0.20	0.1	1	11/22/19 10:59	11/21/19	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/25/19 20:12	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	10 U	mg/L	10	9	1	11/20/19 14:00	NA	
Sulfate	9056A	0.20 U	mg/L	0.20	0.04	1	11/19/19 15:03	NA	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: Method Blank
Lab Code: R1911350-MB2

Service Request: R1911350
Date Collected: NA
Date Received: NA
Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date</u> <u>Extracted</u>	<u>Q</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	2.0 U	mg/L	2.0	1.8	1	11/22/19 17:38	NA	
Ammonia as Nitrogen, undistilled	350.1	0.050 U	mg/L	0.050	0.003	1	11/22/19 22:54	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/20/19 17:35	NA	
Bromide	9056A	0.10 U	mg/L	0.10	0.04	1	11/20/19 12:37	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	1.0 U	mg/L	1.0	0.5	1	11/22/19 02:03	NA	
Chloride	9056A	0.20 U	mg/L	0.20	0.05	1	11/20/19 12:37	NA	
Nitrate as Nitrogen	9056A	0.10 U	mg/L	0.10	0.02	1	11/20/19 12:37	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.20 U	mg/L	0.20	0.10	1	11/22/19 11:27	11/21/19	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/25/19 22:04	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	10 U	mg/L	10	9	1	11/22/19 11:00	NA	
Sulfate	9056A	0.20 U	mg/L	0.20	0.04	1	11/20/19 12:37	NA	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: Method Blank
Lab Code: R1911350-MB3

Service Request: R1911350
Date Collected: NA
Date Received: NA
Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date	
								Extracted	Q
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/22/19 14:41	NA	
Bromide	9056A	0.10 U	mg/L	0.10	0.04	1	11/21/19 21:28	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	1.0 U	mg/L	1.0	0.5	1	11/22/19 20:07	NA	
Chloride	9056A	0.20 U	mg/L	0.20	0.05	1	11/21/19 21:28	NA	
Nitrate as Nitrogen	9056A	0.10 U	mg/L	0.10	0.02	1	11/21/19 21:28	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.20 U	mg/L	0.20	0.10	1	11/26/19 11:38	11/25/19	
Sulfate	9056A	0.20 U	mg/L	0.20	0.04	1	11/20/19 15:00	NA	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water
Sample Name: Method Blank
Lab Code: R1911350-MB4

Service Request: R1911350
Date Collected: NA
Date Received: NA
Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/22/19 16:15	
Chloride	9056A	0.20 U	mg/L	0.20	0.05	1	11/25/19 16:52	
Sulfate	9056A	0.20 U	mg/L	0.20	0.04	1	11/21/19 21:28	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water

Service Request: R1911350
Date Collected: 11/18/19
Date Received: 11/19/19
Date Analyzed: 11/22/19

Duplicate Matrix Spike Summary
Carbon, Total Organic (TOC)

Sample Name: DUP1-1119
Lab Code: R1911350-002
Analysis Method: SM 5310 C-2000(2011)

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Matrix Spike R1911350-002MS			Duplicate Matrix Spike R1911350-002DMS			% Rec Limits	RPD	RPD Limit
		Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Carbon, Total Organic (TOC)	1.1	11.2	10.0	101	12.2	10.0	110	48-135	8	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water

Service Request: R1911350
Date Collected: 11/18/19
Date Received: 11/19/19
Date Analyzed: 11/22/19
Date Extracted: 11/21/19

Duplicate Matrix Spike Summary
Nitrogen, Total Kjeldahl (TKN)

Sample Name: MWL-1119
Lab Code: R1911350-004
Analysis Method: 351.2
Prep Method: Method

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Matrix Spike R1911350-004MS			Duplicate Matrix Spike R1911350-004DMS			% Rec Limits	RPD	RPD Limit
		Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Nitrogen, Total Kjeldahl (TKN)	0.20 U	2.38	2.50	95	2.42	2.50	97	90-110	2	20

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Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water

Service Request: R1911350
Date Collected: 11/18/19
Date Received: 11/19/19
Date Analyzed: 11/19/19 - 11/25/19

**Duplicate Matrix Spike Summary
General Chemistry Parameters**

Sample Name: MWH-1119
Lab Code: R1911350-005

Units: mg/L
Basis: NA

Analyte Name	Method	Matrix Spike R1911350-005MS			Duplicate Matrix Spike R1911350-005DMS						
		Sample Result	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec	% Rec Limits	RPD	RPD Limit
Ammonia as Nitrogen, undistilled	350.1	0.050 U	0.216	0.250	87 *	0.218	0.250	87 *	90-110	<1	20
Bromide	9056A	1.0 U	10.1	10.0	101	9.9	10.0	99	80-120	1	15
Chloride	9056A	14.0	35.0	20.0	105	35.0	20.0	105	80-120	<1	15
Chemical Oxygen Demand, Total	410.4	5.0 U	17.5	25.0	70 *	19.4	25.0	78 *	90-110	11	20
Phenolics, Total Recoverable	9066	0.0050 U	0.0416	0.0400	104	0.0414	0.0400	104	49-137	<1	20
Sulfate	9056A	176	233	60.0	96	234	60.0	98	80-120	<1	15
Nitrogen, Total Kjeldahl (TKN)	351.2	0.20 U	2.40	2.50	96	2.42	2.50	97	90-110	<1	20
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	0.6 J	11.3	10.0	107	11.3	10.0	107	48-135	<1	20
Nitrate as Nitrogen	9056A	0.7 J	10.6	10.0	100	10.6	10.0	99	80-120	<1	15

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Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water

Service Request: R1911350
Date Collected: 11/19/19
Date Received: 11/20/19
Date Analyzed: 11/22/19 - 11/23/19

**Duplicate Matrix Spike Summary
General Chemistry Parameters**

Sample Name: MWD-1119
Lab Code: R1911350-008

Units: mg/L
Basis: NA

Matrix Spike
R1911350-008MS

Duplicate Matrix Spike
R1911350-008DMS

Analyte Name	Method	Sample Result	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec	% Rec Limits	RPD	RPD Limit
Chemical Oxygen Demand, Total	410.4	5.0 U	18.5	25.0	74 *	16.8	25.0	67 *	90-110	9	20
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	0.6 J	11.1	10.0	105	10.2	10.0	97	48-135	8	20

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water

Service Request:R1911350
Date Collected:11/19/19
Date Received:11/20/19
Date Analyzed:11/20/19

**Duplicate Matrix Spike Summary
General Chemistry Parameters**

Sample Name: MWP-1119
Lab Code: R1911350-010

Units:mg/L
Basis:NA

Analyte Name	Method	Sample Result	Result	Matrix Spike R1911350-010MS			Duplicate Matrix Spike R1911350-010DMS			RPD	RPD Limit
				Spike Amount	% Rec	Result	Spike Amount	% Rec	Limits		
Bromide	9056A	1.0 U	10.0	10.0	100	9.9	10.0	99	80-120	<1	15
Chloride	9056A	9.3	29.7	20.0	102	29.6	20.0	102	80-120	<1	15
Sulfate	9056A	52.7	71.8	20.0	95	71.4	20.0	93	80-120	<1	15
Nitrate as Nitrogen	9056A	1.0 U	10.1	10.0	101	10.1	10.0	101	80-120	<1	15

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Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water

Service Request: R1911350
Date Collected: 11/19/19
Date Received: 11/20/19
Date Analyzed: 11/22/19

Duplicate Matrix Spike Summary
Carbon, Total Organic (TOC)

Sample Name: MWF-1119
Lab Code: R1911350-012
Analysis Method: SM 5310 C-2000(2011)

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Matrix Spike R1911350-012MS		Duplicate Matrix Spike R1911350-012DMS		% Rec Limits	RPD	RPD Limit		
		Result	Spike Amount	% Rec	Result				Spike Amount	% Rec
Carbon, Total Organic (TOC)	3.5	13.4	10.0	100	13.9	10.0	104	48-135	3	20

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Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water

Service Request: R1911350
Date Collected: 11/20/19
Date Received: 11/21/19
Date Analyzed: 11/22/19

Duplicate Matrix Spike Summary
Ammonia as Nitrogen, undistilled

Sample Name: EB1-1119
Lab Code: R1911350-013
Analysis Method: 350.1

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Matrix Spike R1911350-013MS			Duplicate Matrix Spike R1911350-013DMS			% Rec Limits	RPD	RPD Limit
		Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Ammonia as Nitrogen, undistilled	0.050 U	0.240	0.250	96	0.240	0.250	96	90-110	<1	20

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Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water

Service Request:R1911350
Date Collected:11/20/19
Date Received:11/21/19
Date Analyzed:11/21/19 - 11/25/19

**Duplicate Matrix Spike Summary
General Chemistry Parameters**

Sample Name: MWQ-1119
Lab Code: R1911350-014

Units:mg/L
Basis:NA

**Matrix Spike
R1911350-014MS**

**Duplicate Matrix Spike
R1911350-014DMS**

Analyte Name	Method	Sample Result	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec	% Rec Limits	RPD	RPD Limit
Bromide	9056A	1.0 U	9.7	10.0	97	9.9	10.0	99	80-120	2	15
Chloride	9056A	112	147	40.0	87	147	40.0	87	80-120	<1	15
Sulfate	9056A	21.3	41.3	20.0	100	41.1	20.0	99	80-120	<1	15
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	1.9	12.0	10.0	101	12.3	10.0	105	48-135	3	20
Nitrate as Nitrogen	9056A	0.5 J	10.3	10.0	98	10.3	10.0	99	80-120	<1	15

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Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water

Service Request: R1911350
Date Collected: 11/18/19
Date Received: 11/19/19
Date Analyzed: 11/20/19 - 11/22/19

Replicate Sample Summary
General Chemistry Parameters

Sample Name: MWH-1119
Lab Code: R1911350-005

Units: mg/L
Basis: NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample R1911350-005DUP Result	Average	RPD	RPD Limit
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	2.0	1.8	114	114	114	<1	20
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0		2.0 U	2.0 U	NC	NC	20
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	10	9	426	425	426	<1	10

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Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water

Service Request: R1911350
Date Collected: 11/19/19
Date Received: 11/20/19
Date Analyzed: 11/20/19

Replicate Sample Summary
General Chemistry Parameters

Sample Name: MWF-1119
Lab Code: R1911350-012

Units: mg/L
Basis: NA

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>MRL</u>	<u>Sample Result</u>	<u>Duplicate Sample R1911350-012DUP Result</u>	<u>Average</u>	<u>RPD</u>	<u>RPD Limit</u>
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0	2.0 U	2.0 U	NC	NC	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water

Service Request: R1911350
Date Analyzed: 11/19/19 - 11/25/19

Lab Control Sample Summary
General Chemistry Parameters

Units:mg/L
Basis:NA

Lab Control Sample
R1911350-LCS2

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	17.6	20.0	88	80-120
Ammonia as Nitrogen, undistilled	350.1	0.240	0.250	96	90-110
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	183	198	93	85-115
Bromide	9056A	0.997	1.00	100	80-120
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	10.1	10.0	101	80-121
Chemical Oxygen Demand, Total	410.4	47.9	50.0	96	90-110
Chloride	9056A	2.04	2.00	102	80-120
Nitrate as Nitrogen	9056A	1.01	1.00	101	80-120
Nitrogen, Total Kjeldahl (TKN)	351.2	2.29	2.50	92	90-110
Phenolics, Total Recoverable	9066	0.0409	0.0400	102	85-115
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	916	914	100	90-110
Sulfate	9056A	2.01	2.00	100	80-120

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water

Service Request: R1911350
Date Analyzed: 11/20/19 - 11/25/19

Lab Control Sample Summary
General Chemistry Parameters

Units:mg/L
Basis:NA

Lab Control Sample
R1911350-LCS3

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	18.4	20.0	92	80-120
Ammonia as Nitrogen, undistilled	350.1	0.241	0.250	97	90-110
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	180	198	91	85-115
Bromide	9056A	1.01	1.00	101	80-120
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	10.5	10.0	105	80-121
Chloride	9056A	2.03	2.00	101	80-120
Nitrate as Nitrogen	9056A	1.02	1.00	102	80-120
Nitrogen, Total Kjeldahl (TKN)	351.2	2.27	2.50	91	90-110
Phenolics, Total Recoverable	9066	0.0403	0.0400	101	85-115
Sulfate	9056A	2.01	2.00	100	80-120

ALS Group USA, Corp.
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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water

Service Request: R1911350
Date Analyzed: 11/20/19 - 11/26/19

Lab Control Sample Summary
General Chemistry Parameters

Units:mg/L
Basis:NA

Lab Control Sample
R1911350-LCS4

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	196	198	99	85-115
Bromide	9056A	0.962	1.00	96	80-120
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	10.3	10.0	103	80-121
Chloride	9056A	2.00	2.00	100	80-120
Nitrate as Nitrogen	9056A	0.997	1.00	100	80-120
Nitrogen, Total Kjeldahl (TKN)	351.2	2.29	2.50	91	90-110
Sulfate	9056A	1.99	2.00	99	80-120

ALS Group USA, Corp.
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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water

Service Request: R1911350
Date Analyzed: 11/21/19 - 11/25/19

Lab Control Sample Summary
General Chemistry Parameters

Units:mg/L
Basis:NA

Lab Control Sample
R1911350-LCS5

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	194	198	98	85-115
Chloride	9056A	2.03	2.00	101	80-120
Sulfate	9056A	1.98	2.00	99	80-120

ALS Group USA, Corp.
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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Parameters
Sample Matrix: Water

Service Request: R1911350
Date Analyzed: 11/22/19

Duplicate Lab Control Sample Summary
General Chemistry Parameters

Units:mg/L
Basis:NA

Lab Control Sample
R1911350-LCS1

Duplicate Lab Control Sample
R1911350-DLCS1

<u>Analyte Name</u>	<u>Analytical Method</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>	<u>RPD</u>	<u>RPD Limit</u>
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	912	914	100	910	914	100	90-110	<1	10



December 02, 2019

Service Request No:R1911351

Russell Anderson
Casella Waste Systems - Hakes Billing
4 Chenell Drive Suite 200
Concord, NH 03301

Laboratory Results for: Hakes C&D Landfill - 363 Routine Plus Parameters

Dear Russell,

Enclosed are the results of the sample(s) submitted to our laboratory November 19, 2019
For your reference, these analyses have been assigned our service request number **R1911351**.

All testing was performed according to our laboratory's quality assurance program and met the requirements of the TNI standards except as noted in the case narrative report. Any testing not included in the lab's accreditation is identified on a Non-Certified Analytes report. All results are intended to be considered in their entirety. ALS Environmental is not responsible for use of less than the complete report. Results apply only to the individual samples submitted to the lab for analysis, as listed in the report. The measurement uncertainty of the results included in this report is within that expected when using the prescribed method(s), and represented by Laboratory Control Sample control limits. Any events, such as QC failures or Holding Time exceedances, which may add to the uncertainty are explained in the report narrative or are flagged with qualifiers. The flags are explained in the Report Qualifiers and Definitions page of this report.

Please contact me if you have any questions. My extension is 7472. You may also contact me via email at Janice.Jaeger@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Brady Kalkman
For

Janice Jaeger
Project Manager

CC: Jon Brandes



Narrative Documents

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com



Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water

Service Request: R1911351
Date Received: 11/19/2019

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier II level requested by the client.

Sample Receipt:

Twelve water samples were received for analysis at ALS Environmental on 11/19/2019. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Metals:

No significant anomalies were noted with this analysis.

General Chemistry:

No significant anomalies were noted with this analysis.

A handwritten signature in black ink, appearing to read "Samantha", is written over a horizontal line.

Approved by _____

Date 12/02/2019



SAMPLE DETECTION SUMMARY

CLIENT ID: SW2A-1119 Lab ID: R1911351-001

Analyte	Results	Flag	MDL	MRL	Units	Method
Solids, Total Suspended (TSS)	1.9			1.0	mg/L	SM 2540 D-1997 (2011)

CLIENT ID: SW2-1119 Lab ID: R1911351-003

Analyte	Results	Flag	MDL	MRL	Units	Method
Alkalinity, Total as CaCO3	34.8		1.8	2.0	mg/L	SM 2320 B-1997 (2011)
Carbon, Total Organic (TOC)	2.7		0.5	1.0	mg/L	SM 5310 C-2000 (2011)
Chemical Oxygen Demand, Total	8.4		3.8	5.0	mg/L	410.4
Chloride	8.3		0.5	2.0	mg/L	9056A
Hardness, Total as CaCO3	47.0			6.62	mg/L	SM 2340 B-1997 (2011)
Nitrogen, Total Kjeldahl (TKN)	0.16	J	0.10	0.20	mg/L	351.2
Solids, Total Dissolved (TDS)	91		9	10	mg/L	SM 2540 C-1997 (2011)
Solids, Total Suspended (TSS)	1.2			1.0	mg/L	SM 2540 D-1997 (2011)
Sulfate	15.4		0.4	2.0	mg/L	9056A
Calcium, Total	12700		300	1000	ug/L	6010C
Iron, Total	310		20	100	ug/L	6010C
Magnesium, Total	3700		30	1000	ug/L	6010C
Manganese, Total	9	J	4	10	ug/L	6010C
Potassium, Total	1100	J	200	2000	ug/L	6010C
Sodium, Total	6200		200	1000	ug/L	6010C

CLIENT ID: SW3A-1119 Lab ID: R1911351-004

Analyte	Results	Flag	MDL	MRL	Units	Method
Alkalinity, Total as CaCO3	112		1.8	2.0	mg/L	SM 2320 B-1997 (2011)
Ammonia as Nitrogen, undistilled	0.011	J	0.003	0.050	mg/L	350.1
Carbon, Total Organic (TOC)	4.2		0.5	1.0	mg/L	SM 5310 C-2000 (2011)
Chemical Oxygen Demand, Total	11.5		3.8	5.0	mg/L	410.4
Chloride	20.8		0.5	2.0	mg/L	9056A
Hardness, Total as CaCO3	168			6.62	mg/L	SM 2340 B-1997 (2011)
Nitrate+Nitrite as Nitrogen	0.003	J	0.002	0.050	mg/L	353.2
Nitrogen, Total as Nitrogen	0.31			0.2	mg/L	Calculation
Nitrogen, Total Kjeldahl (TKN)	0.30		0.10	0.20	mg/L	351.2
Oil and Grease, Total (HEM)	2.1	J	1.6	4.9	mg/L	1664A
Solids, Total Dissolved (TDS)	272		9	10	mg/L	SM 2540 C-1997 (2011)
Solids, Total Suspended (TSS)	18.5			1.0	mg/L	SM 2540 D-1997 (2011)
Sulfate	58.0		0.4	2.0	mg/L	9056A
Calcium, Total	51400		300	1000	ug/L	6010C



SAMPLE DETECTION SUMMARY

CLIENT ID: SW3A-1119 Lab ID: R1911351-004

Analyte	Results	Flag	MDL	MRL	Units	Method
Iron, Total	2450		20	100	ug/L	6010C
Magnesium, Total	9600		30	1000	ug/L	6010C
Manganese, Total	122		4	10	ug/L	6010C
Potassium, Total	5900		200	2000	ug/L	6010C
Sodium, Total	11400		200	1000	ug/L	6010C

CLIENT ID: GSS3-1119 Lab ID: R1911351-005

Analyte	Results	Flag	MDL	MRL	Units	Method
Alkalinity, Total as CaCO3	177		1.8	2.0	mg/L	SM 2320 B-1997 (2011)
Carbon, Total Organic (TOC)	0.7	J	0.5	1.0	mg/L	SM 5310 C-2000 (2011)
Chloride	28.3		0.5	2.0	mg/L	9056A
Hardness, Total as CaCO3	199			6.62	mg/L	SM 2340 B-1997 (2011)
Solids, Total Dissolved (TDS)	272		9	10	mg/L	SM 2540 C-1997 (2011)
Sulfate	18.0		0.4	2.0	mg/L	9056A
Calcium, Total	56600		300	1000	ug/L	6010C
Iron, Total	50	BJ	20	100	ug/L	6010C
Magnesium, Total	13900		30	1000	ug/L	6010C
Potassium, Total	1800	J	200	2000	ug/L	6010C
Sodium, Total	14100		200	1000	ug/L	6010C

CLIENT ID: GSS4-1119 Lab ID: R1911351-006

Analyte	Results	Flag	MDL	MRL	Units	Method
Alkalinity, Total as CaCO3	70.4		1.8	2.0	mg/L	SM 2320 B-1997 (2011)
Carbon, Total Organic (TOC)	0.6	J	0.5	1.0	mg/L	SM 5310 C-2000 (2011)
Chloride	120		0.9	4.0	mg/L	9056A
Hardness, Total as CaCO3	168			6.62	mg/L	SM 2340 B-1997 (2011)
Nitrate as Nitrogen	0.5	J	0.2	1.0	mg/L	9056A
Solids, Total Dissolved (TDS)	296		9	10	mg/L	SM 2540 C-1997 (2011)
Sulfate	20.0		0.4	2.0	mg/L	9056A
Calcium, Total	42900		300	1000	ug/L	6010C
Iron, Total	30	BJ	20	100	ug/L	6010C
Magnesium, Total	14900		30	1000	ug/L	6010C
Potassium, Total	3200		200	2000	ug/L	6010C
Sodium, Total	36300		200	1000	ug/L	6010C

CLIENT ID: GSS5-1119 Lab ID: R1911351-007

Analyte	Results	Flag	MDL	MRL	Units	Method
Alkalinity, Total as CaCO3	110		1.8	2.0	mg/L	SM 2320 B-1997 (2011)



SAMPLE DETECTION SUMMARY

CLIENT ID: GSS5-1119 **Lab ID: R1911351-007**

Analyte	Results	Flag	MDL	MRL	Units	Method
Carbon, Total Organic (TOC)	1.0	J	0.5	1.0	mg/L	SM 5310 C-2000 (2011)
Chloride	51.7		0.5	2.0	mg/L	9056A
Hardness, Total as CaCO3	169			6.62	mg/L	SM 2340 B-1997 (2011)
Nitrate as Nitrogen	0.4	J	0.2	1.0	mg/L	9056A
Solids, Total Dissolved (TDS)	261		9	10	mg/L	SM 2540 C-1997 (2011)
Sulfate	35.9		0.4	2.0	mg/L	9056A
Calcium, Total	43900		300	1000	ug/L	6010C
Iron, Total	30	BJ	20	100	ug/L	6010C
Magnesium, Total	14400		30	1000	ug/L	6010C
Potassium, Total	2500		200	2000	ug/L	6010C
Sodium, Total	19700		200	1000	ug/L	6010C

CLIENT ID: SW1-1119 **Lab ID: R1911351-008**

Analyte	Results	Flag	MDL	MRL	Units	Method
Solids, Total Suspended (TSS)	3.6			1.0	mg/L	SM 2540 D-1997 (2011)

CLIENT ID: GSS6-1119 **Lab ID: R1911351-009**

Analyte	Results	Flag	MDL	MRL	Units	Method
Alkalinity, Total as CaCO3	190		1.8	2.0	mg/L	SM 2320 B-1997 (2011)
Carbon, Total Organic (TOC)	1.4		0.5	1.0	mg/L	SM 5310 C-2000 (2011)
Chemical Oxygen Demand, Total	6.0		3.8	5.0	mg/L	410.4
Chloride	30.3		0.5	2.0	mg/L	9056A
Hardness, Total as CaCO3	218			6.62	mg/L	SM 2340 B-1997 (2011)
Solids, Total Dissolved (TDS)	408		9	10	mg/L	SM 2540 C-1997 (2011)
Sulfate	77.0		0.4	2.0	mg/L	9056A
Calcium, Total	58700		300	1000	ug/L	6010C
Iron, Total	1130		20	100	ug/L	6010C
Magnesium, Total	17400		30	1000	ug/L	6010C
Manganese, Total	158		4	10	ug/L	6010C
Potassium, Total	2500		200	2000	ug/L	6010C
Sodium, Total	17700		200	1000	ug/L	6010C

CLIENT ID: SW1A-1119 **Lab ID: R1911351-010**

Analyte	Results	Flag	MDL	MRL	Units	Method
Alkalinity, Total as CaCO3	16.0		1.8	2.0	mg/L	SM 2320 B-1997 (2011)
Ammonia as Nitrogen, undistilled	0.003	J	0.003	0.050	mg/L	350.1
Carbon, Total Organic (TOC)	3.4		0.5	1.0	mg/L	SM 5310 C-2000 (2011)



SAMPLE DETECTION SUMMARY

CLIENT ID: SW1A-1119 **Lab ID: R1911351-010**

Analyte	Results	Flag	MDL	MRL	Units	Method
Chemical Oxygen Demand, Total	7.7		3.8	5.0	mg/L	410.4
Chloride	10.7		0.5	2.0	mg/L	9056A
Hardness, Total as CaCO3	23.8			6.62	mg/L	SM 2340 B-1997 (2011)
Nitrogen, Total Kjeldahl (TKN)	0.10	J	0.10	0.20	mg/L	351.2
Solids, Total Dissolved (TDS)	68		9	10	mg/L	SM 2540 C-1997 (2011)
Solids, Total Suspended (TSS)	2.5			1.0	mg/L	SM 2540 D-1997 (2011)
Sulfate	8.2		0.4	2.0	mg/L	9056A
Calcium, Total	6100		300	1000	ug/L	6010C
Iron, Total	140	B	20	100	ug/L	6010C
Magnesium, Total	2100		30	1000	ug/L	6010C
Manganese, Total	5	J	4	10	ug/L	6010C
Potassium, Total	700	J	200	2000	ug/L	6010C
Sodium, Total	7200		200	1000	ug/L	6010C

CLIENT ID: GSS8-1119 **Lab ID: R1911351-011**

Analyte	Results	Flag	MDL	MRL	Units	Method
Alkalinity, Total as CaCO3	206		1.8	2.0	mg/L	SM 2320 B-1997 (2011)
Carbon, Total Organic (TOC)	3.1		0.5	1.0	mg/L	SM 5310 C-2000 (2011)
Chemical Oxygen Demand, Total	9.5		3.8	5.0	mg/L	410.4
Chloride	105		0.9	4.0	mg/L	9056A
Hardness, Total as CaCO3	302			6.62	mg/L	SM 2340 B-1997 (2011)
Nitrate as Nitrogen	0.6	J	0.2	1.0	mg/L	9056A
Nitrogen, Total Kjeldahl (TKN)	0.11	J	0.10	0.20	mg/L	351.2
Solids, Total Dissolved (TDS)	485		9	10	mg/L	SM 2540 C-1997 (2011)
Sulfate	57.9		0.4	2.0	mg/L	9056A
Calcium, Total	89900		300	1000	ug/L	6010C
Iron, Total	100	B	20	100	ug/L	6010C
Magnesium, Total	18800		30	1000	ug/L	6010C
Manganese, Total	46		4	10	ug/L	6010C
Potassium, Total	2200		200	2000	ug/L	6010C
Sodium, Total	48800		200	1000	ug/L	6010C

CLIENT ID: GSS1A-1119 **Lab ID: R1911351-012**

Analyte	Results	Flag	MDL	MRL	Units	Method
Alkalinity, Total as CaCO3	94.8		1.8	2.0	mg/L	SM 2320 B-1997 (2011)
Ammonia as Nitrogen, undistilled	0.024	J	0.003	0.050	mg/L	350.1
Carbon, Total Organic (TOC)	6.3		0.5	1.0	mg/L	SM 5310 C-2000 (2011)



SAMPLE DETECTION SUMMARY

CLIENT ID: GSS1A-1119 **Lab ID: R1911351-012**

Analyte	Results	Flag	MDL	MRL	Units	Method
Chemical Oxygen Demand, Total	16.2		3.8	5.0	mg/L	410.4
Chloride	1.7	J	0.5	2.0	mg/L	9056A
Hardness, Total as CaCO ₃	145			6.62	mg/L	SM 2340 B-1997 (2011)
Nitrate as Nitrogen	0.8	J	0.2	1.0	mg/L	9056A
Nitrogen, Total Kjeldahl (TKN)	0.40		0.10	0.20	mg/L	351.2
Solids, Total Dissolved (TDS)	224		9	10	mg/L	SM 2540 C-1997 (2011)
Sulfate	62.3		0.4	2.0	mg/L	9056A
Calcium, Total	39000		300	1000	ug/L	6010C
Iron, Total	990		20	100	ug/L	6010C
Magnesium, Total	11500		30	1000	ug/L	6010C
Manganese, Total	72		4	10	ug/L	6010C
Potassium, Total	1700	J	200	2000	ug/L	6010C
Sodium, Total	4900		200	1000	ug/L	6010C



Sample Receipt Information

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters

Service Request:R1911351

SAMPLE CROSS-REFERENCE

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
R1911351-001	SW2A-1119	11/18/2019	0830
R1911351-002	SW7-1119	11/18/2019	0857
R1911351-003	SW2-1119	11/18/2019	0920
R1911351-004	SW3A-1119	11/18/2019	0940
R1911351-005	GSS3-1119	11/18/2019	1050
R1911351-006	GSS4-1119	11/18/2019	1130
R1911351-007	GSS5-1119	11/18/2019	1150
R1911351-008	SW1-1119	11/18/2019	1205
R1911351-009	GSS6-1119	11/18/2019	1240
R1911351-010	SW1A-1119	11/18/2019	1320
R1911351-011	GSS8-1119	11/18/2019	1425
R1911351-012	GSS1A-1119	11/18/2019	1450

Client: **Casella/On-Site**
 4376 Manning Ridge Road
 Campbell, NY 14870

Project: **Hakes C&D Landfill - 363 Routine Plus Parameters**

Project Manager: **Russ Anderson/Jon Brandes**

Telephone No. 585-593-1824 Email: jonb@on-sitehs.com

Page 1 of 1

Method of Shipment
FedEx



Sample I.D.	Lab Sample No.	No. of Containers	Matrix				Prsv.		Sampling Date	Sampling Time	BOD (NP)	Phenols & TOC (H2SO4)	Alkalinity (NP)	NH3, TKN, COD (H2SO4)	T-Metals, Hard. (Routine + As) (HNO3)	TDS, NO3, Br, Cl, SO4 (NP)	TSS (NP)	O&G (H2SO4)	TN(NP) test from TDS bottle																
			Soil	Water	Air	Other	Yes	No																											
SW2A-1119		1	X				X	11-18-19	0830								X																		
SW7-1119		1	X				X	11-18-19	0857								X																		
SW2-1119		7	X				X X	11-18-19	0920	X	X	X	X	X	X	X	X																		
SW3A-1119		8	X				X X	11-18-19	0940	X	X	X	X	X	X	X	X	X	X	X															
GSS3-1119		6	X				X X	11-18-19	1050	X	X	X	X	X	X	X																			
GSS4-1119		6	X				X X	11-18-19	1130	X	X	X	X	X	X	X																			
GSS5-1119		6	X				X X	11-18-19	1150	X	X	X	X	X	X	X																			
SW1-1119		1	X				X	11-18-19	1205								X																		
GSS6-1119		6	X				X X	11-18-19	1240	X	X	X	X	X	X	X																			
SW1A-1119		7	X				X X	11-18-19	1320	X	X	X	X	X	X	X	X																		
GSS8-1119		6	X				X X	11-18-19	1425	X	X	X	X	X	X	X																			
GSS1A-1119		6	X				X X	11-18-19	1450	X	X	X	X	X	X	X																			

Special Detection Limit/Reporting

PDF to Russ and On-Site, and EDD to On-Site.

REMARKS

Sample Received Intact: Yes No Temperature received: Ice No ice

Relinquished by (Sign & Print Name): <i>[Signature]</i> Scott Watson	Date: 11-18-19 Time: 1600	Received by (Sign & Print Name):	Lab Work No.:
Relinquished by:	Date: Time:	Received by:	
Relinquished by:	Date: Time:	Received by:	
Relinquished by:	Date: Time:	Received by laboratory: <i>[Signature]</i>	Date: 11/19/19 Time: 0955

R1911351 5
 Casella Waste Systems - Hakes Billing
 Hakes C&D Landfill - 363 Routine Plus Parameters



Cooler Receipt and Preservation Check Form

R1911351

5

Casella Waste Systems - Hekes Billing
Hekes C&D Landfill - 363 Routine Plus Parameters



Project/Client Casella - Hekes Folder Number _____

Cooler received on 11/19/19 by: AD

COURIER: ALS UPS FEDEX VELOCITY CLIENT

1	Were Custody seals on outside of cooler?	<input checked="" type="radio"/> Y <input type="radio"/> N
2	Custody papers properly completed (ink, signed)?	<input checked="" type="radio"/> Y <input type="radio"/> N
3	Did all bottles arrive in good condition (unbroken)?	<input checked="" type="radio"/> Y <input type="radio"/> N
4	Circle: <u>Wet Ice</u> Dry Ice Gel packs present?	<input checked="" type="radio"/> Y <input type="radio"/> N

5a	Perchlorate samples have required headspace?	<input type="radio"/> Y <input type="radio"/> N <input checked="" type="radio"/> NA
5b	Did VOA vials <u>ALK</u> or Sulfide have sig* bubbles?	<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> NA
6	Where did the bottles originate?	<u>ALS/RDC</u> CLIENT
7	Soil VOA received as: Bulk Encore 5035set	<input checked="" type="radio"/> NA

8. Temperature Readings Date: 11/19/19 Time: 1010 ID: IR#7 IR#10 From: Temp Blank Sample Bottle

Observed Temp (°C)	<u>1.3</u>	<u>1.8</u>	<u>2.1</u>				
Within 0-6°C?	<input checked="" type="radio"/> Y <input type="radio"/> N	<input checked="" type="radio"/> Y <input type="radio"/> N	<input checked="" type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N
If <0°C, were samples frozen?	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N

If out of Temperature, note packing/ice condition: _____ Ice melted Poorly Packed (described below) Same Day Rule

& Client Approval to Run Samples: _____ Standing Approval Client aware at drop-off Client notified by: _____

All samples held in storage location: R-02 by AD on 11/19/19 at 1022
 5035 samples placed in storage location: _____ by _____ on _____ at _____

Cooler Breakdown/Preservation Check**: Date: 11/19/19 Time: 1545 by: AD

- 9. Were all bottle labels complete (i.e. analysis, preservation, etc.)? YES NO
- 10. Did all bottle labels and tags agree with custody papers? YES NO
- 11. Were correct containers used for the tests indicated? YES NO
- 12. Were 5035 vials acceptable (no extra labels, not leaking)? YES NO N/A
- 13. Air Samples: Cassettes / Tubes Intact with MS? Canisters Pressurized Tedlar® Bags Inflated N/A

pH	Lot of test paper	Reagent	Preserved?		Lot Received	Exp	Sample ID Adjusted	Vol. Added	Lot Added	Final pH
			Yes	No						
≥12		NaOH								
≤2	<u>230018</u>	HNO ₃	<input checked="" type="checkbox"/>		<u>118081</u>	<u>10/10</u>				
≤2	<u>↓</u>	H ₂ SO ₄	<input checked="" type="checkbox"/>		<u>202731</u>	<u>↓</u>				
<4		NaHSO ₄								
5-9		For 608pest			No=Notify for 3day					
Residual Chlorine (-)		For CN, Phenol, 625, 608pest, 522	<input checked="" type="checkbox"/>		If+, contact PM to add Na ₂ S ₂ O ₃ (625, 608, CN), ascorbic (phenol).					
		Na ₂ S ₂ O ₃								
		ZnAcetate	-	-						
		HCl	**	**						

**VOAs and 1664 Not to be tested before analysis. Otherwise, all bottles of all samples with chemical preservatives are checked (not just representatives).

Bottle lot numbers: 19-09-03, 80919-04, 090219-2AH0, 092319-13MC, 093019-13MC

Explain all Discrepancies/ Other Comments:

all
headspace on SW & GS samples (Routine plus)

HPROD	BULK
HTR	FLDT
SUB	HGFB
ALS	LL3541

Labels secondary reviewed by: AD

PC Secondary Review: _____

*significant air bubbles: VOA > 5-6 mm : WC > 1 in. diameter



Miscellaneous Forms

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
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REPORT QUALIFIERS AND DEFINITIONS

<p>U Analyte was analyzed for but not detected. The sample quantitation limit has been corrected for dilution and for percent moisture, unless otherwise noted in the case narrative.</p> <p>J Estimated value due to either being a Tentatively Identified Compound (TIC) or that the concentration is between the MRL and the MDL. Concentrations are not verified within the linear range of the calibration. For DoD: concentration >40% difference between two GC columns (pesticides/Aroclors).</p> <p>B Analyte was also detected in the associated method blank at a concentration that may have contributed to the sample result.</p> <p>E Inorganics- Concentration is estimated due to the serial dilution was outside control limits.</p> <p>E Organics- Concentration has exceeded the calibration range for that specific analysis.</p> <p>D Concentration is a result of a dilution, typically a secondary analysis of the sample due to exceeding the calibration range or that a surrogate has been diluted out of the sample and cannot be assessed.</p> <p>* Indicates that a quality control parameter has exceeded laboratory limits. Under the "Notes" column of the Form I, this qualifier denotes analysis was performed out of Holding Time.</p> <p>H Analysis was performed out of hold time for tests that have an "immediate" hold time criteria.</p> <p># Spike was diluted out.</p>	<p>+ Correlation coefficient for MSA is <0.995.</p> <p>N Inorganics- Matrix spike recovery was outside laboratory limits.</p> <p>N Organics- Presumptive evidence of a compound (reported as a TIC) based on the MS library search.</p> <p>S Concentration has been determined using Method of Standard Additions (MSA).</p> <p>W Post-Digestion Spike recovery is outside control limits and the sample absorbance is <50% of the spike absorbance.</p> <p>P Concentration >40% difference between the two GC columns.</p> <p>C Confirmed by GC/MS</p> <p>Q DoD reports: indicates a pesticide/Aroclor is not confirmed ($\times 100\%$ Difference between two GC columns).</p> <p>X See Case Narrative for discussion.</p> <p>MRL Method Reporting Limit. Also known as:</p> <p>LOQ Limit of Quantitation (LOQ) The lowest concentration at which the method analyte may be reliably quantified under the method conditions.</p> <p>MDL Method Detection Limit. A statistical value derived from a study designed to provide the lowest concentration that will be detected 99% of the time. Values between the MDL and MRL are estimated (see J qualifier).</p> <p>LOD Limit of Detection. A value at or above the MDL which has been verified to be detectable.</p> <p>ND Non-Detect. Analyte was not detected at the concentration listed. Same as U qualifier.</p>
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Rochester Lab ID # for State Certifications¹

Connecticut ID # PH0556	Maine ID #NY0032	Pennsylvania ID# 68-786
Delaware Approved	New Hampshire ID # 2941	Rhode Island ID # 158
DoD ELAP #65817	New York ID # 10145	Virginia #460167
Florida ID # E87674	North Carolina #676	

¹ Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state or agency requirements. The test results meet requirements of the current NELAP/TNI standards or state or agency requirements, where applicable, except as noted in the case narrative. Since not all analyte/method/matrix combinations are offered for state/NELAC accreditation, this report may contain results which are not accredited. For a specific list of accredited analytes, contact the laboratory or go to <https://www.alsglobal.com/locations/americas/north-america/usa/new-york/rochester-environmental>

ALS Laboratory Group

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

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Analyst Summary report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters/

Service Request: R1911351

Sample Name: SW2A-1119
Lab Code: R1911351-001
Sample Matrix: Water

Date Collected: 11/18/19
Date Received: 11/19/19

Analysis Method
SM 2540 D-1997(2011)

Extracted/Digested By

Analyzed By
KAWONG

Sample Name: SW7-1119
Lab Code: R1911351-002
Sample Matrix: Water

Date Collected: 11/18/19
Date Received: 11/19/19

Analysis Method
SM 2540 D-1997(2011)

Extracted/Digested By

Analyzed By
KAWONG

Sample Name: SW2-1119
Lab Code: R1911351-003
Sample Matrix: Water

Date Collected: 11/18/19
Date Received: 11/19/19

Analysis Method

350.1
351.2
410.4
6010C
9056A
9066
SM 2320 B-1997(2011)
SM 2540 C-1997(2011)
SM 2540 D-1997(2011)
SM 5210 B-2001(2011)
SM 5310 C-2000(2011)

Extracted/Digested By

GNITAJOUPPI
AKONZEL

Analyzed By
MROGERSON
GNITAJOUPPI
SMEDBURY
KMCLAEN
KWONG
BBOWE
KWONG
KAWONG
KAWONG
NSMITH
SMEDBURY

ALS Group USA, Corp.
dba ALS Environmental

Analyst Summary report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters/

Service Request: R1911351

Sample Name: SW3A-1119
Lab Code: R1911351-004
Sample Matrix: Water

Date Collected: 11/18/19
Date Received: 11/19/19

Analysis Method	Extracted/Digested By	Analyzed By
1664A		STALARICO
350.1		MROGERSON
351.2	GNITAJOUPPI	GNITAJOUPPI
353.2		GNITAJOUPPI
410.4		SMEDBURY
6010C	AKONZEL	KMCLAEN
9056A		KWONG
9066		BBOWE
SM 2320 B-1997(2011)		KWONG
SM 2540 C-1997(2011)		KAWONG
SM 2540 D-1997(2011)		KAWONG
SM 5210 B-2001(2011)		NSMITH
SM 5310 C-2000(2011)		SMEDBURY

Sample Name: GSS3-1119
Lab Code: R1911351-005
Sample Matrix: Water

Date Collected: 11/18/19
Date Received: 11/19/19

Analysis Method	Extracted/Digested By	Analyzed By
350.1		MROGERSON
351.2	GNITAJOUPPI	GNITAJOUPPI
410.4		SMEDBURY
6010C	AKONZEL	KMCLAEN
9056A		KWONG
9066		BBOWE
SM 2320 B-1997(2011)		KWONG
SM 2540 C-1997(2011)		KAWONG
SM 5210 B-2001(2011)		NSMITH
SM 5310 C-2000(2011)		SMEDBURY

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Analyst Summary report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters/

Service Request: R1911351

Sample Name: GSS4-1119
Lab Code: R1911351-006
Sample Matrix: Water

Date Collected: 11/18/19
Date Received: 11/19/19

Analysis Method	Extracted/Digested By	Analyzed By
350.1		MROGERSON
351.2	GNITAJOUPPI	GNITAJOUPPI
410.4		SMEDBURY
6010C	AKONZEL	KMCLAEN
9056A		KWONG
9066		BBOWE
SM 2320 B-1997(2011)		KWONG
SM 2540 C-1997(2011)		KAWONG
SM 5210 B-2001(2011)		NSMITH
SM 5310 C-2000(2011)		SMEDBURY

Sample Name: GSS5-1119
Lab Code: R1911351-007
Sample Matrix: Water

Date Collected: 11/18/19
Date Received: 11/19/19

Analysis Method	Extracted/Digested By	Analyzed By
350.1		MROGERSON
351.2	GNITAJOUPPI	GNITAJOUPPI
410.4		SMEDBURY
6010C	AKONZEL	KMCLAEN
9056A		KWONG
9066		BBOWE
SM 2320 B-1997(2011)		KWONG
SM 2540 C-1997(2011)		KAWONG
SM 5210 B-2001(2011)		NSMITH
SM 5310 C-2000(2011)		SMEDBURY

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Analyst Summary report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters/

Service Request: R1911351

Sample Name: SW1-1119
Lab Code: R1911351-008
Sample Matrix: Water

Date Collected: 11/18/19
Date Received: 11/19/19

Analysis Method
SM 2540 D-1997(2011)

Extracted/Digested By

Analyzed By
KAWONG

Sample Name: GSS6-1119
Lab Code: R1911351-009
Sample Matrix: Water

Date Collected: 11/18/19
Date Received: 11/19/19

Analysis Method

350.1
351.2
410.4
6010C
9056A
9066
SM 2320 B-1997(2011)
SM 2540 C-1997(2011)
SM 5210 B-2001(2011)
SM 5310 C-2000(2011)

Extracted/Digested By

GNITAJOUPPI
AKONZEL

Analyzed By
MROGERSON
GNITAJOUPPI
SMEDBURY
KMCLAEN
KWONG
BBOWE
KWONG
KAWONG
NSMITH
SMEDBURY

Sample Name: SW1A-1119
Lab Code: R1911351-010
Sample Matrix: Water

Date Collected: 11/18/19
Date Received: 11/19/19

Analysis Method

350.1
351.2
410.4
6010C
9056A
9066
SM 2320 B-1997(2011)
SM 2540 C-1997(2011)
SM 2540 D-1997(2011)

Extracted/Digested By

GNITAJOUPPI
AKONZEL

Analyzed By
MROGERSON
GNITAJOUPPI
SMEDBURY
KMCLAEN
KWONG
BBOWE
KWONG
KAWONG
KAWONG

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Analyst Summary report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters/

Service Request: R1911351

Sample Name: SW1A-1119
Lab Code: R1911351-010
Sample Matrix: Water

Date Collected: 11/18/19
Date Received: 11/19/19

Analysis Method	Extracted/Digested By	Analyzed By
SM 5210 B-2001(2011)		NSMITH
SM 5310 C-2000(2011)		SMEDBURY

Sample Name: GSS8-1119
Lab Code: R1911351-011
Sample Matrix: Water

Date Collected: 11/18/19
Date Received: 11/19/19

Analysis Method	Extracted/Digested By	Analyzed By
350.1		MROGERSON
351.2	GNITAJOUPPI	GNITAJOUPPI
410.4		SMEDBURY
6010C	AKONZEL	KMCLAEN
9056A		KWONG
9066		BBOWE
SM 2320 B-1997(2011)		KWONG
SM 2540 C-1997(2011)		KAWONG
SM 5210 B-2001(2011)		NSMITH
SM 5310 C-2000(2011)		SMEDBURY

Sample Name: GSS1A-1119
Lab Code: R1911351-012
Sample Matrix: Water

Date Collected: 11/18/19
Date Received: 11/19/19

Analysis Method	Extracted/Digested By	Analyzed By
350.1		MROGERSON
351.2	NSMITH	GNITAJOUPPI
410.4		SMEDBURY
6010C	AKONZEL	KMCLAEN
9056A		KWONG
9066		BBOWE
SM 2320 B-1997(2011)		KWONG
SM 2540 C-1997(2011)		KAWONG

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Analyst Summary report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters/

Service Request: R1911351

Sample Name: GSS1A-1119
Lab Code: R1911351-012
Sample Matrix: Water

Date Collected: 11/18/19
Date Received: 11/19/19

Analysis Method

SM 5210 B-2001(2011)
SM 5310 C-2000(2011)

Extracted/Digested By

Analyzed By

NSMITH
SMEDBURY



INORGANIC PREPARATION METHODS

The preparation methods associated with this report are found in these tables unless discussed in the case narrative.

Water/Liquid Matrix

Analytical Method	Preparation Method
200.7	200.2
200.8	200.2
6010C	3005A/3010A
6020A	ILM05.3
9014 Cyanide Reactivity	SW846 Ch7, 7.3.4.2
9034 Sulfide Reactivity	SW846 Ch7, 7.3.4.2
9034 Sulfide Acid Soluble	9030B
9056A Bomb (Halogens)	5050A
9066 Manual Distillation	9065
SM 4500-CN-E Residual Cyanide	SM 4500-CN-G
SM 4500-CN-E WAD Cyanide	SM 4500-CN-I

Solid/Soil/Non-Aqueous Matrix

Analytical Method	Preparation Method
6010C	3050B
6020A	3050B
6010C TCLP (1311) extract	3005A/3010A
6010 SPLP (1312) extract	3005A/3010A
7196A	3060A
7199	3060A
9056A Halogens/Halides	5050
300.0 Anions/ 350.1/ 353.2/ SM 2320B/ SM 5210B/ 9056A Anions	DI extraction

For analytical methods not listed, the preparation method is the same as the analytical method reference.



Sample Results

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Metals

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: SW2-1119
Lab Code: R1911351-003

Service Request: R1911351
Date Collected: 11/18/19 09:20
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/22/19 18:40	11/21/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/22/19 18:40	11/21/19	
Calcium, Total	6010C	12700	ug/L	1000	300	1	11/22/19 18:40	11/21/19	
Iron, Total	6010C	310	ug/L	100	20	1	11/22/19 18:40	11/21/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/22/19 18:40	11/21/19	
Magnesium, Total	6010C	3700	ug/L	1000	30	1	11/22/19 18:40	11/21/19	
Manganese, Total	6010C	9 J	ug/L	10	4	1	11/22/19 18:40	11/21/19	
Potassium, Total	6010C	1100 J	ug/L	2000	200	1	11/22/19 18:40	11/21/19	
Sodium, Total	6010C	6200	ug/L	1000	200	1	11/22/19 18:40	11/21/19	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: SW3A-1119
Lab Code: R1911351-004

Service Request: R1911351
Date Collected: 11/18/19 09:40
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/22/19 18:43	11/21/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/22/19 18:43	11/21/19	
Calcium, Total	6010C	51400	ug/L	1000	300	1	11/22/19 18:43	11/21/19	
Iron, Total	6010C	2450	ug/L	100	20	1	11/22/19 18:43	11/21/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/22/19 18:43	11/21/19	
Magnesium, Total	6010C	9600	ug/L	1000	30	1	11/22/19 18:43	11/21/19	
Manganese, Total	6010C	122	ug/L	10	4	1	11/22/19 18:43	11/21/19	
Potassium, Total	6010C	5900	ug/L	2000	200	1	11/22/19 18:43	11/21/19	
Sodium, Total	6010C	11400	ug/L	1000	200	1	11/22/19 18:43	11/21/19	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: GSS3-1119
Lab Code: R1911351-005

Service Request: R1911351
Date Collected: 11/18/19 10:50
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/22/19 18:46	11/21/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/22/19 18:46	11/21/19	
Calcium, Total	6010C	56600	ug/L	1000	300	1	11/22/19 18:46	11/21/19	
Iron, Total	6010C	50 BJ	ug/L	100	20	1	11/22/19 18:46	11/21/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/22/19 18:46	11/21/19	
Magnesium, Total	6010C	13900	ug/L	1000	30	1	11/22/19 18:46	11/21/19	
Manganese, Total	6010C	10 U	ug/L	10	4	1	11/22/19 18:46	11/21/19	
Potassium, Total	6010C	1800 J	ug/L	2000	200	1	11/22/19 18:46	11/21/19	
Sodium, Total	6010C	14100	ug/L	1000	200	1	11/22/19 18:46	11/21/19	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: GSS4-1119
Lab Code: R1911351-006

Service Request: R1911351
Date Collected: 11/18/19 11:30
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/22/19 18:50	11/21/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/22/19 18:50	11/21/19	
Calcium, Total	6010C	42900	ug/L	1000	300	1	11/22/19 18:50	11/21/19	
Iron, Total	6010C	30 BJ	ug/L	100	20	1	11/22/19 18:50	11/21/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/22/19 18:50	11/21/19	
Magnesium, Total	6010C	14900	ug/L	1000	30	1	11/22/19 18:50	11/21/19	
Manganese, Total	6010C	10 U	ug/L	10	4	1	11/22/19 18:50	11/21/19	
Potassium, Total	6010C	3200	ug/L	2000	200	1	11/22/19 18:50	11/21/19	
Sodium, Total	6010C	36300	ug/L	1000	200	1	11/22/19 18:50	11/21/19	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: GSS5-1119
Lab Code: R1911351-007

Service Request: R1911351
Date Collected: 11/18/19 11:50
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/22/19 20:50	11/21/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/22/19 20:50	11/21/19	
Calcium, Total	6010C	43900	ug/L	1000	300	1	11/22/19 20:50	11/21/19	
Iron, Total	6010C	30 BJ	ug/L	100	20	1	11/22/19 20:50	11/21/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/22/19 20:50	11/21/19	
Magnesium, Total	6010C	14400	ug/L	1000	30	1	11/22/19 20:50	11/21/19	
Manganese, Total	6010C	10 U	ug/L	10	4	1	11/22/19 20:50	11/21/19	
Potassium, Total	6010C	2500	ug/L	2000	200	1	11/22/19 20:50	11/21/19	
Sodium, Total	6010C	19700	ug/L	1000	200	1	11/22/19 20:50	11/21/19	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: GSS6-1119
Lab Code: R1911351-009

Service Request: R1911351
Date Collected: 11/18/19 12:40
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/22/19 20:53	11/21/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/22/19 20:53	11/21/19	
Calcium, Total	6010C	58700	ug/L	1000	300	1	11/22/19 20:53	11/21/19	
Iron, Total	6010C	1130	ug/L	100	20	1	11/22/19 20:53	11/21/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/22/19 20:53	11/21/19	
Magnesium, Total	6010C	17400	ug/L	1000	30	1	11/22/19 20:53	11/21/19	
Manganese, Total	6010C	158	ug/L	10	4	1	11/22/19 20:53	11/21/19	
Potassium, Total	6010C	2500	ug/L	2000	200	1	11/22/19 20:53	11/21/19	
Sodium, Total	6010C	17700	ug/L	1000	200	1	11/22/19 20:53	11/21/19	

ALS Group USA, Corp.
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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: SW1A-1119
Lab Code: R1911351-010

Service Request: R1911351
Date Collected: 11/18/19 13:20
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/22/19 20:57	11/21/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/22/19 20:57	11/21/19	
Calcium, Total	6010C	6100	ug/L	1000	300	1	11/22/19 20:57	11/21/19	
Iron, Total	6010C	140 B	ug/L	100	20	1	11/22/19 20:57	11/21/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/22/19 20:57	11/21/19	
Magnesium, Total	6010C	2100	ug/L	1000	30	1	11/22/19 20:57	11/21/19	
Manganese, Total	6010C	5 J	ug/L	10	4	1	11/22/19 20:57	11/21/19	
Potassium, Total	6010C	700 J	ug/L	2000	200	1	11/22/19 20:57	11/21/19	
Sodium, Total	6010C	7200	ug/L	1000	200	1	11/22/19 20:57	11/21/19	

ALS Group USA, Corp.
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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: GSS8-1119
Lab Code: R1911351-011

Service Request: R1911351
Date Collected: 11/18/19 14:25
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/22/19 21:00	11/21/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/22/19 21:00	11/21/19	
Calcium, Total	6010C	89900	ug/L	1000	300	1	11/22/19 21:00	11/21/19	
Iron, Total	6010C	100 B	ug/L	100	20	1	11/22/19 21:00	11/21/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/22/19 21:00	11/21/19	
Magnesium, Total	6010C	18800	ug/L	1000	30	1	11/22/19 21:00	11/21/19	
Manganese, Total	6010C	46	ug/L	10	4	1	11/22/19 21:00	11/21/19	
Potassium, Total	6010C	2200	ug/L	2000	200	1	11/22/19 21:00	11/21/19	
Sodium, Total	6010C	48800	ug/L	1000	200	1	11/22/19 21:00	11/21/19	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: GSS1A-1119
Lab Code: R1911351-012

Service Request: R1911351
Date Collected: 11/18/19 14:50
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/22/19 21:03	11/21/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/22/19 21:03	11/21/19	
Calcium, Total	6010C	39000	ug/L	1000	300	1	11/22/19 21:03	11/21/19	
Iron, Total	6010C	990	ug/L	100	20	1	11/22/19 21:03	11/21/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/22/19 21:03	11/21/19	
Magnesium, Total	6010C	11500	ug/L	1000	30	1	11/22/19 21:03	11/21/19	
Manganese, Total	6010C	72	ug/L	10	4	1	11/22/19 21:03	11/21/19	
Potassium, Total	6010C	1700 J	ug/L	2000	200	1	11/22/19 21:03	11/21/19	
Sodium, Total	6010C	4900	ug/L	1000	200	1	11/22/19 21:03	11/21/19	



General Chemistry

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: SW2A-1119
Lab Code: R1911351-001

Service Request: R1911351
Date Collected: 11/18/19 08:30
Date Received: 11/19/19 09:55
Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Q</u>
Solids, Total Suspended (TSS)	SM 2540 D-1997(2011)	1.9	mg/L	1.0	1	11/22/19 07:55	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: SW7-1119
Lab Code: R1911351-002

Service Request: R1911351
Date Collected: 11/18/19 08:57
Date Received: 11/19/19 09:55
Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Q</u>
Solids, Total Suspended (TSS)	SM 2540 D-1997(2011)	1.0 U	mg/L	1.0	1	11/22/19 07:55	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: SW2-1119
Lab Code: R1911351-003

Service Request: R1911351
Date Collected: 11/18/19 09:20
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	34.8	mg/L	2.0	1.8	1	11/22/19 10:53	NA	
Ammonia as Nitrogen, undistilled	350.1	0.050	U mg/L	0.050	0.003	1	11/22/19 23:22	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0	U mg/L	2.0	-	1	11/20/19 08:01	NA	
Bromide	9056A	1.0	U mg/L	1.0	0.4	10	11/19/19 15:57	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	2.7	mg/L	1.0	0.5	1	11/22/19 23:36	NA	
Chemical Oxygen Demand, Total	410.4	8.4	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	8.3	mg/L	2.0	0.5	10	11/19/19 15:57	NA	
Hardness, Total as CaCO3	SM 2340 B-1997(2011)	47.0	mg/L	6.62	-	1	NA	NA	
Nitrate as Nitrogen	9056A	1.0	U mg/L	1.0	0.2	10	11/19/19 15:57	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.16	J mg/L	0.20	0.10	1	11/22/19 11:45	11/21/19	
Phenolics, Total Recoverable	9066	0.0050	U mg/L	0.0050	0.0010	1	11/26/19 00:12	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	91	mg/L	10	9	1	11/20/19 14:00	NA	
Solids, Total Suspended (TSS)	SM 2540 D-1997(2011)	1.2	mg/L	1.0	-	1	11/22/19 07:55	NA	
Sulfate	9056A	15.4	mg/L	2.0	0.4	10	11/19/19 15:57	NA	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: SW3A-1119
Lab Code: R1911351-004

Service Request: R1911351
Date Collected: 11/18/19 09:40
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date</u> <u>Extracted</u>	<u>Q</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	112	mg/L	2.0	1.8	1	11/22/19 11:00	NA	
Ammonia as Nitrogen, undistilled	350.1	0.011 J	mg/L	0.050	0.003	1	11/22/19 23:23	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/20/19 07:53	NA	
Bromide	9056A	1.0 U	mg/L	1.0	0.4	10	11/19/19 16:27	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	4.2	mg/L	1.0	0.5	1	11/23/19 00:39	NA	
Chemical Oxygen Demand, Total	410.4	11.5	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	20.8	mg/L	2.0	0.5	10	11/19/19 16:27	NA	
Hardness, Total as CaCO3	SM 2340 B-1997(2011)	168	mg/L	6.62	-	1	NA	NA	
Nitrate as Nitrogen	9056A	1.0 U	mg/L	1.0	0.2	10	11/19/19 16:27	NA	
Nitrate+Nitrite as Nitrogen	353.2	0.003 J	mg/L	0.050	0.002	1	12/01/19 10:28	NA	
Nitrogen, Total as Nitrogen	Calculation	0.31	mg/L	0.2	-	1	NA	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.30	mg/L	0.20	0.10	1	11/22/19 11:46	11/21/19	
Oil and Grease, Total (HEM)	1664A	2.1 J	mg/L	4.9	1.6	1	11/21/19 09:00	NA	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/26/19 00:24	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	272	mg/L	10	9	1	11/20/19 14:00	NA	
Solids, Total Suspended (TSS)	SM 2540 D-1997(2011)	18.5	mg/L	1.0	-	1	11/22/19 07:55	NA	
Sulfate	9056A	58.0	mg/L	2.0	0.4	10	11/19/19 16:27	NA	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: GSS3-1119
Lab Code: R1911351-005

Service Request: R1911351
Date Collected: 11/18/19 10:50
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	177	mg/L	2.0	1.8	1	11/22/19 11:17	NA	
Ammonia as Nitrogen, undistilled	350.1	0.050 U	mg/L	0.050	0.003	1	11/22/19 23:25	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/20/19 07:59	NA	
Bromide	9056A	1.0 U	mg/L	1.0	0.4	10	11/19/19 16:33	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	0.7 J	mg/L	1.0	0.5	1	11/23/19 01:41	NA	
Chemical Oxygen Demand, Total	410.4	5.0 U	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	28.3	mg/L	2.0	0.5	10	11/19/19 16:33	NA	
Hardness, Total as CaCO3	SM 2340 B-1997(2011)	199	mg/L	6.62	-	1	NA	NA	
Nitrate as Nitrogen	9056A	1.0 U	mg/L	1.0	0.2	10	11/19/19 16:33	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.20 U	mg/L	0.20	0.10	1	11/22/19 11:47	11/21/19	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/26/19 00:28	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	272	mg/L	10	9	1	11/20/19 14:00	NA	
Sulfate	9056A	18.0	mg/L	2.0	0.4	10	11/19/19 16:33	NA	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: GSS4-1119
Lab Code: R1911351-006

Service Request: R1911351
Date Collected: 11/18/19 11:30
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	70.4	mg/L	2.0	1.8	1	11/22/19 11:24	NA	
Ammonia as Nitrogen, undistilled	350.1	0.050 U	mg/L	0.050	0.003	1	11/22/19 23:26	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/20/19 08:18	NA	
Bromide	9056A	1.0 U	mg/L	1.0	0.4	10	11/19/19 16:39	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	0.6 J	mg/L	1.0	0.5	1	11/23/19 02:02	NA	
Chemical Oxygen Demand, Total	410.4	5.0 U	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	120	mg/L	4.0	0.9	20	11/19/19 16:45	NA	
Hardness, Total as CaCO3	SM 2340 B-1997(2011)	168	mg/L	6.62	-	1	NA	NA	
Nitrate as Nitrogen	9056A	0.5 J	mg/L	1.0	0.2	10	11/19/19 16:39	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.20 U	mg/L	0.20	0.10	1	11/22/19 11:47	11/21/19	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/26/19 00:32	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	296	mg/L	10	9	1	11/20/19 14:00	NA	
Sulfate	9056A	20.0	mg/L	2.0	0.4	10	11/19/19 16:39	NA	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: GSS5-1119
Lab Code: R1911351-007

Service Request: R1911351
Date Collected: 11/18/19 11:50
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	110	mg/L	2.0	1.8	1	11/22/19 11:32	NA	
Ammonia as Nitrogen, undistilled	350.1	0.050 U	mg/L	0.050	0.003	1	11/22/19 23:27	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/20/19 08:19	NA	
Bromide	9056A	1.0 U	mg/L	1.0	0.4	10	11/19/19 16:51	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	1.0 J	mg/L	1.0	0.5	1	11/23/19 02:23	NA	
Chemical Oxygen Demand, Total	410.4	5.0 U	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	51.7	mg/L	2.0	0.5	10	11/19/19 16:51	NA	
Hardness, Total as CaCO3	SM 2340 B-1997(2011)	169	mg/L	6.62	-	1	NA	NA	
Nitrate as Nitrogen	9056A	0.4 J	mg/L	1.0	0.2	10	11/19/19 16:51	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.20 U	mg/L	0.20	0.10	1	11/22/19 11:48	11/21/19	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/26/19 00:36	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	261	mg/L	10	9	1	11/20/19 14:00	NA	
Sulfate	9056A	35.9	mg/L	2.0	0.4	10	11/19/19 16:51	NA	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: SW1-1119
Lab Code: R1911351-008

Service Request: R1911351
Date Collected: 11/18/19 12:05
Date Received: 11/19/19 09:55
Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Q</u>
Solids, Total Suspended (TSS)	SM 2540 D-1997(2011)	3.6	mg/L	1.0	1	11/22/19 07:55	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: GSS6-1119
Lab Code: R1911351-009

Service Request: R1911351
Date Collected: 11/18/19 12:40
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date</u> <u>Extracted</u>	<u>Q</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	190	mg/L	2.0	1.8	1	11/22/19 11:39	NA	
Ammonia as Nitrogen, undistilled	350.1	0.050 U	mg/L	0.050	0.003	1	11/22/19 23:29	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/20/19 08:00	NA	
Bromide	9056A	1.0 U	mg/L	1.0	0.4	10	11/19/19 16:57	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	1.4	mg/L	1.0	0.5	1	11/23/19 02:44	NA	
Chemical Oxygen Demand, Total	410.4	6.0	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	30.3	mg/L	2.0	0.5	10	11/19/19 16:57	NA	
Hardness, Total as CaCO3	SM 2340 B-1997(2011)	218	mg/L	6.62	-	1	NA	NA	
Nitrate as Nitrogen	9056A	1.0 U	mg/L	1.0	0.2	10	11/19/19 16:57	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.20 U	mg/L	0.20	0.10	1	11/22/19 11:49	11/21/19	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/26/19 00:40	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	408	mg/L	10	9	1	11/20/19 14:00	NA	
Sulfate	9056A	77.0	mg/L	2.0	0.4	10	11/19/19 16:57	NA	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: SW1A-1119
Lab Code: R1911351-010

Service Request: R1911351
Date Collected: 11/18/19 13:20
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	16.0	mg/L	2.0	1.8	1	11/22/19 11:45	NA	
Ammonia as Nitrogen, undistilled	350.1	0.003 J	mg/L	0.050	0.003	1	11/22/19 23:30	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/20/19 08:03	NA	
Bromide	9056A	1.0 U	mg/L	1.0	0.4	10	11/19/19 17:03	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	3.4	mg/L	1.0	0.5	1	11/23/19 03:05	NA	
Chemical Oxygen Demand, Total	410.4	7.7	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	10.7	mg/L	2.0	0.5	10	11/19/19 17:03	NA	
Hardness, Total as CaCO3	SM 2340 B-1997(2011)	23.8	mg/L	6.62	-	1	NA	NA	
Nitrate as Nitrogen	9056A	1.0 U	mg/L	1.0	0.2	10	11/19/19 17:03	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.10 J	mg/L	0.20	0.10	1	11/22/19 11:50	11/21/19	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/26/19 00:44	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	68	mg/L	10	9	1	11/20/19 14:00	NA	
Solids, Total Suspended (TSS)	SM 2540 D-1997(2011)	2.5	mg/L	1.0	-	1	11/22/19 07:55	NA	
Sulfate	9056A	8.2	mg/L	2.0	0.4	10	11/19/19 17:03	NA	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: GSS8-1119
Lab Code: R1911351-011

Service Request: R1911351
Date Collected: 11/18/19 14:25
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	206	mg/L	2.0	1.8	1	11/22/19 11:58	NA	
Ammonia as Nitrogen, undistilled	350.1	0.050 U	mg/L	0.050	0.003	1	11/22/19 23:31	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/20/19 08:04	NA	
Bromide	9056A	1.0 U	mg/L	1.0	0.4	10	11/19/19 17:09	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	3.1	mg/L	1.0	0.5	1	11/23/19 03:26	NA	
Chemical Oxygen Demand, Total	410.4	9.5	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	105	mg/L	4.0	0.9	20	11/19/19 17:15	NA	
Hardness, Total as CaCO3	SM 2340 B-1997(2011)	302	mg/L	6.62	-	1	NA	NA	
Nitrate as Nitrogen	9056A	0.6 J	mg/L	1.0	0.2	10	11/19/19 17:09	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.11 J	mg/L	0.20	0.10	1	11/22/19 11:51	11/21/19	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/26/19 01:04	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	485	mg/L	10	9	1	11/20/19 14:00	NA	
Sulfate	9056A	57.9	mg/L	2.0	0.4	10	11/19/19 17:09	NA	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: GSS1A-1119
Lab Code: R1911351-012

Service Request: R1911351
Date Collected: 11/18/19 14:50
Date Received: 11/19/19 09:55

Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	94.8	mg/L	2.0	1.8	1	11/22/19 12:06	NA	
Ammonia as Nitrogen, undistilled	350.1	0.024 J	mg/L	0.050	0.003	1	11/22/19 23:32	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/20/19 08:08	NA	
Bromide	9056A	1.0 U	mg/L	1.0	0.4	10	11/19/19 17:33	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	6.3	mg/L	1.0	0.5	1	11/23/19 03:47	NA	
Chemical Oxygen Demand, Total	410.4	16.2	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	1.7 J	mg/L	2.0	0.5	10	11/19/19 17:33	NA	
Hardness, Total as CaCO3	SM 2340 B-1997(2011)	145	mg/L	6.62	-	1	NA	NA	
Nitrate as Nitrogen	9056A	0.8 J	mg/L	1.0	0.2	10	11/19/19 17:33	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.40	mg/L	0.20	0.10	1	11/22/19 11:59	11/21/19	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/26/19 01:12	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	224	mg/L	10	9	1	11/20/19 14:00	NA	
Sulfate	9056A	62.3	mg/L	2.0	0.4	10	11/19/19 17:33	NA	



QC Summary Forms

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Metals

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ALS Group USA, Corp.
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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: Method Blank
Lab Code: R1911351-MB1

Service Request: R1911351
Date Collected: NA
Date Received: NA
Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/22/19 19:29	11/21/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/22/19 19:29	11/21/19	
Calcium, Total	6010C	1000 U	ug/L	1000	300	1	11/22/19 19:29	11/21/19	
Iron, Total	6010C	20 J	ug/L	100	20	1	11/22/19 19:29	11/21/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/22/19 19:29	11/21/19	
Magnesium, Total	6010C	1000 U	ug/L	1000	30	1	11/22/19 19:29	11/21/19	
Manganese, Total	6010C	10 U	ug/L	10	4	1	11/22/19 19:29	11/21/19	
Potassium, Total	6010C	2000 U	ug/L	2000	200	1	11/22/19 19:29	11/21/19	
Sodium, Total	6010C	1000 U	ug/L	1000	200	1	11/22/19 19:29	11/21/19	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: Method Blank
Lab Code: R1911351-MB2

Service Request: R1911351
Date Collected: NA
Date Received: NA
Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic, Total	6010C	10 U	ug/L	10	4	1	11/22/19 17:15	11/21/19	
Cadmium, Total	6010C	5.0 U	ug/L	5.0	0.4	1	11/22/19 17:15	11/21/19	
Calcium, Total	6010C	1000 U	ug/L	1000	300	1	11/22/19 17:15	11/21/19	
Iron, Total	6010C	30 J	ug/L	100	20	1	11/22/19 17:15	11/21/19	
Lead, Total	6010C	5.0 U	ug/L	5.0	2.1	1	11/22/19 17:15	11/21/19	
Magnesium, Total	6010C	1000 U	ug/L	1000	30	1	11/22/19 17:15	11/21/19	
Manganese, Total	6010C	10 U	ug/L	10	4	1	11/22/19 17:15	11/21/19	
Potassium, Total	6010C	2000 U	ug/L	2000	200	1	11/22/19 17:15	11/21/19	
Sodium, Total	6010C	1000 U	ug/L	1000	200	1	11/22/19 17:15	11/21/19	

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water

Service Request: R1911351

Date Analyzed: 11/22/19

Lab Control Sample Summary
Inorganic Parameters

Units:ug/L

Basis:NA

Lab Control Sample
R1911351-LCS1

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Arsenic, Total	6010C	43.7	40	109	80-120
Cadmium, Total	6010C	51.5	50.0	103	80-120
Calcium, Total	6010C	2200	2000	108	80-120
Iron, Total	6010C	990	1000	99	80-120
Lead, Total	6010C	501	500	100	80-120
Magnesium, Total	6010C	2000	2000	98	80-120
Manganese, Total	6010C	496	500	99	80-120
Potassium, Total	6010C	19200	20000	96	80-120
Sodium, Total	6010C	19800	20000	99	80-120

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water

Service Request: R1911351

Date Analyzed: 11/22/19

Lab Control Sample Summary
Inorganic Parameters

Units:ug/L

Basis:NA

Lab Control Sample
R1911351-LCS2

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Arsenic, Total	6010C	44.2	40	111	80-120
Cadmium, Total	6010C	51.6	50.0	103	80-120
Calcium, Total	6010C	2100	2000	103	80-120
Iron, Total	6010C	1010	1000	101	80-120
Lead, Total	6010C	503	500	101	80-120
Magnesium, Total	6010C	1960	2000	98	80-120
Manganese, Total	6010C	500	500	100	80-120
Potassium, Total	6010C	19300	20000	96	80-120
Sodium, Total	6010C	19800	20000	99	80-120



General Chemistry

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: Method Blank
Lab Code: R1911351-MB1

Service Request: R1911351
Date Collected: NA
Date Received: NA
Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	2.0 U	mg/L	2.0	1.8	1	11/22/19 08:36	NA	
Ammonia as Nitrogen, undistilled	350.1	0.050 U	mg/L	0.050	0.003	1	11/22/19 22:54	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/20/19 17:35	NA	
Bromide	9056A	0.10 U	mg/L	0.10	0.04	1	11/19/19 15:03	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	1.0 U	mg/L	1.0	0.5	1	11/22/19 20:07	NA	
Chemical Oxygen Demand, Total	410.4	5.0 U	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	0.20 U	mg/L	0.20	0.05	1	11/19/19 15:03	NA	
Nitrate as Nitrogen	9056A	0.10 U	mg/L	0.10	0.02	1	11/19/19 15:03	NA	
Nitrate+Nitrite as Nitrogen	353.2	0.050 U	mg/L	0.050	0.002	1	12/01/19 10:17	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.20 U	mg/L	0.20	0.10	1	11/22/19 11:27	11/21/19	
Oil and Grease, Total (HEM)	1664A	5.0 U	mg/L	5.0	1.6	1	11/21/19 09:00	NA	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/25/19 22:04	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	10 U	mg/L	10	9	1	11/20/19 14:00	NA	
Solids, Total Suspended (TSS)	SM 2540 D-1997(2011)	1.0 U	mg/L	1.0	-	1	11/22/19 07:55	NA	
Sulfate	9056A	0.20 U	mg/L	0.20	0.04	1	11/19/19 15:03	NA	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: Method Blank
Lab Code: R1911351-MB2

Service Request: R1911351
Date Collected: NA
Date Received: NA
Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	2.0 U	mg/L	2.0	1.8	1	11/22/19 11:11	NA	
Chemical Oxygen Demand, Total	410.4	5.0 U	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.20 U	mg/L	0.20	0.10	1	11/22/19 11:57	11/21/19	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/26/19 00:52	NA	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water
Sample Name: Method Blank
Lab Code: R1911351-MB3

Service Request: R1911351
Date Collected: NA
Date Received: NA
Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Q</u>
Chemical Oxygen Demand, Total	410.4	5.0 U	mg/L	5.0	3.8	1	11/23/19 14:00	

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water

Service Request: R1911351
Date Collected: 11/18/19
Date Received: 11/19/19
Date Analyzed: 11/19/19 - 11/26/19

**Duplicate Matrix Spike Summary
General Chemistry Parameters**

Sample Name: SW2-1119 **Units:** mg/L
Lab Code: R1911351-003 **Basis:** NA

**Matrix Spike
R1911351-003MS**

**Duplicate Matrix Spike
R1911351-003DMS**

Analyte Name	Method	Sample		Spike		Duplicate Matrix Spike		% Rec	Limits	RPD	RPD Limit
		Result	Result	Amount	% Rec	Result	Amount				
Bromide	9056A	1.0 U	9.9	10.0	99	9.8	10.0	98	80-120	<1	15
Chloride	9056A	8.3	28.7	20.0	102	28.8	20.0	102	80-120	<1	15
Phenolics, Total Recoverable	9066	0.0050 U	0.0412	0.0400	103	0.0416	0.0400	104	49-137	<1	20
Sulfate	9056A	15.4	35.2	20.0	99	35.1	20.0	99	80-120	<1	15
Nitrate as Nitrogen	9056A	1.0 U	10.0	10.0	100	10.1	10.0	101	80-120	<1	15

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water

Service Request:R1911351
Date Collected:11/18/19
Date Received:11/19/19
Date Analyzed:11/23/19

**Duplicate Matrix Spike Summary
General Chemistry Parameters**

Sample Name: SW3A-1119
Lab Code: R1911351-004

Units:mg/L
Basis:NA

Matrix Spike
R1911351-004MS

Duplicate Matrix Spike
R1911351-004DMS

Analyte Name	Method	Sample Result	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec	% Rec Limits	RPD	RPD Limit
Chemical Oxygen Demand, Total	410.4	11.5	29.1	25.0	70 *	28.8	25.0	69 *	90-110	1	20
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	4.2	14.5	10.0	103	15.0	10.0	107	48-135	3	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water

Service Request: R1911351
Date Collected: 11/18/19
Date Received: 11/19/19
Date Analyzed: 11/22/19
Date Extracted: 11/21/19

Duplicate Matrix Spike Summary
Nitrogen, Total Kjeldahl (TKN)

Sample Name: GSS8-1119
Lab Code: R1911351-011
Analysis Method: 351.2
Prep Method: Method

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Matrix Spike R1911351-011MS			Duplicate Matrix Spike R1911351-011DMS			% Rec Limits	RPD	RPD Limit
		Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Nitrogen, Total Kjeldahl (TKN)	0.11 J	2.51	2.50	96	2.66	2.50	102	90-110	6	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water

Service Request: R1911351
Date Collected: 11/18/19
Date Received: 11/19/19
Date Analyzed: 11/22/19

Replicate Sample Summary
General Chemistry Parameters

Sample Name: GSS1A-1119
Lab Code: R1911351-012

Units: mg/L
Basis: NA

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>MRL</u>	<u>MDL</u>	<u>Sample Result</u>	<u>Duplicate Sample R1911351-012DUP Result</u>	<u>Average</u>	<u>RPD</u>	<u>RPD Limit</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	2.0	1.8	94.8	94.0	94.4	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water

Service Request: R1911351
Date Analyzed: 11/19/19 - 12/01/19

Lab Control Sample Summary
General Chemistry Parameters

Units:mg/L
Basis:NA

Lab Control Sample
R1911351-LCS1

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	17.6	20.0	88	80-120
Ammonia as Nitrogen, undistilled	350.1	0.241	0.250	97	90-110
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	183	198	93	85-115
Bromide	9056A	0.997	1.00	100	80-120
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	10.3	10.0	103	80-121
Chemical Oxygen Demand, Total	410.4	47.9	50.0	96	90-110
Chloride	9056A	2.04	2.00	102	80-120
Nitrate as Nitrogen	9056A	1.01	1.00	101	80-120
Nitrate+Nitrite as Nitrogen	353.2	0.518	0.500	104	90-110
Nitrogen, Total Kjeldahl (TKN)	351.2	2.27	2.50	91	90-110
Oil and Grease, Total (HEM)	1664A	32.0	40.5	79	78-114
Phenolics, Total Recoverable	9066	0.0403	0.0400	101	85-115
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	916	914	100	90-110
Solids, Total Suspended (TSS)	SM 2540 D-1997(2011)	205	214	96	80-120
Sulfate	9056A	2.01	2.00	100	80-120

ALS Group USA, Corp.
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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water

Service Request: R1911351
Date Analyzed: 11/22/19 - 11/26/19

Lab Control Sample Summary
General Chemistry Parameters

Units:mg/L
Basis:NA

Lab Control Sample
R1911351-LCS2

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	18.0	20.0	90	80-120
Chemical Oxygen Demand, Total	410.4	45.5	50.0	91	90-110
Nitrogen, Total Kjeldahl (TKN)	351.2	2.41	2.50	96	90-110
Phenolics, Total Recoverable	9066	0.0379	0.0400	95	85-115

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - 363 Routine Plus Parameters
Sample Matrix: Water

Service Request: R1911351
Date Analyzed: 11/23/19

Lab Control Sample Summary
General Chemistry Parameters

Units:mg/L
Basis:NA

Lab Control Sample
R1911351-LCS3

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Chemical Oxygen Demand, Total	410.4	46.1	50.0	92	90-110



December 31, 2019

Service Request No:R1911491

Russell Anderson
Casella Waste Systems - Hakes Billing
4 Chenell Drive Suite 200
Concord, NH 03301

Laboratory Results for: Hakes C&D Landfill - Part 363 Expanded Parameters

Dear Russell,

Enclosed are the results of the sample(s) submitted to our laboratory November 21, 2019
For your reference, these analyses have been assigned our service request number **R1911491**.

All testing was performed according to our laboratory's quality assurance program and met the requirements of the TNI standards except as noted in the case narrative report. Any testing not included in the lab's accreditation is identified on a Non-Certified Analytes report. All results are intended to be considered in their entirety. ALS Environmental is not responsible for use of less than the complete report. Results apply only to the individual samples submitted to the lab for analysis, as listed in the report. The measurement uncertainty of the results included in this report is within that expected when using the prescribed method(s), and represented by Laboratory Control Sample control limits. Any events, such as QC failures or Holding Time exceedances, which may add to the uncertainty are explained in the report narrative or are flagged with qualifiers. The flags are explained in the Report Qualifiers and Definitions page of this report.

Please contact me if you have any questions. My extension is 7472. You may also contact me via email at Janice.Jaeger@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Janice Jaeger
Project Manager

CC: Jon Brandes



Narrative Documents

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Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Received: 11/21/2019

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier level IV requested by the client.

Sample Receipt:

Three water samples were received for analysis at ALS Environmental on 11/21/2019. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Semivolatiles by GC/MS:

Method 8270D, 12/05/2019: The lower control limit was exceeded for one or more analytes in the Continuing Calibration Verification (CCV). Since there were no detections of the analyte(s) above the MRL in the associated field samples, the quantitation is not affected. The data quality was not significantly affected and no further corrective action was taken.

Method 8270D, 11/28/2019: The upper control limit was exceeded for one or more analytes in the Continuing Calibration Verification (CCV). The field samples analyzed in this sequence did not contain the analyte(s) in question above the Method Reporting Limit (MRL). Since the exceedance equates to a potential high bias, the data quality was not significantly affected and no further corrective action was taken.

Method 8270D, 11/28/2019: The lower control limit was exceeded for one or more analytes in the Continuing Calibration Verification (CCV). Since there were no detections of the analyte(s) above the MRL in the associated field samples, the quantitation is not affected. The data quality was not significantly affected and no further corrective action was taken.

8270D: An MDL and LCS/LCSD recovery cannot be determined for p-Phenylenediamine. p-Phenylenediamine is degraded in the extraction procedure. The compound has been flagged with an "X" and should be considered as indeterminate.

N-Nitrosodiphenylamine and Diphenylamine identity cannot be distinguished since N-Nitrosodiphenylamine breaks down to diphenylamine in the injection port of the instrument. Quantitation provided for either compound is from the instrument response of both compounds.

Method 8270D SIM,661766:The analysis was initially performed within the recommended holding time. Re-extraction and Reanalysis at a dilution was required. The reanalysis was performed past the recommended holding time. Sample R1911491-001.

Method 8270D SIM: The lower control limit was exceeded for one or more surrogates in one or more samples in this report. The elevated recovery equates to a low bias. The result is reported and the sample is to be re-extracted out of recommended holding time.

Semivolatile GC:

dMethod 8081B, 12/10/2019: The upper control limit was exceeded for one or more analytes in the Continuing Calibration Verification (CCV). The field samples analyzed in this sequence did not contain the analyte(s) in question above the Method Reporting Limit (MRL). Since the exceedance equates to a potential high bias, the data quality was not significantly affected and no further corrective action was taken.

Method 8081B, 662956s: The control limits were exceeded for one or more surrogates due to matrix interferences. A re-extraction and reanalysis was performed, but produced similar results. The re-extraction was performed out of holding time. No further corrective action was required.

Method 8081B, 12/10/2019: The lower control limit for the spike recovery of the Laboratory Control Sample (LCSD) was exceeded for one or more analyte. There were no detections of the analyte(s) in the associated field samples. The discrepancy

A handwritten signature in black ink, appearing to read "Samantha", is written over a horizontal line.

Approved by _____

Date 12/31/2019



associated with reduced recovery equates to a potential low bias. The analytes affected are flagged in the LCS Summary. Passes in the LCS.

Method 8081B, 12/03/2019: The upper control limit was exceeded for one or more analytes in the Continuing Calibration Verification (CCV). The field samples analyzed in this sequence did not contain the analyte(s) in question above the Method Reporting Limit (MRL). Since the exceedance equates to a potential high bias, the data quality was not significantly affected and no further corrective action was taken.

kepone has been reported as zero percent recovery in the LCS/LCSD due to a limitation in LIMs. kepone was detected at 8% and 7% recovery, respectively, outside laboratory limits. The LCS/LCSD is unacceptable and should be flagged on the summary form. The precision is also outside laboratory control limits.

Method 8082A, 12/09/2019: The upper control limit was exceeded for one or more analytes in the Continuing Calibration Verification (CCV). The field samples analyzed in this sequence did not contain the analyte(s) in question above the Method Reporting Limit (MRL). Since the exceedance equates to a potential high bias, the data quality was not significantly affected and no further corrective action was taken.

Method 8082A, 12/09/2019: The lower control limit for the spike recovery of the Laboratory Control Sample (LCS) was exceeded for one or more analyte. There were no detections of the analyte(s) in the associated field samples. The discrepancy associated with reduced recovery equates to a potential low bias. Additional analysis of the associated field samples could not be performed because insufficient sample remained for testing. The analytes affected are flagged in the LCS Summary. Lcsd worked.

Method 8082A, 662687s: The control limits were exceeded for one or more surrogates due to matrix interferences. A re-extraction and reanalysis was performed, but produced similar results. No further corrective action was required.

Method 8082A, 12/09/2019: The control limit was exceeded for one or more surrogates in the Continuing Calibration Verification (CCV). The surrogates were not within acceptance limits for the associated field samples. They were re-extracts confirming surr out low ccv failed high. The data quality was not significantly affected and no further corrective action was taken.

Metals:

No significant anomalies were noted with this analysis.

General Chemistry:

Method 7196A: One or more samples were received with insufficient hold time remaining to complete the analysis within the recommended limit. The analysis was performed as soon as possible after receipt by the laboratory. The data is flagged to indicate the holding time exceedance.

Method 7196A, R1911941-001: The Method Reporting Limit (MRL) was elevated due to color and reactivity of sample.

Subcontracted Analytical Parameters:

One or more samples were subcontracted to another laboratory for testing. The certified analytical report from the subcontractor has been included in its entirety at the end of this report and includes the name and address of the subcontracted laboratory.

Volatiles by GC/MS:

Method 8260C, 12/02/2019: The lower control limit was exceeded for one or more analytes in the Continuing Calibration Verification (CCV). Since there were no detections of the analyte(s) above the MRL in the associated field samples, the quantitation is not affected. The data quality was not significantly affected and no further corrective action was taken.

Method 8260C, 11/27/2019: The lower control limit was exceeded for one or more analytes in the Continuing Calibration Verification (CCV). Since there were no detections of the analyte(s) above the MRL in the associated field samples, the quantitation is not affected. The data quality was not significantly affected and no further corrective action was taken.

Approved by _____

Date 12/31/2019



Sample Receipt Information

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters

Service Request:R1911491

SAMPLE CROSS-REFERENCE

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
R1911491-001	LCS-1119	11/20/2019	1130
R1911491-003	Trip Blank	11/20/2019	



ALS-Environmental
1565 Jefferson Rd, Bldg 300, Suite 360
Rochester, NY 14623
585.288.5380

Client: **Casella/On-Site**
4376 Manning Ridge Road
Campbell, NY 14870
Project Manager: **Russ Anderson/Jon Brandes**

CHAIN of CUSTODY
Project: **Hakes C&D Landfill - Part 363 Expanded Parameters**
Telephone No. 585-593-1824
Email: jonb@on-sitehs.com

Page 4 of 4
Method of Shipment: **FED Ex**
Special Detection Limit/Reporting

Sample I.D.	Lab Sample No.	No. of Containers	Matrix				Prsv.		Sampling Date	Sampling Time	VOC's 8260 (HCL)	TOC, Phenols (H2SO4)	BOD, Alkalinity, Total Color (NP)	8081/8082/8151/8270 (NP)	T-Metals (Exp List), Hard (HNO3)	T-CN (NaOH)	TDS, Cr+6, NO3, Br, Cl, SO4 (NP)	NH3, TKN, COD (H2SO4)	T- Ra-226(903.1), Ra-228(904.0)(HNO3)	Total: Uranium (908.0) (HNO3)	Diss: Ra-226 (903.1), Ra-228 (904.0) (Dissolved: Uranium (908.0) (NP)	PFAS (EPA 537) (NP)	1,4 Dioxane (EPA 8270 SIM) (NP)
			Soil	Water	Air	Other	Yes	No																
LCS-1119		27	X				X	X	11-20-19	1130	X	X	X	X	X	X	X	X	X	X	X	X	X	

PDF to Russ and On-Site, and EDD to On-Site.

Sample Received Intact: Yes No Temperature received: Ice No ice

Relinq. by sampler (Sign & Print Name) <i>Kevin Dye / Kevin Dye</i>	Date 11-20-19	Time 1400	Received by (Sign & Print Name)
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory <i>[Signature]</i>
	Date	Time	Date 11/21/19
			Time 0935

Lab Work No.



Cooler Receipt and Preservation Check Form

R1911491 5
Casella Waste Systems - Hakes Billing
Hakes C&D Landfill - Part 383 Expanded Paramete

Project/Client Casella - Hakes Folder Number _____

Cooler received on 11/21/19 by: Q COURIER: ALS UPS FEDEX VELOCITY CLIENT

1	Were Custody seals on outside of cooler?	<input checked="" type="radio"/> Y <input type="radio"/> N
2	Custody papers properly completed (ink, signed)?	<input checked="" type="radio"/> Y <input type="radio"/> N
3	Did all bottles arrive in good condition (unbroken)?	<input checked="" type="radio"/> Y <input type="radio"/> N
4	Circle: <u>Wet Ice</u> Dry Ice Gel packs present?	<input checked="" type="radio"/> Y <input type="radio"/> N

5a	Perchlorate samples have required headspace?	Y N <input checked="" type="radio"/> NA
5b	Did VOA vials, Alk, or Sulfide have sig* bubbles?	Y <input checked="" type="radio"/> N NA
6	Where did the bottles originate?	<u>ALS/ROC</u> CLIENT
7	Soil VOA received as:	Bulk Encore 5035set <input checked="" type="radio"/> NA

8. Temperature Readings Date: 11/21/19 Time: 0950 ID: IR#7 IR#10 From: Temp Blank Sample Bottle

Observed Temp (°C)	<u>1.4</u>	<u>1.3</u>	<u>2.7</u>	<u>1.9</u>			
Within 0-6°C?	<input checked="" type="radio"/> Y <input type="radio"/> N	<input checked="" type="radio"/> Y <input type="radio"/> N	<input checked="" type="radio"/> Y <input type="radio"/> N	<input checked="" type="radio"/> Y <input type="radio"/> N	Y N	Y N	Y N
If <0°C, were samples frozen?	Y N	Y N	Y N	Y N	Y N	Y N	Y N

If out of Temperature, note packing/ice condition: _____ Ice melted Poorly Packed (described below) Same Day Rule
& Client Approval to Run Samples: _____ Standing Approval Client aware at drop-off Client notified by: _____

All samples held in storage location: R002 by e on 11/21/19 at 1005
5035 samples placed in storage location: _____ by _____ on _____ at _____

Cooler Breakdown/Preservation Check**: Date: 11/22/19 Time: 0905 by: Q

- 9. Were all bottle labels complete (i.e. analysis, preservation, etc.)? YES NO
- 10. Did all bottle labels and tags agree with custody papers? YES NO
- 11. Were correct containers used for the tests indicated? YES NO
- 12. Were 5035 vials acceptable (no extra labels, not leaking)? YES NO
- 13. Air Samples: Cassettes / Tubes Intact with MS? YES NO Canisters Pressurized YES NO Tedlar® Bags Inflated YES NO

pH	Lot of test paper	Reagent	Preserved?		Lot Received	Exp	Sample ID Adjusted	Vol. Added	Lot Added	Final pH
			Yes	No						
≥12	<u>230018</u>	NaOH	<input checked="" type="checkbox"/>		<u>202153</u>					
≤2		HNO ₃		<input checked="" type="checkbox"/>	<u>1118081</u>		<u>Sample will not pressure due to wet trip</u>			
≤2		H ₂ SO ₄	<input checked="" type="checkbox"/>		<u>202739</u>					
<4		NaHSO ₄								
5-9		For 608pest			No=Notify for 3day					
Residual Chlorine (-)		For <u>CN</u> , <u>Phenol</u> 625, 608pest, 522	<input checked="" type="checkbox"/>		If +, contact PM to add Na ₂ S ₂ O ₃ (625, 608, CN), ascorbic (phenol).					
		Na ₂ S ₂ O ₃								
		ZnAcetate	-	-						
		HCl	**	**	<u>J050-11</u>					

Bottle lot numbers: 090219-JAMU, 80919-04, 19-09-03, 092319-IBMC, 093019-18C
Explain all Discrepancies/ Other Comments:

Rec'd Trip Blank not in COC

HPROD	BULK
HTR	FLDT
<u>SUB</u>	HGFB
ALS	LL3541

Labels secondary reviewed by: Q
PC Secondary Review: _____

*significant air bubbles: VOA > 5-6 mm : WC > 1 in. diameter



Miscellaneous Forms

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

REPORT QUALIFIERS AND DEFINITIONS

<p>U Analyte was analyzed for but not detected. The sample quantitation limit has been corrected for dilution and for percent moisture, unless otherwise noted in the case narrative.</p> <p>J Estimated value due to either being a Tentatively Identified Compound (TIC) or that the concentration is between the MRL and the MDL. Concentrations are not verified within the linear range of the calibration. For DoD: concentration >40% difference between two GC columns (pesticides/Aroclors).</p> <p>B Analyte was also detected in the associated method blank at a concentration that may have contributed to the sample result.</p> <p>E Inorganics- Concentration is estimated due to the serial dilution was outside control limits.</p> <p>E Organics- Concentration has exceeded the calibration range for that specific analysis.</p> <p>D Concentration is a result of a dilution, typically a secondary analysis of the sample due to exceeding the calibration range or that a surrogate has been diluted out of the sample and cannot be assessed.</p> <p>* Indicates that a quality control parameter has exceeded laboratory limits. Under the "Notes" column of the Form I, this qualifier denotes analysis was performed out of Holding Time.</p> <p>H Analysis was performed out of hold time for tests that have an "immediate" hold time criteria.</p> <p># Spike was diluted out.</p>	<p>+ Correlation coefficient for MSA is <0.995.</p> <p>N Inorganics- Matrix spike recovery was outside laboratory limits.</p> <p>N Organics- Presumptive evidence of a compound (reported as a TIC) based on the MS library search.</p> <p>S Concentration has been determined using Method of Standard Additions (MSA).</p> <p>W Post-Digestion Spike recovery is outside control limits and the sample absorbance is <50% of the spike absorbance.</p> <p>P Concentration >40% difference between the two GC columns.</p> <p>C Confirmed by GC/MS</p> <p>Q DoD reports: indicates a pesticide/Aroclor is not confirmed ($\times 100\%$ Difference between two GC columns).</p> <p>X See Case Narrative for discussion.</p> <p>MRL Method Reporting Limit. Also known as:</p> <p>LOQ Limit of Quantitation (LOQ) The lowest concentration at which the method analyte may be reliably quantified under the method conditions.</p> <p>MDL Method Detection Limit. A statistical value derived from a study designed to provide the lowest concentration that will be detected 99% of the time. Values between the MDL and MRL are estimated (see J qualifier).</p> <p>LOD Limit of Detection. A value at or above the MDL which has been verified to be detectable.</p> <p>ND Non-Detect. Analyte was not detected at the concentration listed. Same as U qualifier.</p>
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Rochester Lab ID # for State Certifications¹

Connecticut ID # PH0556	Maine ID #NY0032	Pennsylvania ID# 68-786
Delaware Approved	New Hampshire ID # 2941	Rhode Island ID # 158
DoD ELAP #65817	New York ID # 10145	Virginia #460167
Florida ID # E87674	North Carolina #676	

¹ Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state or agency requirements. The test results meet requirements of the current NELAP/TNI standards or state or agency requirements, where applicable, except as noted in the case narrative. Since not all analyte/method/matrix combinations are offered for state/NELAC accreditation, this report may contain results which are not accredited. For a specific list of accredited analytes, contact the laboratory or go to <https://www.alsglobal.com/locations/americas/north-america/usa/new-york/rochester-environmental>

ALS Laboratory Group

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters

Service Request: R1911491

Non-Certified Analytes

Certifying Agency: New York Department of Health

Method	Matrix	Analyte
8081B	Water	Famphur

ALS Group USA, Corp.
dba ALS Environmental

Analyst Summary report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters/

Service Request: R1911491

Sample Name: LCS-1119
Lab Code: R1911491-001
Sample Matrix: Water

Date Collected: 11/20/19
Date Received: 11/21/19

Analysis Method	Extracted/Digested By	Analyzed By
350.1		MROGERSON
351.2	NSMITH	GNITAJOUPPI
410.4		SMEDBURY
6010C	AKONZEL	KMCLAEN
7196A		SMEDBURY
7470A	AKONZEL	KMCLAEN
8081B	KSERCU	BALLGEIER
8082A	KSERCU	BALLGEIER
8151A	KSERCU	BALLGEIER
8260C		AMOSSES
8270D	KSERCU	JMISIUREWICZ
8270D SIM	AFELSER	AFELSER
9056A		KWONG
9066		BBOWE
Kelada-01		CWOODS
PFC/537M	KLMILLER	LDOMREIS
SM 2120 B-2001(2011)		KAWONG
SM 2320 B-1997(2011)		KWONG
SM 2540 C-1997(2011)		GKNIGHT
SM 5210 B-2001(2011)		NSMITH
SM 5310 C-2000(2011)		CWOODS

Sample Name: LCS-1119
Lab Code: R1911491-001.R01
Sample Matrix: Water

Date Collected: 11/20/19
Date Received: 11/21/19

Analysis Method	Extracted/Digested By	Analyzed By
8081B	KSERCU	BALLGEIER
8082A	KSERCU	BALLGEIER
8260C		AMOSSES
8270D	KSERCU	JMISIUREWICZ
8270D SIM	AFELSER	AFELSER
PFC/537M	KLMILLER	LDOMREIS

ALS Group USA, Corp.

dba ALS Environmental

Analyst Summary report

Client: Casella Waste Systems (Hampden ME)

Service Request: R1911491

Project: Hakes C&D Landfill - Part 363 Expanded Parameters/

Sample Name: Trip Blank

Date Collected: 11/20/19

Lab Code: R1911491-003

Date Received: 11/21/19

Sample Matrix: Water

Analysis Method

Extracted/Digested By

Analyzed By

8260C

AMOSEs



INORGANIC PREPARATION METHODS

The preparation methods associated with this report are found in these tables unless discussed in the case narrative.

Water/Liquid Matrix

Analytical Method	Preparation Method
200.7	200.2
200.8	200.2
6010C	3005A/3010A
6020A	ILM05.3
9034 Sulfide Acid Soluble	9030B
SM 4500-CN-E Residual Cyanide	SM 4500-CN-G
SM 4500-CN-E WAD Cyanide	SM 4500-CN-I

Solid/Soil/Non-Aqueous Matrix

Analytical Method	Preparation Method
6010C	3050B
6020A	3050B
6010C TCLP (1311) extract	3005A/3010A
6010 SPLP (1312) extract	3005A/3010A
7199	3060A
300.0 Anions/ 350.1/ 353.2/ SM 2320B/ SM 5210B/ 9056A Anions	DI extraction
For analytical methods not listed, the preparation method is the same as the analytical method reference.	



Sample Results

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
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Volatile Organic Compounds by GC/MS

ALS Environmental—Rochester Laboratory

1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623

Phone (585) 288-5380 Fax (585) 288-8475

www.alsglobal.com

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Collected: 11/20/19 11:30
Date Received: 11/21/19 09:35

Sample Name: LCS-1119
Lab Code: R1911491-001

Units: ug/L
Basis: NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	50 U	50	2.0	10	11/27/19 23:23	
1,1,1-Trichloroethane (TCA)	50 U	50	2.1	10	11/27/19 23:23	
1,1,2,2-Tetrachloroethane	50 U	50	2.0	10	11/27/19 23:23	
1,1,2-Trichloroethane	50 U	50	2.0	10	11/27/19 23:23	
1,1-Dichloroethane (1,1-DCA)	50 U	50	2.0	10	11/27/19 23:23	
1,1-Dichloroethene (1,1-DCE)	50 U	50	2.5	10	11/27/19 23:23	
1,1-Dichloropropene	50 U	50	2.0	10	11/27/19 23:23	
1,2,3-Trichloropropane	50 U	50	2.6	10	11/27/19 23:23	
1,2-Dibromo-3-chloropropane (DBCP)	50 U	50	4.5	10	11/27/19 23:23	
1,2-Dibromoethane	50 U	50	2.0	10	11/27/19 23:23	
1,2-Dichloroethane	50 U	50	2.0	10	11/27/19 23:23	
1,2-Dichloropropane	50 U	50	2.0	10	11/27/19 23:23	
1,3-Dichloropropane	50 U	50	2.0	10	11/27/19 23:23	
2,2-Dichloropropane	50 U	50	2.4	10	11/27/19 23:23	
2-Butanone (MEK)	1300	100	7.8	10	11/27/19 23:23	
2-Chloro-1,3-butadiene	50 U	50	2.0	10	11/27/19 23:23	
2-Hexanone	19 J	100	2.0	10	11/27/19 23:23	
2-Methyl-1-propanol (Isobutyl Alcohol)	1000 U	1000	170	10	11/27/19 23:23	
3-Chloro-1-propene	50 U	50	3.6	10	11/27/19 23:23	
4-Methyl-2-pentanone	120	100	2.0	10	11/27/19 23:23	
Acetone	3000 D	200	42	20	12/02/19 16:04	
Acetonitrile	1000 U	1000	52	10	11/27/19 23:23	
Acrolein	1000 U	1000	9.0	10	11/27/19 23:23	
Acrylonitrile	1000 U	1000	9.0	10	11/27/19 23:23	
Benzene	6.9 J	50	2.0	10	11/27/19 23:23	
Bromochloromethane	50 U	50	2.4	10	11/27/19 23:23	
Bromodichloromethane	50 U	50	2.2	10	11/27/19 23:23	
Bromoform	50 U	50	2.5	10	11/27/19 23:23	
Bromomethane	50 U	50	7.0	10	11/27/19 23:23	
Carbon Disulfide	2.7 J	100	2.5	10	11/27/19 23:23	
Carbon Tetrachloride	50 U	50	3.4	10	11/27/19 23:23	
Chlorobenzene	50 U	50	2.0	10	11/27/19 23:23	
Chloroethane	50 U	50	2.3	10	11/27/19 23:23	
Chloroform	50 U	50	2.4	10	11/27/19 23:23	
Chloromethane	50 U	50	2.8	10	11/27/19 23:23	
Dibromochloromethane	50 U	50	2.0	10	11/27/19 23:23	
Dibromomethane	50 U	50	2.0	10	11/27/19 23:23	
Dichlorodifluoromethane (CFC 12)	50 U	50	2.1	10	11/27/19 23:23	
Dichloromethane	50 U	50	3.6	10	11/27/19 23:23	
Ethyl Methacrylate	100 U	100	2.0	10	11/27/19 23:23	
Ethylbenzene	3.7 J	50	2.0	10	11/27/19 23:23	
Iodomethane	100 U	100	12	10	11/27/19 23:23	
Methacrylonitrile	200 U	200	5.2	10	11/27/19 23:23	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Collected: 11/20/19 11:30
Date Received: 11/21/19 09:35

Sample Name: LCS-1119
Lab Code: R1911491-001

Units: ug/L
Basis: NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Methyl Methacrylate	100 U	100	2.4	10	11/27/19 23:23	
Propionitrile	1000 U	1000	12	10	11/27/19 23:23	
Styrene	50 U	50	2.0	10	11/27/19 23:23	
Tetrachloroethene (PCE)	50 U	50	2.1	10	11/27/19 23:23	
Toluene	8.0 J	50	2.0	10	11/27/19 23:23	
Trichloroethene (TCE)	50 U	50	2.0	10	11/27/19 23:23	
Trichlorofluoromethane (CFC 11)	50 U	50	2.4	10	11/27/19 23:23	
Vinyl Acetate	100 U	100	11	10	11/27/19 23:23	
Vinyl Chloride	50 U	50	2.0	10	11/27/19 23:23	
cis-1,2-Dichloroethene	50 U	50	2.3	10	11/27/19 23:23	
cis-1,3-Dichloropropene	50 U	50	2.0	10	11/27/19 23:23	
m,p-Xylenes	7.4 J	50	2.0	10	11/27/19 23:23	
o-Xylene	4.3 J	50	2.0	10	11/27/19 23:23	
trans-1,2-Dichloroethene	50 U	50	2.0	10	11/27/19 23:23	
trans-1,3-Dichloropropene	50 U	50	2.3	10	11/27/19 23:23	
trans-1,4-Dichloro-2-butene	50 U	50	7.8	10	11/27/19 23:23	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	106	85 - 122	11/27/19 23:23	
Dibromofluoromethane	107	89 - 119	11/27/19 23:23	
Toluene-d8	110	87 - 121	11/27/19 23:23	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water
Sample Name: Trip Blank
Lab Code: R1911491-003

Service Request: R1911491
Date Collected: 11/20/19
Date Received: 11/21/19 09:35

Units: ug/L
Basis: NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	5.0 U	5.0	0.20	1	11/27/19 23:45	
1,1,1-Trichloroethane (TCA)	5.0 U	5.0	0.21	1	11/27/19 23:45	
1,1,2,2-Tetrachloroethane	5.0 U	5.0	0.20	1	11/27/19 23:45	
1,1,2-Trichloroethane	5.0 U	5.0	0.20	1	11/27/19 23:45	
1,1-Dichloroethane (1,1-DCA)	5.0 U	5.0	0.20	1	11/27/19 23:45	
1,1-Dichloroethene (1,1-DCE)	5.0 U	5.0	0.25	1	11/27/19 23:45	
1,1-Dichloropropene	5.0 U	5.0	0.20	1	11/27/19 23:45	
1,2,3-Trichloropropane	5.0 U	5.0	0.26	1	11/27/19 23:45	
1,2-Dibromo-3-chloropropane (DBCP)	5.0 U	5.0	0.45	1	11/27/19 23:45	
1,2-Dibromoethane	5.0 U	5.0	0.20	1	11/27/19 23:45	
1,2-Dichloroethane	5.0 U	5.0	0.20	1	11/27/19 23:45	
1,2-Dichloropropane	5.0 U	5.0	0.20	1	11/27/19 23:45	
1,3-Dichloropropane	5.0 U	5.0	0.20	1	11/27/19 23:45	
2,2-Dichloropropane	5.0 U	5.0	0.24	1	11/27/19 23:45	
2-Butanone (MEK)	10 U	10	0.78	1	11/27/19 23:45	
2-Chloro-1,3-butadiene	5.0 U	5.0	0.20	1	11/27/19 23:45	
2-Hexanone	10 U	10	0.20	1	11/27/19 23:45	
2-Methyl-1-propanol (Isobutyl Alcohol)	100 U	100	17	1	11/27/19 23:45	
3-Chloro-1-propene	5.0 U	5.0	0.36	1	11/27/19 23:45	
4-Methyl-2-pentanone	10 U	10	0.20	1	11/27/19 23:45	
Acetone	3.1 BJ	10	2.1	1	11/27/19 23:45	
Acetonitrile	100 U	100	5.2	1	11/27/19 23:45	
Acrolein	100 U	100	0.90	1	11/27/19 23:45	
Acrylonitrile	100 U	100	0.90	1	11/27/19 23:45	
Benzene	5.0 U	5.0	0.20	1	11/27/19 23:45	
Bromochloromethane	5.0 U	5.0	0.24	1	11/27/19 23:45	
Bromodichloromethane	5.0 U	5.0	0.22	1	11/27/19 23:45	
Bromoform	5.0 U	5.0	0.25	1	11/27/19 23:45	
Bromomethane	5.0 U	5.0	0.70	1	11/27/19 23:45	
Carbon Disulfide	10 U	10	0.25	1	11/27/19 23:45	
Carbon Tetrachloride	5.0 U	5.0	0.34	1	11/27/19 23:45	
Chlorobenzene	5.0 U	5.0	0.20	1	11/27/19 23:45	
Chloroethane	5.0 U	5.0	0.23	1	11/27/19 23:45	
Chloroform	5.0 U	5.0	0.24	1	11/27/19 23:45	
Chloromethane	5.0 U	5.0	0.28	1	11/27/19 23:45	
Dibromochloromethane	5.0 U	5.0	0.20	1	11/27/19 23:45	
Dibromomethane	5.0 U	5.0	0.20	1	11/27/19 23:45	
Dichlorodifluoromethane (CFC 12)	5.0 U	5.0	0.21	1	11/27/19 23:45	
Dichloromethane	5.0 U	5.0	0.36	1	11/27/19 23:45	
Ethyl Methacrylate	10 U	10	0.20	1	11/27/19 23:45	
Ethylbenzene	5.0 U	5.0	0.20	1	11/27/19 23:45	
Iodomethane	10 U	10	1.2	1	11/27/19 23:45	
Methacrylonitrile	20 U	20	0.52	1	11/27/19 23:45	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Collected: 11/20/19
Date Received: 11/21/19 09:35

Sample Name: Trip Blank
Lab Code: R1911491-003

Units: ug/L
Basis: NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Methyl Methacrylate	10 U	10	0.24	1	11/27/19 23:45	
Propionitrile	100 U	100	1.2	1	11/27/19 23:45	
Styrene	5.0 U	5.0	0.20	1	11/27/19 23:45	
Tetrachloroethene (PCE)	5.0 U	5.0	0.21	1	11/27/19 23:45	
Toluene	5.0 U	5.0	0.20	1	11/27/19 23:45	
Trichloroethene (TCE)	5.0 U	5.0	0.20	1	11/27/19 23:45	
Trichlorofluoromethane (CFC 11)	5.0 U	5.0	0.24	1	11/27/19 23:45	
Vinyl Acetate	10 U	10	1.1	1	11/27/19 23:45	
Vinyl Chloride	5.0 U	5.0	0.20	1	11/27/19 23:45	
cis-1,2-Dichloroethene	5.0 U	5.0	0.23	1	11/27/19 23:45	
cis-1,3-Dichloropropene	5.0 U	5.0	0.20	1	11/27/19 23:45	
m,p-Xylenes	5.0 U	5.0	0.20	1	11/27/19 23:45	
o-Xylene	5.0 U	5.0	0.20	1	11/27/19 23:45	
trans-1,2-Dichloroethene	5.0 U	5.0	0.20	1	11/27/19 23:45	
trans-1,3-Dichloropropene	5.0 U	5.0	0.23	1	11/27/19 23:45	
trans-1,4-Dichloro-2-butene	5.0 U	5.0	0.78	1	11/27/19 23:45	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	99	85 - 122	11/27/19 23:45	
Dibromofluoromethane	103	89 - 119	11/27/19 23:45	
Toluene-d8	101	87 - 121	11/27/19 23:45	



Semivolatile Organic Compounds by GC/MS

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Collected: 11/20/19 11:30
Date Received: 11/21/19 09:35

Sample Name: LCS-1119
Lab Code: R1911491-001

Units: ug/L
Basis: NA

Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3510C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,2,4,5-Tetrachlorobenzene	9.5 U	9.5	1.0	1	11/28/19 04:04	11/25/19	
1,2,4-Trichlorobenzene	9.5 U	9.5	1.0	1	11/28/19 04:04	11/25/19	
1,2-Dichlorobenzene	9.5 U	9.5	1.0	1	11/28/19 04:04	11/25/19	
1,3,5-Trinitrobenzene	9.5 U	9.5	4.0	1	11/28/19 04:04	11/25/19	
1,3-Dichlorobenzene	9.5 U	9.5	1.0	1	11/28/19 04:04	11/25/19	
1,3-Dinitrobenzene	9.5 U	9.5	2.0	1	11/28/19 04:04	11/25/19	
1,4-Dichlorobenzene	9.5 U	9.5	1.0	1	11/28/19 04:04	11/25/19	
1,4-Naphthoquinone	48 U	48	3.2	1	11/28/19 04:04	11/25/19	
p-Phenylenediamine	48 UX	48	-	1	11/28/19 04:04	11/25/19	
1-Naphthylamine	48 U	48	3.5	1	11/28/19 04:04	11/25/19	
2,3,4,6-Tetrachlorophenol	9.5 U	9.5	1.0	1	11/28/19 04:04	11/25/19	
2,4,5-Trichlorophenol	9.5 U	9.5	1.1	1	11/28/19 04:04	11/25/19	
2,4,6-Trichlorophenol	9.5 U	9.5	1.0	1	11/28/19 04:04	11/25/19	
2,4-Dichlorophenol	9.5 U	9.5	1.0	1	11/28/19 04:04	11/25/19	
2,4-Dimethylphenol	15	9.5	1.0	1	11/28/19 04:04	11/25/19	
2,4-Dinitrophenol	48 U	48	7.0	1	11/28/19 04:04	11/25/19	
2,4-Dinitrotoluene	9.5 U	9.5	2.7	1	11/28/19 04:04	11/25/19	
2,6-Dichlorophenol	9.5 U	9.5	1.0	1	11/28/19 04:04	11/25/19	
2,6-Dinitrotoluene	9.5 U	9.5	1.5	1	11/28/19 04:04	11/25/19	
2-Acetylaminofluorene	9.5 U	9.5	1.6	1	11/28/19 04:04	11/25/19	
2-Chloronaphthalene	1.3 J	9.5	1.1	1	11/28/19 04:04	11/25/19	
2-Chlorophenol	9.5 U	9.5	1.0	1	11/28/19 04:04	11/25/19	
5-Nitro-2-methylaniline	9.5 U	9.5	2.5	1	11/28/19 04:04	11/25/19	
2-Methylnaphthalene	9.0 J	9.5	1.0	1	11/28/19 04:04	11/25/19	
2-Methylphenol	7.9 J	9.5	1.0	1	11/28/19 04:04	11/25/19	
2-Naphthylamine	48 U	48	2.1	1	11/28/19 04:04	11/25/19	
2-Nitroaniline	48 U	48	2.4	1	11/28/19 04:04	11/25/19	
2-Nitrophenol	9.5 U	9.5	1.5	1	11/28/19 04:04	11/25/19	
3,3'-Dichlorobenzidine	9.5 U	9.5	1.0	1	11/28/19 04:04	11/25/19	
3,3'-Dimethylbenzidine	48 U	48	1.6	1	11/28/19 04:04	11/25/19	
3- and 4-Methylphenol Coelution	96 D	19	2.0	2	12/05/19 09:19	11/25/19	
3-Methylcholanthrene	9.5 U	9.5	1.3	1	11/28/19 04:04	11/25/19	
3-Nitroaniline	48 U	48	1.8	1	11/28/19 04:04	11/25/19	
4,6-Dinitro-2-methylphenol	48 U	48	3.7	1	11/28/19 04:04	11/25/19	
4-Aminobiphenyl	48 U	48	1.8	1	11/28/19 04:04	11/25/19	
4-Bromophenyl Phenyl Ether	9.5 U	9.5	1.4	1	11/28/19 04:04	11/25/19	
4-Chloro-3-methylphenol	9.5 U	9.5	1.1	1	11/28/19 04:04	11/25/19	
4-Chloroaniline	9.5 U	9.5	1.0	1	11/28/19 04:04	11/25/19	
4-Chlorophenyl Phenyl Ether	9.5 U	9.5	1.2	1	11/28/19 04:04	11/25/19	
4-Nitroaniline	48 U	48	1.9	1	11/28/19 04:04	11/25/19	
4-Nitrophenol	48 U	48	3.0	1	11/28/19 04:04	11/25/19	
7,12-Dimethylbenz(a)anthracene	9.5 U	9.5	1.9	1	11/28/19 04:04	11/25/19	
Acenaphthene	8.9 J	9.5	1.6	1	11/28/19 04:04	11/25/19	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Collected: 11/20/19 11:30
Date Received: 11/21/19 09:35

Sample Name: LCS-1119
Lab Code: R1911491-001

Units: ug/L
Basis: NA

Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3510C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Acenaphthylene	9.5 U	9.5	1.3	1	11/28/19 04:04	11/25/19	
Acetophenone	12	9.5	1.3	1	11/28/19 04:04	11/25/19	
Anthracene	9.5 U	9.5	1.4	1	11/28/19 04:04	11/25/19	
Benz(a)anthracene	9.5 U	9.5	1.0	1	11/28/19 04:04	11/25/19	
Benzo(a)pyrene	9.5 U	9.5	1.3	1	11/28/19 04:04	11/25/19	
Benzo(b)fluoranthene	9.5 U	9.5	1.3	1	11/28/19 04:04	11/25/19	
Benzo(g,h,i)perylene	9.5 U	9.5	1.5	1	11/28/19 04:04	11/25/19	
Benzo(k)fluoranthene	9.5 U	9.5	1.5	1	11/28/19 04:04	11/25/19	
Benzyl Alcohol	9.5 U	9.5	1.0	1	11/28/19 04:04	11/25/19	
2,2'-Oxybis(1-chloropropane)	9.5 U	9.5	1.4	1	11/28/19 04:04	11/25/19	
Bis(2-chloroethoxy)methane	9.5 U	9.5	1.0	1	11/28/19 04:04	11/25/19	
Bis(2-chloroethyl) Ether	5.2 J	9.5	1.0	1	11/28/19 04:04	11/25/19	
Bis(2-ethylhexyl) Phthalate	9.7 U	9.7	9.7	1	11/28/19 04:04	11/25/19	
Butyl Benzyl Phthalate	9.5 U	9.5	1.0	1	11/28/19 04:04	11/25/19	
Chlorobenzilate	9.5 U	9.5	2.3	1	11/28/19 04:04	11/25/19	
Chrysene	9.5 U	9.5	1.5	1	11/28/19 04:04	11/25/19	
Di-n-butyl Phthalate	9.5 U	9.5	1.1	1	11/28/19 04:04	11/25/19	
Di-n-octyl Phthalate	9.5 U	9.5	1.8	1	11/28/19 04:04	11/25/19	
Diallate	9.5 U	9.5	1.9	1	11/28/19 04:04	11/25/19	
Dibenz(a,h)anthracene	9.5 U	9.5	1.4	1	11/28/19 04:04	11/25/19	
Dibenzofuran	3.7 J	9.5	1.3	1	11/28/19 04:04	11/25/19	
Diethyl Phthalate	1.3 J	9.5	1.2	1	11/28/19 04:04	11/25/19	
Dimethoate	48 U	48	1.9	1	11/28/19 04:04	11/25/19	
Dimethyl Phthalate	9.5 U	9.5	1.5	1	11/28/19 04:04	11/25/19	
Diphenylamine	9.5 U	9.5	4.7	1	11/28/19 04:04	11/25/19	
Disulfoton	9.5 U	9.5	3.0	1	11/28/19 04:04	11/25/19	
Ethyl Methanesulfonate	9.5 U	9.5	1.1	1	11/28/19 04:04	11/25/19	
Fluoranthene	9.5 U	9.5	1.4	1	11/28/19 04:04	11/25/19	
Fluorene	2.3 J	9.5	1.6	1	11/28/19 04:04	11/25/19	
Hexachlorobenzene	9.5 U	9.5	1.4	1	11/28/19 04:04	11/25/19	
Hexachlorobutadiene	9.5 U	9.5	1.1	1	11/28/19 04:04	11/25/19	
Hexachlorocyclopentadiene	9.5 U	9.5	1.5	1	11/28/19 04:04	11/25/19	
Hexachloroethane	9.5 U	9.5	1.2	1	11/28/19 04:04	11/25/19	
Hexachloropropene	9.5 U	9.5	1.3	1	11/28/19 04:04	11/25/19	
Indeno(1,2,3-cd)pyrene	9.5 U	9.5	1.4	1	11/28/19 04:04	11/25/19	
Isodrin	9.5 U	9.5	1.7	1	11/28/19 04:04	11/25/19	
Isophorone	9.5 U	9.5	1.2	1	11/28/19 04:04	11/25/19	
Isosafrole	9.5 U	9.5	1.3	1	11/28/19 04:04	11/25/19	
Methapyrilene	48 U	48	4.0	1	11/28/19 04:04	11/25/19	
Methyl Methanesulfonate	9.5 U	9.5	1.0	1	11/28/19 04:04	11/25/19	
Methyl Parathion	9.5 U	9.5	2.2	1	11/28/19 04:04	11/25/19	
N-Nitrosodi-n-butylamine	9.5 U	9.5	2.3	1	11/28/19 04:04	11/25/19	
N-Nitrosodi-n-propylamine	9.5 U	9.5	2.0	1	11/28/19 04:04	11/25/19	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Collected: 11/20/19 11:30
Date Received: 11/21/19 09:35

Sample Name: LCS-1119
Lab Code: R1911491-001

Units: ug/L
Basis: NA

Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3510C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
N-Nitrosodiethylamine	9.5 U	9.5	1.0	1	11/28/19 04:04	11/25/19	
N-Nitrosodimethylamine	9.5 U	9.5	2.4	1	11/28/19 04:04	11/25/19	
N-Nitrosodiphenylamine	9.5 U	9.5	4.7	1	11/28/19 04:04	11/25/19	
N-Nitrosomethylethylamine	9.5 U	9.5	1.6	1	11/28/19 04:04	11/25/19	
N-Nitrosopiperidine	9.5 U	9.5	1.5	1	11/28/19 04:04	11/25/19	
N-Nitrosopyrrolidine	9.5 U	9.5	1.5	1	11/28/19 04:04	11/25/19	
Naphthalene	53	9.5	1.1	1	11/28/19 04:04	11/25/19	
Nitrobenzene	9.5 U	9.5	1.0	1	11/28/19 04:04	11/25/19	
O,O,O-Triethyl Phosphorothioate	9.5 U	9.5	1.5	1	11/28/19 04:04	11/25/19	
Parathion	9.5 U	9.5	4.4	1	11/28/19 04:04	11/25/19	
Pentachlorobenzene	9.5 U	9.5	1.7	1	11/28/19 04:04	11/25/19	
Pentachloronitrobenzene (PCNB)	9.5 U	9.5	1.5	1	11/28/19 04:04	11/25/19	
Pentachlorophenol (PCP)	48 U	48	6.0	1	11/28/19 04:04	11/25/19	
Phenacetin	9.5 U	9.5	1.4	1	11/28/19 04:04	11/25/19	
Phenanthrene	9.5 U	9.5	1.6	1	11/28/19 04:04	11/25/19	
Phenol	72	9.5	3.0	1	11/28/19 04:04	11/25/19	
Phorate	9.5 U	9.5	1.8	1	11/28/19 04:04	11/25/19	
Pronamide	9.5 U	9.5	1.6	1	11/28/19 04:04	11/25/19	
Pyrene	9.5 U	9.5	1.8	1	11/28/19 04:04	11/25/19	
Safrole	9.5 U	9.5	1.0	1	11/28/19 04:04	11/25/19	
Thionazin	9.5 U	9.5	2.0	1	11/28/19 04:04	11/25/19	
o-Toluidine	9.5 U	9.5	1.6	1	11/28/19 04:04	11/25/19	
p-Dimethylaminoazobenzene	9.5 U	9.5	2.1	1	11/28/19 04:04	11/25/19	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2,4,6-Tribromophenol	66	35 - 141	11/28/19 04:04	
2-Fluorobiphenyl	58	31 - 118	11/28/19 04:04	
2-Fluorophenol	33	10 - 105	11/28/19 04:04	
Nitrobenzene-d5	68	31 - 110	11/28/19 04:04	
Phenol-d6	26	10 - 107	11/28/19 04:04	
p-Terphenyl-d14	12	10 - 165	11/28/19 04:04	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Collected: 11/20/19 11:30
Date Received: 11/21/19 09:35

Sample Name: LCS-1119
Lab Code: R1911491-001

Units: ug/L
Basis: NA

1,4-Dioxane by GC/MS

Analysis Method: 8270D SIM
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	120	0.40	0.27	1	12/02/19 14:14	12/2/19	*

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	82	64 - 124	12/02/19 14:14	



Semivolatile Organic Compounds by GC

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Collected: 11/20/19 11:30
Date Received: 11/21/19 09:35

Sample Name: LCS-1119
Lab Code: R1911491-001

Units: ug/L
Basis: NA

Organochlorine Pesticides by Gas Chromatography

Analysis Method: 8081B
Prep Method: EPA 3510C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
4,4'-DDD	0.046 U	0.046	0.020	1	12/03/19 20:25	11/26/19	
4,4'-DDE	0.046 U	0.046	0.020	1	12/03/19 20:25	11/26/19	
4,4'-DDT	0.046 U	0.046	0.020	1	12/03/19 20:25	11/26/19	
Aldrin	0.046 U	0.046	0.020	1	12/03/19 20:25	11/26/19	
Dieldrin	0.046 U	0.046	0.020	1	12/03/19 20:25	11/26/19	
Endosulfan I	0.046 U	0.046	0.020	1	12/03/19 20:25	11/26/19	
Endosulfan II	0.046 U	0.046	0.020	1	12/03/19 20:25	11/26/19	
Endosulfan Sulfate	0.046 U	0.046	0.020	1	12/03/19 20:25	11/26/19	
Endrin	0.046 U	0.046	0.020	1	12/03/19 20:25	11/26/19	
Endrin Aldehyde	0.046 U	0.046	0.020	1	12/03/19 20:25	11/26/19	
Famphur	0.93 U	0.93	0.50	1	12/03/19 20:25	11/26/19	
Heptachlor	0.046 U	0.046	0.020	1	12/03/19 20:25	11/26/19	
Heptachlor Epoxide	0.046 U	0.046	0.020	1	12/03/19 20:25	11/26/19	
Kepone	4.6 U	4.6	2.5	1	12/03/19 20:25	11/26/19	
Methoxychlor	0.046 U	0.046	0.020	1	12/03/19 20:25	11/26/19	
Toxaphene	0.50 U	0.50	0.50	1	12/03/19 20:25	11/26/19	
alpha-BHC	0.046 U	0.046	0.020	1	12/03/19 20:25	11/26/19	
alpha-Chlordane	0.046 U	0.046	0.020	1	12/03/19 20:25	11/26/19	
beta-BHC	0.046 U	0.046	0.020	1	12/03/19 20:25	11/26/19	
delta-BHC	0.046 U	0.046	0.020	1	12/03/19 20:25	11/26/19	
gamma-BHC (Lindane)	0.046 U	0.046	0.020	1	12/03/19 20:25	11/26/19	
gamma-Chlordane	0.046 U	0.046	0.020	1	12/03/19 20:25	11/26/19	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	5 *	10 - 164	12/03/19 20:25	*
Tetrachloro-m-xylene	36	10 - 147	12/03/19 20:25	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Collected: 11/20/19 11:30
Date Received: 11/21/19 09:35

Sample Name: LCS-1119
Lab Code: R1911491-001

Units: ug/L
Basis: NA

Polychlorinated Biphenyls (PCBs) by GC

Analysis Method: 8082A
Prep Method: EPA 3510C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aroclor 1016	0.93 U	0.93	0.50	1	12/03/19 21:14	11/26/19	
Aroclor 1221	1.9 U	1.9	1.0	1	12/03/19 21:14	11/26/19	
Aroclor 1232	0.93 U	0.93	0.50	1	12/03/19 21:14	11/26/19	
Aroclor 1242	0.93 U	0.93	0.50	1	12/03/19 21:14	11/26/19	
Aroclor 1248	0.93 U	0.93	0.50	1	12/03/19 21:14	11/26/19	
Aroclor 1254	0.93 U	0.93	0.50	1	12/03/19 21:14	11/26/19	
Aroclor 1260	0.93 U	0.93	0.50	1	12/03/19 21:14	11/26/19	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	5 *	10 - 152	12/03/19 21:14	*
Tetrachloro-m-xylene	38	14 - 129	12/03/19 21:14	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Collected: 11/20/19 11:30
Date Received: 11/21/19 09:35

Sample Name: LCS-1119
Lab Code: R1911491-001

Units: ug/L
Basis: NA

Chlorinated Herbicides by GC

Analysis Method: 8151A
Prep Method: Method

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
2,4,5-T	0.50 U	0.50	0.21	1	11/27/19 22:25	11/26/19	
2,4,5-TP	0.50 U	0.50	0.19	1	11/27/19 22:25	11/26/19	
2,4-D	0.50 U	0.50	0.31	1	11/27/19 22:25	11/26/19	
Dinoseb	0.50 U	0.50	0.17	1	11/27/19 22:25	11/26/19	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
DCAA	33	10 - 136	11/27/19 22:25	



Metals

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General Chemistry

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water
Sample Name: LCS-1119
Lab Code: R1911491-001

Service Request: R1911491
Date Collected: 11/20/19 11:30
Date Received: 11/21/19 09:35

Basis: NA

Inorganic Parameters

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	1840	mg/L	10	9	5	11/22/19 20:28	NA	
Ammonia as Nitrogen, undistilled	350.1	287	mg/L	50	3	1000	11/26/19 21:16	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	96.6	mg/L	2.0	-	1	11/22/19 06:16	NA	
Bromide	9056A	6.4	mg/L	1.0	0.4	10	11/21/19 19:17	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	280	mg/L	20	9	20	11/26/19 09:56	NA	
Chemical Oxygen Demand, Total	410.4	982	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	1620	mg/L	40	9	200	11/21/19 19:29	NA	
Chromium, Hexavalent	7196A	0.10 U	mg/L	0.10	0.03	10	11/21/19 20:31	NA	*
Color, True	SM 2120 B-2001(2011)	250	ColorUnits	10	-	10	11/22/19 05:00	NA	
Cyanide, Total	Kelada-01	0.145	mg/L	0.050	0.040	10	11/26/19 13:47	NA	
Hardness, Total as CaCO3	SM 2340 B-1997(2011)	1590	mg/L	6.62	-	1	NA	NA	
Nitrate as Nitrogen	9056A	1.0 U	mg/L	1.0	0.2	10	11/21/19 19:17	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	88.4	mg/L	4.0	2.0	20	11/26/19 14:20	11/25/19	
pH of Color Analysis	SM 2120 B-2001(2011)	7.71	pH Units	-	-	10	11/25/19 05:55	NA	*
Phenolics, Total Recoverable	9066	0.426	mg/L	0.050	0.010	10	11/25/19 18:40	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	4660	mg/L	50	45	1	11/25/19 15:15	NA	
Sulfate	9056A	223	mg/L	8.0	1.6	40	11/21/19 19:23	NA	



QC Summary Forms

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Volatile Organic Compounds by GC/MS

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491

SURROGATE RECOVERY SUMMARY
Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Extraction Method: EPA 5030C

Sample Name	Lab Code	4-Bromofluorobenzene	Dibromofluoromethane	Toluene-d8
		85-122	89-119	87-121
LCS-1119	R1911491-001	106	107	110
Trip Blank	R1911491-003	99	103	101
Method Blank	RQ1913983-06	97	102	101
Method Blank	RQ1914032-07	102	103	102
Lab Control Sample	RQ1913983-05	99	103	100
Lab Control Sample	RQ1914032-04	97	102	98
Duplicate Lab Control Sample	RQ1914032-05	100	105	101

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water
Sample Name: Method Blank
Lab Code: RQ1913983-06

Service Request: R1911491
Date Collected: NA
Date Received: NA
Units: ug/L
Basis: NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	5.0 U	5.0	0.20	1	11/27/19 23:01	
1,1,1-Trichloroethane (TCA)	5.0 U	5.0	0.21	1	11/27/19 23:01	
1,1,2,2-Tetrachloroethane	5.0 U	5.0	0.20	1	11/27/19 23:01	
1,1,2-Trichloroethane	5.0 U	5.0	0.20	1	11/27/19 23:01	
1,1-Dichloroethane (1,1-DCA)	5.0 U	5.0	0.20	1	11/27/19 23:01	
1,1-Dichloroethene (1,1-DCE)	5.0 U	5.0	0.25	1	11/27/19 23:01	
1,1-Dichloropropene	5.0 U	5.0	0.20	1	11/27/19 23:01	
1,2,3-Trichloropropane	5.0 U	5.0	0.26	1	11/27/19 23:01	
1,2-Dibromo-3-chloropropane (DBCP)	5.0 U	5.0	0.45	1	11/27/19 23:01	
1,2-Dibromoethane	5.0 U	5.0	0.20	1	11/27/19 23:01	
1,2-Dichloroethane	5.0 U	5.0	0.20	1	11/27/19 23:01	
1,2-Dichloropropane	5.0 U	5.0	0.20	1	11/27/19 23:01	
1,3-Dichloropropane	5.0 U	5.0	0.20	1	11/27/19 23:01	
2,2-Dichloropropane	5.0 U	5.0	0.24	1	11/27/19 23:01	
2-Butanone (MEK)	10 U	10	0.78	1	11/27/19 23:01	
2-Chloro-1,3-butadiene	5.0 U	5.0	0.20	1	11/27/19 23:01	
2-Hexanone	10 U	10	0.20	1	11/27/19 23:01	
2-Methyl-1-propanol (Isobutyl Alcohol)	100 U	100	17	1	11/27/19 23:01	
3-Chloro-1-propene	5.0 U	5.0	0.36	1	11/27/19 23:01	
4-Methyl-2-pentanone	10 U	10	0.20	1	11/27/19 23:01	
Acetone	6.2 J	10	2.1	1	11/27/19 23:01	
Acetonitrile	100 U	100	5.2	1	11/27/19 23:01	
Acrolein	100 U	100	0.90	1	11/27/19 23:01	
Acrylonitrile	100 U	100	0.90	1	11/27/19 23:01	
Benzene	5.0 U	5.0	0.20	1	11/27/19 23:01	
Bromochloromethane	5.0 U	5.0	0.24	1	11/27/19 23:01	
Bromodichloromethane	5.0 U	5.0	0.22	1	11/27/19 23:01	
Bromoform	5.0 U	5.0	0.25	1	11/27/19 23:01	
Bromomethane	5.0 U	5.0	0.70	1	11/27/19 23:01	
Carbon Disulfide	10 U	10	0.25	1	11/27/19 23:01	
Carbon Tetrachloride	5.0 U	5.0	0.34	1	11/27/19 23:01	
Chlorobenzene	5.0 U	5.0	0.20	1	11/27/19 23:01	
Chloroethane	5.0 U	5.0	0.23	1	11/27/19 23:01	
Chloroform	5.0 U	5.0	0.24	1	11/27/19 23:01	
Chloromethane	0.28 J	5.0	0.28	1	11/27/19 23:01	
Dibromochloromethane	5.0 U	5.0	0.20	1	11/27/19 23:01	
Dibromomethane	5.0 U	5.0	0.20	1	11/27/19 23:01	
Dichlorodifluoromethane (CFC 12)	5.0 U	5.0	0.21	1	11/27/19 23:01	
Dichloromethane	5.0 U	5.0	0.36	1	11/27/19 23:01	
Ethyl Methacrylate	10 U	10	0.20	1	11/27/19 23:01	
Ethylbenzene	5.0 U	5.0	0.20	1	11/27/19 23:01	
Iodomethane	10 U	10	1.2	1	11/27/19 23:01	
Methacrylonitrile	20 U	20	0.52	1	11/27/19 23:01	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Collected: NA
Date Received: NA

Sample Name: Method Blank
Lab Code: RQ1913983-06

Units: ug/L
Basis: NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Methyl Methacrylate	10 U	10	0.24	1	11/27/19 23:01	
Propionitrile	100 U	100	1.2	1	11/27/19 23:01	
Styrene	5.0 U	5.0	0.20	1	11/27/19 23:01	
Tetrachloroethene (PCE)	5.0 U	5.0	0.21	1	11/27/19 23:01	
Toluene	5.0 U	5.0	0.20	1	11/27/19 23:01	
Trichloroethene (TCE)	5.0 U	5.0	0.20	1	11/27/19 23:01	
Trichlorofluoromethane (CFC 11)	5.0 U	5.0	0.24	1	11/27/19 23:01	
Vinyl Acetate	10 U	10	1.1	1	11/27/19 23:01	
Vinyl Chloride	5.0 U	5.0	0.20	1	11/27/19 23:01	
cis-1,2-Dichloroethene	5.0 U	5.0	0.23	1	11/27/19 23:01	
cis-1,3-Dichloropropene	5.0 U	5.0	0.20	1	11/27/19 23:01	
m,p-Xylenes	5.0 U	5.0	0.20	1	11/27/19 23:01	
o-Xylene	5.0 U	5.0	0.20	1	11/27/19 23:01	
trans-1,2-Dichloroethene	5.0 U	5.0	0.20	1	11/27/19 23:01	
trans-1,3-Dichloropropene	5.0 U	5.0	0.23	1	11/27/19 23:01	
trans-1,4-Dichloro-2-butene	5.0 U	5.0	0.78	1	11/27/19 23:01	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	97	85 - 122	11/27/19 23:01	
Dibromofluoromethane	102	89 - 119	11/27/19 23:01	
Toluene-d8	101	87 - 121	11/27/19 23:01	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water
Sample Name: Method Blank
Lab Code: RQ1914032-07

Service Request: R1911491
Date Collected: NA
Date Received: NA
Units: ug/L
Basis: NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	5.0 U	5.0	0.20	1	12/02/19 13:32	
1,1,1-Trichloroethane (TCA)	5.0 U	5.0	0.21	1	12/02/19 13:32	
1,1,2,2-Tetrachloroethane	5.0 U	5.0	0.20	1	12/02/19 13:32	
1,1,2-Trichloroethane	5.0 U	5.0	0.20	1	12/02/19 13:32	
1,1-Dichloroethane (1,1-DCA)	5.0 U	5.0	0.20	1	12/02/19 13:32	
1,1-Dichloroethene (1,1-DCE)	5.0 U	5.0	0.25	1	12/02/19 13:32	
1,1-Dichloropropene	5.0 U	5.0	0.20	1	12/02/19 13:32	
1,2,3-Trichloropropane	5.0 U	5.0	0.26	1	12/02/19 13:32	
1,2-Dibromo-3-chloropropane (DBCP)	5.0 U	5.0	0.45	1	12/02/19 13:32	
1,2-Dibromoethane	5.0 U	5.0	0.20	1	12/02/19 13:32	
1,2-Dichloroethane	5.0 U	5.0	0.20	1	12/02/19 13:32	
1,2-Dichloropropane	5.0 U	5.0	0.20	1	12/02/19 13:32	
1,3-Dichloropropane	5.0 U	5.0	0.20	1	12/02/19 13:32	
2,2-Dichloropropane	5.0 U	5.0	0.24	1	12/02/19 13:32	
2-Butanone (MEK)	10 U	10	0.78	1	12/02/19 13:32	
2-Chloro-1,3-butadiene	5.0 U	5.0	0.20	1	12/02/19 13:32	
2-Hexanone	10 U	10	0.20	1	12/02/19 13:32	
2-Methyl-1-propanol (Isobutyl Alcohol)	100 U	100	17	1	12/02/19 13:32	
3-Chloro-1-propene	5.0 U	5.0	0.36	1	12/02/19 13:32	
4-Methyl-2-pentanone	10 U	10	0.20	1	12/02/19 13:32	
Acetone	10 U	10	2.1	1	12/02/19 13:32	
Acetonitrile	100 U	100	5.2	1	12/02/19 13:32	
Acrolein	100 U	100	0.90	1	12/02/19 13:32	
Acrylonitrile	100 U	100	0.90	1	12/02/19 13:32	
Benzene	5.0 U	5.0	0.20	1	12/02/19 13:32	
Bromochloromethane	5.0 U	5.0	0.24	1	12/02/19 13:32	
Bromodichloromethane	5.0 U	5.0	0.22	1	12/02/19 13:32	
Bromoform	5.0 U	5.0	0.25	1	12/02/19 13:32	
Bromomethane	5.0 U	5.0	0.70	1	12/02/19 13:32	
Carbon Disulfide	10 U	10	0.25	1	12/02/19 13:32	
Carbon Tetrachloride	5.0 U	5.0	0.34	1	12/02/19 13:32	
Chlorobenzene	5.0 U	5.0	0.20	1	12/02/19 13:32	
Chloroethane	5.0 U	5.0	0.23	1	12/02/19 13:32	
Chloroform	5.0 U	5.0	0.24	1	12/02/19 13:32	
Chloromethane	5.0 U	5.0	0.28	1	12/02/19 13:32	
Dibromochloromethane	5.0 U	5.0	0.20	1	12/02/19 13:32	
Dibromomethane	5.0 U	5.0	0.20	1	12/02/19 13:32	
Dichlorodifluoromethane (CFC 12)	5.0 U	5.0	0.21	1	12/02/19 13:32	
Dichloromethane	5.0 U	5.0	0.36	1	12/02/19 13:32	
Ethyl Methacrylate	10 U	10	0.20	1	12/02/19 13:32	
Ethylbenzene	5.0 U	5.0	0.20	1	12/02/19 13:32	
Iodomethane	10 U	10	1.2	1	12/02/19 13:32	
Methacrylonitrile	20 U	20	0.52	1	12/02/19 13:32	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Collected: NA
Date Received: NA

Sample Name: Method Blank
Lab Code: RQ1914032-07

Units: ug/L
Basis: NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Methyl Methacrylate	10 U	10	0.24	1	12/02/19 13:32	
Propionitrile	100 U	100	1.2	1	12/02/19 13:32	
Styrene	5.0 U	5.0	0.20	1	12/02/19 13:32	
Tetrachloroethene (PCE)	5.0 U	5.0	0.21	1	12/02/19 13:32	
Toluene	5.0 U	5.0	0.20	1	12/02/19 13:32	
Trichloroethene (TCE)	5.0 U	5.0	0.20	1	12/02/19 13:32	
Trichlorofluoromethane (CFC 11)	5.0 U	5.0	0.24	1	12/02/19 13:32	
Vinyl Acetate	10 U	10	1.1	1	12/02/19 13:32	
Vinyl Chloride	5.0 U	5.0	0.20	1	12/02/19 13:32	
cis-1,2-Dichloroethene	5.0 U	5.0	0.23	1	12/02/19 13:32	
cis-1,3-Dichloropropene	5.0 U	5.0	0.20	1	12/02/19 13:32	
m,p-Xylenes	5.0 U	5.0	0.20	1	12/02/19 13:32	
o-Xylene	5.0 U	5.0	0.20	1	12/02/19 13:32	
trans-1,2-Dichloroethene	5.0 U	5.0	0.20	1	12/02/19 13:32	
trans-1,3-Dichloropropene	5.0 U	5.0	0.23	1	12/02/19 13:32	
trans-1,4-Dichloro-2-butene	5.0 U	5.0	0.78	1	12/02/19 13:32	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	102	85 - 122	12/02/19 13:32	
Dibromofluoromethane	103	89 - 119	12/02/19 13:32	
Toluene-d8	102	87 - 121	12/02/19 13:32	

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491

Date Analyzed: 11/27/19

Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Units:ug/L

Basis:NA

Lab Control Sample

RQ1913983-05

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
1,1,1,2-Tetrachloroethane	8260C	21.2	20.0	106	76-129
1,1,1-Trichloroethane (TCA)	8260C	21.5	20.0	108	75-125
1,1,2,2-Tetrachloroethane	8260C	21.8	20.0	109	78-126
1,1,2-Trichloroethane	8260C	20.9	20.0	104	82-121
1,1-Dichloroethane (1,1-DCA)	8260C	20.8	20.0	104	80-124
1,1-Dichloroethene (1,1-DCE)	8260C	20.3	20.0	102	71-118
1,1-Dichloropropene	8260C	19.5	20.0	98	76-118
1,2,3-Trichloropropane	8260C	20.5	20.0	103	75-118
1,2-Dibromo-3-chloropropane (DBCP)	8260C	21.4	20.0	107	55-136
1,2-Dibromoethane	8260C	21.2	20.0	106	82-127
1,2-Dichloroethane	8260C	19.0	20.0	95	71-127
1,2-Dichloropropane	8260C	19.4	20.0	97	80-119
1,3-Dichloropropane	8260C	20.9	20.0	105	83-119
2,2-Dichloropropane	8260C	17.3	20.0	87	61-139
2-Butanone (MEK)	8260C	18.4	20.0	92	61-137
2-Chloro-1,3-butadiene	8260C	19.2	20.0	96	68-139
2-Hexanone	8260C	18.8	20.0	94	63-124
2-Methyl-1-propanol (Isobutyl Alcohol)	8260C	498	400	124	51-143
3-Chloro-1-propene	8260C	21.6	20.0	108	61-143
4-Methyl-2-pentanone	8260C	16.8	20.0	84	66-124
Acetone	8260C	19.2	20.0	96	40-161
Acetonitrile	8260C	89.0 J	100	89	46-154
Acrolein	8260C	23.3 J	40.0	58	13-165
Acrylonitrile	8260C	98.4 J	100	98	71-130
Benzene	8260C	21.1	20.0	106	79-119
Bromochloromethane	8260C	20.2	20.0	101	81-126
Bromodichloromethane	8260C	20.3	20.0	102	81-123
Bromoform	8260C	21.4	20.0	107	65-146
Bromomethane	8260C	15.3	20.0	77	42-166
Carbon Disulfide	8260C	19.2	20.0	96	66-128
Carbon Tetrachloride	8260C	21.6	20.0	108	70-127
Chlorobenzene	8260C	21.0	20.0	105	80-121
Chloroethane	8260C	19.3	20.0	97	62-131

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Analyzed: 11/27/19

Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Units:ug/L
Basis:NA

Lab Control Sample
RQ1913983-05

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Chloroform	8260C	21.2	20.0	106	79-120
Chloromethane	8260C	18.8	20.0	94	65-135
Dibromochloromethane	8260C	21.6	20.0	108	72-128
Dibromomethane	8260C	19.7	20.0	98	80-118
Dichlorodifluoromethane (CFC 12)	8260C	19.3	20.0	97	59-155
Dichloromethane	8260C	20.6	20.0	103	73-122
Ethyl Methacrylate	8260C	19.8	20.0	99	68-132
Ethylbenzene	8260C	20.9	20.0	105	76-120
Iodomethane	8260C	16.1	20.0	81	18-160
Methacrylonitrile	8260C	19.1 J	20.0	96	68-123
Methyl Methacrylate	8260C	19.5	20.0	97	68-129
Propionitrile	8260C	104	100	104	69-126
Styrene	8260C	20.2	20.0	101	80-124
Tetrachloroethene (PCE)	8260C	19.3	20.0	96	72-125
Toluene	8260C	20.7	20.0	103	79-119
Trichloroethene (TCE)	8260C	19.8	20.0	99	74-122
Trichlorofluoromethane (CFC 11)	8260C	22.6	20.0	113	71-136
Vinyl Acetate	8260C	19.6	20.0	98	52-174
Vinyl Chloride	8260C	19.4	20.0	97	74-159
cis-1,2-Dichloroethene	8260C	20.6	20.0	103	80-121
cis-1,3-Dichloropropene	8260C	19.5	20.0	98	77-122
m,p-Xylenes	8260C	43.7	40.0	109	80-126
o-Xylene	8260C	21.1	20.0	106	79-123
trans-1,2-Dichloroethene	8260C	21.1	20.0	105	73-118
trans-1,3-Dichloropropene	8260C	18.5	20.0	92	71-133
trans-1,4-Dichloro-2-butene	8260C	20.2	20.0	101	39-137

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Analyzed: 12/02/19

Duplicate Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Units:ug/L
Basis:NA

Analyte Name	Lab Control Sample RQ1914032-04				Duplicate Lab Control Sample RQ1914032-05				RPD	RPD Limit
	Analytical Method	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec	% Rec Limits		
1,1,1,2-Tetrachloroethane	8260C	21.8	20.0	109	23.2	20.0	116	76-129	6	30
1,1,1-Trichloroethane (TCA)	8260C	21.5	20.0	108	21.2	20.0	106	75-125	2	30
1,1,2,2-Tetrachloroethane	8260C	22.4	20.0	112	22.7	20.0	113	78-126	1	30
1,1,2-Trichloroethane	8260C	20.8	20.0	104	21.3	20.0	106	82-121	2	30
1,1-Dichloroethane (1,1-DCA)	8260C	20.0	20.0	100	20.7	20.0	104	80-124	4	30
1,1-Dichloroethene (1,1-DCE)	8260C	20.1	20.0	100	20.2	20.0	101	71-118	<1	30
1,1-Dichloropropene	8260C	19.9	20.0	99	21.1	20.0	105	76-118	6	30
1,2,3-Trichloropropane	8260C	20.2	20.0	101	19.5	20.0	98	75-118	4	30
1,2-Dibromo-3-chloropropane (DBCP)	8260C	21.8	20.0	109	22.4	20.0	112	55-136	3	30
1,2-Dibromoethane	8260C	20.0	20.0	100	20.7	20.0	103	82-127	3	30
1,2-Dichloroethane	8260C	19.1	20.0	96	19.4	20.0	97	71-127	1	30
1,2-Dichloropropane	8260C	19.1	20.0	96	20.1	20.0	100	80-119	5	30
1,3-Dichloropropane	8260C	19.5	20.0	97	20.4	20.0	102	83-119	5	30
2,2-Dichloropropane	8260C	21.0	20.0	105	21.8	20.0	109	61-139	4	30
2-Butanone (MEK)	8260C	19.9	20.0	100	19.9	20.0	99	61-137	<1	30
2-Chloro-1,3-butadiene	8260C	20.8	20.0	104	20.7	20.0	104	68-139	<1	30
2-Hexanone	8260C	20.4	20.0	102	20.2	20.0	101	63-124	<1	30
2-Methyl-1-propanol (Isobutyl Alcohol)	8260C	456	400	114	499	400	125	51-143	9	30
3-Chloro-1-propene	8260C	20.8	20.0	104	22.6	20.0	113	61-143	8	30
4-Methyl-2-pentanone	8260C	19.0	20.0	95	19.0	20.0	95	66-124	<1	30
Acetone	8260C	16.8	20.0	84	19.4	20.0	97	40-161	15	30
Acetonitrile	8260C	90.6 J	100	91	97.4 J	100	97	46-154	7	30
Acrolein	8260C	35.3 J	40.0	88	35.8 J	40.0	89	13-165	1	30
Acrylonitrile	8260C	97.1 J	100	97	101	100	101	71-130	4	30
Benzene	8260C	20.4	20.0	102	21.8	20.0	109	79-119	6	30
Bromochloromethane	8260C	20.0	20.0	100	20.1	20.0	100	81-126	<1	30
Bromodichloromethane	8260C	21.2	20.0	106	20.5	20.0	103	81-123	3	30
Bromoform	8260C	20.7	20.0	104	22.1	20.0	111	65-146	7	30
Bromomethane	8260C	15.7	20.0	78	16.4	20.0	82	42-166	5	30
Carbon Disulfide	8260C	21.7	20.0	109	21.4	20.0	107	66-128	1	30
Carbon Tetrachloride	8260C	20.5	20.0	102	22.9	20.0	115	70-127	11	30
Chlorobenzene	8260C	21.2	20.0	106	21.1	20.0	105	80-121	<1	30
Chloroethane	8260C	18.1	20.0	90	18.0	20.0	90	62-131	<1	30

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Analyzed: 12/02/19

Duplicate Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Units:ug/L
Basis:NA

Analyte Name	Lab Control Sample RQ1914032-04				Duplicate Lab Control Sample RQ1914032-05				% Rec Limits	RPD	RPD Limit
	Analytica I Method	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec				
Chloroform	8260C	20.5	20.0	103	21.6	20.0	108	79-120	5	30	
Chloromethane	8260C	17.9	20.0	90	18.8	20.0	94	65-135	5	30	
Dibromochloromethane	8260C	22.7	20.0	113	23.4	20.0	117	72-128	3	30	
Dibromomethane	8260C	20.0	20.0	100	20.7	20.0	104	80-118	4	30	
Dichlorodifluoromethane (CFC 12)	8260C	19.5	20.0	98	20.1	20.0	101	59-155	3	30	
Dichloromethane	8260C	20.3	20.0	102	21.6	20.0	108	73-122	6	30	
Ethyl Methacrylate	8260C	19.7	20.0	98	20.4	20.0	102	68-132	3	30	
Ethylbenzene	8260C	21.1	20.0	105	21.8	20.0	109	76-120	4	30	
Iodomethane	8260C	18.3	20.0	91	19.0	20.0	95	18-160	4	30	
Methacrylonitrile	8260C	17.9 J	20.0	90	19.6 J	20.0	98	68-123	9	30	
Methyl Methacrylate	8260C	20.2	20.0	101	20.4	20.0	102	68-129	1	30	
Propionitrile	8260C	101	100	101	99.2 J	100	99	69-126	2	30	
Styrene	8260C	20.3	20.0	102	21.3	20.0	107	80-124	5	30	
Tetrachloroethene (PCE)	8260C	20.4	20.0	102	21.5	20.0	107	72-125	5	30	
Toluene	8260C	20.6	20.0	103	21.0	20.0	105	79-119	2	30	
Trichloroethene (TCE)	8260C	20.0	20.0	100	21.1	20.0	105	74-122	5	30	
Trichlorofluoromethane (CFC 11)	8260C	22.0	20.0	110	23.1	20.0	115	71-136	5	30	
Vinyl Acetate	8260C	21.7	20.0	109	21.5	20.0	108	52-174	<1	30	
Vinyl Chloride	8260C	18.6	20.0	93	19.3	20.0	96	74-159	4	30	
cis-1,2-Dichloroethene	8260C	20.2	20.0	101	20.4	20.0	102	80-121	<1	30	
cis-1,3-Dichloropropene	8260C	19.9	20.0	100	20.6	20.0	103	77-122	3	30	
m,p-Xylenes	8260C	44.5	40.0	111	44.6	40.0	112	80-126	<1	30	
o-Xylene	8260C	20.9	20.0	105	20.4	20.0	102	79-123	2	30	
trans-1,2-Dichloroethene	8260C	21.2	20.0	106	22.0	20.0	110	73-118	4	30	
trans-1,3-Dichloropropene	8260C	19.1	20.0	95	19.9	20.0	100	71-133	4	30	
trans-1,4-Dichloro-2-butene	8260C	20.1	20.0	101	19.8	20.0	99	39-137	2	30	



Semivolatile Organic Compounds by GC/MS

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491

SURROGATE RECOVERY SUMMARY
Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Extraction Method: EPA 3510C

Sample Name	Lab Code	2,4,6-Tribromophenol	2-Fluorobiphenyl	2-Fluorophenol
		35-141	31-118	10-105
LCS-1119	R1911491-001	66	58	33
Method Blank	RQ1913814-01	75	71	43
Lab Control Sample	RQ1913814-02	83	79	51
Duplicate Lab Control Sample	RQ1913814-03	84	81	46

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491

SURROGATE RECOVERY SUMMARY
Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Extraction Method: EPA 3510C

Sample Name	Lab Code	Nitrobenzene-d5	Phenol-d6	p-Terphenyl-d14
		31-110	10-107	10-165
LCS-1119	R1911491-001	68	26	12
Method Blank	RQ1913814-01	83	30	58
Lab Control Sample	RQ1913814-02	86	35	52
Duplicate Lab Control Sample	RQ1913814-03	88	34	49

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water
Sample Name: Method Blank
Lab Code: RQ1913814-01

Service Request: R1911491
Date Collected: NA
Date Received: NA
Units: ug/L
Basis: NA

Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3510C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,2,4,5-Tetrachlorobenzene	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
1,2,4-Trichlorobenzene	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
1,2-Dichlorobenzene	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
1,3,5-Trinitrobenzene	10 U	10	4.0	1	11/27/19 22:04	11/25/19	
1,3-Dichlorobenzene	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
1,3-Dinitrobenzene	10 U	10	2.0	1	11/27/19 22:04	11/25/19	
1,4-Dichlorobenzene	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
1,4-Naphthoquinone	50 U	50	3.2	1	11/27/19 22:04	11/25/19	
p-Phenylenediamine	50 UX	50	-	1	11/27/19 22:04	11/25/19	
1-Naphthylamine	50 U	50	3.5	1	11/27/19 22:04	11/25/19	
2,3,4,6-Tetrachlorophenol	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
2,4,5-Trichlorophenol	10 U	10	1.1	1	11/27/19 22:04	11/25/19	
2,4,6-Trichlorophenol	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
2,4-Dichlorophenol	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
2,4-Dimethylphenol	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
2,4-Dinitrophenol	50 U	50	7.0	1	11/27/19 22:04	11/25/19	
2,4-Dinitrotoluene	10 U	10	2.7	1	11/27/19 22:04	11/25/19	
2,6-Dichlorophenol	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
2,6-Dinitrotoluene	10 U	10	1.5	1	11/27/19 22:04	11/25/19	
2-Acetylaminofluorene	10 U	10	1.6	1	11/27/19 22:04	11/25/19	
2-Chloronaphthalene	10 U	10	1.1	1	11/27/19 22:04	11/25/19	
2-Chlorophenol	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
5-Nitro-2-methylaniline	10 U	10	2.5	1	11/27/19 22:04	11/25/19	
2-Methylnaphthalene	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
2-Methylphenol	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
2-Naphthylamine	50 U	50	2.1	1	11/27/19 22:04	11/25/19	
2-Nitroaniline	50 U	50	2.4	1	11/27/19 22:04	11/25/19	
2-Nitrophenol	10 U	10	1.5	1	11/27/19 22:04	11/25/19	
3,3'-Dichlorobenzidine	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
3,3'-Dimethylbenzidine	50 U	50	1.6	1	11/27/19 22:04	11/25/19	
3- and 4-Methylphenol Coelution	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
3-Methylcholanthrene	10 U	10	1.3	1	11/27/19 22:04	11/25/19	
3-Nitroaniline	50 U	50	1.8	1	11/27/19 22:04	11/25/19	
4,6-Dinitro-2-methylphenol	50 U	50	3.7	1	11/27/19 22:04	11/25/19	
4-Aminobiphenyl	50 U	50	1.8	1	11/27/19 22:04	11/25/19	
4-Bromophenyl Phenyl Ether	10 U	10	1.4	1	11/27/19 22:04	11/25/19	
4-Chloro-3-methylphenol	10 U	10	1.1	1	11/27/19 22:04	11/25/19	
4-Chloroaniline	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
4-Chlorophenyl Phenyl Ether	10 U	10	1.2	1	11/27/19 22:04	11/25/19	
4-Nitroaniline	50 U	50	1.9	1	11/27/19 22:04	11/25/19	
4-Nitrophenol	50 U	50	3.0	1	11/27/19 22:04	11/25/19	
7,12-Dimethylbenz(a)anthracene	10 U	10	1.9	1	11/27/19 22:04	11/25/19	
Acenaphthene	10 U	10	1.6	1	11/27/19 22:04	11/25/19	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water
Sample Name: Method Blank
Lab Code: RQ1913814-01

Service Request: R1911491
Date Collected: NA
Date Received: NA
Units: ug/L
Basis: NA

Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3510C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Acenaphthylene	10 U	10	1.3	1	11/27/19 22:04	11/25/19	
Acetophenone	10 U	10	1.3	1	11/27/19 22:04	11/25/19	
Anthracene	10 U	10	1.4	1	11/27/19 22:04	11/25/19	
Benz(a)anthracene	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
Benzo(a)pyrene	10 U	10	1.3	1	11/27/19 22:04	11/25/19	
Benzo(b)fluoranthene	10 U	10	1.3	1	11/27/19 22:04	11/25/19	
Benzo(g,h,i)perylene	10 U	10	1.5	1	11/27/19 22:04	11/25/19	
Benzo(k)fluoranthene	10 U	10	1.5	1	11/27/19 22:04	11/25/19	
Benzyl Alcohol	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
2,2'-Oxybis(1-chloropropane)	10 U	10	1.4	1	11/27/19 22:04	11/25/19	
Bis(2-chloroethoxy)methane	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
Bis(2-chloroethyl) Ether	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
Bis(2-ethylhexyl) Phthalate	10 U	10	9.7	1	11/27/19 22:04	11/25/19	
Butyl Benzyl Phthalate	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
Chlorobenzilate	10 U	10	2.3	1	11/27/19 22:04	11/25/19	
Chrysene	10 U	10	1.5	1	11/27/19 22:04	11/25/19	
Di-n-butyl Phthalate	10 U	10	1.1	1	11/27/19 22:04	11/25/19	
Di-n-octyl Phthalate	10 U	10	1.8	1	11/27/19 22:04	11/25/19	
Diallate	10 U	10	1.9	1	11/27/19 22:04	11/25/19	
Dibenz(a,h)anthracene	10 U	10	1.4	1	11/27/19 22:04	11/25/19	
Dibenzofuran	10 U	10	1.3	1	11/27/19 22:04	11/25/19	
Diethyl Phthalate	10 U	10	1.2	1	11/27/19 22:04	11/25/19	
Dimethoate	50 U	50	1.9	1	11/27/19 22:04	11/25/19	
Dimethyl Phthalate	10 U	10	1.5	1	11/27/19 22:04	11/25/19	
Diphenylamine	10 U	10	4.7	1	11/27/19 22:04	11/25/19	
Disulfoton	10 U	10	3.0	1	11/27/19 22:04	11/25/19	
Ethyl Methanesulfonate	10 U	10	1.1	1	11/27/19 22:04	11/25/19	
Fluoranthene	10 U	10	1.4	1	11/27/19 22:04	11/25/19	
Fluorene	10 U	10	1.6	1	11/27/19 22:04	11/25/19	
Hexachlorobenzene	10 U	10	1.4	1	11/27/19 22:04	11/25/19	
Hexachlorobutadiene	10 U	10	1.1	1	11/27/19 22:04	11/25/19	
Hexachlorocyclopentadiene	10 U	10	1.5	1	11/27/19 22:04	11/25/19	
Hexachloroethane	10 U	10	1.2	1	11/27/19 22:04	11/25/19	
Hexachloropropene	10 U	10	1.3	1	11/27/19 22:04	11/25/19	
Indeno(1,2,3-cd)pyrene	10 U	10	1.4	1	11/27/19 22:04	11/25/19	
Isodrin	10 U	10	1.7	1	11/27/19 22:04	11/25/19	
Isophorone	10 U	10	1.2	1	11/27/19 22:04	11/25/19	
Isosafrole	10 U	10	1.3	1	11/27/19 22:04	11/25/19	
Methapyrilene	50 U	50	4.0	1	11/27/19 22:04	11/25/19	
Methyl Methanesulfonate	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
Methyl Parathion	10 U	10	2.2	1	11/27/19 22:04	11/25/19	
N-Nitrosodi-n-butylamine	10 U	10	2.3	1	11/27/19 22:04	11/25/19	
N-Nitrosodi-n-propylamine	10 U	10	2.0	1	11/27/19 22:04	11/25/19	

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water
Sample Name: Method Blank
Lab Code: RQ1913814-01

Service Request: R1911491
Date Collected: NA
Date Received: NA
Units: ug/L
Basis: NA

Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3510C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
N-Nitrosodiethylamine	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
N-Nitrosodimethylamine	10 U	10	2.4	1	11/27/19 22:04	11/25/19	
N-Nitrosodiphenylamine	10 U	10	4.7	1	11/27/19 22:04	11/25/19	
N-Nitrosomethylethylamine	10 U	10	1.6	1	11/27/19 22:04	11/25/19	
N-Nitrosopiperidine	10 U	10	1.5	1	11/27/19 22:04	11/25/19	
N-Nitrosopyrrolidine	10 U	10	1.5	1	11/27/19 22:04	11/25/19	
Naphthalene	10 U	10	1.1	1	11/27/19 22:04	11/25/19	
Nitrobenzene	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
O,O,O-Triethyl Phosphorothioate	10 U	10	1.5	1	11/27/19 22:04	11/25/19	
Parathion	10 U	10	4.4	1	11/27/19 22:04	11/25/19	
Pentachlorobenzene	10 U	10	1.7	1	11/27/19 22:04	11/25/19	
Pentachloronitrobenzene (PCNB)	10 U	10	1.5	1	11/27/19 22:04	11/25/19	
Pentachlorophenol (PCP)	50 U	50	6.0	1	11/27/19 22:04	11/25/19	
Phenacetin	10 U	10	1.4	1	11/27/19 22:04	11/25/19	
Phenanthrene	10 U	10	1.6	1	11/27/19 22:04	11/25/19	
Phenol	10 U	10	3.0	1	11/27/19 22:04	11/25/19	
Phorate	10 U	10	1.8	1	11/27/19 22:04	11/25/19	
Pronamide	10 U	10	1.6	1	11/27/19 22:04	11/25/19	
Pyrene	10 U	10	1.8	1	11/27/19 22:04	11/25/19	
Safrole	10 U	10	1.0	1	11/27/19 22:04	11/25/19	
Thionazin	10 U	10	2.0	1	11/27/19 22:04	11/25/19	
o-Toluidine	10 U	10	1.6	1	11/27/19 22:04	11/25/19	
p-Dimethylaminoazobenzene	10 U	10	2.1	1	11/27/19 22:04	11/25/19	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2,4,6-Tribromophenol	75	35 - 141	11/27/19 22:04	
2-Fluorobiphenyl	71	31 - 118	11/27/19 22:04	
2-Fluorophenol	43	10 - 105	11/27/19 22:04	
Nitrobenzene-d5	83	31 - 110	11/27/19 22:04	
Phenol-d6	30	10 - 107	11/27/19 22:04	
p-Terphenyl-d14	58	10 - 165	11/27/19 22:04	

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Analyzed: 11/27/19

Duplicate Lab Control Sample Summary
Semivolatile Organic Compounds by GC/MS

Units:ug/L
Basis:NA

Analyte Name	Lab Control Sample RQ1913814-02				Duplicate Lab Control Sample RQ1913814-03				RPD	RPD Limit
	Analytical Method	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec	% Rec Limits		
1,2,4,5-Tetrachlorobenzene	8270D	36.6	50.2	73	36.1	50.2	72	15-132	1	30
1,2,4-Trichlorobenzene	8270D	33.0	50.0	66	32.7	50.0	65	10-127	2	30
1,2-Dichlorobenzene	8270D	32.7	50.0	65	31.7	50.0	63	23-130	3	30
1,3-Dichlorobenzene	8270D	31.6	50.0	63	30.4	50.0	61	21-90	3	30
1,3-Dinitrobenzene	8270D	50.2	50.0	100	50.8	50.0	102	51-125	2	30
1,4-Dichlorobenzene	8270D	32.2	50.0	64	31.6	50.0	63	10-124	2	30
2,3,4,6-Tetrachlorophenol	8270D	43.9	50.0	88	44.9	50.0	90	42-136	2	30
2,4,5-Trichlorophenol	8270D	46.4	50.0	93	46.7	50.0	93	48-134	<1	30
2,4,6-Trichlorophenol	8270D	44.7	50.0	89	46.0	50.0	92	44-135	3	30
2,4-Dichlorophenol	8270D	42.0	50.0	84	41.9	50.0	84	48-127	<1	30
2,4-Dimethylphenol	8270D	41.8	50.0	84	41.7	50.0	83	59-113	1	30
2,4-Dinitrophenol	8270D	54.7	50.0	109	56.3	50.0	113	21-154	4	30
2,4-Dinitrotoluene	8270D	49.8	50.0	100	52.1	50.0	104	54-130	4	30
2,6-Dinitrotoluene	8270D	47.3	50.0	95	48.3	50.0	97	51-127	2	30
2-Chloronaphthalene	8270D	40.7	50.0	81	39.8	50.0	80	40-108	1	30
2-Chlorophenol	8270D	38.6	50.0	77	37.4	50.0	75	42-112	3	30
2-Methylnaphthalene	8270D	37.1	50.0	74	36.6	50.0	73	34-102	1	30
2-Methylphenol	8270D	36.4	50.0	73	35.2	50.0	70	47-100	4	30
2-Nitroaniline	8270D	51.2	50.0	102	52.4	50.0	105	52-133	3	30
2-Nitrophenol	8270D	43.2	50.0	86	44.0	50.0	88	43-131	2	30
3,3'-Dichlorobenzidine	8270D	43.1	50.0	86	45.1	50.0	90	43-126	5	30
3- and 4-Methylphenol Coelution	8270D	32.6	50.0	65	31.5	50.0	63	40-92	3	30
3-Nitroaniline	8270D	42.4 J	50.0	85	42.5 J	50.0	85	42-111	<1	30
4,6-Dinitro-2-methylphenol	8270D	51.4	50.0	103	51.1	50.0	102	36-152	<1	30
4-Bromophenyl Phenyl Ether	8270D	38.6	50.0	77	39.7	50.0	79	48-114	3	30
4-Chloro-3-methylphenol	8270D	44.5	50.0	89	43.8	50.0	88	52-113	1	30
4-Chloroaniline	8270D	39.0	50.0	78	36.8	50.0	74	44-109	5	30
4-Chlorophenyl Phenyl Ether	8270D	38.7	50.0	77	39.2	50.0	78	51-107	1	30
4-Nitroaniline	8270D	46.6 J	50.0	93	48.1 J	50.0	96	54-133	3	30
4-Nitrophenol	8270D	23.3 J	50.0	47	24.1 J	50.0	48	10-126	2	30
Acenaphthene	8270D	43.6	50.0	87	43.8	50.0	88	52-107	1	30
Acenaphthylene	8270D	46.0	50.0	92	46.4	50.0	93	55-109	1	30
Acetophenone	8270D	85.9	100	86	88.0	100	88	46-114	2	30

ALS Group USA, Corp.
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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Analyzed: 11/27/19

Duplicate Lab Control Sample Summary
Semivolatile Organic Compounds by GC/MS

Units:ug/L
Basis:NA

Analyte Name	Lab Control Sample RQ1913814-02				Duplicate Lab Control Sample RQ1913814-03				RPD	RPD Limit
	Analytical Method	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec	% Rec Limits		
Anthracene	8270D	48.1	50.0	96	49.9	50.0	100	55-116	4	30
Benz(a)anthracene	8270D	46.1	50.0	92	47.8	50.0	96	61-121	4	30
Benzo(a)pyrene	8270D	47.2	50.0	94	48.6	50.0	97	44-114	3	30
Benzo(b)fluoranthene	8270D	43.6	50.0	87	45.7	50.0	91	62-115	4	30
Benzo(g,h,i)perylene	8270D	45.2	50.0	90	47.0	50.0	94	63-136	4	30
Benzo(k)fluoranthene	8270D	47.5	50.0	95	48.4	50.0	97	49-133	2	30
Benzyl Alcohol	8270D	41.9	50.0	84	41.1	50.0	82	31-109	2	30
2,2'-Oxybis(1-chloropropane)	8270D	45.0	50.0	90	46.0	50.0	92	32-122	2	30
Bis(2-chloroethoxy)methane	8270D	43.5	50.0	87	45.8	50.0	92	55-110	6	30
Bis(2-chloroethyl) Ether	8270D	41.0	50.0	82	41.6	50.0	83	46-102	1	30
Bis(2-ethylhexyl) Phthalate	8270D	51.7	50.0	103	53.0	50.0	106	51-132	3	30
Butyl Benzyl Phthalate	8270D	52.6	50.0	105	54.1	50.0	108	41-148	3	30
Chrysene	8270D	46.1	50.0	92	47.3	50.0	95	57-118	3	30
Di-n-butyl Phthalate	8270D	49.0	50.0	98	50.9	50.0	102	57-128	4	30
Di-n-octyl Phthalate	8270D	53.8	50.0	108	54.8	50.0	110	62-124	2	30
Dibenz(a,h)anthracene	8270D	29.4	50.0	59	30.8	50.0	62	54-135	5	30
Dibenzofuran	8270D	44.6	50.0	89	45.5	50.0	91	55-110	2	30
Diethyl Phthalate	8270D	49.1	50.0	98	51.2	50.0	102	53-113	4	30
Dimethyl Phthalate	8270D	44.9	50.0	90	46.2	50.0	92	51-112	2	30
Fluoranthene	8270D	45.3	50.0	91	46.7	50.0	93	66-127	2	30
Fluorene	8270D	45.5	50.0	91	46.4	50.0	93	54-106	2	30
Hexachlorobenzene	8270D	42.1	50.0	84	44.1	50.0	88	53-123	5	30
Hexachlorobutadiene	8270D	31.3	50.0	63	31.2	50.0	62	16-95	2	30
Hexachlorocyclopentadiene	8270D	23.4	50.0	47	21.4	50.0	43	10-99	9	30
Hexachloroethane	8270D	30.6	50.0	61	30.2	50.0	60	15-92	2	30
Indeno(1,2,3-cd)pyrene	8270D	44.3	50.0	89	45.8	50.0	92	62-137	3	30
Isophorone	8270D	46.4	50.0	93	47.7	50.0	95	50-116	2	30
N-Nitrosodi-n-propylamine	8270D	46.2	50.0	92	48.5	50.0	97	49-115	5	30
N-Nitrosodimethylamine	8270D	29.6	50.0	59	29.1	50.0	58	31-70	2	30
N-Nitrosodiphenylamine	8270D	51.4	50.0	103	52.8	50.0	106	45-123	3	30
Naphthalene	8270D	36.9	50.0	74	36.5	50.0	73	38-99	1	30
Nitrobenzene	8270D	43.9	50.0	88	44.7	50.0	89	46-108	1	30
Pentachlorophenol (PCP)	8270D	47.0 J	50.0	94	50.5	50.0	101	29-164	7	30

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Analyzed: 11/27/19

Duplicate Lab Control Sample Summary
Semivolatile Organic Compounds by GC/MS

Units:ug/L
Basis:NA

Analyte Name	Lab Control Sample RQ1913814-02				Duplicate Lab Control Sample RQ1913814-03					
	Analytical Method	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec	% Rec Limits	RPD	RPD Limit
Phenanthrene	8270D	46.0	50.0	92	47.6	50.0	95	58-118	3	30
Phenol	8270D	19.3	50.0	39	21.5	50.0	43	10-113	10	30
Pyrene	8270D	48.8	50.0	98	50.6	50.0	101	61-122	3	30

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491

SURROGATE RECOVERY SUMMARY

1,4-Dioxane by GC/MS

Analysis Method: 8270D SIM

Extraction Method: EPA 3535A

Sample Name	Lab Code	1,4-Dioxane-d8
		64-124
LCS-1119	R1911491-001	82
Method Blank	RQ1914017-01	113
Lab Control Sample	RQ1914017-02	107
Duplicate Lab Control Sample	RQ1914017-03	101

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Collected: NA
Date Received: NA

Sample Name: Method Blank
Lab Code: RQ1914017-01

Units: ug/L
Basis: NA

1,4-Dioxane by GC/MS

Analysis Method: 8270D SIM
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	0.040 U	0.040	0.027	1	12/02/19 13:21	12/2/19	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	113	64 - 124	12/02/19 13:21	

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491

Date Analyzed: 12/02/19

Duplicate Lab Control Sample Summary
1,4-Dioxane by GC/MS

Units:ug/L

Basis:NA

Analyte Name	Analytical Method	Result	Lab Control Sample		Duplicate Lab Control Sample		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
1,4-Dioxane	8270D SIM	9.87	10.0	99	9.31	10.0	93	58-124	6	30



Semivolatile Organic Compounds by GC

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491

SURROGATE RECOVERY SUMMARY
Organochlorine Pesticides by Gas Chromatography

Analysis Method: 8081B
Extraction Method: EPA 3510C

Sample Name	Lab Code	Decachlorobiphenyl	Tetrachloro-m-xylene
		10-164	10-147
LCS-1119	R1911491-001	5*	36
Method Blank	RQ1913875-01	28	60
Lab Control Sample	RQ1913875-02	37	69
Duplicate Lab Control Sample	RQ1913875-03	36	70

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Collected: NA
Date Received: NA

Sample Name: Method Blank
Lab Code: RQ1913875-01

Units: ug/L
Basis: NA

Organochlorine Pesticides by Gas Chromatography

Analysis Method: 8081B
Prep Method: EPA 3510C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
4,4'-DDD	0.050 U	0.050	0.020	1	12/03/19 17:48	11/26/19	
4,4'-DDE	0.050 U	0.050	0.020	1	12/03/19 17:48	11/26/19	
4,4'-DDT	0.050 U	0.050	0.020	1	12/03/19 17:48	11/26/19	
Aldrin	0.050 U	0.050	0.020	1	12/03/19 17:48	11/26/19	
Dieldrin	0.050 U	0.050	0.020	1	12/03/19 17:48	11/26/19	
Endosulfan I	0.050 U	0.050	0.020	1	12/03/19 17:48	11/26/19	
Endosulfan II	0.050 U	0.050	0.020	1	12/03/19 17:48	11/26/19	
Endosulfan Sulfate	0.050 U	0.050	0.020	1	12/03/19 17:48	11/26/19	
Endrin	0.050 U	0.050	0.020	1	12/03/19 17:48	11/26/19	
Endrin Aldehyde	0.050 U	0.050	0.020	1	12/03/19 17:48	11/26/19	
Famphur	1.0 U	1.0	0.50	1	12/03/19 17:48	11/26/19	
Heptachlor	0.050 U	0.050	0.020	1	12/03/19 17:48	11/26/19	
Heptachlor Epoxide	0.050 U	0.050	0.020	1	12/03/19 17:48	11/26/19	
Kepone	5.0 U	5.0	2.5	1	12/03/19 17:48	11/26/19	
Methoxychlor	0.050 U	0.050	0.020	1	12/03/19 17:48	11/26/19	
Toxaphene	0.50 U	0.50	0.50	1	12/03/19 17:48	11/26/19	
alpha-BHC	0.050 U	0.050	0.020	1	12/03/19 17:48	11/26/19	
alpha-Chlordane	0.050 U	0.050	0.020	1	12/03/19 17:48	11/26/19	
beta-BHC	0.050 U	0.050	0.020	1	12/03/19 17:48	11/26/19	
delta-BHC	0.050 U	0.050	0.020	1	12/03/19 17:48	11/26/19	
gamma-BHC (Lindane)	0.050 U	0.050	0.020	1	12/03/19 17:48	11/26/19	
gamma-Chlordane	0.050 U	0.050	0.020	1	12/03/19 17:48	11/26/19	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	28	10 - 164	12/03/19 17:48	
Tetrachloro-m-xylene	60	10 - 147	12/03/19 17:48	

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Analyzed: 12/03/19 - 12/04/19

Duplicate Lab Control Sample Summary
Organochlorine Pesticides by Gas Chromatography

Units:ug/L
Basis:NA

Analyte Name	Lab Control Sample RQ1913875-02				Duplicate Lab Control Sample RQ1913875-03					
	Analytical Method	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec	% Rec Limits	RPD	RPD Limit
4,4'-DDD	8081B	0.205	0.200	102	0.213	0.200	106	42-159	4	30
4,4'-DDE	8081B	0.154	0.200	77	0.169	0.200	85	47-147	9	30
4,4'-DDT	8081B	0.184	0.200	92	0.192	0.200	96	41-149	4	30
Aldrin	8081B	0.131	0.200	65	0.143	0.200	71	22-137	9	30
Dieldrin	8081B	0.170	0.200	85	0.187	0.200	93	52-144	10	30
Endosulfan I	8081B	0.164	0.200	82	0.183	0.200	91	52-136	11	30
Endosulfan II	8081B	0.183	0.200	92	0.203	0.200	102	57-138	11	30
Endosulfan Sulfate	8081B	0.181	0.200	91	0.197	0.200	98	34-156	8	30
Endrin	8081B	0.200	0.200	100	0.217	0.200	109	56-143	8	30
Endrin Aldehyde	8081B	0.0963	0.200	48	0.0357 J	0.200	18	10-166	92*	30
Famphur	8081B	2.51	3.00	84	1.03	3.00	34	30-107	83*	30
Heptachlor	8081B	0.151	0.200	75	0.164	0.200	82	32-141	8	30
Heptachlor Epoxide	8081B	0.170	0.200	85	0.186	0.200	93	51-143	10	30
Kepone	8081B	5.0 U	15.0	0 *	2.5 U	15.0	0 *	11-127	NC	30
Methoxychlor	8081B	0.233	0.200	116	0.253	0.200	127	56-149	8	30
alpha-BHC	8081B	0.161	0.200	81	0.175	0.200	88	36-151	8	30
alpha-Chlordane	8081B	0.161	0.200	80	0.177	0.200	88	50-139	9	30
beta-BHC	8081B	0.177	0.200	89	0.190	0.200	95	55-149	7	30
delta-BHC	8081B	0.187	0.200	93	0.191	0.200	95	29-159	2	30
gamma-BHC (Lindane)	8081B	0.169	0.200	84	0.181	0.200	91	41-149	7	30
gamma-Chlordane	8081B	0.158	0.200	79	0.173	0.200	86	50-140	9	30

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491

SURROGATE RECOVERY SUMMARY
Polychlorinated Biphenyls (PCBs) by GC

Analysis Method: 8082A
Extraction Method: EPA 3510C

Sample Name	Lab Code	Decachlorobiphenyl	Tetrachloro-m-xylene
		10-152	14-129
LCS-1119	R1911491-001	5*	38
Method Blank	RQ1913875-01	32	67
Lab Control Sample	RQ1913875-02	43	79
Duplicate Lab Control Sample	RQ1913875-03	52	85

ALS Group USA, Corp.
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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Collected: NA
Date Received: NA

Sample Name: Method Blank
Lab Code: RQ1913875-01

Units: ug/L
Basis: NA

Polychlorinated Biphenyls (PCBs) by GC

Analysis Method: 8082A
Prep Method: EPA 3510C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aroclor 1016	1.0 U	1.0	0.50	1	11/27/19 17:50	11/26/19	
Aroclor 1221	2.0 U	2.0	1.0	1	11/27/19 17:50	11/26/19	
Aroclor 1232	1.0 U	1.0	0.50	1	11/27/19 17:50	11/26/19	
Aroclor 1242	1.0 U	1.0	0.50	1	11/27/19 17:50	11/26/19	
Aroclor 1248	1.0 U	1.0	0.50	1	11/27/19 17:50	11/26/19	
Aroclor 1254	1.0 U	1.0	0.50	1	11/27/19 17:50	11/26/19	
Aroclor 1260	1.0 U	1.0	0.50	1	11/27/19 17:50	11/26/19	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	32	10 - 152	11/27/19 17:50	
Tetrachloro-m-xylene	67	14 - 129	11/27/19 17:50	

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491

Date Analyzed: 11/27/19

Duplicate Lab Control Sample Summary
Polychlorinated Biphenyls (PCBs) by GC

Units:ug/L

Basis:NA

Lab Control Sample
RQ1913875-02

Duplicate Lab Control Sample
RQ1913875-03

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec	% Rec Limits	RPD	RPD Limit
Aroclor 1016	8082A	4.21	5.00	84	4.23	5.00	85	49-123	<1	30
Aroclor 1260	8082A	3.50	5.00	70	3.81	5.00	76	57-135	8	30

ALS Group USA, Corp.
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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491

SURROGATE RECOVERY SUMMARY
Chlorinated Herbicides by GC

Analysis Method: 8151A
Extraction Method: Method

Sample Name	Lab Code	DCAA 10-136
LCS-1119	R1911491-001	33
Method Blank	RQ1913874-01	41
Lab Control Sample	RQ1913874-02	43
Duplicate Lab Control Sample	RQ1913874-03	38

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Collected: NA
Date Received: NA

Sample Name: Method Blank
Lab Code: RQ1913874-01

Units: ug/L
Basis: NA

Chlorinated Herbicides by GC

Analysis Method: 8151A
Prep Method: Method

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
2,4,5-T	0.50 U	0.50	0.21	1	11/27/19 15:41	11/26/19	
2,4,5-TP	0.50 U	0.50	0.19	1	11/27/19 15:41	11/26/19	
2,4-D	0.50 U	0.50	0.31	1	11/27/19 15:41	11/26/19	
Dinoseb	0.50 U	0.50	0.17	1	11/27/19 15:41	11/26/19	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
DCAA	41	10 - 136	11/27/19 15:41	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491

Date Analyzed: 11/27/19

Duplicate Lab Control Sample Summary
Chlorinated Herbicides by GC

Units:ug/L

Basis:NA

Lab Control Sample
RQ1913874-02

Duplicate Lab Control Sample
RQ1913874-03

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec	% Rec Limits	RPD	RPD Limit
2,4,5-T	8151A	1.43	2.50	57	1.55	2.50	62	21-125	8	30
2,4,5-TP	8151A	1.25	2.50	50	1.34	2.50	54	21-120	7	30
2,4-D	8151A	1.28	2.50	51	1.36	2.50	54	26-154	5	30
Dinoseb	8151A	0.960	2.50	38	1.01	2.50	40	13-112	5	30



Metals

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METALS

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BLANKS

Contract: R1911491

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG NO.: LCS-1119

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L, ppt, or mg/kg): UG/L

Analyte	Initial Calib. Blank ug/L	Continuing Calibration Blank ug/L						Preparation Blank		M
		1	C	2	C	3	C	C		
Aluminum	23.00 U	23.00	U	23.00	U	23.00	U	23.000	U	P
Antimony	5.20 J	4.70	U	4.70	U	4.70	U	4.700	U	P
Arsenic	3.90 U	3.90	U	3.90	U	3.90	U	3.900	U	P
Barium	3.00 U	3.00	U	3.00	U	3.00	U	3.000	U	P
Beryllium	0.13 U	0.13	U	0.13	U	0.13	U	0.130	U	P
Boron	12.00 U	12.00	U	12.00	U	12.00	U	12.000	U	P
Cadmium	0.35 U	0.35	U	0.35	U	0.35	U	0.350	U	P
Mercury	0.077 U	0.077	U	0.077	U	0.077	U	0.077	U	CV
Calcium	220.00 U	220.00	U	220.00	U	220.00	U	220.000	U	P
Chromium	0.59 U	0.59	U	0.59	U	0.59	U	0.590	U	P
Cobalt	0.89 U	0.89	U	0.89	U	0.89	U	0.890	U	P
Copper	3.90 U	3.90	U	3.90	U	3.90	U	3.900	U	P
Iron	18.00 U	18.00	U	18.00	U	18.00	U	18.000	U	P
Lead	2.10 U	-2.70	J	2.10	U	2.10	U	-3.300	J	P
Magnesium	29.00 U	29.00	U	29.00	U	29.00	U	29.000	U	P
Manganese	3.70 U	3.70	U	3.70	U	3.70	U	3.700	U	P
Nickel	2.60 U	2.60	U	2.60	U	2.60	U	2.600	U	P
Potassium	200.00 U	200.00	U	200.00	U	200.00	U	200.000	U	P
Selenium	4.60 U	4.60	U	4.60	U	4.60	U	4.600	U	P
Silver	0.57 U	0.57	U	0.57	U	0.57	U	0.570	U	P
Sodium	130.00 U	130.00	U	130.00	U	130.00	U	130.000	U	P
Thallium	6.60 U	6.60	U	6.60	U	6.60	U	6.600	U	P
Tin	8.00 U	8.00	U	8.00	U	8.00	U	8.000	U	P
Vanadium	0.67 U	0.67	U	0.67	U	0.67	U	0.670	U	P
Zinc	9.40 U	9.40	U	9.40	U	9.40	U	9.400	U	P

Comments:

METALS

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BLANKS

Contract: R1911491

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG NO.: LCS-1119

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L, ppt, or mg/kg): UG/L

Analyte	Initial Calib. Blank ug/L	Continuing Calibration Blank ug/L						Preparation Blank	C	M
		1	C	2	C	3	C			
Aluminum		23.00	U	23.00	U					P
Antimony		4.70	U	4.70	U					P
Arsenic		3.90	U	3.90	U					P
Barium		3.00	U	3.00	U					P
Beryllium		0.13	U	0.13	U					P
Boron		12.00	U	12.00	U					P
Cadmium		0.35	U	0.35	U					P
Mercury		0.077	U							CV
Calcium		220.00	U	220.00	U					P
Chromium		0.59	U	0.59	U					P
Cobalt		0.89	U	0.89	U					P
Copper		3.90	U	3.90	U					P
Iron		18.00	U	18.00	U					P
Lead		-3.30	J	2.10	U					P
Magnesium		29.00	U	29.00	U					P
Manganese		3.70	U	3.70	U					P
Nickel		2.60	U	2.60	U					P
Potassium		200.00	U	200.00	U					P
Selenium		4.60	U	4.60	U					P
Silver		0.57	U	0.57	U					P
Sodium		130.00	U	130.00	U					P
Thallium		6.60	U	6.60	U					P
Tin		8.00	U	8.00	U					P
Vanadium		0.67	U	0.67	U					P
Zinc		9.40	U	9.40	U					P

Comments:

METALS
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DUPLICATES

SAMPLE NO.

DLCSW

Contract: R1911491

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG NO.: LCS-1119

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0 % Solids for Duplicate: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit	Sample (S) C	Duplicate (D) C	RPD	Q	M
Aluminum		1820	1810	1		P
Antimony		483	482	0		P
Arsenic		36	40	11		P
Barium		2050	2040	0		P
Beryllium		50	50	0		P
Boron		993	988	1		P
Cadmium		51	51	0		P
Calcium		1720	1670	3		P
Chromium		205	203	1		P
Cobalt		512	509	1		P
Copper		234	233	0		P
Iron		977	1010	3		P
Lead		500	494	1		P
Magnesium		1940	1930	1		P
Manganese		496	493	1		P
Nickel		507	505	0		P
Potassium		19100	19000	1		P
Selenium		1060	1060	0		P
Silver		48	48	0		P
Sodium		19600	19600	0		P
Thallium		1850	1840	1		P
Tin		4970	4960	0		P
Vanadium		496	494	0		P
Zinc		503	500	1		P

Comments: _____

METALS

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LABORATORY CONTROL SAMPLE

Contract: R1911491

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG NO.: LCS-1119

Solid LCS Source: _____

Aqueous LCS Source: CPI

Analyte	Aqueous (ug/L)			Solid (mg/K)				
	True	Found	%R	True	Found	C	Limits	%R
Aluminum	2000	1820	91					
Antimony	500	483	97					
Arsenic	40	36	90					
Barium	2000	2050	102					
Beryllium	50	50	100					
Boron	1000	993	99					
Cadmium	50	51	102					
Mercury	1.000	1.030	103					
Calcium	2000	1720	86					
Chromium	200	205	102					
Cobalt	500	512	102					
Copper	250	234	94					
Iron	1000	977	98					
Lead	500	500	100					
Magnesium	2000	1940	97					
Manganese	500	496	99					
Nickel	500	507	101					
Potassium	20000	19100	96					
Selenium	1010	1060	105					
Silver	50	48	96					
Sodium	20000	19600	98					
Thallium	2000	1850	92					
Tin	5000	4970	99					
Vanadium	500	496	99					
Zinc	500	503	101					

Comments: _____

METALS

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LABORATORY CONTROL SAMPLE

Contract: R1911491

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG NO.: LCS-1119

Solid LCS Source: _____

Aqueous LCS Source: CPI

Analyte	Aqueous (ug/L)			Solid (mg/K)				
	True	Found	%R	True	Found	C	Limits	%R
Aluminum	2000	1810	90					
Antimony	500	482	96					
Arsenic	40	40	100					
Barium	2000	2040	102					
Beryllium	50	50	100					
Boron	1000	988	99					
Cadmium	50	51	102					
Calcium	2000	1670	84					
Chromium	200	203	102					
Cobalt	500	509	102					
Copper	250	233	93					
Iron	1000	1010	101					
Lead	500	494	99					
Magnesium	2000	1930	96					
Manganese	500	493	99					
Nickel	500	505	101					
Potassium	20000	19000	95					
Selenium	1010	1060	105					
Silver	50	48	96					
Sodium	20000	19600	98					
Thallium	2000	1840	92					
Tin	5000	4960	99					
Vanadium	500	494	99					
Zinc	500	500	100					

Comments: _____



General Chemistry

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Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water
Sample Name: Method Blank
Lab Code: R1911491-MB

Service Request: R1911491
Date Collected: NA
Date Received: NA
Basis: NA

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	2.0 U	mg/L	2.0	1.8	1	11/22/19 17:38	NA	
Ammonia as Nitrogen, undistilled	350.1	0.050 U	mg/L	0.050	0.003	1	11/26/19 20:46	NA	
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	2.0 U	mg/L	2.0	-	1	11/22/19 14:41	NA	
Bromide	9056A	0.10 U	mg/L	0.10	0.04	1	11/21/19 17:53	NA	
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	1.0 U	mg/L	1.0	0.5	1	11/26/19 07:10	NA	
Chemical Oxygen Demand, Total	410.4	5.0 U	mg/L	5.0	3.8	1	11/23/19 14:00	NA	
Chloride	9056A	0.20 U	mg/L	0.20	0.05	1	11/21/19 17:53	NA	
Chromium, Hexavalent	7196A	0.010 U	mg/L	0.010	0.003	1	11/21/19 20:27	NA	
Color, True	SM 2120 B-2001(2011)	1.0	ColorUnits	1.0	-	1	11/22/19 05:00	NA	
Cyanide, Total	Kelada-01	0.0050 U	mg/L	0.0050	0.0040	1	11/26/19 13:19	NA	
Nitrate as Nitrogen	9056A	0.10 U	mg/L	0.10	0.02	1	11/21/19 17:53	NA	
Nitrogen, Total Kjeldahl (TKN)	351.2	0.20 U	mg/L	0.20	0.10	1	11/26/19 13:27	11/25/19	
Phenolics, Total Recoverable	9066	0.0050 U	mg/L	0.0050	0.0010	1	11/25/19 17:25	NA	
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	10 U	mg/L	10	9	1	11/25/19 15:15	NA	
Sulfate	9056A	0.20 U	mg/L	0.20	0.04	1	11/21/19 17:53	NA	

ALS Group USA, Corp.

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QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Collected: 11/20/19
Date Received: 11/21/19
Date Analyzed: 11/22/19

Replicate Sample Summary
General Chemistry Parameters

Sample Name: LCS-1119
Lab Code: R1911491-001

Units: ColorUnits
Basis: NA

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>MRL</u>	<u>MDL</u>	<u>Sample Result</u>	<u>Duplicate Sample R1911491-001DUP Result</u>	<u>Average</u>	<u>RPD</u>	<u>RPD Limit</u>
Color, True	SM 2120 B-2001(2011)	10		250	250	250	<1	5

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Collected: 11/20/19
Date Received: 11/21/19
Date Analyzed: 11/25/19

Replicate Sample Summary
General Chemistry Parameters

Sample Name: LCS-1119
Lab Code: R1911491-001

Units: mg/L
Basis: NA

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>MRL</u>	<u>MDL</u>	<u>Sample Result</u>	<u>Duplicate Sample R1911491-001DUP Result</u>	<u>Average</u>	<u>RPD</u>	<u>RPD Limit</u>
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	50	45	4660	4790	4730	3	10

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Collected: 11/20/19
Date Received: 11/21/19
Date Analyzed: 11/25/19

Replicate Sample Summary
General Chemistry Parameters

Sample Name: LCS-1119
Lab Code: R1911491-001

Units: pH Units
Basis: NA

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>MRL</u>	<u>MDL</u>	<u>Sample Result</u>	<u>Duplicate Sample R1911491-001DUP Result</u>	<u>Average</u>	<u>RPD</u>	<u>RPD Limit</u>
pH of Color Analysis	SM 2120 B-2001(2011)	-		7.71	7.71	7.71	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Analyzed: 11/21/19 - 11/26/19

Lab Control Sample Summary
General Chemistry Parameters

Units:mg/L
Basis:NA

Lab Control Sample
R1911491-LCS

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Alkalinity, Total as CaCO3	SM 2320 B-1997(2011)	18.4	20.0	92	80-120
Ammonia as Nitrogen, undistilled	350.1	0.247	0.250	99	90-110
Biochemical Oxygen Demand (BOD)	SM 5210 B-2001(2011)	196	198	99	85-115
Bromide	9056A	0.945	1.00	95	80-120
Carbon, Total Organic (TOC)	SM 5310 C-2000(2011)	9.49	10.0	95	80-121
Chemical Oxygen Demand, Total	410.4	544	500	109	90-110
Chloride	9056A	2.01	2.00	101	80-120
Chromium, Hexavalent	7196A	0.101	0.100	101	80-120
Cyanide, Total	Kelada-01	0.100	0.100	100	90-110
Nitrate as Nitrogen	9056A	1.00	1.00	100	80-120
Nitrogen, Total Kjeldahl (TKN)	351.2	2.29	2.50	92	90-110
Phenolics, Total Recoverable	9066	0.0395	0.0400	99	85-115
Solids, Total Dissolved (TDS)	SM 2540 C-1997(2011)	904	914	99	90-110
Sulfate	9056A	1.95	2.00	98	80-120



Subcontracted Analytical Parameters

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Radium-226

Case Narrative

ALS Environmental

R1911491

Work Order Number: 1911577

1. This report consists of the analytical results and supporting documentation for two water samples received by ALS on 11/23/2019.
2. These samples were prepared and analyzed according to EPA method 903.1. The analyses were completed on 12/30/2019.
3. The analysis results for these samples are reported in units of pCi/L. Sample 1911577-2 was filtered through a 0.45 micron filter and preserved prior to analysis. Sample 1911577-1 was not filtered prior to analysis.
4. Sample volume was insufficient to allow preparation of a duplicate. A laboratory control sample duplicate (LCSD) was prepared in lieu of a client sample duplicate.
5. ALS uses the following convention for reporting significant digits in the TPU and MDC results. The TPU value is rounded to two significant digits. The MDC value is rounded to the same decimal place as the TPU value. In practice, this could result in an MDC reported value of zero for samples with significant activity, including the batch laboratory control sample.
6. No anomalous situations were encountered during the preparation or analysis of these samples. All quality control criteria were met.



The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Pik Yee Yuen
Radiochemistry Primary Data Reviewer

12/30/19
Date

Radiochemistry Final Data Reviewer

Date

Section 1

CHAIN OF CUSTODY

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1911577

Client Name: ALS Environmental

Client Project Name:

Client Project Number: R1911491

Client PO Number: R1911491

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
LCS-1119	1911577-1		WATER	20-Nov-19	11:30
LCS Diss-1119	1911577-2		WATER	20-Nov-19	11:30

ALS Environmental Chain of Custody

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ALS Contact: Janice Jaeger
1911577

Project Number: R1911491
Project Manager: Janice Jaeger
QAP: LAB QAP

Lab Code	Sample ID	# of Cont.	Matrix	Sample			Lab ID
				Date	Time	Time	
R1911491-001	LCS-1119	3	Water	11/20/19	1130		Radium 228 904.0
R1911491-002	LCS Diss-1119	3	Water	11/20/19	1130		Radium 226 903.1 Nat U 908.0

10-165 - filtering

Test Comments

Radium 226 - 903.1 R1911491-002 Require Lab Filtering!!
Radium 228 - 904.0 R1911491-002 Require Lab Filtering!!
Nat U - 908.0 R1911491-002 Require Lab Filtering!!

Test I + IV

Special Instructions/Comments	Turnaround Requirements	Report Requirements	Invoice Information
	RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 STANDARD Requested FAX Date: _____ Requested Report Date: 12/02/19	I. Results Only <input checked="" type="checkbox"/> II. Results + QC Summaries III. Results + QC and Calibration Summaries <input checked="" type="checkbox"/> IV. Data Validation Report with Raw Data PQL/MDL <input checked="" type="checkbox"/> Y EDD <input checked="" type="checkbox"/> Y <i>8-2, c</i>	
NPDES H - Test is On Hold P - Test is Authorized for Prep Only			

Requested By: *Samuel* 11/22/19 1400 Received By: *Janice Jaeger* 12/14/19 11/23/19 0855 Airbill Number: _____



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Rochester

Workorder No: 1911577

Project Manager: JRK

Initials: EE

Date: 11/23/19

1. Are airbills / shipping documents present and/or removable?		DROP OFF	<input checked="" type="radio"/> YES	<input type="radio"/> NO		
2. Are custody seals on shipping containers intact?		NONE	<input checked="" type="radio"/> YES	<input type="radio"/> NO *		
3. Are custody seals on sample containers intact?		NONE	<input checked="" type="radio"/> YES	<input type="radio"/> NO *		
4. Is there a COC (chain-of-custody) present?			<input checked="" type="radio"/> YES	<input type="radio"/> NO *		
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)			<input checked="" type="radio"/> YES	<input type="radio"/> NO *		
6. Are short-hold samples present?			YES	<input checked="" type="radio"/> NO		
7. Are all samples within holding times for the requested analyses?			<input checked="" type="radio"/> YES	<input type="radio"/> NO *		
8. Were all sample containers received intact? (not broken or leaking)			<input checked="" type="radio"/> YES	<input type="radio"/> NO *		
9. Is there sufficient sample for the requested analyses?			<input checked="" type="radio"/> YES	<input type="radio"/> NO *		
10. Are samples in proper containers for requested analyses? (form 250, Sample Handling Guidelines)			<input checked="" type="radio"/> YES	<input type="radio"/> NO *		
11. Are all aqueous samples preserved correctly, if required? (excluding volatiles)		N/A	YES	<input checked="" type="radio"/> NO *		
12. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)		<input checked="" type="radio"/> N/A	YES	<input type="radio"/> NO		
13. Were the samples shipped on ice?			YES	<input checked="" type="radio"/> NO		
14. Were cooler temperatures measured at 0.1-6.0°C?	IR gun used*:	#3	#5	<input checked="" type="radio"/> RAD ONLY	YES	NO
Cooler #: <u>1</u> <u>2</u> <u>3</u>						
Temperature (°C): <u>AMB</u> <u>AMB</u> <u>AMB</u>						
# of custody seals on cooler: <u>1</u> <u>1</u> <u>1</u>						
External mR/hr reading: <u>10</u> <u>9</u> <u>9</u>						
Background mR/hr reading: <u>11</u>						
Were external mR/hr readings ≤ two times background and within DOT acceptance criteria? <input checked="" type="radio"/> YES / <input type="radio"/> NO / <input type="radio"/> NA (If no, see Form 008.)						

* Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.

1) all sample bottles have initial ph ~ 7
... 577 - all bottles added 2ml HNO₃, final ph < 2 | lot #: 228685

Were unpreserved bottles pH checked? YES NA

All client bottle ID's vs ALS lab ID's double-checked by: EE

If applicable, was the client contacted? YES / NO / NA Contact: _____

Date/Time: _____

Project Manager Signature / Date: _____

[Signature] 11-25-19

1911577

Part # 156148-434 RIT EXP 11/19

ORIGIN ID: ONHA (585) 672-7464
SND
ALS ENVIRONMENTAL
1565 JEFFERSON RD
BLDG 300 SUITE 360
ROCHESTER, NY 14623
UNITED STATES*US

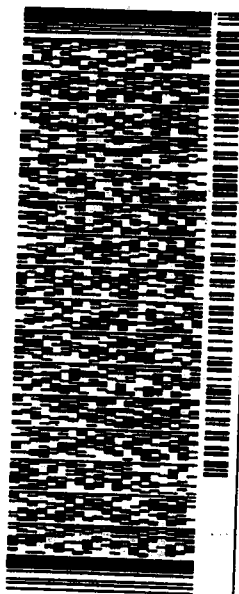
SHIP DATE: 22NOV19
ACTWT: 48.85 LB
CRD: 0342584/CAF3314
BILL THIRD PARTY

TO SAMPLE RECEIVING
ALS LABS - FT. COLLINS
225 COMMERCE DRIVE

10-1

FORT COLLINS CO 80524 AMB

(970) 490-1511
REF: DEPT:



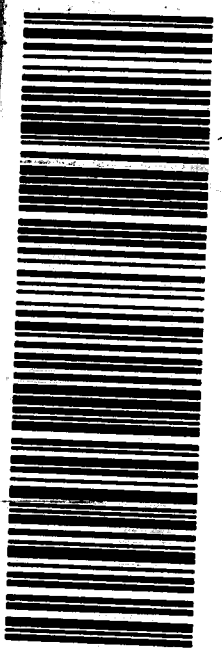
J1912190820101

TRK# 1 of 3
0201 4846 1685 1583
MASTER

SATURDAY 12:00P
PRIORITY OVERNIGHT

XO FTGA

80524
CO-US DEN



565C1/F330/0542

Part # 156148-434 RIT EXP 11/19

ORIGIN ID: ONHA (585) 672-7464
SND
ALS ENVIRONMENTAL
1565 JEFFERSON RD
BLDG 300 SUITE 360
ROCHESTER, NY 14623
UNITED STATES US

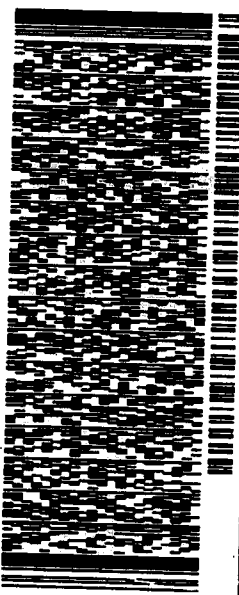
SHIP DATE: 22NOV19
ACTWT: 48.00 LB
CRD: 0342584/CAF3311
BILL THIRD PARTY

TO SAMPLE RECEIVING
ALS LABS - FT. COLLINS
225 COMMERCE DRIVE

9-1

FORT COLLINS CO 80524 AMB

(970) 490-1511
REF: DEPT:



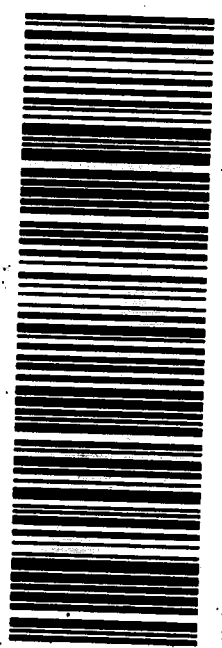
J19121908200101

MPS# 2 of 3
0263 4846 1685 1594
Met# 4846 1685 1583

SATURDAY 12:00P
PRIORITY OVERNIGHT

XO FTGA

80524
CO-US DEN



565C1/F330/0542

FedEx



RT B759 2 12:00
ST 9 1594 11.23

1911577

Part # 156148-43c PVT Exp 11/98

ORIGIN ID: 0NH4 (585) 672-7464
SND
ALS ENVIRONMENTAL
1565 JEFFERSON RD
BLDG 300 SUITE 360
ROCHESTER NY 14623
UNITED STATES US

SHIP DATE: 22NOV19
ACTWT: 4.95 LB
CRD: 0342584/CR/E3911

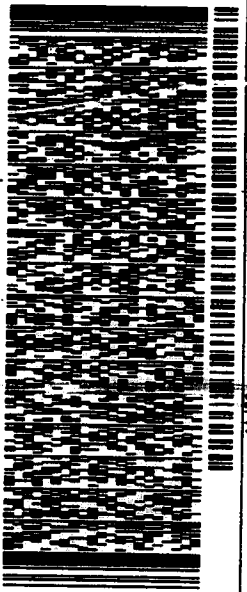
BILL THIRD PARTY

TO SAMPLE RECEIVING
ALS LABS - FT. COLLINS
225 COMMERCE DRIVE

9-1

FORT COLLINS CO 80524
(970) 490-1511
REF1

AMB



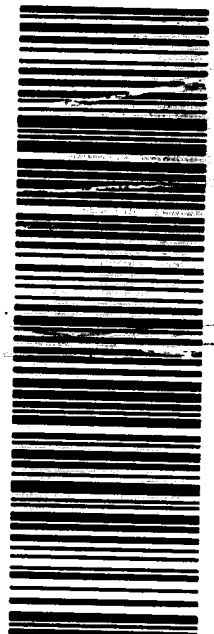
J191210082001ev

MPS# 4846 1685 1609
Met# 4846 1685 1583
0283

SATURDAY 12:00P
PRIORITY OVERNIGHT

XO FTCA

80524
CO-US DEN



Section 2



SAMPLE RESULTS SUMMARY

Radium-226 by Radon Emanation - Method 903.1 Sample Results Summary

Client Name: ALS Environmental
 Client Project Name:
 Client Project Number: R1911491
 Laboratory Name: ALS -- Fort Collins
 PAI Work Order: 1911577

Page: 1 of 1
 Reported on: Monday, December 30, 2019
 3:33:22 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyze	Flags
1911577-1	LCS-1119	Sample	Ra-226	0.62 +/- 0.56	0.81	NA	pCi/l	WATER	RE191219-1	12/30/2019	U
1911577-2	LCS Diss-1119	Sample	Ra-226	1.83 +/- 0.79	0.58	NA	pCi/l	WATER	RE191219-1	12/30/2019	

Comments:

Data Package ID: *RE1911577-1*

Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- LT - Result is less than Requested MDC, greater than sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
- Y2 - Chemical Yield outside default limits.
- M - The requested MDC was not met.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

- TPU - Total Propagated Uncertainty
- MDC - Sample specific Minimum Detectable Concentration
- BDL - Below Detection Limit

Section 3

QC RESULTS SUMMARY



Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 14

Method Blank Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1911577
Client Name: ALS Environmental
ClientProject ID: R1911491

Lab ID: RE191219-1MB	Sample Matrix: WATER	Prep Batch: RE191219-1	Final Aliquot: 498 ml
	Prep SOP: PAI 783 Rev 14	QC Batch ID: RE191219-1-1	Result Units: pCi/l
	Date Collected: 19-Dec-19	Run ID: RE191219-1A	File Name: Manual Entry
	Date Prepared: 19-Dec-19	Count Time: 15 minutes	
	Date Analyzed: 30-Dec-19		

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0 +/- 0.28	0.59	1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	16590	16290	ug	98.2	40 - 110 %	

Comments: This sample was filtered prior to analysis.

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Data Package ID: RE1911577-1

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 14

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins
Work Order Number: 1911577
Client Name: ALS Environmental
ClientProject ID: R1911491

Lab ID: RE191219-1LCS

Sample Matrix: WATER
Prep SOP: PAI 783 Rev 14
Date Collected: 19-Dec-19
Date Prepared: 19-Dec-19
Date Analyzed: 30-Dec-19

Prep Batch: RE191219-1
QCBatchID: RE191219-1-1
Run ID: RE191219-1A
Count Time: 15 minutes

Final Aliquot: 498 ml
Result Units: pCi/l
File Name: Manual Entry

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13982-63-3	Ra-226	72 +/- 18	0	92.94	77.1	67 - 120	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	16560	16460	ug	99.4	40 - 110 %	

Comments: This sample was filtered prior to analysis.

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: RE1911577-1

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 14

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins
Work Order Number: 1911577
Client Name: ALS Environmental
ClientProject ID: R1911491

Lab ID: RE191219-1LCSD

Sample Matrix: WATER
Prep SOP: PAI 783 Rev 14
Date Collected: 19-Dec-19
Date Prepared: 19-Dec-19
Date Analyzed: 30-Dec-19

Prep Batch: RE191219-1
QCBatchID: RE191219-1-1
Run ID: RE191219-1A
Count Time: 15 minutes

Final Aliquot: 498 ml
Result Units: pCi/l
File Name: Manual Entry

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13982-63-3	Ra-226	89 +/- 22	0	92.94	96.2	67 - 120	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	16570	16330	ug	98.6	40 - 110 %	

Comments: This sample was filtered prior to analysis.

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: RE1911577-1

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 14

Duplicate Sample Results (DER)

Lab Name: ALS -- Fort Collins
Work Order Number: 1911577
Client Name: ALS Environmental
ClientProject ID: R1911491

Field ID:	
Lab ID:	RE191219-1LCSD

Sample Matrix: WATER
Prep SOP: PAI 783 Rev 14
Date Collected: 19-Dec-19
Date Prepared: 19-Dec-19
Date Analyzed: 30-Dec-19

Prep Batch: RE191219-1
QCBatchID: RE191219-1-1
Run ID: RE191219-1A
Count Time: 15 minutes

Final Aliquot: 498 ml
Prep Basis: Filtered
Moisture(%): NA
Result Units: pCi/l
File Name: Manual Entry

CASNO	Analyte	Sample				Duplicate				DER	DER Lim
		Result +/-	2 s TPU	MDC	Flags	Result +/-	2 s TPU	MDC	Flags		
13982-63-3	Ra-226	72 +/-	18	0	P	89 +/-	22	0	P	0.622	2.13

Comments: This sample was filtered prior to analysis.

Duplicate Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
- Y2 - Chemical Yield outside default limits.
- W - DER is greater than Warning Limit of 1.42
- D - DER is greater than Control Limit of 2.13
- LT - Result is less than Request MDC, greater than sample specific MDC
- M - Requested MDC not met.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- L - LCS Recovery below lower control limit.
- H - LCS Recovery above upper control limit.
- P - LCS, Matrix Spike Recovery within control limits.
- N - Matrix Spike Recovery outside control limits

Abbreviations:

- TPU - Total Propagated Uncertainty
- DER - Duplicate Error Ratio
- BDL - Below Detection Limit
- NR - Not Reported

Data Package ID: RE1911577-1

Section 4

INDIVIDUAL SAMPLE RESULTS



Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 14

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1911577
Client Name: ALS Environmental
ClientProject ID: R1911491

Field ID:	LCS-1119
Lab ID:	1911577-1

Sample Matrix: WATER
Prep SOP: PAI 783 Rev 14
Date Collected: 20-Nov-19
Date Prepared: 19-Dec-19
Date Analyzed: 30-Dec-19

Prep Batch: RE191219-1
QCBatchID: RE191219-1-3
Run ID: RE191219-1A
Count Time: 15 minutes
Report Basis: Unfiltered

Final Aliquot: 498 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.62 +/- 0.56	0.81	1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	17160	16080	ug	93.7	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: RE1911577-1

Dissolved Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 14

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1911577
Client Name: ALS Environmental
ClientProject ID: R1911491

Field ID:	LCS Diss-1119
Lab ID:	1911577-2

Sample Matrix: WATER
Prep SOP: PAI 783 Rev 14
Date Collected: 20-Nov-19
Date Prepared: 19-Dec-19
Date Analyzed: 30-Dec-19

Prep Batch: RE191219-1
QCBatchID: RE191219-1-1
Run ID: RE191219-1A
Count Time: 15 minutes
Report Basis: Filtered

Final Aliquot: 498 ml
Prep Basis: Filtered
Moisture(%): NA
Result Units: pCi/l
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	1.83 +/- 0.79	0.58	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	17450	16870	ug	96.7	40 - 110 %	

Comments: This sample was filtered prior to analysis.

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: RE1911577-1



Radium-228

Case Narrative

ALS Environmental

R1911491

Work Order Number: 1911577

1. This report consists of the analytical results and supporting documentation for two water samples received by ALS on 11/23/2019.
2. These samples were prepared according to EPA method 904.0.
3. The samples were analyzed for the presence of ^{228}Ra by low background gas flow proportional counting of ^{228}Ac , which is the ingrown progeny of ^{228}Ra , according to EPA method 904.0. The analyses were completed on 12/16/2019.
4. The analysis results for these samples are reported in units of pCi/L. The samples were filtered prior to analysis. Sample 1911577-2 was filtered through a 0.45 micron filter and preserved prior to analysis.
5. Sample volume was insufficient to allow preparation of a duplicate. A laboratory control sample duplicate (LCSD) was prepared in lieu of a client sample duplicate.
6. To reduce matrix interference, reduced aliquots were used for the preparation of these samples. Consequently, the requested MDC was not met for these samples. The reported activity exceeds the achieved MDC. These samples are identified with an "M3" qualifier on the final reports.
7. No further anomalous situations were noted during the preparation and analysis of these samples. All remaining quality control criteria were met.



The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Pik Yee Yuen
Radiochemistry Primary Data Reviewer

12/23/19
Date

Radiochemistry Final Data Reviewer

Date

Section 1

CHAIN OF CUSTODY

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1911577

Client Name: ALS Environmental

Client Project Name:

Client Project Number: R1911491

Client PO Number: R1911491

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
LCS-1119	1911577-1		WATER	20-Nov-19	11:30
LCS Diss-1119	1911577-2		WATER	20-Nov-19	11:30

ALS Environmental Chain of Custody

1565 Jefferson Rd, Building 300 • Rochester, NY 14623 • 585-288-5380 • FAX 585-288-8475

ALS Contact: Janice Jaeger

1911577

Project Number: R1911491
 Project Manager: Janice Jaeger
 QAP: LAB QAP

Lab Code	Sample ID	# of Cont.	Matrix	Sample			Lab ID
				Date	Time	Time	
R1911491-001	LCS-1119	3	Water	11/20/19	1130	Fort Collins ALS	Radium 226 903.1
R1911491-002	LCS Diss-1119	3	Water	11/20/19	1130	Fort Collins ALS	Radium 228 904.0

10-165 - filtering

Test Comments

Radium 226 - 903.1 R1911491-002 Require Lab Filtering!!
 Radium 228 - 904.0 R1911491-002 Require Lab Filtering!!
 Nat U - 908.0 R1911491-002 Require Lab Filtering!!

Test I + IV

Special Instructions/Comments	Turnaround Requirements	Report Requirements	Invoice Information
			PO# 58R1911491 Bill to
NPDES H - Test is On Hold P - Test is Authorized for Prep Only	RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 STANDARD	I. Results Only X II. Results + QC Summaries III. Results + QC and Calibration Summaries X IV. Data Validation Report with Raw Data	
	Requested FAX Date: 12/02/19 Requested Report Date: 12/14/19	PQL/MDL <u>Y</u> EDD <u>Y</u> <i>8-2, c</i>	

Requisitioned By: *Samuel* 11/22/19 1460 Received By: *Janice Jaeger* 12/14/19
 Airbill Number: 11223/19 0885



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Rochester

Workorder No: 1911577

Project Manager: JRK

Initials: EE

Date: 11/23/19

1. Are airbills / shipping documents present and/or removable?		DROP OFF	<input checked="" type="radio"/> YES	NO		
2. Are custody seals on shipping containers intact?		NONE	<input checked="" type="radio"/> YES	NO *		
3. Are custody seals on sample containers intact?		NONE	YES	NO *		
4. Is there a COC (chain-of-custody) present?			<input checked="" type="radio"/> YES	NO *		
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)			<input checked="" type="radio"/> YES	NO *		
6. Are short-hold samples present?			YES	<input checked="" type="radio"/> NO		
7. Are all samples within holding times for the requested analyses?			<input checked="" type="radio"/> YES	NO *		
8. Were all sample containers received intact? (not broken or leaking)			<input checked="" type="radio"/> YES	NO *		
9. Is there sufficient sample for the requested analyses?			<input checked="" type="radio"/> YES	NO *		
10. Are samples in proper containers for requested analyses? (form 250, Sample Handling Guidelines)			<input checked="" type="radio"/> YES	NO *		
11. Are all aqueous samples preserved correctly, if required? (excluding volatiles)		N/A	YES	<input checked="" type="radio"/> NO *		
12. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)		<input checked="" type="radio"/> N/A	YES	NO		
13. Were the samples shipped on ice?			YES	<input checked="" type="radio"/> NO		
14. Were cooler temperatures measured at 0.1-6.0°C?	IR gun used*:	#3	#5	<input checked="" type="radio"/> RAD ONLY	YES	NO
Cooler #: <u>1</u> <u>2</u> <u>3</u>						
Temperature (°C): <u>AMB</u> <u>AMB</u> <u>AMB</u>						
# of custody seals on cooler: <u>1</u> <u>1</u> <u>1</u>						
External mR/hr reading: <u>10</u> <u>9</u> <u>9</u>						
Background mR/hr reading: <u>11</u>						
Were external mR/hr readings ≤ two times background and within DOT acceptance criteria? <input checked="" type="radio"/> YES / NO / NA (If no, see Form 008.)						

* Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.

1) all sample bottles have initial ph ~ 7
... 577 - all bottles added 2ml HNO₃, final ph < 2 | lot #: 228685

Were unpreserved bottles pH checked? YES NA

All client bottle ID's vs ALS lab ID's double-checked by: EE

If applicable, was the client contacted? YES / NO / NA Contact: _____

Date/Time: _____

Project Manager Signature / Date: _____

[Signature] 11-25-19

1911577

Part # 156148-434 RIT EXP 11/19

ORIGIN ID: ONHA (585) 672-7464
SND
ALS ENVIRONMENTAL
1565 JEFFERSON RD
BLDG 300 SUITE 360
ROCHESTER, NY 14623
UNITED STATES*US

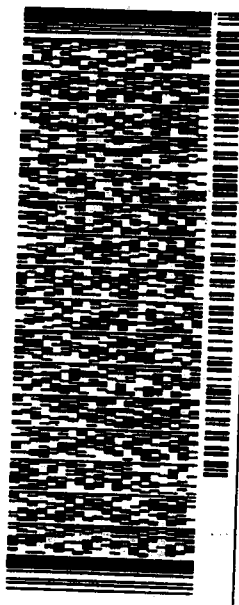
SHIP DATE: 22NOV19
ACTWT: 48.85 LB
CRD: 0342584/CAF3314
BILL THIRD PARTY

TO SAMPLE RECEIVING
ALS LABS - FT. COLLINS
225 COMMERCE DRIVE

10-1

FORT COLLINS CO 80524 AMB

(970) 490-1511
REF: DEPT:



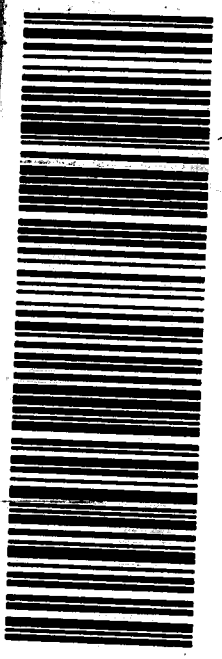
J1012190820101

TRK# 1 of 3
[0201] 4846 1685 1583
MASTER

SATURDAY 12:00P
PRIORITY OVERNIGHT

XO FTGA

80524
CO-US DEN



565C1/F330/0542

Part # 156148-434 RIT EXP 11/19

ORIGIN ID: ONHA (585) 672-7464
SND
ALS ENVIRONMENTAL
1565 JEFFERSON RD
BLDG 300 SUITE 360
ROCHESTER, NY 14623
UNITED STATES US

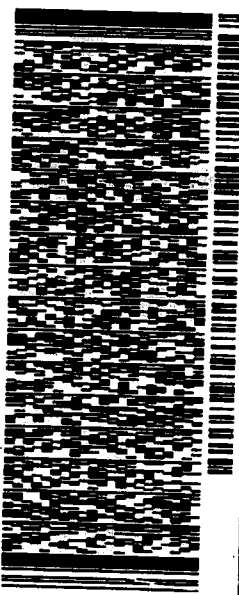
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ACTWT: 48.00 LB
CRD: 0342584/CAF3311
BILL THIRD PARTY

TO SAMPLE RECEIVING
ALS LABS - FT. COLLINS
225 COMMERCE DRIVE

9-1

FORT COLLINS CO 80524 AMB

(970) 490-1511
REF: DEPT:



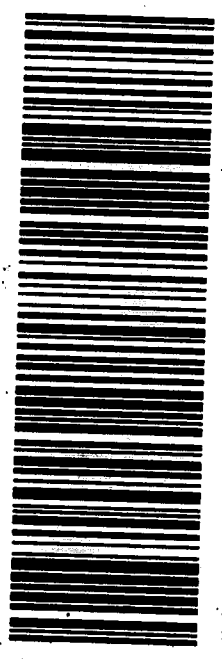
J10121908200101

MPS# 2 of 3
[0263] 4846 1685 1594
Metr# 4846 1685 1583

SATURDAY 12:00P
PRIORITY OVERNIGHT

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80524
CO-US DEN



565C1/F330/0542

FedEx



RT B759 2 12:00
ST 9 1594 11.23

1911577

ORIGIN ID: 0NH4 (585) 672-7464
SND
ALS ENVIRONMENTAL
1565 JEFFERSON RD
BLDG 300 SUITE 360
ROCHESTER NY 14623
UNITED STATES US

SHIP DATE: 22NOV19
ACTWT: 4.95 LB
CRD: 0342384/CR/E3911

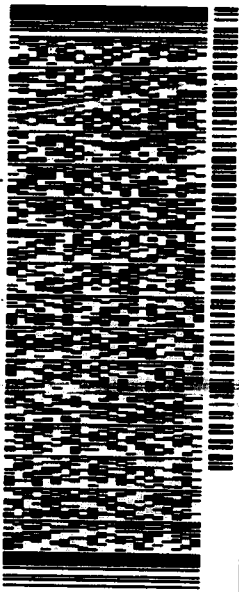
BILL THIRD PARTY

TO SAMPLE RECEIVING
ALS LABS - FT. COLLINS
225 COMMERCE DRIVE

9-1

FORT COLLINS CO 80524
(970) 490-1511
REF: 1
PT: 1

AMB



J191210082001ev

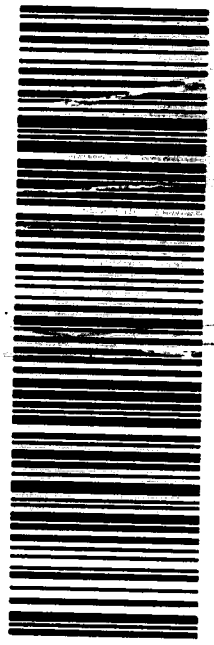
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Met# 4846 1685 1583
0283

3 of 3

SATURDAY 12:00P
PRIORITY OVERNIGHT

XO FTCA

80524
CO-US DEN



Part # 156148-43- PVT EXP 11/98

56SCL7330/0542

Section 2



SAMPLE RESULTS SUMMARY

Radium-228 Analysis by GFPC Sample Results Summary

Client Name: ALS Environmental
Client Project Name:
Client Project Number: R1911491
Laboratory Name: ALS -- Fort Collins
PAI Work Order: 1911577

Page: 1 of 1
Reported on: Monday, December 23, 2019
 9:25:09 AM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyze	Flags
1911577-1	LCS-1119	Sample	Ra-228	2.38 +/- 0.96	1.49	NA	pCi/l	WATER	RA191203-1	12/16/2019	M3
1911577-2	LCS Diss-1119	Sample	Ra-228	2.16 +/- 0.97	1.62	NA	pCi/l	WATER	RA191203-1	12/16/2019	M3

Comments:

Data Package ID: RA1911577-1

Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- LT - Result is less than Requested MDC, greater than sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
- Y2 - Chemical Yield outside default limits.
- M - The requested MDC was not met.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

- TPU - Total Propagated Uncertainty
- MDC - Sample specific Minimum Detectable Concentration
- BDL - Below Detection Limit

Section 3

QC RESULTS SUMMARY



Radium-228 Analysis by GFPC

PAI 724 Rev 14

Method Blank Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1911577
Client Name: ALS Environmental
ClientProject ID: R1911491

Lab ID: RA191203-1MB	Sample Matrix: WATER	Prep Batch: RA191203-1	Final Aliquot: 997 ml
	Prep SOP: SOP749 Rev 6	QCBatchID: RA191203-1-1	Result Units: pCi/l
	Date Collected: 03-Dec-19	Run ID: RA191203-1A	File Name: RAC1216
	Date Prepared: 03-Dec-19	Count Time: 150 minutes	
	Date Analyzed: 16-Dec-19		

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
15262-20-1	Ra-228	0.44 +/- 0.37	0.75	1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	34800	33650	ug	96.7	40 - 110 %	

Comments: This sample was filtered prior to analysis.

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
BDL - Below Detection Limit

M - Requested MDC not met.
B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.
DL - Decision Level

Data Package ID: RA1911577-1

Radium-228 Analysis by GFPC

PAI 724 Rev 14

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins
Work Order Number: 1911577
Client Name: ALS Environmental
ClientProject ID: R1911491

Lab ID: RA191203-1LCS

Sample Matrix: WATER
Prep SOP: SOP749 Rev 6
Date Collected: 03-Dec-19
Date Prepared: 03-Dec-19
Date Analyzed: 16-Dec-19

Prep Batch: RA191203-1
QCBatchID: RA191203-1-1
Run ID: RA191203-1A
Count Time: 150 minutes

Final Aliquot: 997 ml
Result Units: pCi/l
File Name: RAC1216

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
15262-20-1	Ra-228	42.0 +/- 9.7	0.7	41.43	101	70 - 130	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	34800	34160	ug	98.1	40 - 110 %	

Comments: This sample was filtered prior to analysis.

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: RA1911577-1

Radium-228 Analysis by GFPC

PAI 724 Rev 14

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins
Work Order Number: 1911577
Client Name: ALS Environmental
ClientProject ID: R1911491

Lab ID: RA191203-1LCSD

Sample Matrix: WATER
Prep SOP: SOP749 Rev 6
Date Collected: 03-Dec-19
Date Prepared: 03-Dec-19
Date Analyzed: 16-Dec-19

Prep Batch: RA191203-1
QCBatchID: RA191203-1-1
Run ID: RA191203-1A
Count Time: 150 minutes

Final Aliquot: 997 ml
Result Units: pCi/l
File Name: RAC1216

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
15262-20-1	Ra-228	41.1 +/- 9.5	0.7	41.43	99.3	70 - 130	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	34850	33940	ug	97.4	40 - 110 %	

Comments: This sample was filtered prior to analysis.

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: RA1911577-1

Radium-228 Analysis by GFPC

PAI 724 Rev 14

Duplicate Sample Results (DER)

Lab Name: ALS -- Fort Collins
Work Order Number: 1911577
Client Name: ALS Environmental
ClientProject ID: R1911491

Field ID:	
Lab ID:	RA191203-1LCSD

Sample Matrix: WATER
Prep SOP: SOP749 Rev 6
Date Collected: 03-Dec-19
Date Prepared: 03-Dec-19
Date Analyzed: 16-Dec-19

Prep Batch: RA191203-1
QCBatchID: RA191203-1-1
Run ID: RA191203-1A
Count Time: 150 minutes

Final Aliquot: 997 ml
Prep Basis: Filtered
Moisture(%): NA
Result Units: pCi/l
File Name: RAC1216

CASNO	Analyte	Sample				Duplicate				DER	DER Lim
		Result +/-	2 s TPU	MDC	Flags	Result +/-	2 s TPU	MDC	Flags		
15262-20-1	Ra-228	42.0 +/-	9.7	0.7	P	41.1 +/-	9.5	0.7	P	0.0601	2.13

Comments: This sample was filtered prior to analysis.

Duplicate Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
- Y2 - Chemical Yield outside default limits.
- W - DER is greater than Warning Limit of 1.42
- D - DER is greater than Control Limit of 2.13
- LT - Result is less than Request MDC, greater than sample specific MDC
- M - Requested MDC not met.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- L - LCS Recovery below lower control limit.
- H - LCS Recovery above upper control limit.
- P - LCS, Matrix Spike Recovery within control limits.
- N - Matrix Spike Recovery outside control limits

Abbreviations:

- TPU - Total Propagated Uncertainty
- DER - Duplicate Error Ratio
- BDL - Below Detection Limit
- NR - Not Reported

Data Package ID: RA1911577-1

Section 4

INDIVIDUAL SAMPLE RESULTS



Radium-228 Analysis by GFPC

PAI 724 Rev 14

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1911577
Client Name: ALS Environmental
ClientProject ID: R1911491

Field ID:	LCS-1119
Lab ID:	1911577-1

Sample Matrix: WATER
Prep SOP: SOP749 Rev 6
Date Collected: 20-Nov-19
Date Prepared: 03-Dec-19
Date Analyzed: 16-Dec-19

Prep Batch: RA191203-1
QCBatchID: RA191203-1-1
Run ID: RA191203-1A
Count Time: 150 minutes
Report Basis: Filtered

Final Aliquot: 499 ml
Prep Basis: Filtered
Moisture(%): NA
Result Units: pCi/l
File Name: RAC1216

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
15262-20-1	Ra-228	2.38 +/- 0.96	1.49	1	NA	M3

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	35480	34250	ug	96.5	40 - 110 %	

Comments: This sample was filtered prior to analysis.

Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
- Y2 - Chemical Yield outside default limits.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- M - The requested MDC was not met.

Abbreviations:

- TPU - Total Propagated Uncertainty
- MDC - Sample specific Minimum Detectable Concentration
- BDL - Below Detection Limit
- DL - Decision Level

Data Package ID: RA1911577-1

Dissolved Radium-228 Analysis by GFPC

PAI 724 Rev 14

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1911577
Client Name: ALS Environmental
ClientProject ID: R1911491

Field ID:	LCS Diss-1119
Lab ID:	1911577-2

Sample Matrix: WATER
Prep SOP: SOP749 Rev 6
Date Collected: 20-Nov-19
Date Prepared: 03-Dec-19
Date Analyzed: 16-Dec-19

Prep Batch: RA191203-1
QCBatchID: RA191203-1-1
Run ID: RA191203-1A
Count Time: 150 minutes
Report Basis: Filtered

Final Aliquot: 499 ml
Prep Basis: Filtered
Moisture(%): NA
Result Units: pCi/l
File Name: RAC1216

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
15262-20-1	Ra-228	2.16 +/- 0.97	1.62	1	NA	M3

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	35580	34070	ug	95.7	40 - 110 %	

Comments: This sample was filtered prior to analysis.

Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
- Y2 - Chemical Yield outside default limits.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- M - The requested MDC was not met.

Abbreviations:

- TPU - Total Propagated Uncertainty
- MDC - Sample specific Minimum Detectable Concentration
- BDL - Below Detection Limit
- DL - Decision Level

Data Package ID: RA1911577-1



Total Uranium Case Narrative

ALS Environmental

R1911491

Work Order Number: 1911577

1. This report consists of the analytical results and supporting documentation for two water samples received by ALS on 11/23/2019.
2. These samples were prepared according to EPA method 908.0.
3. The samples were analyzed for the presence of isotopic and total uranium according to EPA method 908.0. The analyses were completed on 12/20/2019.
4. The total uranium results were determined by adding the isotopic results, and are displayed as the analyte 'URANIUM, TOTAL' for each sample.
5. The analysis results for these samples are reported in units of pCi/L. Sample 1911577-2 was filtered through a 0.45 micron filter and preserved prior to analysis. Sample 1911577-1 was not filtered prior to analysis.
6. This analytical method quantifies U-235 alpha activity in a specific region of interest corresponding to emission energies between those of U-234 and U-238. A potential limitation of this method is that measurable amounts of U-234 in the sample may cause a small amount of characteristic activity in the U-235 region of interest due to poorly resolved alpha activity at the boundary between the two regions. To minimize the potential for a high bias in the U-235 analytical results, the U-235 region of interest has been narrowed and limited to a lower energy region. An 85.1% abundance correction has been made to the final U-235 results.
7. ALS uses the following convention for reporting significant digits in the TPU and MDC results. The TPU value is rounded to two significant digits. The MDC value is rounded to the same decimal place as the TPU value. In practice, this could result in an MDC reported value of zero for samples with significant activity, including the batch laboratory control sample.



8. Uranium-235 and URANIUM, TOTAL activity is reported in the associated method blank above the minimum detectable concentration value, as indicated with a "B3" qualifier on the final reports. The measured blank activity is below the requested MDC. Results are acceptable according to the current revision of SOP 715 and are submitted without further qualification.
9. No further anomalous situations were encountered during the preparation or analysis of these samples. All remaining quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Pik Yee Yuen
Radiochemistry Primary Data Reviewer

12/23/19
Date

Radiochemistry Final Data Reviewer

Date

Section 1

CHAIN OF CUSTODY

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1911577

Client Name: ALS Environmental

Client Project Name:

Client Project Number: R1911491

Client PO Number: R1911491

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
LCS-1119	1911577-1		WATER	20-Nov-19	11:30
LCS Diss-1119	1911577-2		WATER	20-Nov-19	11:30

ALS Environmental Chain of Custody

1565 Jefferson Rd, Building 300 • Rochester, NY 14623 • 585-288-5380 • FAX 585-288-8475

ALS Contact: Janice Jaeger

1911577

Project Number: R1911491
 Project Manager: Janice Jaeger
 QAP: LAB QAP

Lab Code	Sample ID	# of Cont.	Matrix	Sample			Lab ID
				Date	Time	Time	
R1911491-001	LCS-1119	3	Water	11/20/19	1130	Fort Collins ALS	Radium 226 903.1
R1911491-002	LCS Diss-1119	3	Water	11/20/19	1130	Fort Collins ALS	Radium 228 904.0

19-165 - filtering

Test Comments

Radium 226 - 903.1 R1911491-002 Require Lab Filtering!!
 Radium 228 - 904.0 R1911491-002 Require Lab Filtering!!
 Nat U - 908.0 R1911491-002 Require Lab Filtering!!

Test I + IV

Special Instructions/Comments	Turnaround Requirements	Report Requirements	Invoice Information
			PO# 58R1911491
NPDES	RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 STANDARD	I. Results Only <input checked="" type="checkbox"/> II. Results + QC Summaries III. Results + QC and Calibration Summaries <input checked="" type="checkbox"/> IV. Data Validation Report with Raw Data	Bill to
	Requested FAX Date: _____ Requested Report Date: 12/02/19	PQL/MDL <input checked="" type="checkbox"/> Y EDD <input checked="" type="checkbox"/> Y <i>8-2-2</i>	
H - Test is On Hold	P - Test is Authorized for Prep Only		

Received By: *[Signature]* 11/23/19 0855 Airbill Number: 11223/19 0855
 12/14/19



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Rochester

Workorder No: 1911577

Project Manager: JRK

Initials: EE

Date: 11/23/19

1. Are airbills / shipping documents present and/or removable?		DROP OFF	<input checked="" type="radio"/> YES	NO		
2. Are custody seals on shipping containers intact?		NONE	<input checked="" type="radio"/> YES	NO *		
3. Are custody seals on sample containers intact?		NONE	YES	NO *		
4. Is there a COC (chain-of-custody) present?			<input checked="" type="radio"/> YES	NO *		
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)			<input checked="" type="radio"/> YES	NO *		
6. Are short-hold samples present?			YES	<input checked="" type="radio"/> NO		
7. Are all samples within holding times for the requested analyses?			<input checked="" type="radio"/> YES	NO *		
8. Were all sample containers received intact? (not broken or leaking)			<input checked="" type="radio"/> YES	NO *		
9. Is there sufficient sample for the requested analyses?			<input checked="" type="radio"/> YES	NO *		
10. Are samples in proper containers for requested analyses? (form 250, Sample Handling Guidelines)			<input checked="" type="radio"/> YES	NO *		
11. Are all aqueous samples preserved correctly, if required? (excluding volatiles)		N/A	YES	<input checked="" type="radio"/> NO *		
12. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)		<input checked="" type="radio"/> N/A	YES	NO		
13. Were the samples shipped on ice?			YES	<input checked="" type="radio"/> NO		
14. Were cooler temperatures measured at 0.1-6.0°C?	IR gun used*:	#3	#5	<input checked="" type="radio"/> RAD ONLY	YES	NO
Cooler #: <u>1</u> <u>2</u> <u>3</u>						
Temperature (°C): <u>AMB</u> <u>AMB</u> <u>AMB</u>						
# of custody seals on cooler: <u>1</u> <u>1</u> <u>1</u>						
External mR/hr reading: <u>10</u> <u>9</u> <u>9</u>						
Background mR/hr reading: <u>11</u>						
Were external mR/hr readings ≤ two times background and within DOT acceptance criteria? <input checked="" type="radio"/> YES / NO / NA (If no, see Form 008.)						

* Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.

1) all sample bottles have initial ph ~ 7
... 577 - all bottles added 2ml HNO₃, final ph < 2 | lot #: 228685

Were unpreserved bottles pH checked? YES NA

All client bottle ID's vs ALS lab ID's double-checked by: EE

If applicable, was the client contacted? YES / NO / NA Contact: _____

Date/Time: _____

Project Manager Signature / Date: _____

[Signature] 11-25-19

1911577

Part # 156148-434 RIT EXP 11/19

ORIGIN ID: ONHA (585) 672-7464
SND
ALS ENVIRONMENTAL
1565 JEFFERSON RD
BLDG 300 SUITE 360
ROCHESTER, NY 14623
UNITED STATES*US

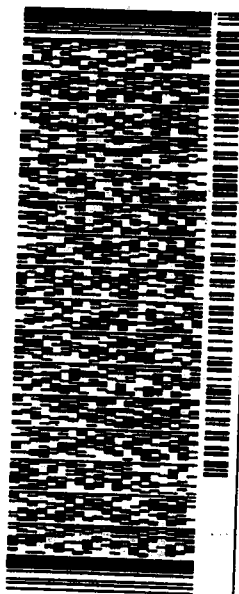
SHIP DATE: 22NOV19
ACTWT: 48.85 LB
CRD: 0342584/CNF3314
BILL THIRD PARTY

TO SAMPLE RECEIVING
ALS LABS - FT. COLLINS
225 COMMERCE DRIVE

10-1

FORT COLLINS CO 80524 AMB

(970) 490-1511
REF: DEPT:



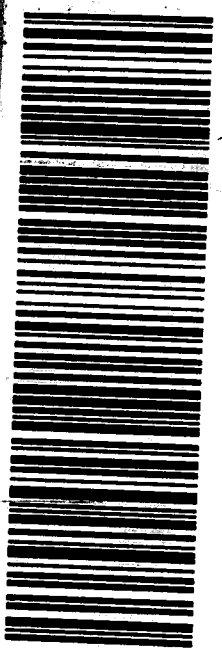
J1012190820101

TRK# 1 of 3
0201 4846 1685 1583
MASTER

SATURDAY 12:00P
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Part # 156148-434 RIT EXP 11/19

ORIGIN ID: ONHA (585) 672-7464
SND
ALS ENVIRONMENTAL
1565 JEFFERSON RD
BLDG 300 SUITE 360
ROCHESTER, NY 14623
UNITED STATES US

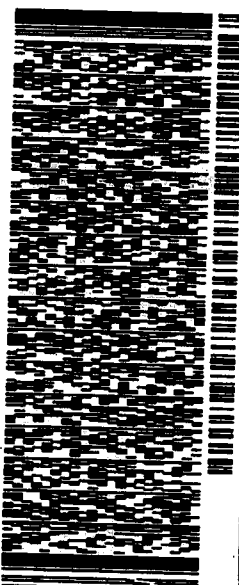
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ACTWT: 48.00 LB
CRD: 0342584/CNF3311
BILL THIRD PARTY

TO SAMPLE RECEIVING
ALS LABS - FT. COLLINS
225 COMMERCE DRIVE

9-1

FORT COLLINS CO 80524 AMB

(970) 490-1511
REF: DEPT:



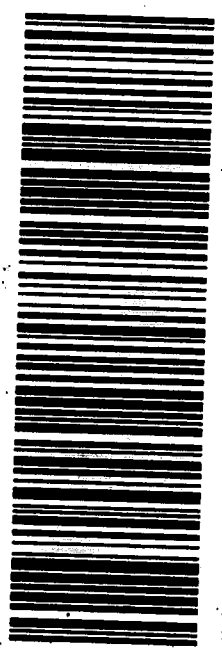
J10121908200101

MPS# 2 of 3
0263 4846 1685 1594
Met# 4846 1685 1583

SATURDAY 12:00P
PRIORITY OVERNIGHT

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FedEx



RT B759 2 12:00
ST 9 1594 11.23

1911577

Part # 156148-43c PVT Exp 11/98

ORIGIN ID: 0NH4 (585) 672-7464
SND
ALS ENVIRONMENTAL
1565 JEFFERSON RD
BLDG 300 SUITE 360
ROCHESTER NY 14623
UNITED STATES US

SHIP DATE: 22NOV19
ACTWT: 4.95 LB
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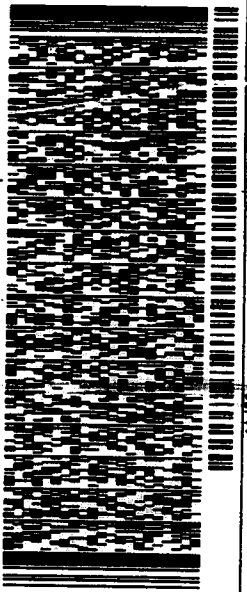
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ALS LABS - FT. COLLINS
225 COMMERCE DRIVE

9-1

FORT COLLINS CO 80524
(970) 490-1511
REF1

AMB



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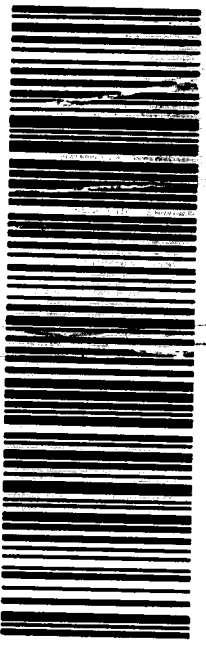
3 of 3

MPS# 4846 1685 1609
Met# 4846 1685 1683

SATURDAY 12:00P
PRIORITY OVERNIGHT

XO FTCA

80524
CO-US DEN



Section 2



SAMPLE RESULTS SUMMARY

Total Uranium by Alpha Spectroscopy Sample Results Summary

Client Name: ALS Environmental
 Client Project Name:
 Client Project Number: R1911491
 Laboratory Name: ALS -- Fort Collins
 PAI Work Order: 1911577

Page: 1 of 1
 Reported on: Monday, December 23, 2019
 1:45:13 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyze	Flags
1911577-1	LCS-1119	Sample	U-234	0.30 +/- 0.13	0.11	NA	pCi/l	WATER	AS191203-3	12/19/2019	
1911577-1	LCS-1119	Sample	U-235	0.014 +/- 0.052	0.038	NA	pCi/l	WATER	AS191203-3	12/19/2019	U
1911577-1	LCS-1119	Sample	U-238	0.20 +/- 0.11	0.10	NA	pCi/l	WATER	AS191203-3	12/19/2019	
1911577-1	LCS-1119	Sample	URANIUM, TOTAL	0.51 +/- 0.18	0.13	NA	pCi/l	WATER	AS191203-3	12/19/2019	
1911577-2	LCS Diss-1119	Sample	U-234	0.22 +/- 0.11	0.10	NA	pCi/l	WATER	AS191203-3	12/19/2019	
1911577-2	LCS Diss-1119	Sample	U-235	0.025 +/- 0.046	0.034	NA	pCi/l	WATER	AS191203-3	12/19/2019	U
1911577-2	LCS Diss-1119	Sample	U-238	0.174 +/- 0.093	0.071	NA	pCi/l	WATER	AS191203-3	12/19/2019	
1911577-2	LCS Diss-1119	Sample	URANIUM, TOTAL	0.41 +/- 0.15	0.11	NA	pCi/l	WATER	AS191203-3	12/19/2019	

Comments:

Data Package ID: *UT1911577-1*

Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- LT - Result is less than Requested MDC, greater than sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
- Y2 - Chemical Yield outside default limits.
- M - The requested MDC was not met.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

- TPU - Total Propagated Uncertainty
- MDC - Sample specific Minimum Detectable Concentration
- BDL - Below Detection Limit

Section 3

QC RESULTS SUMMARY

3

Total Uranium by Alpha Spectroscopy

PAI 714 Rev 15

Method Blank Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1911577
Client Name: ALS Environmental
ClientProject ID: R1911491

Lab ID: AS191203-3MB

Sample Matrix: WATER
Prep SOP: PAI 778 Rev 16
Date Collected: 03-Dec-19
Date Prepared: 03-Dec-19
Date Analyzed: 20-Dec-19

Prep Batch: AS191203-3
QCBatchID: AS191203-3-1
Run ID: AS191203-3UD
Count Time: 600 minutes

Final Aliquot: 1000 ml
Result Units: pCi/l
File Name: Spectrum #3

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.019 +/- 0.018	0.026	0.2	NA	U
15117-96-1	U-235	0.027 +/- 0.021	0.010	0.2	NA	B3
7440-61-1	U-238	0.009 +/- 0.014	0.026	0.2	NA	U
7440-61-1	URANIUM, TOTAL	0.055 +/- 0.031	0.033	0.2	NA	B3

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.567	3.15	pCi/l	69.0	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
BDL - Below Detection Limit

M - Requested MDC not met.
B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.
DL - Decision Level

Data Package ID: *UT1911577-1*

Total Uranium by Alpha Spectroscopy

PAI 714 Rev 15

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins
Work Order Number: 1911577
Client Name: ALS Environmental
ClientProject ID: R1911491

Lab ID: AS191203-3LCS

Sample Matrix: WATER
Prep SOP: PAI 778 Rev 16
Date Collected: 03-Dec-19
Date Prepared: 03-Dec-19
Date Analyzed: 19-Dec-19

Prep Batch: AS191203-3
QCBatchID: AS191203-3-1
Run ID: AS191203-3UD
Count Time: 360 minutes

Final Aliquot: 1000 ml
Result Units: pCi/l
File Name: Spectrum #1

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13966-29-5	U-234	4.29 +/- 0.75	0.01	4.220	102	82 - 122	P
15117-96-1	U-235	0.260 +/- 0.087	0.015	0.2017	129	NA	
7440-61-1	U-238	4.64 +/- 0.81	0.03	4.382	106	78 - 126	P
7440-61-1	URANIUM, TOTAL	9.2 +/- 1.1	0	8.804	104	82 - 122	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.567	3.97	pCi/l	86.8	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: UT1911577-1

Section 4

INDIVIDUAL SAMPLE RESULTS



Total Uranium by Alpha Spectroscopy

PAI 714 Rev 15

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1911577
Client Name: ALS Environmental
ClientProject ID: R1911491

Field ID:	LCS-1119
Lab ID:	1911577-1

Sample Matrix: WATER
Prep SOP: PAI 778 Rev 16
Date Collected: 20-Nov-19
Date Prepared: 03-Dec-19
Date Analyzed: 19-Dec-19

Prep Batch: AS191203-3
QCBatchID: AS191203-3-1
Run ID: AS191203-3UD
Count Time: 360 minutes
Report Basis: Unfiltered

Final Aliquot: 500 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.30 +/- 0.13	0.11	0.2	NA	
15117-96-1	U-235	0.014 +/- 0.052	0.038	0.2	NA	U
7440-61-1	U-238	0.20 +/- 0.11	0.10	0.2	NA	
7440-61-1	URANIUM, TOTAL	0.51 +/- 0.18	0.13	0.2	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	9.134	6.3	pCi/l	69.2	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UT1911577-1*

Dissolved Total Uranium by Alpha Spectroscopy

PAI 714 Rev 15

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1911577
Client Name: ALS Environmental
ClientProject ID: R1911491

Field ID:	LCS Diss-1119
Lab ID:	1911577-2

Sample Matrix: WATER
Prep SOP: PAI 778 Rev 16
Date Collected: 20-Nov-19
Date Prepared: 03-Dec-19
Date Analyzed: 19-Dec-19

Prep Batch: AS191203-3
QCBatchID: AS191203-3-2
Run ID: AS191203-3UD
Count Time: 360 minutes
Report Basis: Filtered

Final Aliquot: 500 ml
Prep Basis: Filtered
Moisture(%): NA
Result Units: pCi/l
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.22 +/- 0.11	0.10	0.2	NA	
15117-96-1	U-235	0.025 +/- 0.046	0.034	0.2	NA	U
7440-61-1	U-238	0.174 +/- 0.093	0.071	0.2	NA	
7440-61-1	URANIUM, TOTAL	0.41 +/- 0.15	0.11	0.2	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	9.134	7.0	pCi/l	76.4	30 - 110 %	

Comments: This sample was filtered prior to analysis.

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: UT1911577-1



ALS Environmental
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December 11, 2019

Analytical Report for Service Request No: R1911491

Janice Jaeger
ALS Environmental
1565 Jefferson Rd, Building 300
Suite 360
Rochester, NY 14623

RE: Hakes C&D Landfill - Part 363 Expanded Parameters

Dear Janice Jaeger,

Enclosed are the results of the sample(s) submitted to our laboratory November 23, 2019
For your reference, these analyses have been assigned our service request number **R1911491**.

All testing was performed according to our laboratory's quality assurance program and met the requirements of the TNI standards except as noted in the case narrative report. Any testing not included in the lab's accreditation is identified on a Non-Certified Analytes report. All results are intended to be considered in their entirety. ALS Environmental is not responsible for use of less than the complete report. Results apply only to the individual samples submitted to the lab for analysis, as listed in the report. The measurement uncertainty of the results included in this report is within that expected when using the prescribed method(s), and represented by Laboratory Control Sample control limits. Any events, such as QC failures or Holding Time exceedances, which may add to the uncertainty are explained in the report narrative or are flagged with qualifiers. The flags are explained in the Report Qualifiers and Definitions page of this report.

Please contact me if you have any questions. My extension is 3275. You may also contact me via email at Chris.Leaf@ALSGlobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

for Chris Leaf
Project Manager



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Acronyms

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Chain of Custody

PFAS by HPLC/MS/MS

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
 - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses**

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjllabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



Case Narrative

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Received: 11/23/2019

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), Matrix/Duplicate Matrix Spike (MS/DMS), Laboratory Control Sample (LCS), and Laboratory/Duplicate Laboratory Control Sample (LCS/DLCS).

Sample Receipt:

One water sample was received for analysis at ALS Environmental on 11/23/2019. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The sample was stored at minimum in accordance with the analytical method requirements.

Organic LC:

Method PFC/537M, 12/07/2019: The upper control criterion was exceeded for 13C2-8:2 FTS in sample LCS-1119. The associated native analyte was not detected above the Method Reporting Limit (MRL) in this sample. The error associated with an elevated recovery equated to a high bias. Assuming the native analyte performed similar to the labeled analog, the effect on the reported results was minimal. The quality of the sample data was not significantly affected. No further corrective action was appropriate.

Method PFC/537M, 12/07/2019: The upper control criterion was exceeded for one or more surrogates in Method Blank KQ1917781-06. No target analytes were detected in the Method Blank. Since the apparent problem equates to a high bias, the data quality was not significantly affected. No further corrective action was appropriate.

Approved by _____

Date 12/11/2019



Chain of Custody

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Intra-Network Chain of Custody

1565 Jefferson Rd, Building 300 • Rochester, NY 14623 • 585-288-5380 • FAX 585-288-8475

ALS Contact: Janice Jaeger

Project Name: Hakes C&D Landfill - Part 363 Expanded Parameters
Project Number:
Project Manager: Russell Anderson
Company: Casella Waste Systems - Hakes Billing
QAP: LAB QAP

PFAS
PFC/537M

Lab Code	Client Sample ID	# of Cont.	Matrix	Sample		Date Received	Send To	
				Date	Time			
R1911491-001	LCS-1119	2	Water	11/20/19	1130	11/21/19	KELSO	IV

Test Comments
 PFAS - PFC/537M R1911491-001 NYS 21 list

Special Instructions/Comments NPDES pH Checked _____	Turnaround Requirements ___ RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 ___ STANDARD Requested FAX Date: _____ Requested Report Date: <u>12/02/19</u>	Report Requirements ___ I. Results Only <input checked="" type="checkbox"/> II. Results + QC Summaries ___ III. Results + QC and Calibration Summaries <input checked="" type="checkbox"/> IV. Data Validation Report with Raw Data PQL/MDL <input checked="" type="checkbox"/> Y EDD <input type="checkbox"/> Y	Invoice Information PO# 58R1911491 Bill to
---	---	---	--

Relinquished By: *Amel whal* 11/22/19/1440 Received By: *M. Heister* 11/23/19 Airbill Number: _____



PC CL

Cooler Receipt and Preservation Form

Client ALS Rochester Service Request K19 21911491
 Received: 11/23/19 Opened: 11/23/19 By: MP Unloaded: 11/23/19 By: MP

Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered

Samples were received in: (circle) Cooler Box Envelope Other _____ NA

Were custody seals on coolers? NA Y N If yes, how many and where? 1 front

If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number			NA	Filed
-0.9	-1.1			-0.2	308	283	4846	1685	1745		

- Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves _____
- Were custody papers properly filled out (ink, signed, etc.)? NA Y N
- Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA Y N
If applicable, tissue samples were received: Frozen Partially Thawed Thawed
- Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
- Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
- Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
- Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
- Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
- Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____



PFAS by HPLC/MS/MS

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Phone (360)577-7222 Fax (360)636-1068
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ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Collected: 11/20/19 11:30
Date Received: 11/21/19 09:35

Sample Name: LCS-1119
Lab Code: R1911491-001

Units: ng/L
Basis: NA

Per- and Polyfluoroalkyl Substances (PFAS) by LC/MS/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	330	31	1.8	1	12/05/19 16:20	12/3/19	
Perfluorohexane sulfonic acid (PFHxS)	220	31	8.2	1	12/05/19 16:20	12/3/19	
Perfluoroheptane sulfonic acid (PFHpS)	ND U	31	2.8	1	12/05/19 16:20	12/3/19	
Perfluorooctane sulfonic acid (PFOS)	120	13	2.8	1	12/05/19 16:20	12/3/19	
Perfluorodecane sulfonic acid (PFDS)	ND U	31	1.9	1	12/05/19 16:20	12/3/19	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	720	31	2.5	1	12/05/19 16:20	12/3/19	
Perfluoropentanoic acid (PFPeA)	2200	31	11	1	12/05/19 16:20	12/3/19	
Perfluorohexanoic acid (PFHxA)	1600	63	55	1	12/05/19 16:20	12/3/19	
Perfluoroheptanoic acid (PFHpA)	580	31	4.0	1	12/05/19 16:20	12/3/19	
Perfluorooctanoic acid (PFOA)	940	13	2.2	1	12/05/19 16:20	12/3/19	
Perfluorononanoic acid (PFNA)	46	31	6.9	1	12/05/19 16:20	12/3/19	
Perfluorodecanoic acid (PFDA)	15 J	31	7.5	1	12/05/19 16:20	12/3/19	
Perfluoroundecanoic acid (PFUnDA)	ND U	31	9.4	1	12/05/19 16:20	12/3/19	
Perfluorododecanoic acid (PFDoDA)	ND U	31	8.2	1	12/05/19 16:20	12/3/19	
Perfluorotridecanoic acid (PFTTrDA)	ND U	31	8.2	1	12/05/19 16:20	12/3/19	
Perfluorotetradecanoic acid (PFTeDA)	ND U	31	13	1	12/05/19 16:20	12/3/19	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	31	3.3	1	12/05/19 16:20	12/3/19	
N-Methyl perfluorooctane sulfonamidoacetic acid	46	31	8.8	1	12/05/19 16:20	12/3/19	
N-Ethyl perfluorooctane sulfonamidoacetic acid	12 J	31	3.2	1	12/05/19 16:20	12/3/19	
(n:2) Fluorotelomer Sulfonic Acids							
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	220	31	3.5	1	12/07/19 01:09	12/3/19	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	8.1 J	31	0.94	1	12/05/19 16:20	12/3/19	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Collected: 11/20/19 11:30
Date Received: 11/21/19 09:35

Sample Name: LCS-1119
Lab Code: R1911491-001

Units: ng/L
Basis: NA

Per- and Polyfluoroalkyl Substances (PFAS) by LC/MS/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	44	20 - 109	12/05/19 16:20	
18O2-PFHxS	51	26 - 122	12/05/19 16:20	
13C4-PFOS	77	25 - 121	12/05/19 16:20	
13C4-PFBA	39	27 - 124	12/05/19 16:20	
13C5-PFPeA	32	27 - 138	12/05/19 16:20	
13C2-PFHxA	40	28 - 132	12/05/19 16:20	
13C4-PFHpA	43	19 - 139	12/05/19 16:20	
13C4-PFOA	56	22 - 130	12/05/19 16:20	
13C5-PFNA	66	20 - 127	12/05/19 16:20	
13C2-PFDA	78	24 - 125	12/05/19 16:20	
13C2-PFUnDA	93	22 - 125	12/05/19 16:20	
13C2-PFDoDA	67	19 - 122	12/05/19 16:20	
13C2-PFTeDA	24	13 - 124	12/05/19 16:20	
13C8-FOSA	67	18 - 109	12/05/19 16:20	
D3-MeFOSAA	73	9 - 123	12/05/19 16:20	
D5-EtFOSAA	92	12 - 126	12/05/19 16:20	
13C2-6:2 FTS	223	10 - 226	12/07/19 01:09	
13C2-8:2 FTS	234	10 - 202	12/05/19 16:20	*

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Collected: NA
Date Received: NA

Sample Name: Method Blank
Lab Code: KQ1917781-06

Units: ng/L
Basis: NA

Per- and Polyfluoroalkyl Substances (PFAS) by LC/MS/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	ND U	5.0	0.28	1	12/05/19 12:40	12/3/19	
Perfluorohexane sulfonic acid (PFHxS)	ND U	5.0	1.3	1	12/05/19 12:40	12/3/19	
Perfluoroheptane sulfonic acid (PFHpS)	ND U	5.0	0.44	1	12/05/19 12:40	12/3/19	
Perfluorooctane sulfonic acid (PFOS)	ND U	2.0	0.44	1	12/05/19 12:40	12/3/19	
Perfluorodecane sulfonic acid (PFDS)	ND U	5.0	0.30	1	12/05/19 12:40	12/3/19	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	ND U	5.0	0.40	1	12/05/19 12:40	12/3/19	
Perfluoropentanoic acid (PFPeA)	ND U	5.0	1.7	1	12/05/19 12:40	12/3/19	
Perfluorohexanoic acid (PFHxA)	ND U	10	8.8	1	12/05/19 12:40	12/3/19	
Perfluoroheptanoic acid (PFHpA)	ND U	5.0	0.63	1	12/05/19 12:40	12/3/19	
Perfluorooctanoic acid (PFOA)	ND U	2.0	0.35	1	12/05/19 12:40	12/3/19	
Perfluorononanoic acid (PFNA)	ND U	5.0	1.1	1	12/05/19 12:40	12/3/19	
Perfluorodecanoic acid (PFDA)	ND U	5.0	1.2	1	12/05/19 12:40	12/3/19	
Perfluoroundecanoic acid (PFUnDA)	ND U	5.0	1.5	1	12/05/19 12:40	12/3/19	
Perfluorododecanoic acid (PFDoDA)	ND U	5.0	1.3	1	12/05/19 12:40	12/3/19	
Perfluorotridecanoic acid (PFTTrDA)	ND U	5.0	1.3	1	12/05/19 12:40	12/3/19	
Perfluorotetradecanoic acid (PFTeDA)	ND U	5.0	2.0	1	12/05/19 12:40	12/3/19	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	5.0	0.52	1	12/05/19 12:40	12/3/19	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	5.0	1.4	1	12/05/19 12:40	12/3/19	
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	5.0	0.50	1	12/05/19 12:40	12/3/19	
(n:2) Fluorotelomer Sulfonic Acids							
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	5.0	0.55	1	12/05/19 12:40	12/3/19	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	5.0	0.15	1	12/05/19 12:40	12/3/19	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Collected: NA
Date Received: NA

Sample Name: Method Blank
Lab Code: KQ1917781-06

Units: ng/L
Basis: NA

Per- and Polyfluoroalkyl Substances (PFAS) by LC/MS/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	91	20 - 109	12/05/19 12:40	
18O2-PFHxS	130	26 - 122	12/05/19 12:40	*
13C4-PFOS	149	25 - 121	12/05/19 12:40	*
13C4-PFBA	135	27 - 124	12/05/19 12:40	*
13C5-PFPeA	131	27 - 138	12/05/19 12:40	
13C2-PFHxA	153	28 - 132	12/05/19 12:40	*
13C4-PFHpA	130	19 - 139	12/05/19 12:40	
13C4-PFOA	151	22 - 130	12/05/19 12:40	*
13C5-PFNA	140	20 - 127	12/05/19 12:40	*
13C2-PFDA	139	24 - 125	12/05/19 12:40	*
13C2-PFUnDA	164	22 - 125	12/05/19 12:40	*
13C2-PFDoDA	126	19 - 122	12/05/19 12:40	*
13C2-PFTeDA	124	13 - 124	12/05/19 12:40	
13C8-FOSA	122	18 - 109	12/05/19 12:40	*
D3-MeFOSAA	123	9 - 123	12/05/19 12:40	
D5-EtFOSAA	133	12 - 126	12/05/19 12:40	*
13C2-6:2 FTS	143	10 - 226	12/05/19 12:40	
13C2-8:2 FTS	140	10 - 202	12/05/19 12:40	

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters/
Sample Matrix: Water

Service Request: R1911491

SURROGATE RECOVERY SUMMARY
Per- and Polyfluoroalkyl Substances (PFAS) by LC/MS/MS

Analysis Method: PFC/537M
Extraction Method: EPA 3535A

Surrogate	Control Limits	LCS-1119	Method Blank	Lab Control Sample
		R1911491-001	KQ1917781-06	KQ1917781-05
13C3-PFBS	20-109	44	91	61
18O2-PFHxS	26-122	51	130*	81
13C4-PFOS	25-121	77	149*	101
13C4-PFBA	27-124	39	135*	87
13C5-PFPeA	27-138	32	131	87
13C2-PFHxA	28-132	40	153*	103
13C4-PFHpA	19-139	43	130	86
13C4-PFOA	22-130	56	151*	99
13C5-PFNA	20-127	66	140*	93
13C2-PFDA	24-125	78	139*	93
13C2-PFUnDA	22-125	93	164*	108
13C2-PFDoDA	19-122	67	126*	87
13C2-PFTeDA	13-124	24	124	82
13C8-FOSA	18-109	67	122*	86
D3-MeFOSAA	9-123	73	123	86
D5-EtFOSAA	12-126	92	133*	84
13C2-6:2 FTS	10-226	223	143	99
13C2-8:2 FTS	10-202	234*	140	98

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with an pound (#) indicate the control criteria is not acceptable.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Casella Waste Systems (Hampden ME)
Project: Hakes C&D Landfill - Part 363 Expanded Parameters
Sample Matrix: Water

Service Request: R1911491
Date Analyzed: 12/05/19
Date Extracted: 12/03/19

Lab Control Sample Summary
Per- and Polyfluoroalkyl Substances (PFAS) by LC/MS/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Units: ng/L
Basis: NA
Analysis Lot: 662106

Lab Control Sample
KQ1917781-05

Analyte Name	Result	Spike Amount	% Rec	% Rec Limits
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	29.4	30.4	96	71-142
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	29.7	30.7	97	69-137
N-Ethyl perfluorooctane sulfonamidoacetic acid	24.6	32.0	77	58-155
N-Methyl perfluorooctane sulfonamidoacetic acid	29.5	32.0	92	69-151
Perfluorobutane sulfonic acid (PFBS)	28.4	28.4	100	61-140
Perfluorobutanoic acid (PFBA)	32.2	32.0	101	51-157
Perfluorodecane sulfonic acid (PFDS)	26.4	30.9	86	69-146
Perfluorodecanoic acid (PFDA)	31.6	32.0	99	73-136
Perfluorododecanoic acid (PFDoDA)	29.0	32.0	90	71-138
Perfluoroheptane sulfonic acid (PFHpS)	37.4	30.5	122	62-178
Perfluoroheptanoic acid (PFHpA)	29.3	32.0	92	72-133
Perfluorohexane sulfonic acid (PFHxS)	29.0	29.2	99	69-144
Perfluorohexanoic acid (PFHxA)	26.2	32.0	82	71-138
Perfluorononanoic acid (PFNA)	28.2	32.0	88	69-148
Perfluorooctane sulfonamide (FOSA)	29.5	32.0	92	64-135
Perfluorooctane sulfonic acid (PFOS)	28.0	29.7	94	71-139
Perfluorooctanoic acid (PFOA)	29.7	32.0	93	74-146
Perfluoropentanoic acid (PFPeA)	31.9	32.0	100	67-127
Perfluorotetradecanoic acid (PFTeDA)	28.9	32.0	90	63-139
Perfluorotridecanoic acid (PFTrDA)	35.1	32.0	110	65-140
Perfluoroundecanoic acid (PFUnDA)	28.9	32.0	90	76-134

ATTACHMENT 3 – WASTE ORIGIN

HAKES C & D LANDFILL
County/Origin/Material Report
 Transactions from 01/01/2019 through 12/31/2019
 Inbound Tickets Only
 Third Party and Intercompany Customers
 Recycle and Disposal Material
 Origin Summary

	Cubic Yards	Tons	Est Tons
CT - CONNECTICUT			
FAIRFIELD - FAIRFIELD, CT <i>16 tickets and 16 transactions</i>	0.00	125.82	0.00
HART - HARTFORD, CT <i>28 tickets and 28 transactions</i>	0.00	243.04	0.00
LITCHFIELD - LITCHFIELD, CT <i>2 tickets and 2 transactions</i>	0.00	14.40	0.00
NEW HAVEN - NEW HAVEN, CT <i>44 tickets and 44 transactions</i>	0.00	503.93	0.00
NEW L - NEW LONDON, CT <i>1 ticket and 1 transaction</i>	0.00	6.30	0.00
WEHA - WEST HAVEN, CT <i>2 tickets and 2 transactions</i>	0.00	14.43	0.00
WIND - WINDHAM, CT <i>1 ticket and 1 transaction</i>	0.00	11.69	0.00
CT - CONNECTICUT <i>94 tickets and 94 transactions</i>	0.00	919.61	0.00
MA - MASSACHUSETTS			
BERK - BERKSHIRE, MASS <i>1 ticket and 1 transaction</i>	0.00	8.57	0.00
PLY - PLYMOUTH,MA <i>194 tickets and 197 transactions</i>	0.00	4,610.41	0.00
SPRING - SPRINGFIELD,MA <i>3 tickets and 4 transactions</i>	0.00	37.33	0.00
WORCESTER - WORCESTER,MA <i>2 tickets and 2 transactions</i>	0.00	76.52	0.00
MA - MASSACHUSETTS <i>200 tickets and 204 transactions</i>	0.00	4,732.83	0.00
NA - NOT APPLICABLE			
NA - NOT APPLICABLE <i>11 tickets and 11 transactions</i>	0.00	100.15	0.00
NA - NOT APPLICABLE <i>11 tickets and 11 transactions</i>	0.00	100.15	0.00

HAKES C & D LANDFILL
County/Origin/Material Report
 Transactions from 01/01/2019 through 12/31/2019
 Inbound Tickets Only
 Third Party and Intercompany Customers
 Recycle and Disposal Material
 Origin Summary

	Cubic Yards	Tons	Est Tons
NJ - NEW JERSEY			
ESSEX - ESSEX, NJ <i>8 tickets and 8 transactions</i>	0.00	188.34	0.00
MID - MIDDLESEX, NJ <i>1 ticket and 1 transaction</i>	0.00	30.33	0.00
MORRIS - MORRIS, NJ <i>2 tickets and 2 transactions</i>	0.00	35.76	0.00
UN - UNION, NJ <i>5 tickets and 5 transactions</i>	0.00	113.89	0.00
NJ - NEW JERSEY <i>16 tickets and 16 transactions</i>	0.00	368.32	0.00
NY - NEW YORK			
BR - BRONX, NY <i>2,862 tickets and 2,950 transactions</i>	0.00	100,761.91	0.00
BROOME - BROOME, NY <i>1 ticket and 1 transaction</i>	0.00	27.16	0.00
CAYUGA - CAYUGA, NY <i>1 ticket and 1 transaction</i>	0.00	2.46	0.00
CHEMUNG - CHEMUNG, NY <i>780 tickets and 818 transactions</i>	0.00	4,706.00	0.00
CORT - CORTLAND, NY <i>5 tickets and 5 transactions</i>	0.00	96.07	0.00
GREEN - GREEN, NY <i>98 tickets and 102 transactions</i>	0.00	2,457.76	0.00
KINGS - KINGS, NY <i>1,868 tickets and 2,010 transactions</i>	0.00	65,175.11	0.00
ORANGE - ORANGE, NY <i>449 tickets and 465 transactions</i>	0.00	14,145.45	0.00
QU - QUEENS, NY <i>1,704 tickets and 1,822 transactions</i>	0.00	58,967.39	0.00
ROCK - ROCKLAND, NY <i>290 tickets and 296 transactions</i>	0.00	9,772.23	0.00
SCHUYLAR - SCHUYLER, NY <i>239 tickets and 245 transactions</i>	0.00	2,902.08	0.00

HAKES C & D LANDFILL
County/Origin/Material Report
 Transactions from 01/01/2019 through 12/31/2019
 Inbound Tickets Only
 Third Party and Intercompany Customers
 Recycle and Disposal Material
 Origin Summary

County: All
 Origin: All
 Material: All

	Cubic Yards	Tons	Est Tons
NY - NEW YORK			
SENECA - SENECA,NY <i>1 ticket and 1 transaction</i>	0.00	3.30	0.00
STEUBEN - STEUBEN,NY <i>440 tickets and 458 transactions</i>	0.00	2,108.01	0.00
SUFFOLK - SUFFOLK, NY <i>6 tickets and 6 transactions</i>	0.00	208.48	0.00
SUL - SULLIVAN,NY <i>31 tickets and 31 transactions</i>	0.00	567.73	0.00
TIOGA, NY - TIOGA, NY <i>14 tickets and 14 transactions</i>	0.00	186.82	0.00
TOMPKINS - TOMPKINS,NY <i>172 tickets and 178 transactions</i>	0.00	4,031.85	0.00
ULSTER - ULSTER,NY <i>2 tickets and 2 transactions</i>	0.00	57.15	0.00
WESTCHES - WESTCHESTER,NY <i>3,095 tickets and 3,131 transactions</i>	0.00	113,728.77	0.00
YATES - YATES, NY <i>6 tickets and 7 transactions</i>	0.00	21.34	0.00
NY - NEW YORK <i>12,064 tickets and 12,543 transactions</i>	0.00	379,927.07	0.00
PA - PENNSYLVANIA			
BRA - BRADFORD,PA <i>3 tickets and 3 transactions</i>	0.00	23.70	0.00
TIOGA - TIOGA, PA <i>17 tickets and 18 transactions</i>	0.00	158.39	0.00
PA - PENNSYLVANIA <i>20 tickets and 21 transactions</i>	0.00	182.09	0.00
RI - RHODE ISLAND			
NEW - NEWPORT, RI <i>2 tickets and 2 transactions</i>	0.00	17.35	0.00
PROVIDENCE - PROVIDENCE, RI <i>2 tickets and 2 transactions</i>	0.00	19.43	0.00

HAKES C & D LANDFILL
County/Origin/Material Report
 Transactions from 01/01/2019 through 12/31/2019
 Inbound Tickets Only
 Third Party and Intercompany Customers
 Recycle and Disposal Material
 Origin Summary

RI - RHODE ISLAND

4 tickets and 4 transactions

Cubic Yards	Tons	Est Tons
0.00	36.78	0.00
<u>0.00</u>	<u>386,266.85</u>	<u>0.00</u>

Report Grand Totals

12,409 tickets and 12,893 transactions

End of Report

ATTACHMENT 4 – UNAUTHORIZED WASTE SUPPORTING DOCUMENTS

HAKES C&D LANDFILL
WASTE REFUSAL FORM

Facility Supervisor: CHARLES PLANK Date: 3/11/19 Time: 9:00 AM

Weather: CLOUDY Temperature: 34 Wind: SW 0-3 MPH

HAULER INFORMATION:

Name: SAM McDONALD CONTRACTING

Address: 767 S. KINYON ST. Telephone: 607-731-2653

ELMIRA, NY 14904 Driver: THURMAN LIQUORI

Truck #: 110

LOAD INFORMATION:

Weight of Load _____ Tons Scale Ticket #: _____

Vehicle Destination: _____

Description of Waste Load: LOAD WASNT WEIGHED IN

Source of Waste: BAGS OF GARBAGE, CARPET.

Comments: _____

REJECTED FOR BAGS & CARPET

Pictures Taken? No Yes
Video Tape? No Yes

Inspectors Signature: Charles Plank

Facility Supervisor Signature: Charles Plank

Driver Signature: Thurman Liquori



767 S. Kinyon Street- Elmira, NY
607-732-4034

www.mcdonaldcontracting.com

NON-HAZARDOUS WASTE - CONSTRUCTION & DEMOLITION

TRANSPORTER:
S & M MCDONALD CONTRACTING
767 S KINYON ST
ELMIRA, NY 14904

DATE: 3-11-19

LOAD # NA

DESTINATION FACILITY:
HAKES C&D LANDFILL

SMMC TRUCK# 110 TRAILER # NA

SHIPPER:
S & M MCDONALD CONTRACTING
COUNTY: CHEMUNG, NY

HAULER/DRIVER:
SIGN: [Signature]
PRINT: Thickman LiQuori
DATE: 3-11-19
I HEREBY CERTIFY THAT THE MATERIAL NAMED
WAS PICKED UP AT THE GENERATOR SITE
LISTED, AND THAT IT WAS DELIVERED WITHOUT
INCIDENT TO THE DESTINATION LISTED.

ORIGIN OF LOAD
SERVICE MASTER 2689 COFF RD
CORNING NY

MSW _____
C&D X

RECEIVING FACILITY SECTION:
SIGN: _____ PRINT: _____ DATE: _____

CONSTRUCTION & DEMOLITION (C&D) IS UNCONTAMINATED SOLID WASTE RESULTING FROM THE CONSTRUCTION, REMODELING, REPAIR & DEMOLITION OF UTILITIES, STRUCTURES, ROADS & UNCONTAMINATED SOLID WASTE RESULTING FROM LAND CLEARING. SUCH WASTE INCLUDES, BUT IS NOT LIMITED TO BRICKS, CONCRETE, & OTHER MASONRY MATERIALS; SOIL, ROCK, WOOD (INCLUDING PAINTED, TREATED & COATED WOOD & WOOD PRODUCTS); LAND CLEARING DEBRIS; WALL COVERINGS; PLASTER; DRYWELL; PLUMBING FIXTURES; NO ASBESTOS (& NO FRIABLE ASBESTOS) INSULATION, ROOFING; FLOOR TILES; ASPHALT PAVEMENT; GLASS; PLASTIC; ELECTRICAL WIRING; & COMPONENTS CONTAINING NO HAZARDOUS LIQUIDS; PIPE & METAL INCIDENTAL TO ANY OF THE ABOVE.

Charles Plank

From: Charles Plank
Sent: Monday, March 11, 2019 9:26 AM
To: Charles Plank
Subject: McDonald's



Charles Plank
Site Manager
Casella Waste Systems, Inc.

Hakes C&D Landfill
[4376 Manning Ridge Road](#)
[Painted Post, NY 14870](#)
p. [607.937.6044](#) | c. [716.560.7912](#) | f. [607.937.6089](#)

Learn more at [casella.com](#)

Charles Plank

From: Charles Plank
Sent: Monday, March 11, 2019 9:25 AM
To: Charles Plank
Subject: McDonald's



Charles Plank
Site Manager
Casella Waste Systems, Inc.

Hakes C&D Landfill
[4376 Manning Ridge Road](#)
[Painted Post, NY 14870](#)
p. [607.937.6044](#) | c. [716.560.7912](#) | f. [607.937.6089](#)

Learn more at [casella.com](#)

HAKES C&D LANDFILL
WASTE REFUSAL FORM

Facility Supervisor: CHARLES PLANK Date: 7/8/19 Time: 7:45 AM

Weather: CLOUDY/OVERCAST Temperature: 62°

HAULER INFORMATION:

Name: Trans Waste

Address: 3 Barker Drive Telephone: 203-269-8300

Wallingford, CT Driver: Joe Saladin

06492 Truck #: 162

LOAD INFORMATION:

Weight of Load 0.14 Tons Scale Ticket #: _____

Vehicle Destination: white truck Connecticut Energy Solutions Double roll-off

Description of Waste Load: Bagged material

Source of Waste: Yale University Properties, New Haven, CT

Comments: _____

Pictures Taken? No Yes
Video Tape? No Yes

Inspectors Signature: Charles Plank

Facility Supervisor Signature: Charles Plank

Driver Signature: [Signature]



3 Barker Drive • Wallingford, CT 06492
(203) 269-8300 • Fax: (203) 269-8600

CT, MA, RI, VT, NH, ME
GENERATORS

EPA New England
1 Congress Street
Boston, MA 02114-2023
(617) 918-1111

NEW HAVEN
E.P.A. AGENCY

NY GENERATORS

EPA Region 2
290 Broadway, 26th Floor
New York, NY 10007-1866
(212) 637-3000

30300 112
#194167

EMERGENCY RESPONSE
TELEPHONE
#203-269-8300

TK# ASBESTOS DISPOSAL & DOCUMENTATION FORM

Job Number _____ P.O. # _____
 Contractor Spartan Roofing Co
 Address 151 WATER STREET
 City DERBY State CT Zip 06418
 Telephone Number 203-735-0552
 Date Container Del. 5/6/19 Date of Pickup 6/6/19
 Type of Container 30 YD
VOLUME 30 yd **CY** Friable Non-Friable
 MUST BE IN CUBIC YARDS
 Bag Drum Wrapped Other
RG, NA2212, ASBESTOS, 9, PG #!

GENERATOR/BUILDING OWNER
Yale University Properties
 Address 433 Temple Street
 City New Haven State CT Zip 06511
 Phone Number 203-432-8435
GENERATING LOCATION
 Address 100 ASHMUN STREET
 City NEW HAVEN State CT Zip 06516
 Phone Number _____

I certify the above named material does not contain free liquid as defined by 40 CFR part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to NESHAP standards for asbestos waste disposal found in 40 CFR part 61.150.

Shipper's Certification: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national government regulations.

A. HORIZED SIGNATURE

[Handwritten Signature]

Transporter 1: _____
 Name _____ Address _____ Telephone # _____
 Driver: _____ Registration #: _____ Date: _____
 Signature _____ Acknowledgement of receipt of materials. State / # _____

Transporter 2: TransWaste, Inc., 3 Barker Drive, Wallingford, CT 06492 (203) 269-8300
 Driver: _____ Registration #: 496663M CT Date: 7-5-19
 Signature _____ Acknowledgement of receipt of materials. State / # _____

Transporter 3: TransWaste, Inc., 3 Barker Drive, Wallingford, CT 06492 (203) 269-8300
 Name _____ Address _____ Telephone # _____
 Driver: _____ Registration #: _____ Date: _____
 Signature _____ Acknowledgement of receipt of materials. State / # _____

Site : Wayne Township Landfill Site : Minerva Enterprises Site : Hakes Landfill Site : _____
 Address: 15 Landfill Lane Address: 9000 Minerva S.E. Address: 4376 Manning Ridge Rd. Address: _____
McElhattan, PA 17748 Waynesburg, OH 44688 Painted Post, NY 14870
 Phone: 570-769-6977 Phone: 330-866-3435 Phone: 607-937-6044 Phone: _____

Certification of receipt of materials covered by this manifest.

I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

 Name of Authorized Agent Signature [Signature] Receipt Date 7-7-19

GENERATOR



HAKES C & D LANDFILL

4376 MANNING RIDGE ROAD
PAINTED POST, NY 14870
LICENSE#460031 607-937-6044

Ticket: 216899
Date: 7/8/2019
Time: 07:17:10 - 08:39:31

Customer: 84-00284/TRANSWASTE INC.
Carrier: TRANS/TRANSWASTE
Truck: TRAN 1
Truck Type: RO/ROLL OFFS
Grid: CELL 8D/CELL 8D

Comment: 194167 YALE UNIVERSITY

Gross: 72620 L In Scale 1
Tare: 72340 L Out Scale 1
Net: 280 L
Tons: 0.14

Materials & Services

Origin: NEW HAVEN/NEW HAVEN, CT
Material: CD/CONSTRUCTION DEBRIS
Quantity: 0.14 Ton

Weighmaster: JHATCH

Driver:

By signing above, I declare that I did NOT
deposit any PROHIBITED WASTES

Charles Plank

From: Steven Brewer <sb_brewer@yahoo.com>
Sent: Monday, July 08, 2019 7:56 AM
To: Charles Plank
Subject: Trans Waste



Sent from my iPhone

ATTACHMENT 5 – ADDITIONAL PERMIT REPORTING REQUIREMENTS

SPECIAL CONDITION 51:

Annual reports shall be submitted to both the Region 8 Regional Solid and Hazardous Materials Engineer, 6274 East Avon-Lima Road, Avon, NY 14414 and the Central Office no later than 60 days after the first day of January following each year of operation. The reports shall be in accordance with the requirements of Part 360-7.5(b) and include the following information:

- (a) Complaints received;***
- (b) An evaluation of all water and leachate quality data collected throughout the year. The Department may request at any time that this information be provided in a computer-compatible format to be specified by the Department;***
- (c) Evaluations of the landfill gas collection and control system, monitoring system, and monitoring data collected throughout the year. A description of proposed and/or actual changes to the landfill gas collection and control system, monitoring system, and monitoring plan shall be included;***
- (d) A completed copy of the Radiation Monitor Alarm Record form for each instance in which the radiation detector alarms due to an incoming load of waste.***

Responses:

- (a) Please see Attachment 6 (Complaint Log)
- (b) Please see Attachment 2 (Water Quality data). Computer-compatible formats are available upon request.
- (c) In 2019, quarterly landfill gas content monitoring (i.e. carbon dioxide (CO₂), methane (CH₄), and hydrogen sulfide (H₂S)) was conducted. The test results are included in Attachment 2.

In addition, an annual H₂S surface scan was conducted on November 1, 2019. The scan was conducted along the perimeter of the landfill, along a grid pattern on the landfill, at gas collection wells and pipe protrusions, and at three locations outside the perimeter of the landfill. Based on the results, H₂S was not detected at the site. Refer to the Annual Hydrogen Sulfide Surface Emissions Monitoring (SEM) Report submitted on December 4, 2019 to the New York State Department of Environmental Conservation for further details.

Six gas wells were installed in May 2019, designated as GW-14 through GW-19. In addition, to the six gas wells, lateral collection pipes and a new header gas pipe were installed in order to connect the six gas wells to the existing gas collection system. No changes were made to the monitoring system and monitoring plan.

The gas collection system is functioning properly as of February 2020. Hakes is currently evaluating proposed modifications to the gas collection system in 2020.

- (d) The radiation detectors did not go off during 2019.

ATTACHMENT 6 – COMPLAINT LOG

HAKES C&D LANDFILL				
Complaint Log 2019				
Date	Time	Type of Complaint	Contact Info.	Notes and Resolved by Hakes C&D Landfill
		(Odor/Dust/Noise/Road)		
2/8/2019	7:30am	Odor	Dave Franzen	The Franzen's called about odors, went over within 5 minutes. Did not find any odors. Gave Dave Franzen a tour of the facility. 40 degrees wind speed 0-1 wind direction SW
2/13/2019	7:11am	Trucks on road before/after time	Town of Campbell / Tom Austin	Tom Austin called to state that the first Kris truck where up the hill late last night after 9pm. Talked to drivers, came up at 9:10pm. They have been spoken to about time before. Will make sit for 1 hour following day. The 2nd Kris truck came up before 5am this morning, also has been spoken to before about the times, will have sit following day when they come in for 1 hour.
2/13/2019	2:32pm	Odor	Dave Franzen	Dave Franzen texted about Odor at about 2:32pm. Chuck and Mike went over to the Franzen residence. Both smelt something for a quick second, not sure of what. 24 degrees wind speed 0-3 wind direction WSW
2/26/2019	2:00pm	Truck Issues	Tom Austin	Tom Austin came in to talk about the trucks breaking down on Manning Ridge Road Hill
2/27/2019	8:00am	Truck Passing, Kris Trucking #85	Tom Austin	A truck passed Tom Austin while he was plowing down the Hill / The driver was terminated by his company
3/6/2019	2:32pm	Odor	Dave Franzen	Dave Franzen texted about odor, took a trip around the hill, didn't smell anything 13 degrees wind speed 0-1 wind direction NE
3/12/2019	2:04pm	Noise	Dave Franzen	Dave Franzen called about the noise the loggers were making
3/15/2019	12:45pm	Trucks	CK Landis	Logging trucks are parking on the road across from Bill Steeles property. Talked to the loggers not to park/stage on the roadway
3/19/2019	2:35pm	Trucks	Joan Plankis	Mrs. Plankis called about a green truck not stopping at the stop sign
4/4/2019	3:24pm	Trucks	Mrs. Millers	Trucks are not stopping at the stop sign/ A red truck and a Blue truck
4/18/2019	3:18pm	Litter	Dave Franzen	went over and looked at the litter that Dave Franzen found
4/30/2019	9:23am	Litter	Dave Franzen	went over and looked at the litter that Dave Franzen found
6/14/2019	7:25am	Odor	Maggie Franzen	Mike Miller went over to investigate the odor smell , may have gotten a slight smell of the flare/ 51 degrees wind speed 0-6 wind direction S
6/14/2019	9:09am	Odor	Dave Franzen	Mike Miller went back over to investigate the odor complaint, didn't smell anything/ 54 degrees wind speed 0-4 wind direction S
6/25/2019	5:00pm	Odor	Dave Franzen	Smelling odors around there house, Mike Miller Investigated didn't smell anything. 77 degrees, wind speed 3 mph wind direction S
6/25/2019	11:00pm	Odor	Maggie Franzen	Smelling odors at there house 64 degrees, Wind speeds 0MPH, Wind direction ENE
6/26/2019	2:07pm	Odor	Dave Franzen	Smelling slight odors at there house .Chuck took a trip around the area and didn't smell anything . 80 degrees, wind speeds5 MPH, Wind direction SSW
6/27/2019	5:44am	Odor	Dave Franzen	Smelling slight odors at there house. Chuck took a trio around the area didn't smell anything. 57 Degrees, wind speeds 0MPH Wind direction N
6/28/2019	9:37am	Odor	Yasmin Guevara DEC	Email from Yasmin of an odor complaint from Mary Alice Little. Chuck took a trip around and didn't smell anything.
7/26/2019	5:53am	Odor	Dave Franzen	Smelling odors at there house. Chuck went over to check on odors, didn't smell anything . 57 degrees, wind speeds 0 MPH, wind direction S
7/30/2019	9:12am	Odor	Yasmin Guevara DEC	Email from Yasmin of an odor complaint from Mary Alice Little for over the weekend. Chuck took a trip around and didn't smell anything.
9/3/2019	8:01am	Odor	Dave Franzen	Smelling odors at there house. Chuck went over to check on odors, didn't smell anything . 56 degrees, wind speeds 1 MPH, wind direction S
9/23/2019	6:04pm	Odor	Dave Franzen	Smelling odors at there house. Mike Miller went over to check on odors, didn't smell anything . 68 degrees, wind speeds 2 MPH, wind direction SW