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2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

MERRIMACK STATION COAL ASH LANDFILL

Bow, New Hampshire

Prepared for GSP Merrimack LLC
File No. 2025.07
January 2019

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Building Trust. Engineering Success.

Mr. Allan Palmer
GSP Merrimack LLC
431 River Road
Bow, New Hampshire 03304

January 29, 2019
File No. 2025.07

Re: 2019 Annual Groundwater Monitoring and Corrective Action Report
Merrimack Station Coal Ash Landfill
Bow, New Hampshire

Dear Allan:

Sanborn, Head & Associates, Inc. (Sanborn Head) prepared this 2019 Annual Groundwater Monitoring and Corrective Action Report (Annual Report) for the Merrimack Station Coal Ash Landfill site (Site) in Bow, New Hampshire, as required under 40 CFR Part 257.90(e) of the Standards for the Disposal of Coal Combustion Residuals (CCR) in Landfills and Surface Impoundments Rule. Groundwater monitoring at the Site was performed pursuant to 40 CFR Part 257.90 and this Annual Report covers the reporting period from October 19, 2015 (40 CFR Part 257 effective date) through December 31, 2017.

REPORT REQUIREMENTS

As required under 40 CFR Part 257.90(e), this Annual Report includes the following information:

- A map, aerial image, or diagram showing the CCR unit and the background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit (see Figures 1 and 2);
- Location of the monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;
- Monitoring data obtained under 40 CFR Parts 257.90 through 257.98, including:
  - the number of groundwater samples that were collected for analysis for each background and downgradient well (Table 1);
  - the dates the samples were collected (Table 1); and
  - whether the sample was required by the detection monitoring or assessment monitoring programs;
- A narrative discussion of transitions, if any, between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels); and

- Other information required to be included in the annual report as specified in 40 CFR Parts 257.90 through 257.98, which includes;
  - Groundwater elevations measured in each well immediately prior to purging and the rate and direction of groundwater flow, as calculated by the owner or operator of the CCR unit, each time groundwater is sampled (40 CFR Part 257.93[c]) (Table 2); and
  - Written demonstrations prepared by a qualified professional engineer demonstrating that a source other than the CCR unit caused the statistically significant increase (SSI) over background levels for a constituent or that the SSI resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality (40 CFR Part 257.94[e][2]) (Attachment A).

BACKGROUND

The Site has been operating since 1978 and was constructed in a former sand and gravel quarry on the property adjacent to the Merrimack Station electric power generation facility in Bow, New Hampshire. The landfill was constructed with a Hypalon geomembrane liner system and a leachate collection system, and receives coal ash from the nearby Merrimack Station electric power generation facility. A portion of the landfill was filled to final grade and was capped with a final cover system. A Locus Plan for the Site is provided as Figure 1 and the locations of the monitoring wells in relation to the landfill are indicated on the Facility Plan, Figure 2.

The groundwater quality at the Site has been routinely monitored for the past 30 years under New Hampshire Department of Environmental Services (NHDES) regulations. The current groundwater monitoring program, as prescribed by the NHDES Groundwater Release Detection Permit No. GWP-198400065-B-006, dated March 16, 2017, includes the collection of static groundwater level measurements and laboratory analyses of groundwater samples from five (5) overburden monitoring wells (i.e., SB-1, SB-4, SB-6, SB-13, and SB-14) on a semi-annual basis.

As discussed in the Groundwater Monitoring Well Network Verification (Sanborn Head, January 14, 2016, available in the Site's operating record), the five monitoring wells were certified as an appropriate groundwater monitoring system that was designed and constructed to meet the requirements of 40 CFR Part 257.91. There were no monitoring wells installed or decommissioned during the reporting period.

SUMMARY OF GROUNDWATER MONITORING

As specified in 40 CFR Part 257.94(b), a detection monitoring program was initiated in October 2015, to include obtaining a minimum of eight independent samples for each background and downgradient well for the constituents listed in Appendix III and IV of 40 CFR Part 257 by October 17, 2017. A Sampling and Analysis Plan (Sanborn Head, last revised on October 7, 2016) was prepared to address the sampling and analysis requirements of 40 CFR part 257.93. Monitoring well SB-13 is considered the upgradient/background monitoring well. The other monitoring wells are downgradient or sidegradient to the landfill.

Groundwater samples are collected by Eastern Analytical, Inc. (EAI) of Concord, New Hampshire using low-flow sampling techniques, based on the U.S. Environmental Protection Agency (USEPA) Low Stress (Low Flow) Standard Operating Procedure, revised January 19, 2010. The samples are unfiltered and analyzed by EAI for the parameters identified.

The initial eight independent samples were taken for both background and downgradient wells for the constituents listed in Appendix III (boron, calcium, chloride, fluoride, pH, sulfate, and total dissolved solids) and IV (antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, fluoride, lead, lithium, mercury, molybdenum, selenium, thallium, and radium 226 and 228 combined). The statistical analysis of the groundwater monitoring data after the eight initial samples indicated that a transition between monitoring programs (i.e., to assessment monitoring) was not required.

The first semi-annual detection monitoring, as specified in 40 CFR Part 257.94, was performed in November 2017 at the five wells for Appendix III constituents only. Semi-Annual detection monitoring continued during the reporting period in April and November 2018. Additional samples were collected on July 25, 2018 as part of a resampling routine for the April 2018 monitoring round. As described below, the data analyses completed during the reporting period indicated that a transition between monitoring programs (i.e., to assessment monitoring) was to not required.

Groundwater analytical data are summarized in Table 1 and analytical laboratory reports are provided in Attachment B. The groundwater level measurements and inferred general groundwater flow directions are summarized on Table 2.

SUMMARY OF STATISTICAL ANALYSIS

As required under 40 CFR Part 257.90(b)(iv), Sanborn Head evaluated groundwater monitoring data for a statistically significant increase (SSI) over background levels for the constituents listed in Appendix III of 40 CFR Part 257 at the five monitoring wells. On May 4, 2018, Sanborn Head issued a Statistical Method Selection Certification, applicable to the statistical analysis completed on the groundwater analytical data collected through July 25, 2018. The certification is available in the Site's operating record. Statistical analysis of the November 2018 data is ongoing and future statistical analyses of additional groundwater monitoring data reviewed by Sanborn Head under 40 CFR Part 257.93 may result in a change to the statistical method used, and future certifications will need to be revised accordingly.

The prediction interval procedure specified in 40 CFR Part 257.93(f)(3) was selected for evaluation of the most recent parameter values for the site wells (i.e., SB-1, SB-4, SB-6, SB-13, and SB-14). The prediction interval procedures were performed on parameters specified in Appendix III (i.e., boron, calcium, chloride, fluoride, pH, Sulfate, and total dissolved solids) using the multiple well and multiple parameter prediction limit equation.

Based on the prediction interval procedures performed for data collected for the November 2017 and April 2018 monitoring rounds, SSIs over background levels were identified. As such, pursuant to 40 CFR Part 257.94(e)(2), within 90 days of detecting the SSI, Sanborn Head prepared Alternative Source Demonstrations (ASDs) that demonstrated, based on a

weight-of-evidence approach, that the SSIs were due to natural variation in groundwater flow. The SSIs and corresponding ASDs are summarized in Exhibit 1, below. The ASDs are provided as Attachment A.

Exhibit 1: Alternative Source Demonstrations Completed in 2018

Sampling & Resampling Dates	SSI Location and Parameter	ASD Date
November 17, 2017 & January 31, 2018	SB-01: Calcium	May 15, 2018
April 9, 2018 & July 25, 2018	SB-01: Calcium and sulfate SB-14: Sulfate	November 6, 2018

Detection monitoring semi-annual groundwater data collected on November 28 and 29, 2018 is included in Table 1; however, the statistical analysis is on-going. As stipulated in 40 CFR Part 257.93(h)(2), the Site operator has 90 days from completing the sampling and analysis to determine whether there has been an SSI over background for any constituent at each monitoring well (i.e., due by March 12, 2019).

CONCLUSION

We understand that GSP Merrimack LLC will be responsible for placing this Annual Report in the Site's operating record by January 31, 2019. The next Annual Report will be due January 31, 2020 for the time period from January 1, 2019 through December 31, 2019. Should you require additional information, please contact Harrison Roakes of Sanborn Head at (603) 415-6126.

Sincerely,
SANBORN, HEAD & ASSOCIATES, INC.

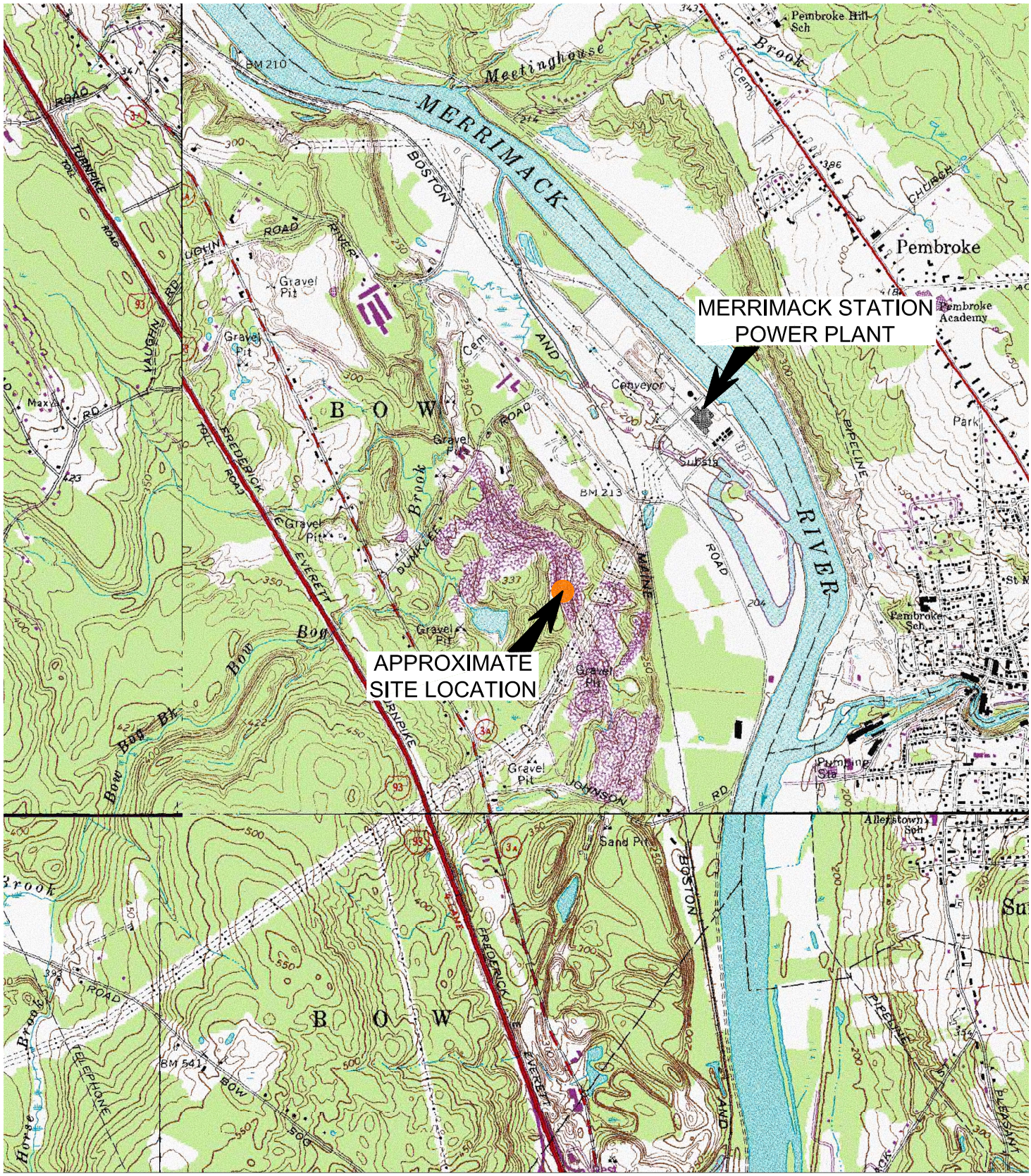
Harrison R. Roakes, P.E.
Project Manager

Eric S. Steinhauser, P.E., CPESC, CPSWQ
Principal

LLD/HRR/ESS: lld

Enclosures:
Figure 1 Locus Plan
Figure 2 Facility Plan
Table 1 Summary of Analytical Results- Groundwater
Table 2 Summary of Groundwater Level Measurements
Attachment A – Alternative Source Demonstrations
Attachment B – Analytical Laboratory Reports

FIGURES



NOTES:

BASE MAP TAKEN FROM 7.5 MINUTE
USGS QUADRANGLE MAP:
BOW, NEW HAMPSHIRE 1967
(PHOTO REVISED 1998)

Drawn By: D. Dombrowsky
Designed By: H. Roakes
Reviewed By: Damiano/Steinhauser
Project No: 2025.07
Date: January 2019

1000 0 2000 Feet

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Figure 1
Locus Plan

2019 Annual Groundwater Monitoring and Corrective Action Report

Merrimack Station
Coal Ash Landfill
Bow, New Hampshire

SB-4
SB-6
SB-1
SB-14
SB-13
MERRIMACK STATION
LINED COAL ASH
LANDFILL
LEACHATE
COLLECTION TANKS

Figure 2

Facility Plan

2019 Annual Groundwater Monitoring and Corrective Action Report

Merrimack Station
Coal Ash Landfill
Bow, New Hampshire

Drawn By: D. Dombrowsky
Designed By: H. Roakes
Reviewed By: L. Damiano/E. Steinhauser
Project No: 2025.07
Date: January 2019

Notes

1. The base map was developed from a drawing prepared by Public Service Company of New Hampshire's Engineering Division entitled, "Area Plan, Merrimack Station, Bow, N.H." The drawing was dated 5/1/90 and was last revised on 6/28/95.

2. The location of the landfill and the site features shown should be considered approximate only.

Legend

- SB-4 — Monitoring Well
- Right-Of-Way
- Fence
- OU — Overhead Utilities
- 250 — Elevation Contour

150' 75' 0 150' 300' Feet

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TABLES

TABLE 1
Summary of Analytical Results – Groundwater
Merrimack Station Coal Ash Landfill
Bow, New Hampshire

Location	Date	Metals µg/L															Miscellaneous Parameters µg/L				s.u	pCi/L		
		Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium	Chloride	Fluoride	Sulfate	Total Dissolved Solids	pH	Radium 226	Radium 228	Radium 226+228
Drinking Water MCL		6	10	2,000	4	NS	5	NS	100	NS	15	NS	2	NS	50	2	NS	4,000	NS	NS	NS	NS	NS	5
GW-1		6 ‡	10 ‡	2,000 ‡	4 ‡	620 ‡	5 ‡	NS ‡	100	NS ‡	15 ‡	NS	2 ‡	NS	50 ‡	2 ‡	NS	4,000	500,000	NS	NS	NS	NS	NS
GW-2		NA	NA	NA	NA	NA	NA	NS	NS	NS	NS	NS	NA	NS	NA	NA	NS	†	†	NS	NS	NS	NS	NS
SB-1	2/24/2016	<1.0	<1.0	14	<1.0	60	<1.0	7,200	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0	<1.0	<1.0	44,000	<100	8,000	96,000	5.2	0.2 ±0.1	0.6 ±0.6	0.8 ±0.6
	4/25/2016	<1.0	<1.0	18	<1.0	100	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	1.0	<1.0	<1.0	58,000	<100	9,000	120,000	5.7	0.5 ±0.2	0.2 ±0.4	0.7 ±0.4
	6/6/2016	<1.0	<1.0	16	<1.0	<50	<1.0	8,200	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	55,000	<100	7,000	140,000	5.5	0.6 ±0.3	0.2 ±0.5	0.8 ±0.5
	7/18/2016	<1.0	<1.0	16	<1.0	70	<1.0	8,600	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	60,000	<100	9,000	120,000	5.4	0.4 ±0.3	0.0 ±0.6	0.4 ±0.6
	8/30/2016	<1.0	<1.0	17	<1.0	<50	<1.0	7,900	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	49,000	<100	7,000	120,000	5.2	0.4 ±0.3	0.3 ±0.4	0.7 ±0.4
	10/17/2016	<1.0	<1.0	17	<1.0	<50	<1.0	9,700	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	60,000	<100	6,000	130,000	5.6	0.6 ±0.4	0.0 ±0.4	0.6 ±0.4
	11/29/2016	<1.0	<1.0	16	<1.0	<50	<1.0	8,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	62,000	<100	6,000	88,000	5.6	1.0 ±0.4	0.8 ±0.5	1.8 ±0.5
	4/19/2017	<1.0	<1.0	16	<1.0	<50	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	56,000	<100	8,000	120,000	5.8	0.4 ±0.3	0.2 ±0.5	0.6 ±0.5
	11/17/2017					50		12,000									68,000	<100	8,000	120,000	5.7			
	1/31/2018 ¢							12,000																
	4/9/2018					67		12,000									55,000	<100	10,000	160,000	5.9			
	7/25/2018 ¢							12,000									63,000		13,000	140,000	5.9			
	11/29/2018					87		13,000									66,000	<100	10,000	100,000	6.1			
SB-4	2/23/2016	<1.0	<1.0	14	<1.0	<50	<1.0	8,400	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0	<1.0	<1.0	95,000	<100	9,000	210,000	5.5	0.3 ±0.1	1.0 ±0.6	1.3 ±0.6
	4/25/2016	<1.0	<1.0	14	<1.0	<50	<1.0	9,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	110,000	<100	8,000	200,000	5.3	0.3 ±0.3	0.0 ±0.4	0.3 ±0.4
	6/6/2016	<1.0	<1.0	12	<1.0	<50	<1.0	8,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	110,000	<100	10,000	230,000	5.6	0.2 ±0.2	0.4 ±0.5	0.6 ±0.5
	7/18/2016	<1.0	<1.0	11	<1.0	<50	<1.0	7,800	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	100,000	<100	11,000	220,000	5.3	0.4 ±0.3	0.4 ±0.6	0.8 ±0.6
	8/30/2016	<1.0	<1.0	10	<1.0	<50	<1.0	6,800	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	88,000	<100	12,000	210,000	5.7	0.2 ±0.2	0.0 ±0.4	0.2 ±0.4
	10/17/2016	<1.0	<1.0	12	<1.0	<50	<1.0	8,400	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	100,000	<100	10,000	190,000	5.7	0.3 ±0.3	0.0 ±0.5	0.3 ±0.5
	11/29/2016	<1.0	1.0	12	<1.0	<50	<1.0	7,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	100,000	<100	10,000	180,000	5.8	0.7 ±0.3	0.5 ±0.5	1.2 ±0.5
	4/19/2017	<1.0	<1.0	19	<1.0	<50	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	120,000	<100	9,000	260,000	5.7	0.3 ±0.3	0.0 ±0.5	0.3 ±0.5
	11/17/2017					<50		10,000									77,000	<100	13,000	170,000	5.8			
	4/9/2018					<50		11,000									93,000	<100	12,000	220,000	5.9			
	7/25/2018 ¢							9,800									95,000		11,000	210,000	5.7			
	11/28/2018					<50		12,000									86,000	<100	13,000	83,000	6.3			
SB-6	2/23/2016	<1.0	<1.0	9.0	<1.0	<50	<1.0	5,300	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0	<1.0	<1.0	80,000	<100	10,000	170,000	5.6	0.1 ±0.07	0.5 ±0.5	0.6 ±0.5
	4/25/2016	<1.0	<1.0	16	<1.0	<50	<1.0	9,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	140,000	<100	7,000	220,000	5.6	0.4 ±0.3	0.0 ±0.4	0.4 ±0.4
	6/6/2016	<1.0	<1.0	17	<1.0	<50	<1.0	9,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	140,000	<100	8,000	270,000	5.4	0.5 ±0.3	0.0 ±0.5	0.5 ±0.5
	7/18/2016	<1.0	<1.0	17	<1.0	<50	<1.0	9,200	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	140,000	<100	9,000	260,000	5.3	0.5 ±0.3	0.3 ±0.6	0.8 ±0.6
	8/30/2016	<1.0	<1.0	18	<1.0	<50	<1.0	9,100	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	140,000	<100	9,000	280,000	5.7	0.4 ±0.2	0.0 ±0.4	0.4 ±0.4
	10/17/2016	<1.0	<1.0	18	<1.0	<50	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	150,000	<100	8,000	260,000	5.8	0.2 ±0.3	0.0 ±0.5	0.2 ±0.5
	11/29/2016	<1.0	<1.0	16	<1.0	<50	<1.0	8,100	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	130,000	<100	9,000	230,000	5.8	0.5 ±0.2	0.8 ±0.5	1.3 ±0.5
	4/19/2017	<1.0	<1.0	13	<1.1	<51	<1.1	7,400	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	100,000	<100	9,000	190,000	5.7	0.4 ±0.3	0.2 ±0.5	0.6 ±0.5
	11/17/2017					<50		9,900									130,000	<100	11,000	230,000	5.6			
	4/9/2018					<50		7,900									120,000	<100	9,500	240,000	5.6			
	7/25/2018 ¢							11,000									180,000		12,000	310,000	5.4			
	11/28/2018					<50		11,000									150,000	<100	11,000	140,000	5.9			
SB-13	2/23/2016	<1.0	<1.0	17	<1.0	<50	<1.0	9,900	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0	<1.0	<1.0	160,000	<100	6,000	270,000	5.3	0.6 ±0.1	0.3 ±0.6	0.9±0.6
	4/25/2016	<1.0	<1.0	17	<1.0	<50	<1.0	8,800	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	160,000	<100	7,000	290,000	5.5	0.4 ±0.3	0.1 ±0.4	0.5 ±0.4
	6/6/2016	<1.0	<1.0	20	<1.0	<50	<1.0	9,900	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	170,000	<100	7,000	320,000	5.5	0.8 ±0.3	0.0 ±0.5	0.8 ±0.5
	7/18/2016	<1.0	<1.0	18	<1.0	<50	<1.0	9,700	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	160,000	<100	8,000	330,000	5.3	0.8 ±0.3	0.0 ±0.6	0.8 ±0.6
	8/30/2016	<1.0	1.0	20	<1.0	<50	<1.0	8,100	2.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	150,000	<100	8,000	270,000	5.4	0.8 ±0.3	0.6 ±0.4	1.4 ±0.4
	10/17/2016	<1.0	<1.0	15	<1.0	<50	<1.0	8,800	2.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	150,000	<100	8,000	260,000	5.1	0.7 ±0.4	0.6 ±0.5	1.3 ±0.5
	11/29/2016	<1.0	<1.0	16	<1.0	<50	<1.0	7,400	1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	140,000	<100	8,000	240,000	5.7	0.6 ±0.3	0.7 ±0.5	1.3 ±0.5
	4/19/2017	<1.0	<1.0	16	<1.1	<51	<1.1	8,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	130,000	<100	8,000	270,000	5.6	0.9 ±0.3	0.3 ±0.5	1.2 ±0.5
	11/17/2017					<50		7,000									110,000	<100	9,000	220,000	5.8			
	4/9/2018					<50		11,000									170,000	<100	8,000	330,000	5.8			
	7/25/2018 ¢							10,000									190,000		8,700	340,000	5.7			
	11/28/2018					<50		13,000									200,000	<100	7,200	260,000	5.8			
SB-14	2/24/2016	<1.0	<1.0	3.0	<1.0	<50	<1.0	6,100	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0	<1.0	<1.0	16,000	<100	4,000	56,000	5.1	0.2 ±0.08	0.0 ±0.5	0.2 ±0.5
	4/25/2016	<1.0	<1.0	9.0	<1.0	<50	<1.0	11,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	58,000	<100	3,000	140,000	5.6	0.8 ±0.5	0.2 ±0.1	1.0 ±0.5
	6/6/2016	<1.0	<1.0	6.0	<1.0	<50	<1.0	7,600	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	32,000	<100	4,000	100,000	5.4	0.5 ±0.2	0.2 ±0.5	0.7 ±0.5
	7/18/2016	<1.0	<1.0	3.0	<1.0	<50	<1.0	6,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	21,000	<100	5,000	68,000	5.3	0.2 ±0.2	0.3 ±0.5	0.5 ±0.5
	8/30/2016	<1.0	<1.0	2.0	<1.0	<50	<1.0	5,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	14,000	<100	4,000	71,000	5.8	0.4 ±0.3	0.4 ±0.5	0.8 ±0.5
	10/17/2016	<1.0	<1.0	2.0	<1.0	<50	<1.0	4,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	11,000	<100	4,000	29,000	5.6	0.2 ±0.3	0.0 ±0.5	0.2 ±0.5
	11/29/2016	<1.0	<1.0	2.0	<1.0	<50	<1.0	2,900	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	7,000	<100	4,000	12,000	5.2	0.2 ±0.4	0.2 ±0.5	0.4 ±0.5
	4/19/2017	<1.0	<1.0	10	<1.0	<50	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	56,000	<100	5,000	120,000	5.6	0.7 ±0.3	0.1 ±0.5	0.8 ±0.5
	11/17/2017					<50		8,000									18,000	<100	5,000	59,000	5.6			
	4/9/2018					<50		4,200									14,000	<100	8,400	80,000	5.8			
	7/25/2018 ¢							5,100									9,800		6,100	56,000	5.6			
	11/28/2018					<50		4,500									7,800	<100	6,300	<5,000	6.0			

TABLE 1
Summary of Analytical Results – Groundwater
Merrimack Station Coal Ash Landfill
Bow, New Hampshire

Notes:

1. Samples were collected by Eastern Analytical, Inc. (EAI) of Concord, New Hampshire on the dates indicated and analyzed by EAI for select metals by USEPA Method 6020. Additional analysis for general select wet chemistry parameters were completed by EAI. Analysis for radium 226 and 228 was completed by KNL Environmental Testing, Inc., of Tampa, Florida. Analysis for lithium was completed by SGS Accutest, of Marlborough, Massachussets (Feb. 2016), and Katahdin Analytical Services, of Scarborough, Maine (April 2016 through October 2016).

2. Concentrations are presented in micrograms per liter (µg/L) which are equivalent to parts per billion (ppb), or they are presented in picoCuries per liter (pCi/L) or pH standard units.

3. "<" indicates the analyte was not detected above the indicated laboratory reporting limit.
A blank indicates the sample was not analyzed for this parameter.

4. "GW-1" and "GW-2" Groundwater Standards are from the New Hampshire Department of Environmental Services (NHDES) Contaminated Sites Risk Characterization and Management Policy (RCMP) (January 1998, with 2000 through 2018 revisions/addenda). GW-1 Groundwater Standards are equivalent to the Ambient Groundwater Quality Standards (AGQSs) promulgated in Env-Or 600 (June 2015 with October 2016 amendment). The AGQS/GW-1 Groundwater Standards are intended to be protective of groundwater as a source of drinking water. The GW-2 Groundwater Standards apply to groundwater as a potential source of indoor air contamination.

5. "Drinking Water MCLs" are from the United States Environmental Protection Agency (EPA) website (accessed March 22, 2016). The Maximum Contaminant Level (MCL) is the highest level of a contaminant that is allowed in drinking water. MCLs are enforceable standards for drinking water systems.

6. "†" indicates the RCMP lists as not currently available.
"‡" indicates the value provided is the corresponding "dissolved metal" NHDES standard for reference only; NHDES standards for total metals are listed in the RCMP.
"NA" indicates the RCMP lists as not applicable.
"NS" indicates the analyte is not listed in the RCMP or MCL list.
"¢" indicates sample rounds collected as part of the resampling program for identifying statistically significant increases (SSIs).

7. **Bold** values exceed the AGQS/GW-1 Groundwater Standard.
Italic values exceed the GW-2 Groundwater Standard.

TABLE 2
Summary of Groundwater Level Measurements
Merrimack Station Coal Ash Landfill
Bow, New Hampshire

Date	Depths and elevations in feet.															Inferred General Groundwater Flow Rate (feet/day)	Inferred General Groundwater Flow Direction
	SB-1			SB-4			SB-6			SB-13			SB-14				
	Reference Elevation	Depth to Water	Water Elevation	Reference Elevation	Depth to Water	Water Elevation	Reference Elevation	Depth to Water	Water Elevation	Reference Elevation	Depth to Water	Water Elevation	Reference Elevation	Depth to Water	Water Elevation		
Feb-16	240.85	33.82	207.03	274.26	67.36	206.90	268.77	61.84	206.93	219.86	11.83	208.03	242.70	34.88	207.82	0.5 - 2.7	Northeast
Apr-16	240.85	32.19	208.66	274.26	65.63	208.63	268.77	60.07	208.70	219.86	10.16	209.70	242.70	33.13	209.57	0.5 - 2.5	Northeast
Jun-16	240.85	31.84	209.01	274.26	66.24	208.02	268.77	60.80	207.97	219.86	11.11	208.75	242.70	33.93	208.77	0.4 - 1.9	East
Jul-16	240.85	33.88	206.97	274.26	67.30	206.96	268.77	62.07	206.70	219.86	12.41	207.45	242.70	35.10	207.60	0.4 - 1.9	Northeast
Aug-16	240.85	35.09	205.76	274.26	68.54	205.72	268.77	63.19	205.58	219.86	13.76	206.10	242.70	36.39	206.31	0.3 - 1.4	Northeast
Oct-16	240.85	36.20	204.65	274.26	69.68	204.58	268.77	64.42	204.35	219.86	13.92	205.94	242.70	37.58	205.12	0.8 - 3.9	North-Northeast
Nov-16	240.85	36.40	204.45	274.26	69.93	204.33	268.77	64.69	204.08	219.86	15.14	204.72	242.70	37.80	204.90	0.3 - 1.6	East-Northeast
Apr-17	240.85	32.27	208.58	274.26	65.82	208.44	268.77	60.04	208.73	219.86	9.58	210.28	242.70	32.99	209.71	0.8 - 3.8	North-Northeast
Nov-17	240.85	32.87	207.98	274.26	66.39	207.87	268.77	60.97	207.80	219.86	11.33	208.53	242.70	34.08	208.62	0.4 - 1.8	Northeast
Apr-18	240.85	31.13	209.72	274.26	64.58	209.68	268.77	58.93	209.84	219.86	8.74	211.12	242.70	31.94	210.76	0.6 - 3.2	North-Northeast
Jul-18	240.85	32.60	208.25	274.26	66.01	208.25	268.77	60.84	207.93	219.86	11.13	208.73	242.70	33.78	208.92	0.4 - 2.0	Northeast
Nov-18	240.85	29.99	210.86	274.26	63.59	210.67	268.77	57.92	210.85	219.86	7.66	212.20	242.70	30.82	211.88	0.7 - 3.3	Northeast

Notes:

1. Depths to water were obtained from laboratory reports and field sampling sheets prepared by Eastern Analytical, Inc.

2. Inferred general groundwater flow rates and flow directions are approximate and are based on the limited hydrogeologic and groundwater elevation data available. Other interpretations are possible and actual conditions may vary from those indicated. Note that groundwater elevations, directions, and rates may change due to seasonal or other variations in temperature, precipitation, runoff, or other factors.

3. Approximate groundwater flow rates were calculated using an assumed saturated hydraulic conductivity of 100 to 500 feet per day, and an assumed porosity of 39%. Assumptions are generally consistent with values typical of medium-grained, clean sand. The calculated groundwater flow rate is equivalent to the average interstitial velocity or the seepage velocity.

ATTACHMENT A

ALTERNATIVE SOURCE DEMONSTRATIONS

May 2018

SANBORN HEAD

Building Trust. Engineering Success.

Mr. Allan G. Palmer
GSP Merrimack LLC
431 River Road
Bow, NH 03304

May 15, 2018
File No. 2025.07

Re: Demonstration of Natural Variation in Groundwater Quality
Data Collected November 2017 and January 2018
Merrimack Station Coal Ash Landfill
Bow, New Hampshire

Dear Allan:

Sanborn, Head & Associates, Inc. (Sanborn Head) prepared this Demonstration of Natural Variation in Groundwater Quality for the Merrimack Station Coal Ash Landfill (landfill) located in Bow, New Hampshire. This Demonstration is provided per the email authorization received February 20, 2018 and is prepared in accordance with the Coal Combustion Residual (CCR) Rules (40 CFR Part 257).

Based on the prediction interval procedure performed by Sanborn Head (see Statistical Method Selection Certification [Statistics Certification], dated May 4, 2018), a statistically significant increase (SSI) of the calcium concentration was identified at downgradient well SB-1 compared to background.[1] As such, pursuant to 40 CFR Part 257.94(e)(2), within 90 days of detecting the SSI, the owner or operator may provide a written demonstration from a qualified professional engineer that: (i) a source other than the CCR unit caused the SSI over background levels for a constituent; or (ii) the SSI resulted from either an error in sampling, analysis, or statistical evaluation; or natural variation in groundwater quality.

Based on our understanding of the site characteristics and the natural variation in groundwater characteristics of the region, the SSI of the calcium concentrations at SB-1 is due to the natural variation in groundwater quality. This finding is supported by the following:

- Detected concentrations of calcium are within the naturally occurring range.
- The site groundwater flow patterns correlate with changes in groundwater quality at the site. Because groundwater flow conditions during the background data set collection were generally different than the flow conditions during the SSI sample collection, the SSI reflects natural variation associated with groundwater flow conditions and it is not indicative of a release from the CCR unit.

Groundwater quality data are provided in Table 1 and monitoring well locations are depicted in Figures 1.A through 1.D.

[1] The background group for calcium at SB-1, in addition to the SB-1 data, included data from monitoring wells SB-4, SB-6, and SB-13. Background data were collected in February 2016 through April 2017. The method for background group selection is discussed in the Statistics Certification dated May 4, 2018.

Calcium occurs naturally in groundwater in the region through dissolution of calcium-producing minerals (e.g., calcite). Although the calcium concentration of 12,000 µg/L at SB-1 was not within the range of calcium concentrations measured in a limited USGS study of local stratified drift aquifers (ten wells, 4,000-8,600 µg/L), the calcium concentration of 12,000 µg/L was less than the reported median concentration of 19,800 µg/L in a regional USGS study of crystalline rock that was based on samples collected from 117 wells.[2,3] The calcium concentrations reported in the regional study are applicable to the site because the glacial outwash overburden at the site is eroded from the underlying crystalline rock and has similar mineralogical composition to the aquifers in the USGS study. There is no New Hampshire Ambient Groundwater Quality Standard (AGQS) or United States Environmental Protection Agency (USEPA) maximum contaminant level (MCL) for calcium because it is generally not considered a health risk at concentrations commonly detected in groundwater and drinking water.

Groundwater flow conditions (e.g., groundwater flow direction, flow rate, and elevations) vary at the site. While groundwater at the site typically flows to the northeast with a relatively flat water table (i.e., hydraulic gradients on the order of 0.001 feet per foot [ft/ft]), groundwater hydraulic gradients and flow rates vary and, at times, the overall flow direction at the site can change to either more northerly (i.e., headed north-northeast) or more easterly (headed east). Tabulated flow conditions for each monitoring event are provided as Table 2 and groundwater contour maps for select monitoring events are provided as Figures 1.A through 1.D (groundwater contour maps for June 2016, November 2016, April 2017, and November 2017, respectively). These tabulated values and groundwater contour maps demonstrate the variability in groundwater flow conditions observed at the site.

In addition to changing groundwater flow patterns, groundwater quality parameter concentrations vary at the site. For example, calcium concentrations at monitoring well SB-14 ranged from 2,900 to 11,000 µg/L during the background monitoring period. Monitoring well SB-14 is upgradient/cross-gradient of the CCR unit and, when flow directions are northeast or north-northeast, SB-14 is approximately upgradient of SB-1. Due to the variability in calcium concentrations at SB-14, if the SB-1 sample (12,000 µg/L calcium) were compared to the SB-14 background data set, then it would not be considered an SSI.[4] Additionally, as can be seen below in Exhibit 1, and as confirmed by statistical analysis, calcium concentrations at SB-14 are strongly correlated with groundwater elevations.[5]

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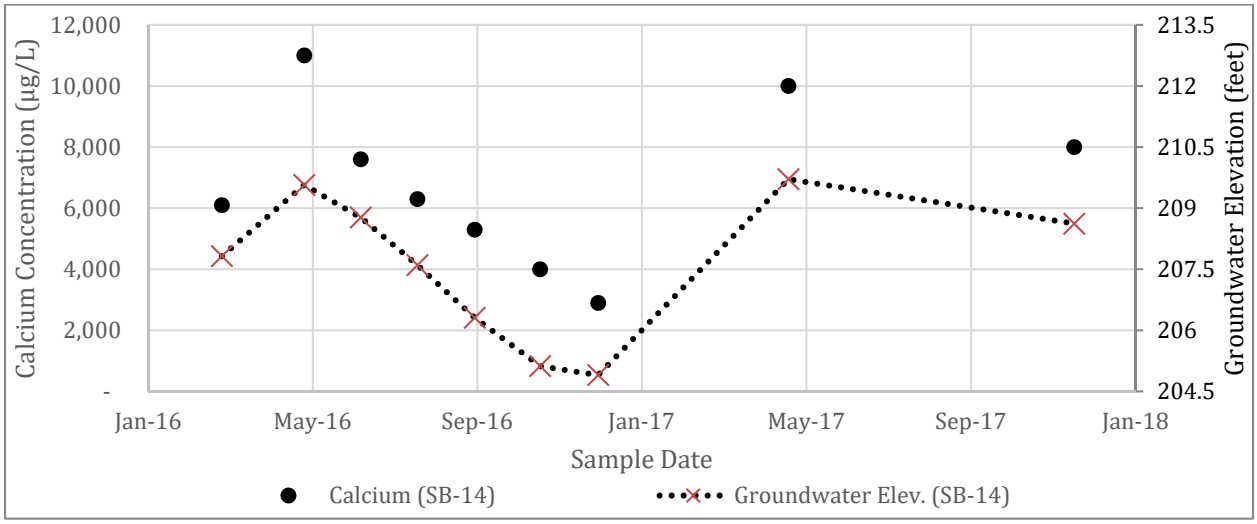
2 "Geohydrology and Water Quality of Stratified-Draft Aquifers in the Middle Merrimack River Basin, South-Central New Hampshire," prepared by U.S. Geological Survey and dated 1995.

3 "Quality of Water from Crystalline Rock Aquifers in New England, New Jersey, and New York, 1995-2007," prepared by U.S. Department of the Interior and U.S. Geological Survey and dated 2012.

4 Based on the prediction limit interval approach discussed in the Statistics Certification dated May 4, 2018.

5 Statistically significant positive correlation between groundwater elevation and calcium concentrations at SB-14 based on a Theil-Sen trend analysis test performed using the statistical software ProUCL 5.1.002 and a confidence coefficient of 0.95.

Exhibit 1: Groundwater Elevations and Calcium Concentrations at SB-14



In addition to naturally fluctuating calcium concentrations, another potential source of variation in groundwater quality at the CCR unit is the extensive and ongoing sand and gravel mining occurring upgradient and cross-gradient of monitoring wells SB-1 and SB-14. Mining activities in the area include approximately 30 acres of non-vegetated area and a drainage feature recently installed directly upgradient/cross-gradient of SB-1 (aerial photographs indicate the apparent vegetated swale was installed between April 2016 and September 2017).

The calcium concentrations measured for the SB-1 background data set were relatively consistent compared to the SB-14 background data set. The consequence of the consistency in a background data set, in the context of the prediction limit statistical analysis that was used to evaluate the SSI, was that the relatively small increases in calcium concentration in November 2017 at SB-1 was interpreted as an SSI. It is our opinion that the SSI in calcium concentration at well SB-1 was due to natural variation in groundwater quality due to groundwater flow conditions that were not adequately reflected in the background data set. Specifically, the November 2017 sample was collected at a time when groundwater elevations were high and groundwater flow was to the northeast or north-northeast. The only background samples collected under these groundwater flow conditions were during April 2016 and April 2017, which both correspond with the background samples with the greatest calcium concentrations at SB-1 (both 10,000 µg/L).

The site conceptual model supports the finding that the increased concentrations of calcium at SB-1 during November 2017 is related to the groundwater flow conditions (i.e., northeast or north-northeast flow and greater groundwater elevations). The November 2017 sample collected at SB-1 reflected the groundwater flow from an upgradient area during a time when calcium concentrations in the upgradient area (e.g., at SB-14) were naturally elevated. This natural variation was not reflected in the background data set because only two of the eight background samples were collected under the groundwater flow conditions similar to those observed during November 2017.

Considering the information currently available, we anticipate that incorporation of additional groundwater quality data into the background data set could mitigate the potential for an SSI associated with natural variation in groundwater flow. Additionally, a more regular sampling schedule (e.g., spring and fall under the semiannual detection monitoring program) may provide more regularity in the groundwater flow conditions during sampling events. We recommend continuing to perform trend analyses during future statistical analyses to detect trends in data and to select appropriate statistical methods.

Based on our understanding of the information presented herein, including the site characteristics, natural variation of regional groundwater quality, and the groundwater flow and groundwater quality monitoring data at SB-1 and other monitoring wells, it is our opinion that the SSI in calcium concentration at well SB-1 is due to natural variation in groundwater flow.

Thank you for the opportunity to be of service to GSP Merrimack LLC. We look forward to continuing to work with you on this project.

Sincerely,
SANBORN, HEAD & ASSOCIATES, INC.

Harrison R. Roakes
Senior Project Engineer

Eric S. Steinhauser, P.E., CPESC, CPSWQ
Principal

HRR/AEA/ESS:hrr

Enclosures: Table 1 – Summary of Analytical Results - Groundwater
Table 2 – Summary of Groundwater Level Measurements
Figure 1.A – June 2016 Groundwater Contours
Figure 1.B – November 2016 Groundwater Contours
Figure 1.C – April 2017 Groundwater Contours
Figure 1.D – October 2017 Groundwater Contours

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TABLES

TABLE 1
Summary of Analytical Results – Groundwater
Merrimack Station Coal Ash Landfill
Bow, New Hampshire

Location	Date	Metals µg/L															Miscellaneous Parameters µg/L				s.u	pCi/L		
		Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium	Chloride	Fluoride	Sulfate	Total Dissolved Solids	pH	Radium 226	Radium 228	Radium 226+228
Drinking Water MCL		6	10	2,000	4	NS	5	NS	100	NS	15	NS	2	NS	50	2	NS	4,000	NS	NS	NS	NS	NS	5
GW-1		6 ‡	10 ‡	2,000 ‡	4 ‡	620 ‡	5 ‡	NS ‡	100	NS ‡	15 ‡	NS	2 ‡	NS	50 ‡	2 ‡	NS	4,000	500,000	NS	NS	NS	NS	NS
GW-2		NA	NA	NA	NA	NA	NA	NS	NA	NS	NA	NS	NA	NS	NA	NA	NS	†	†	NS	NS	NS	NS	NS
SB-1	2/24/2016	<1.0	<1.0	14	<1.0	60	<1.0	7,200	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0	<1.0	<1.0	44,000	<100	8,000	96,000	5.2	0.2 ±0.1	0.6 ±0.6	0.8 ±0.6
	4/25/2016	<1.0	<1.0	18	<1.0	100	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	1.0	<1.0	<1.0	58,000	<100	9,000	120,000	5.7	0.5 ±0.2	0.2 ±0.4	0.7 ±0.4
	6/6/2016	<1.0	<1.0	16	<1.0	<50	<1.0	8,200	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	55,000	<100	7,000	140,000	5.5	0.6 ±0.3	0.2 ±0.5	0.8 ±0.5
	7/18/2016	<1.0	<1.0	16	<1.0	70	<1.0	8,600	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	60,000	<100	9,000	120,000	5.4	0.4 ±0.3	0.0 ±0.6	0.4 ±0.6
	8/30/2016	<1.0	<1.0	17	<1.0	<50	<1.0	7,900	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	49,000	<100	7,000	120,000	5.2	0.4 ±0.3	0.3 ±0.4	0.7 ±0.4
	10/17/2016	<1.0	<1.0	17	<1.0	<50	<1.0	9,700	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	60,000	<100	6,000	130,000	5.6	0.6 ±0.4	0.0 ±0.4	0.6 ±0.4
	11/29/2016	<1.0	<1.0	16	<1.0	<50	<1.0	8,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	62,000	<100	6,000	88,000	5.6	1.0 ±0.4	0.8 ±0.5	1.8 ±0.5
	4/19/2017	<1.0	<1.0	16	<1.0	<50	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	56,000	<100	8,000	120,000	5.8	0.4 ±0.3	0.2 ±0.5	0.6 ±0.5
	11/17/2017					50		12,000¢									68,000	<100	8,000	120,000	5.7			
SB-4	2/23/2016	<1.0	<1.0	14	<1.0	<50	<1.0	8,400	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0	<1.0	<1.0	95,000	<100	9,000	210,000	5.5	0.3 ±0.1	1.0 ±0.6	1.3 ±0.6
	4/25/2016	<1.0	<1.0	14	<1.0	<50	<1.0	9,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	110,000	<100	8,000	200,000	5.3	0.3 ±0.3	0.0 ±0.4	0.3 ±0.4
	6/6/2016	<1.0	<1.0	12	<1.0	<50	<1.0	8,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	110,000	<100	10,000	230,000	5.6	0.2 ±0.2	0.4 ±0.5	0.6 ±0.5
	7/18/2016	<1.0	<1.0	11	<1.0	<50	<1.0	7,800	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	100,000	<100	11,000	220,000	5.3	0.4 ±0.3	0.4 ±0.6	0.8 ±0.6
	8/30/2016	<1.0	<1.0	10	<1.0	<50	<1.0	6,800	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	88,000	<100	12,000	210,000	5.7	0.2 ±0.2	0.0 ±0.4	0.2 ±0.4
	10/17/2016	<1.0	<1.0	12	<1.0	<50	<1.0	8,400	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	100,000	<100	10,000	190,000	5.7	0.3 ±0.3	0.0 ±0.5	0.3 ±0.5
	11/29/2016	<1.0	1.0	12	<1.0	<50	<1.0	7,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	100,000	<100	10,000	180,000	5.8	0.7 ±0.3	0.5 ±0.5	1.2 ±0.5
	4/19/2017	<1.0	<1.0	19	<1.0	<50	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	120,000	<100	9,000	260,000	5.7	0.3 ±0.3	0.0 ±0.5	0.3 ±0.5
	11/17/2017					<50		10,000									77,000	<100	13,000	170,000	5.8			
SB-6	2/23/2016	<1.0	<1.0	9.0	<1.0	<50	<1.0	5,300	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0	<1.0	<1.0	80,000	<100	10,000	170,000	5.6	0.1 ±0.07	0.5 ±0.5	0.6 ±0.5
	4/25/2016	<1.0	<1.0	16	<1.0	<50	<1.0	9,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	140,000	<100	7,000	220,000	5.6	0.4 ±0.3	0.0 ±0.4	0.4 ±0.4
	6/6/2016	<1.0	<1.0	17	<1.0	<50	<1.0	9,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	140,000	<100	8,000	270,000	5.4	0.5 ±0.3	0.0 ±0.5	0.5 ±0.5
	7/18/2016	<1.0	<1.0	17	<1.0	<50	<1.0	9,200	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	140,000	<100	9,000	260,000	5.3	0.5 ±0.3	0.3 ±0.6	0.8 ±0.6
	8/30/2016	<1.0	<1.0	18	<1.0	<50	<1.0	9,100	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	140,000	<100	9,000	280,000	5.7	0.4 ±0.2	0.0 ±0.4	0.4 ±0.4
	10/17/2016	<1.0	<1.0	18	<1.0	<50	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	150,000	<100	8,000	260,000	5.8	0.2 ±0.3	0.0 ±0.5	0.2 ±0.5
	11/29/2016	<1.0	<1.0	16	<1.0	<50	<1.0	8,100	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	130,000	<100	9,000	230,000	5.8	0.5 ±0.2	0.8 ±0.5	1.3 ±0.5
	4/19/2017	<1.0	<1.0	13	<1.1	<51	<1.1	7,400	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	100,000	<100	9,000	190,000	5.7	0.4 ±0.3	0.2 ±0.5	0.6 ±0.5
	11/17/2017					<50		9,900									130,000	<100	11,000	230,000	5.6			
SB-13	2/23/2016	<1.0	<1.0	17	<1.0	<50	<1.0	9,900	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0	<1.0	<1.0	160,000	<100	6,000	270,000	5.3	0.6 ±0.1	0.3 ±0.6	0.9±0.6
	4/25/2016	<1.0	<1.0	17	<1.0	<50	<1.0	8,800	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	160,000	<100	7,000	290,000	5.5	0.4 ±0.3	0.1 ±0.4	0.5 ±0.4
	6/6/2016	<1.0	<1.0	20	<1.0	<50	<1.0	9,900	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	170,000	<100	7,000	320,000	5.5	0.8 ±0.3	0.0 ±0.5	0.8 ±0.5
	7/18/2016	<1.0	<1.0	18	<1.0	<50	<1.0	9,700	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	160,000	<100	8,000	330,000	5.3	0.8 ±0.3	0.0 ±0.6	0.8 ±0.6
	8/30/2016	<1.0	1.0	20	<1.0	<50	<1.0	8,100	2.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	150,000	<100	8,000	270,000	5.4	0.8 ±0.3	0.6 ±0.4	1.4 ±0.4
	10/17/2016	<1.0	<1.0	15	<1.0	<50	<1.0	8,800	2.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	150,000	<100	8,000	260,000	5.1	0.7 ±0.4	0.6 ±0.5	1.3 ±0.5
	11/29/2016	<1.0	<1.0	16	<1.0	<50	<1.0	7,400	1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	140,000	<100	8,000	240,000	5.7	0.6 ±0.3	0.7 ±0.5	1.3 ±0.5
	4/19/2017	<1.0	<1.0	16	<1.1	<51	<1.1	8,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	130,000	<100	8,000	270,000	5.6	0.9 ±0.3	0.3 ±0.5	1.2 ±0.5
	11/17/2017					<50		7,000									110,000	<100	9,000	220,000	5.8			
SB-14	2/24/2016	<1.0	<1.0	3.0	<1.0	<50	<1.0	6,100	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0	<1.0	<1.0	16,000	<100	4,000	56,000	5.1	0.2 ±0.08	0.0 ±0.5	0.2 ±0.5
	4/25/2016	<1.0	<1.0	9.0	<1.0	<50	<1.0	11,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	58,000	<100	3,000	140,000	5.6	0.8 ±0.5	0.2 ±0.1	1.0 ±0.5
	6/6/2016	<1.0	<1.0	6.0	<1.0	<50	<1.0	7,600	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	32,000	<100	4,000	100,000	5.4	0.5 ±0.2	0.2 ±0.5	0.7 ±0.5
	7/18/2016	<1.0	<1.0	3.0	<1.0	<50	<1.0	6,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	21,000	<100	5,000	68,000	5.3	0.2 ±0.2	0.3 ±0.5	0.5 ±0.5
	8/30/2016	<1.0	<1.0	2.0	<1.0	<50	<1.0	5,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	14,000	<100	4,000	71,000	5.8	0.4 ±0.3	0.4 ±0.5	0.8 ±0.5
	10/17/2016	<1.0	<1.0	2.0	<1.0	<50	<1.0	4,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	11,000	<100	4,000	29,000	5.6	0.2 ±0.3	0.0 ±0.5	0.2 ±0.5
	11/29/2016	<1.0	<1.0	2.0	<1.0	<50	<1.0	2,900	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	7,000	<100	4,000	12,000	5.2	0.2 ±0.4	0.2 ±0.5	0.4 ±0.5
	4/19/2017	<1.0	<1.0	10	<1.0	<50	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	56,000	<100	5,000	120,000	5.6	0.7 ±0.3	0.1 ±0.5	0.8 ±0.5
	11/17/2017					<50		8,000									18,000	<100	5,000	59,000	5.6			

Notes:

1. Samples were collected by Eastern Analytical, Inc. (EAI) of Concord, New Hampshire on the dates indicated and analyzed by EAI for select metals by USEPA Method 6020. Additional analysis for general select wet chemistry parameters were completed by EAI. Analysis for radium 226 and 228 was completed by KNL Environmental Testing, Inc., of Tampa, Florida. Analysis for lithium was completed by SGS Accutest, of Marlborough, Massachussets (Feb. 2016), and Katahdin Analytical Services, of Scarborough, Maine (April 2016 through October 2016).

2. Concentrations are presented in micrograms per liter (µg/L) which are equivalent to parts per billion (ppb), or they are presented in picoCuries per liter (pCi/L) or pH standard units.

3. "<" indicates the analyte was not detected above the indicated laboratory reporting limit.
A blank indicates the sample was not analyzed for this parameter.

4. "GW-1" and "GW-2" Groundwater Standards are from the New Hampshire Department of Environmental Services (NHDES) Contaminated Sites Risk Characterization and Management Policy (RCMP) (January 1998, with 2000 through 2013 revisions/addenda). GW-1 Groundwater Standards are equivalent to the Ambient Groundwater Quality Standards (AGQSs) promulgated in Env-Or 600 (June 2015 with October 2016 amendment). The AGQS/GW-1 Groundwater Standards are intended to be protective of groundwater as a source of drinking water. The GW-2 Groundwater Standards apply to groundwater as a potential source of indoor air contamination.

5. "Drinking Water MCLs" are from the United States Environmental Protection Agency (EPA) website (accessed March 22, 2016). The Maximum Contaminant Level (MCL) is the highest level of a contaminant that is allowed in drinking water. MCLs are enforceable standards for drinking water systems.

6. "†" indicates the RCMP lists as not currently available.
"‡" indicates the value provided is the corresponding "dissolved metal" NHDES standard for reference only; NHDES standards for total metals are listed in the RCMP.
"NA" indicates the RCMP lists as not applicable.
"NS" indicates the analyte is not listed in the RCMP or MCL list.
"¢" indicates that, as part of the program for identifying statistically significant increases (SSIs), SB-1 was resampled for calcium on 1/31/2018. The 1/31/2018 result was also 12,000 µg/L.

7. **Bold** values exceed the AGQS/GW-1 Groundwater Standard.

TABLE 2
Summary of Groundwater Level Measurements
Merrimack Station Coal Ash Landfill
Bow, New Hampshire

Date	Depths and elevations in feet.															Inferred General Groundwater Flow Rate (feet/day)	Inferred General Groundwater Flow Direction
	SB-1			SB-4			SB-6			SB-13			SB-14				
	Reference Elevation	Depth to Water	Water Elevation	Reference Elevation	Depth to Water	Water Elevation	Reference Elevation	Depth to Water	Water Elevation	Reference Elevation	Depth to Water	Water Elevation	Reference Elevation	Depth to Water	Water Elevation		
Feb-16	240.85	33.82	207.03	274.26	67.36	206.90	268.77	61.84	206.93	219.86	11.83	208.03	242.70	34.88	207.82	0.5 - 2.7	Northeast
Apr-16	240.85	32.19	208.66	274.26	65.63	208.63	268.77	60.07	208.70	219.86	10.16	209.70	242.70	33.13	209.57	0.5 - 2.5	Northeast
Jun-16	240.85	31.84	209.01	274.26	66.24	208.02	268.77	60.80	207.97	219.86	11.11	208.75	242.70	33.93	208.77	0.4 - 1.9	East
Jul-16	240.85	33.88	206.97	274.26	67.30	206.96	268.77	62.07	206.70	219.86	12.41	207.45	242.70	35.10	207.60	0.4 - 1.9	Northeast
Aug-16	240.85	35.09	205.76	274.26	68.54	205.72	268.77	63.19	205.58	219.86	13.76	206.10	242.70	36.39	206.31	0.3 - 1.4	Northeast
Oct-16	240.85	36.20	204.65	274.26	69.68	204.58	268.77	64.42	204.35	219.86	13.92	205.94	242.70	37.58	205.12	0.8 - 3.9	North-Northeast
Nov-16	240.85	36.40	204.45	274.26	69.93	204.33	268.77	64.69	204.08	219.86	15.14	204.72	242.70	37.80	204.90	0.3 - 1.6	East-Northeast
Apr-17	240.85	32.27	208.58	274.26	65.82	208.44	268.77	60.04	208.73	219.86	9.58	210.28	242.70	32.99	209.71	0.8 - 3.8	North-Northeast
Nov-17	240.85	32.87	207.98	274.26	66.39	207.87	268.77	60.97	207.80	219.86	11.33	208.53	242.70	34.08	208.62	0.4 - 1.8	Northeast

Notes:

1. Reference elevations were surveyed by PSNH and provided to Sanborn Head.

2. Depths to water were obtained from laboratory reports and field sampling sheets prepared by Eastern Analytical, Inc.

3. Inferred general groundwater flow rates and flow directions are approximate and are based on the limited hydrogeologic and groundwater elevation data available. Other interpretations are possible and actual conditions may vary from those indicated. Note that groundwater elevations, directions, and rates may change due to seasonal or other variations in temperature, precipitation, runoff, or other factors.

4. Approximate groundwater flow rates were calculated using an assumed saturated hydraulic conductivity of 100 to 500 feet per day, and an assumed porosity of 39%. Assumptions are generally consistent with values typical of medium-grained, clean sand. The calculated groundwater flow rate is equivalent to the average interstitial velocity or the seepage velocity.

FIGURES

Figure 1.A

June 2016 Groundwater Contours

Merrimack Station
Coal Ash Landfill
Bow, New Hampshire

Drawn By: L. Teal
Designed By: H. Roakes
Reviewed By: L. Damiano
Project No: 2025.07
Date: April 2018

Notes

1. The base map was developed from a drawing prepared by Public Service Company of New Hampshire's Engineering Division entitled, "Area Plan, Merrimack Station, Bow, N.H." The drawing was dated 5/1/90 and was last revised on 6/28/95.

2. The location of site and site features shown should be considered approximate only.

3. Groundwater contours shown on this plan were developed based on groundwater level measurements in the monitoring wells made on June 6, 2016.

Legend

- SB-4 — Monitoring Well
- (209.01') — Groundwater Elevation Measured on June 6, 2016
- Right-Of-Way
- Fence
- OU — Overhead Utilities
- 250 — Elevation Contour
- 208.50' — Groundwater Contour (dashed where less constrained)

SB-4 (208.02')
SB-6 (207.97')
SB-1 (209.01')
SB-13 (208.75')
SB-14 (208.77')
208.25'
208.00'
208.50'
208.75'
APPROXIMATE LOCATION OF KETTLE HOLE
MERRIMACK STATION LINED COAL ASH LANDFILL
LEACHATE COLLECTION TANKS

150' 75' 0 150' 300' Feet

SANBORN HEAD

File:P:\2000s\2025.03\Graphics Files\CAD\Monitoring Well_locs.dwg Plot Date: 1-5-16

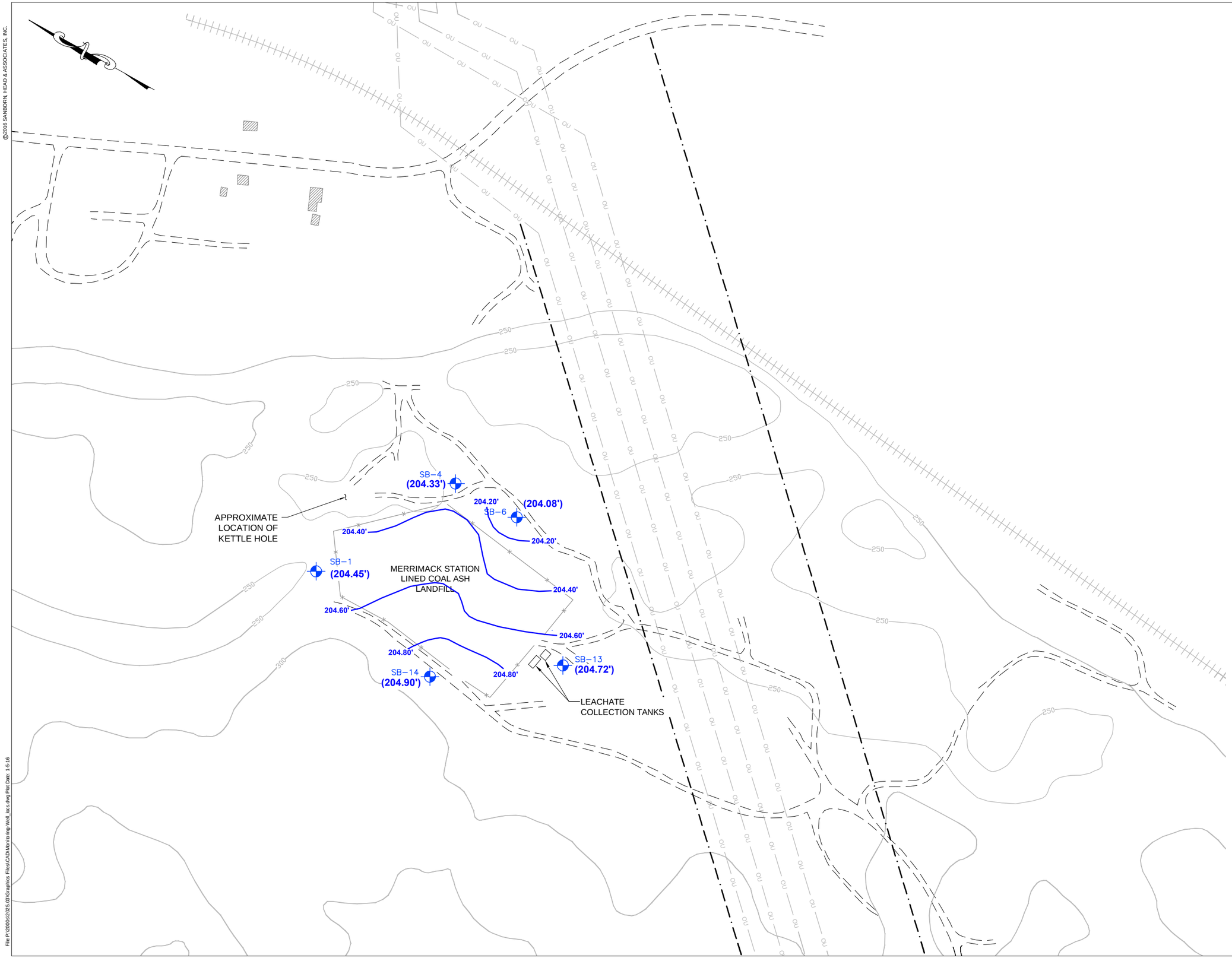

Figure 1.B

November 2016 Groundwater Contours

Merrimack Station
Coal Ash Landfill
Bow, New Hampshire

Drawn By: L. Teal
Designed By: H. Roakes
Reviewed By: L. Damiano
Project No: 2025.07
Date: April 2018

Notes

1. The base map was developed from a drawing prepared by Public Service Company of New Hampshire's Engineering Division entitled, "Area Plan, Merrimack Station, Bow, N.H." The drawing was dated 5/1/90 and was last revised on 6/28/95.

2. The location of site and site features shown should be considered approximate only.

3. Groundwater contours shown on this plan were developed based on groundwater level measurements in the monitoring wells made on November 29, 2016.

Legend

- SB-4 — Monitoring Well
- (204.45') — Groundwater Elevation Measured on Nov. 29, 2016
- Right-Of-Way
- Fence
- OU — Overhead Utilities
- 250 — Elevation Contour
- 204.60' — Groundwater Contour (dashed where less constrained)

150' 75' 0 150' 300' Feet

SANBORN HEAD

File:P:\2000s\2025.03\Graphics Files\CAD\Monitoring Well_locs.dwg Plot Date: 1-5-16

Figure 1.C

April 2017 Groundwater Contours

Merrimack Station
Coal Ash Landfill
Bow, New Hampshire

Drawn By: L. Teal
Designed By: H. Roakes
Reviewed By: L. Damiano
Project No: 2025.07
Date: April 2018

Notes

1. The base map was developed from a drawing prepared by Public Service Company of New Hampshire's Engineering Division entitled, "Area Plan, Merrimack Station, Bow, N.H." The drawing was dated 5/1/90 and was last revised on 6/28/95.

2. The location of site and site features shown should be considered approximate only.

3. Groundwater contours shown on this plan were developed based on groundwater level measurements in the monitoring wells made on April 19, 2017.

Legend

- SB-4 — Monitoring Well
- (208.58') — Groundwater Elevation Measured on April 19, 2017
- Right-Of-Way
- Fence
- OU — Overhead Utilities
- 250 — Elevation Contour
- 209.50' — Groundwater Contour (dashed where less constrained)

SB-4 (208.44')
208.50'
208.50'
SB-6 (208.73')
APPROXIMATE LOCATION OF KETTLE HOLE
SB-1 (208.58')
209.00'
MERRIMACK STATION LINED COAL ASH LANDFILL
209.00'
209.50'
209.50'
210.00'
SB-13 (210.28')
210.00'
SB-14 (209.71')
LEACHATE COLLECTION TANKS

150' 75' 0 150' 300' Feet

SANBORN HEAD

File:P:\2000s\2025.03\Graphics Files\CAD\Monitoring Well_locs.dwg Plot Date: 1-5-16

SB-4
(207.87')

SB-6
(207.80')

APPROXIMATE
LOCATION OF
KETTLE HOLE

SB-1
(207.98')

MERRIMACK STATION
LINED COAL ASH
LANDFILL

208.00'

208.20'

208.40'

SB-14
(208.62')

208.60'

SB-13
(208.53')

LEACHATE
COLLECTION TANKS

Figure 1.D

November 2017 Groundwater Contours

Merrimack Station
Coal Ash Landfill
Bow, New Hampshire

Drawn By: L. Teal
Designed By: H. Roakes
Reviewed By: L. Damiano
Project No: 2025.07
Date: April 2018

Notes

1. The base map was developed from a drawing prepared by Public Service Company of New Hampshire's Engineering Division entitled, "Area Plan, Merrimack Station, Bow, N.H." The drawing was dated 5/1/90 and was last revised on 6/28/95.

2. The location of site and site features shown should be considered approximate only.

3. Groundwater contours shown on this plan were developed based on groundwater level measurements in the monitoring wells made on November 17, 2017.

Legend

- SB-4 — Monitoring Well
- (207.98') — Groundwater Elevation Measured on Nov. 17, 2017
- Right-Of-Way
- Fence
- OU — Overhead Utilities
- 250 — Elevation Contour
- 208.20' — Groundwater Contour (dashed where less constrained)

150' 75' 0 150' 300' Feet

SANBORN HEAD

November 2018

SANBORN HEAD

SANBORN HEAD

Building Trust. Engineering Success.

Mr. Allan G. Palmer
GSP Merrimack LLC
431 River Road
Bow, NH 03304

November 6, 2018
File No. 2025.07

Re: Alternative Source Demonstration
Data Collected April 2018 and July 2018
Merrimack Station Coal Ash Landfill
Bow, New Hampshire

Dear Allan:

Sanborn, Head & Associates, Inc. (Sanborn Head) prepared this Alternative Source Demonstration (ASD) for the Merrimack Station Coal Ash Landfill (the site) located in Bow, New Hampshire. This ASD is provided per the email authorization received from GSP Merrimack LLC on September 18, 2018 and is prepared in accordance with the Coal Combustion Residual (CCR) Rules (40 CFR Part 257).

INTRODUCTION

Based on the prediction interval procedure performed by Sanborn Head, statistically significant increases (SSIs) compared to background were identified at monitoring wells SB-01 (calcium and sulfate) and SB-14 (sulfate).[1] As such, pursuant to 40 CFR Part 257.94(e)(2), within 90 days of detecting the SSI, the owner or operator may provide a written demonstration from a qualified professional engineer that: (i) a source other than the CCR unit caused the SSI over background levels for a constituent; or (ii) the SSI resulted from either an error in sampling, analysis, or statistical evaluation; or natural variation in groundwater quality.

Using a weight-of-evidence approach, we conclude that the SSIs are due to natural variation in groundwater quality based on the following findings:

- Detected concentrations of sulfate and calcium are within the range of naturally occurring concentrations.
- Groundwater flow conditions and groundwater quality vary at the site. Based on variation observed at the site, including at the most upgradient well, the variation in groundwater quality data that resulted in SSIs at SB-01 and SB-14 are generally consistent with the natural variation that is observed at the site.
- Comparison of major ions in groundwater and in landfill leachate do not indicate leachate impacts to groundwater at the site.

[1] The laboratory analytical data resulting in the SSIs were received on August 8, 2018. The statistical analyses are summarized in the Statistical Method Selection Certification, dated May 4, 2018.

Groundwater quality data are provided in Table 1 and monitoring well locations are depicted in Figures 1.A through 1.F.

NATURALLY OCCURING CONCENTRATIONS

The concentrations of calcium and sulfate associated with the SSIs are within the range of naturally occurring concentrations for comparable groundwaters, as reported in a local, state-wide, and regional studies, summarized in Exhibit 1. [2,3,4] The local and state-wide USGS studies are specific to stratified drift aquifers with generally similar geology to the site, and the regional study is applicable to the site because the glacial outwash overburden at the site is eroded from the underlying crystalline rock and has similar mineralogical composition to the aquifers in the regional USGS study.

Exhibit 1: Comparison of Site Calcium and Sulfate Concentrations to Literature

Study/Location	Calcium (µg/L)		Sulfate (µg/L)	
Local Stratified Drift Aquifers [n=16]	Min.: Median: Max.:	3,400 4,650 8,600	Min.: Median: Max.:	1,000 7,500 14,000
New Hampshire Stratified Drift Aquifers [n=255]	Min.: Median: Max.:	40 7,600 87,000	Min.: Median: Max.:	<100 7,800 79,000
Northeast Crystalline Rock Aquifers [n=117]	Min.: Median: Max.:	2,700 19,800 98,500	Min.: Median: Max.:	310 13,420 68,480
SB-01 (SSI data in **bold**)	April 2018: July 2018:	**12,000** **12,000**	April 2018: July 2018:	**10,000** **13,000**
SB-13 (site upgradient well – no SSI)	April 2018: July 2018:	11,000 10,000	April 2018: July 2018:	8,000 8,700
SB-14 (SSI data in **bold**)	April 2018: July 2018:	4,200 5,100	April 2018: July 2018:	**8,400** **6,100**

Calcium

Calcium occurs naturally in groundwater in the region through dissolution of calcium-producing minerals (e.g., calcite). Although the calcium concentrations at SB-01 were greater than the concentrations in the local study, the SSI concentrations were well within the range of values for New Hampshire wells and were less than the regional median concentration. There is no New Hampshire Ambient Groundwater Quality Standard (AGQS) or United States Environmental Protection Agency (USEPA) maximum contaminant level (MCL) for calcium because it is generally not considered a health risk at concentrations commonly detected in groundwater and drinking water.

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2 "Geohydrology and Water Quality of Stratified-Drift Aquifers in the Upper Merrimack River Basin, South-Central New Hampshire," prepared by U.S. Geological Survey and dated 1997; and "Geohydrology and Water Quality of Stratified-Drift Aquifers in the Middle Merrimack River Basin, South-Central New Hampshire," prepared by U.S. Geological Survey and dated 1995.

3 "Ground-Water Resources in New Hampshire: Stratified-Drift Aquifers", prepared by U.S. Geological Survey and dated 1995.

4 "Quality of Water from Crystalline Rock Aquifers in New England, New Jersey, and New York, 1995-2007," prepared by U.S. Department of the Interior and U.S. Geological Survey and dated 2012.

Sulfate

Sulfate occurs naturally in groundwater in the region through dissolution of sulfate-producing minerals (e.g., sulfide ores). The sulfate data that resulted in SSIs at SB-01 and SB-14 were within the range of sulfate concentrations reported in the local and state studies, and the SSI concentrations were less than the median reported in the regional study. Additionally, the sulfate concentrations detected at the site were much less than the New Hampshire Ambient Groundwater Quality Standard (AGQS) for sulfate of 500,000 µg/L. The AGQSs are intended to be protective of groundwater as a source of drinking water.

NATURAL VARIATION DUE TO GROUNDWATER FLOW

Groundwater flow conditions (i.e., groundwater flow direction, flow rate, and elevations) vary at the site. While groundwater at the site typically flows to the northeast with a relatively flat water table (i.e., hydraulic gradients on the order of 0.001 feet per foot [ft/ft]), groundwater hydraulic gradients and flow rates vary and, at times, the overall flow direction at the site can change to either more northerly (i.e., headed north-northeast) or more easterly (headed east). Tabulated flow conditions for each monitoring event are provided as Table 2 and groundwater contour maps for select monitoring events are provided as Figures 1.A through 1.F (groundwater contour maps for June 2016, November 2016, April 2017, November 2017, April 2018, and July 2018, respectively). These tabulated values and groundwater contour maps demonstrate the variability in groundwater flow conditions observed at the site.

Trends in groundwater elevations and trends in groundwater quality (i.e., concentrations of calcium and sulfate) are correlated, as discussed below in the context of each individual SSI. Considering that these changes in groundwater quality are generally not related to flow direction or hydrogeologic location of the monitoring location relative to the landfill i.e., both upgradient and downgradient monitoring wells show similar temporal changes over time, these fluctuations are not indicative of impacts from the landfill. Instead, fluctuations are more likely associated with natural sources of groundwater quality variation, like mineralogical composition of the upgradient aquifer material, groundwater age, or precipitation and infiltrate characteristics.

In addition to natural sources of groundwater quality fluctuation that may be associated with changes in groundwater flow conditions, anthropogenic activities in the area are another potential source of variation in the groundwater quality at the site. One potential source is extensive and ongoing sand and gravel mining occurring upgradient and cross-gradient of monitoring wells SB-01 and SB-14. Mining activities in the area include approximately 30 acres of non-vegetated area and a drainage feature recently installed directly upgradient/cross-gradient of SB-01 (aerial photographs indicate the apparent vegetated swale was installed between April 2016 and September 2017).

Calcium (SSI at SB-01)

Natural variability in calcium concentrations is observed at the site, including the two wells generally upgradient of SB-01 (SB-13 and SB-14). A timeseries plot of groundwater

elevations and calcium concentrations at these wells, included as Figure 2A, relates variation in groundwater elevations and calcium concentrations over time. For example, there is a relatively steady, downward trend in both groundwater elevation and calcium concentrations at SB-13 and SB-14 from April 2016 through December 2016. Then, since groundwater elevations increased in April 2017 through July 2018, there is a general increase in calcium concentrations and variability. We did not observe a correlation between groundwater flow direction and groundwater quality for calcium at SB-01, SB-13, or SB-14. These data demonstrate that, considering the variability in calcium concentrations at upgradient wells, the variability in calcium concentrations at SB-01 that resulted in an SSI is generally consistent with natural variation at the site.

Sulfate (SSI at SB-14)

Sulfate concentrations at the most upgradient monitoring well SB-13 have ranged from 6,000 to 9,000 µg/L during the CCR monitoring period, with a median concentration of 8,000 µg/L. The sulfate concentrations detected at SB-14 that resulted in the SSI were 8,400 µg/L and 6,100 µg/L. For the four most recent monitoring events, sulfate concentrations at SB-13 and SB-14 were equal to or greater than the maximum concentrations detected in the first eight samples collected at the respective locations. Groundwater contour maps for the monitoring rounds corresponding to the SSI data (i.e., Figure 1.E for April 2018 and Figure 1.F for July 2018) indicate SB-14 and SB-13 were generally cross gradient to each other and indicate they were both generally upgradient or cross gradient of the landfill. Based on the hydrologic conditions at the time of sampling and the comparable sulfate concentrations measured at the site upgradient well SB-13, the variability in sulfate concentrations at SB-14 that resulted in an SSI is generally consistent with natural variation at the site.

Sulfate (SSI at SB-01)

Natural variability in sulfate concentrations is observed at the site, including the two wells generally upgradient of SB-01 (SB-13 and SB-14). The timeseries plot of groundwater elevations and sulfate concentrations at these wells, included as Figure 2B, relates variation in groundwater elevations and sulfate concentrations over time. For the four most recent monitoring events, sulfate concentrations at SB-13 and SB-14 were equal to or greater than the maximum concentrations detected in the first eight samples collected at the respective locations. The sulfate data that resulted in an SSI at SB-01 follow the similar, general pattern of increased sulfate in the latest four monitoring rounds coinciding with generally increased groundwater elevations. We did not observe a correlation between groundwater flow direction and groundwater quality for sulfate at SB-01, SB-13, or SB-14. Considering the variability in sulfate concentrations at upgradient wells, particularly during the last four monitoring events, the variability in sulfate concentrations at SB-01 that resulted in an SSI is generally consistent with natural variation at the site.

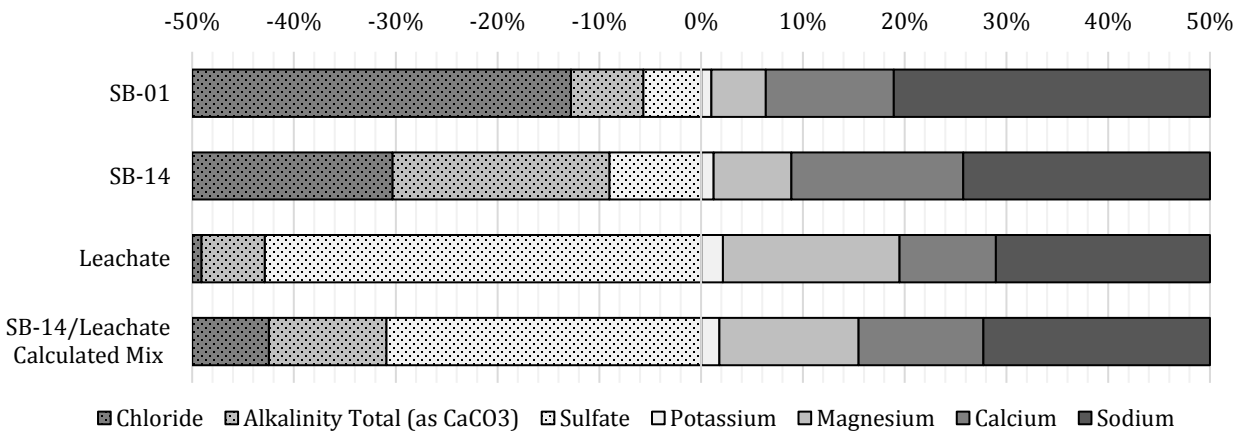
COMPARISON OF GENERAL WATER CHEMISTRY

Additional analyses were completed on the July 2018 samples to collected information on the major ion chemistry at the five site monitoring wells and from the leachate collection system. The results of these analyses are presented in a Piper Diagram, as Figure 3, and as plotted values, Figure 4. Based on the major ion analyses, the leachate was characterized as

a sodium-magnesium-sulfate water type, while the groundwater samples were generally sodium-chloride water types. Monitoring well SB-14, the monitoring well with the least total dissolved solids, was sodium-potassium dominant but did not have a dominant anion type.

To better characterize the SSIs of sulfate and calcium at SB-01, the major ion chemistry at SB-01 was compared with the major ion chemistry at an upgradient well and of the leachate. Although SB-13 is the monitoring well most upgradient of the landfill, based on groundwater elevation contours for the July 2018 monitoring round, SB-14 was the most upgradient well to SB-01 at the time the major ion chemistry samples were collected. The percent contributions for each major cation and anion for SB-01, SB-14, the leachate, and a hypothetical, calculated mix of SB-14 groundwater and leachate are presented in Exhibit 2, below. The relative percent contributions for the hypothetical mix of SB-14 water and leachate were based on a mix of waters that would result in an TDS equivalent to the TDS measured at SB-01.[5]

Exhibit 2: Percent (%) of Total Ionic Strength for Major Anions (-) and Cations (+) at SB-01, SB-14, in Leachate, and for a Hypothetical Leachate/Groundwater Mix



The total dissolved solids (TDS) was greater at SB-01 than at SB-14 (140,000 µg /L and 56,000 µg /L, respectively), which may be a general indication of potential groundwater impacts; however, based on the relative percent contribution of total ionic strength by major ion presented above, the greater TDS at SB-01 is not indicative of impacts from leachate. This conclusion is supported by the follow observations:

- In the leachate, sulfate is the dominant anion and chloride concentrations are relatively low. Magnesium and chloride are the most dominant cations.
- If groundwater from SB-14 and leachate are present in a hypothetical mixture at the ratio described previously (i.e., 98.93:1.07), assuming the waters mix conservatively and no third end-member is present in the mixture, then the relative concentration of sulfate in

[5] The mixed water calculation was based on a mix of 98.93% SB-14 (TDS = 56,000 µg/L) and 1.07% leachate (TDS = 7,900,000 µg/L), resulting in a TDS equivalent to that measured at SB-01 (TDS = 140,000 µg/L).

the sample would increase and the relative concentration of chloride would decrease. Similarly, we would expect the relative concentration of magnesium to increase.

- Trends in relative concentrations between SB-01 and SB-14 were opposite of those that might indicate leachate impacts to groundwater at SB-01: a) the relative concentration of sulfate decreased compared to SB-14; b) the relative concentration of chloride increased compared to SB-14; and c) the relative concentration of magnesium decreased compared to SB-14.

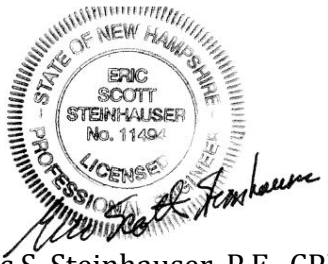
CLOSING

Detected concentrations of sulfate and calcium are within the naturally occurring range, the SSIs are generally consistent with natural variation in groundwater flow conditions and general groundwater quality at the site, and a comparison of major ions in groundwater and in landfill leachate do not indicate leachate impacts to groundwater.

Based on our understanding of the information presented herein, including the site characteristics, natural variation of regional groundwater quality, and the groundwater flow and groundwater quality monitoring data at SB-01, SB-14, and the other monitoring wells, the SSIs in calcium and sulfate concentrations at well SB-01 and the SSI in sulfate concentrations at well SB-14 are due to natural variation in groundwater flow.

Thank you for the opportunity to be of service to GSP Merrimack LLC. We look forward to continuing to work with you on this project.

Sincerely,
SANBORN, HEAD & ASSOCIATES, INC.



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Enclosures: Table 1 – Summary of Analytical Results - Groundwater
Table 2 – Summary of Groundwater Level Measurements
Figure 1.A – June 2016 Groundwater Contours
Figure 1.B – November 2016 Groundwater Contours
Figure 1.C – April 2017 Groundwater Contours
Figure 1.D – October 2017 Groundwater Contours
Figure 1.E – April 2018 Groundwater Contours
Figure 1.F – July 2018 Groundwater Contours
Figure 2.A – Calcium Timeseries
Figure 2.B – Sulfate Timeseries
Figure 3 – Piper Diagram
Figure 4 – Water Quality Signatures

TABLE 1
Summary of Analytical Results – Groundwater
Merrimack Station Coal Ash Landfill
Bow, New Hampshire

Location	Date	Metals µg/L															Miscellaneous Parameters µg/L							
		Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium	Chloride	Fluoride	Sulfate	Total Dissolved Solids	pH s.u	Radium 226 pCi/L	Radium 228 pCi/L	Radium 226+228 pCi/L
Drinking Water MCL		6	10	2,000	4	NS	5	NS	100	NS	15	NS	2	NS	50	2	NS	4,000	NS	NS	NS	NS	NS	5
GW-1		6 ‡	10 ‡	2,000 ‡	4 ‡	620 ‡	5 ‡	NS ‡	100	NS ‡	15 ‡	NS	2 ‡	NS	50 ‡	2 ‡	NS	4,000	500,000	NS	NS	NS	NS	NS
GW-2		NA	NA	NA	NA	NA	NA	NS	NA	NS	NA	NS	NA	NS	NA	NA	NS	†	†	NS	NS	NS	NS	NS
SB-1	2/24/2016	<1.0	<1.0	14	<1.0	60	<1.0	7,200	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0	<1.0	<1.0	44,000	<100	8,000	96,000	5.2	0.2 ±0.1	0.6 ±0.6	0.8 ±0.6
	4/25/2016	<1.0	<1.0	18	<1.0	100	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	1.0	<1.0	<1.0	58,000	<100	9,000	120,000	5.7	0.5 ±0.2	0.2 ±0.4	0.7 ±0.4
	6/6/2016	<1.0	<1.0	16	<1.0	<50	<1.0	8,200	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	55,000	<100	7,000	140,000	5.5	0.6 ±0.3	0.2 ±0.5	0.8 ±0.5
	7/18/2016	<1.0	<1.0	16	<1.0	70	<1.0	8,600	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	60,000	<100	9,000	120,000	5.4	0.4 ±0.3	0.0 ±0.6	0.4 ±0.6
	8/30/2016	<1.0	<1.0	17	<1.0	<50	<1.0	7,900	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	49,000	<100	7,000	120,000	5.2	0.4 ±0.3	0.3 ±0.4	0.7 ±0.4
	10/17/2016	<1.0	<1.0	17	<1.0	<50	<1.0	9,700	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	60,000	<100	6,000	130,000	5.6	0.6 ±0.4	0.0 ±0.4	0.6 ±0.4
	11/29/2016	<1.0	<1.0	16	<1.0	<50	<1.0	8,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	62,000	<100	6,000	88,000	5.6	1.0 ±0.4	0.8 ±0.5	1.8 ±0.5
	4/19/2017	<1.0	<1.0	16	<1.0	<50	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	56,000	<100	8,000	120,000	5.8	0.4 ±0.3	0.2 ±0.5	0.6 ±0.5
	11/17/2017					50		12,000									68,000	<100	8,000	120,000	5.7			
	1/31/2018 ¢							12,000																
	4/9/2018					67		12,000									55,000	<100	10,000	160,000	5.9			
	7/25/2018 ¢							12,000									63,000		13,000	140,000	5.9			
SB-4	2/23/2016	<1.0	<1.0	14	<1.0	<50	<1.0	8,400	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0	<1.0	<1.0	95,000	<100	9,000	210,000	5.5	0.3 ±0.1	1.0 ±0.6	1.3 ±0.6
	4/25/2016	<1.0	<1.0	14	<1.0	<50	<1.0	9,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	110,000	<100	8,000	200,000	5.3	0.3 ±0.3	0.0 ±0.4	0.3 ±0.4
	6/6/2016	<1.0	<1.0	12	<1.0	<50	<1.0	8,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	110,000	<100	10,000	230,000	5.6	0.2 ±0.2	0.4 ±0.5	0.6 ±0.5
	7/18/2016	<1.0	<1.0	11	<1.0	<50	<1.0	7,800	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	100,000	<100	11,000	220,000	5.3	0.4 ±0.3	0.4 ±0.6	0.8 ±0.6
	8/30/2016	<1.0	<1.0	10	<1.0	<50	<1.0	6,800	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	88,000	<100	12,000	210,000	5.7	0.2 ±0.2	0.0 ±0.4	0.2 ±0.4
	10/17/2016	<1.0	<1.0	12	<1.0	<50	<1.0	8,400	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	100,000	<100	10,000	190,000	5.7	0.3 ±0.3	0.0 ±0.5	0.3 ±0.5
	11/29/2016	<1.0	1.0	12	<1.0	<50	<1.0	7,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	100,000	<100	10,000	180,000	5.8	0.7 ±0.3	0.5 ±0.5	1.2 ±0.5
	4/19/2017	<1.0	<1.0	19	<1.0	<50	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	120,000	<100	9,000	260,000	5.7	0.3 ±0.3	0.0 ±0.5	0.3 ±0.5
	11/17/2017					<50		10,000									77,000	<100	13,000	170,000	5.8			
	4/9/2018					<50		11,000									93,000	<100	12,000	220,000	5.9			
	7/25/2018 ¢							9,800									95,000		11,000	210,000	5.7			
SB-6	2/23/2016	<1.0	<1.0	9.0	<1.0	<50	<1.0	5,300	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0	<1.0	<1.0	80,000	<100	10,000	170,000	5.6	0.1 ±0.07	0.5 ±0.5	0.6 ±0.5
	4/25/2016	<1.0	<1.0	16	<1.0	<50	<1.0	9,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	140,000	<100	7,000	220,000	5.6	0.4 ±0.3	0.0 ±0.4	0.4 ±0.4
	6/6/2016	<1.0	<1.0	17	<1.0	<50	<1.0	9,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	140,000	<100	8,000	270,000	5.4	0.5 ±0.3	0.0 ±0.5	0.5 ±0.5
	7/18/2016	<1.0	<1.0	17	<1.0	<50	<1.0	9,200	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	140,000	<100	9,000	260,000	5.3	0.5 ±0.3	0.3 ±0.6	0.8 ±0.6
	8/30/2016	<1.0	<1.0	18	<1.0	<50	<1.0	9,100	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	140,000	<100	9,000	280,000	5.7	0.4 ±0.2	0.0 ±0.4	0.4 ±0.4
	10/17/2016	<1.0	<1.0	18	<1.0	<50	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	150,000	<100	8,000	260,000	5.8	0.2 ±0.3	0.0 ±0.5	0.2 ±0.5
	11/29/2016	<1.0	<1.0	16	<1.0	<50	<1.0	8,100	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	130,000	<100	9,000	230,000	5.8	0.5 ±0.2	0.8 ±0.5	1.3 ±0.5
	4/19/2017	<1.0	<1.0	13	<1.1	<51	<1.1	7,400	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	100,000	<100	9,000	190,000	5.7	0.4 ±0.3	0.2 ±0.5	0.6 ±0.5
	11/17/2017					<50		9,900									130,000	<100	11,000	230,000	5.6			
	4/9/2018					<50		7,900									120,000	<100	9,500	240,000	5.6			
	7/25/2018 ¢							11,000									180,000		12,000	310,000	5.4			
SB-13	2/23/2016	<1.0	<1.0	17	<1.0	<50	<1.0	9,900	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0	<1.0	<1.0	160,000	<100	6,000	270,000	5.3	0.6 ±0.1	0.3 ±0.6	0.9±0.6
	4/25/2016	<1.0	<1.0	17	<1.0	<50	<1.0	8,800	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	160,000	<100	7,000	290,000	5.5	0.4 ±0.3	0.1 ±0.4	0.5 ±0.4
	6/6/2016	<1.0	<1.0	20	<1.0	<50	<1.0	9,900	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	170,000	<100	7,000	320,000	5.5	0.8 ±0.3	0.0 ±0.5	0.8 ±0.5
	7/18/2016	<1.0	<1.0	18	<1.0	<50	<1.0	9,700	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	160,000	<100	8,000	330,000	5.3	0.8 ±0.3	0.0 ±0.6	0.8 ±0.6
	8/30/2016	<1.0	1.0	20	<1.0	<50	<1.0	8,100	2.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	150,000	<100	8,000	270,000	5.4	0.8 ±0.3	0.6 ±0.4	1.4 ±0.4
	10/17/2016	<1.0	<1.0	15	<1.0	<50	<1.0	8,800	2.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	150,000	<100	8,000	260,000	5.1	0.7 ±0.4	0.6 ±0.5	1.3 ±0.5
	11/29/2016	<1.0	<1.0	16	<1.0	<50	<1.0	7,400	1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	140,000	<100	8,000	240,000	5.7	0.6 ±0.3	0.7 ±0.5	1.3 ±0.5
	4/19/2017	<1.0	<1.0	16	<1.1	<51	<1.1	8,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	130,000	<100	8,000	270,000	5.6	0.9 ±0.3	0.3 ±0.5	1.2 ±0.5
	11/17/2017					<50		7,000									110,000	<100	9,000	220,000	5.8			
	4/9/2018					<50		11,000									170,000	<100	8,000	330,000	5.8			
	7/25/2018 ¢							10,000									190,000		8,700	340,000	5.7			
SB-14	2/24/2016	<1.0	<1.0	3.0	<1.0	<50	<1.0	6,100	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0	<1.0	<1.0	16,000	<100	4,000	56,000	5.1	0.2 ±0.08	0.0 ±0.5	0.2 ±0.5
	4/25/2016	<1.0	<1.0	9.0	<1.0	<50	<1.0	11,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	58,000	<100	3,000	140,000	5.6	0.8 ±0.5	0.2 ±0.1	1.0 ±0.5
	6/6/2016	<1.0	<1.0	6.0	<1.0	<50	<1.0	7,600	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	32,000	<100	4,000	100,000	5.4	0.5 ±0.2	0.2 ±0.5	0.7 ±0.5
	7/18/2016	<1.0	<1.0	3.0	<1.0	<50	<1.0	6,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	21,000	<100	5,000	68,000	5.3	0.2 ±0.2	0.3 ±0.5	0.5 ±0.5
	8/30/2016	<1.0	<1.0	2.0	<1.0	<50	<1.0	5,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	14,000	<100	4,000	71,000	5.8	0.4 ±0.3	0.4 ±0.5	0.8 ±0.5
	10/17/2016	<1.0	<1.0	2.0	<1.0	<50	<1.0	4,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	11,000	<100	4,000	29,000	5.6	0.2 ±0.3	0.0 ±0.5	0.2 ±0.5
	11/29/2016	<1.0	<1.0	2.0	<1.0	<50	<1.0	2,900	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	7,000	<100	4,000	12,000	5.2	0.2 ±0.4	0.2 ±0.5	0.4 ±0.5
	4/19/2017	<1.0	<1.0	10	<1.0	<50	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	56,000	<100	5,000	120,000	5.6	0.7 ±0.3	0.1 ±0.5	0.8 ±0.5
	11/17/2017					<50		8,000									18,000	<100	5,000	59,000	5.6			
	4/9/2018					<50		4,200									14,000	<100	8,400	80,000	5.8			
	7/25/2018 ¢							5,100									9,800		6,100	56,000	5.6			

TABLE 1
Summary of Analytical Results – Groundwater
Merrimack Station Coal Ash Landfill
Bow, New Hampshire

Notes:

1. Samples were collected by Eastern Analytical, Inc. (EAI) of Concord, New Hampshire on the dates indicated and analyzed by EAI for select metals by USEPA Method 6020. Additional analysis for general select wet chemistry parameters were completed by EAI. Analysis for radium 226 and 228 was completed by KNL Environmental Testing, Inc., of Tampa, Florida. Analysis for lithium was completed by SGS Accutest, of Marlborough, Massachussets (Feb. 2016), and Katahdin Analytical Services, of Scarborough, Maine (April 2016 through October 2016).

2. Concentrations are presented in micrograms per liter (µg/L) which are equivalent to parts per billion (ppb), or they are presented in picoCuries per liter (pCi/L) or pH standard units.

3. "<" indicates the analyte was not detected above the indicated laboratory reporting limit.
A blank indicates the sample was not analyzed for this parameter.

4. "GW-1" and "GW-2" Groundwater Standards are from the New Hampshire Department of Environmental Services (NHDES) Contaminated Sites Risk Characterization and Management Policy (RCMP) (January 1998, with 2000 through 2018 revisions/addenda). GW-1 Groundwater Standards are equivalent to the Ambient Groundwater Quality Standards (AGQSs) promulgated in Env-Or 600 (June 2015 with October 2016 amendment). The AGQS/GW-1 Groundwater Standards are intended to be protective of groundwater as a source of drinking water. The GW-2 Groundwater Standards apply to groundwater as a potential source of indoor air contamination.

5. "Drinking Water MCLs" are from the United States Environmental Protection Agency (EPA) website (accessed March 22, 2016). The Maximum Contaminant Level (MCL) is the highest level of a contaminant that is allowed in drinking water. MCLs are enforceable standards for drinking water systems.

6. "†" indicates the RCMP lists as not currently available.
"‡" indicates the value provided is the corresponding "dissolved metal" NHDES standard for reference only; NHDES standards for total metals are listed in the RCMP.
"NA" indicates the RCMP lists as not applicable.
"NS" indicates the analyte is not listed in the RCMP or MCL list.
"¢" indicates sample rounds collected as part of the resampling program for identifying statistically significant increases (SSIs).

7. **Bold** values exceed the AGQS/GW-1 Groundwater Standard.
Italic values exceed the GW-2 Groundwater Standard.

TABLE 2
Summary of Groundwater Level Measurements
Merrimack Station Coal Ash Landfill
Bow, New Hampshire

Date	Depths and elevations in feet.																
	SB-1			SB-4			SB-6			SB-13			SB-14			Inferred General Groundwater Flow Rate (feet/day)	Inferred General Groundwater Flow Direction
	Reference Elevation	Depth to Water	Water Elevation	Reference Elevation	Depth to Water	Water Elevation	Reference Elevation	Depth to Water	Water Elevation	Reference Elevation	Depth to Water	Water Elevation	Reference Elevation	Depth to Water	Water Elevation		
Feb-16	240.85	33.82	207.03	274.26	67.36	206.90	268.77	61.84	206.93	219.86	11.83	208.03	242.70	34.88	207.82	0.5 - 2.7	Northeast
Apr-16	240.85	32.19	208.66	274.26	65.63	208.63	268.77	60.07	208.70	219.86	10.16	209.70	242.70	33.13	209.57	0.5 - 2.5	Northeast
Jun-16	240.85	31.84	209.01	274.26	66.24	208.02	268.77	60.80	207.97	219.86	11.11	208.75	242.70	33.93	208.77	0.4 - 1.9	East
Jul-16	240.85	33.88	206.97	274.26	67.30	206.96	268.77	62.07	206.70	219.86	12.41	207.45	242.70	35.10	207.60	0.4 - 1.9	Northeast
Aug-16	240.85	35.09	205.76	274.26	68.54	205.72	268.77	63.19	205.58	219.86	13.76	206.10	242.70	36.39	206.31	0.3 - 1.4	Northeast
Oct-16	240.85	36.20	204.65	274.26	69.68	204.58	268.77	64.42	204.35	219.86	13.92	205.94	242.70	37.58	205.12	0.8 - 3.9	North-Northeast
Nov-16	240.85	36.40	204.45	274.26	69.93	204.33	268.77	64.69	204.08	219.86	15.14	204.72	242.70	37.80	204.90	0.3 - 1.6	East-Northeast
Apr-17	240.85	32.27	208.58	274.26	65.82	208.44	268.77	60.04	208.73	219.86	9.58	210.28	242.70	32.99	209.71	0.8 - 3.8	North-Northeast
Nov-17	240.85	32.87	207.98	274.26	66.39	207.87	268.77	60.97	207.80	219.86	11.33	208.53	242.70	34.08	208.62	0.4 - 1.8	Northeast
Apr-18	240.85	31.13	209.72	274.26	64.58	209.68	268.77	58.93	209.84	219.86	8.74	211.12	242.70	31.94	210.76	0.6 - 3.2	North-Northeast
Jul-18	240.85	32.60	208.25	274.26	66.01	208.25	268.77	60.84	207.93	219.86	11.13	208.73	242.70	33.78	208.92	0.4 - 2.0	Northeast

Notes:

1. Depths to water were obtained from laboratory reports and field sampling sheets prepared by Eastern Analytical, Inc.

2. Inferred general groundwater flow rates and flow directions are approximate and are based on the limited hydrogeologic and groundwater elevation data available. Other interpretations are possible and actual conditions may vary from those indicated. Note that groundwater elevations, directions, and rates may change due to seasonal or other variations in temperature, precipitation, runoff, or other factors.

3. Approximate groundwater flow rates were calculated using an assumed saturated hydraulic conductivity of 100 to 500 feet per day, and an assumed porosity of 39%. Assumptions are generally consistent with values typical of medium-grained, clean sand. The calculated groundwater flow rate is equivalent to the average interstitial velocity or the seepage velocity.

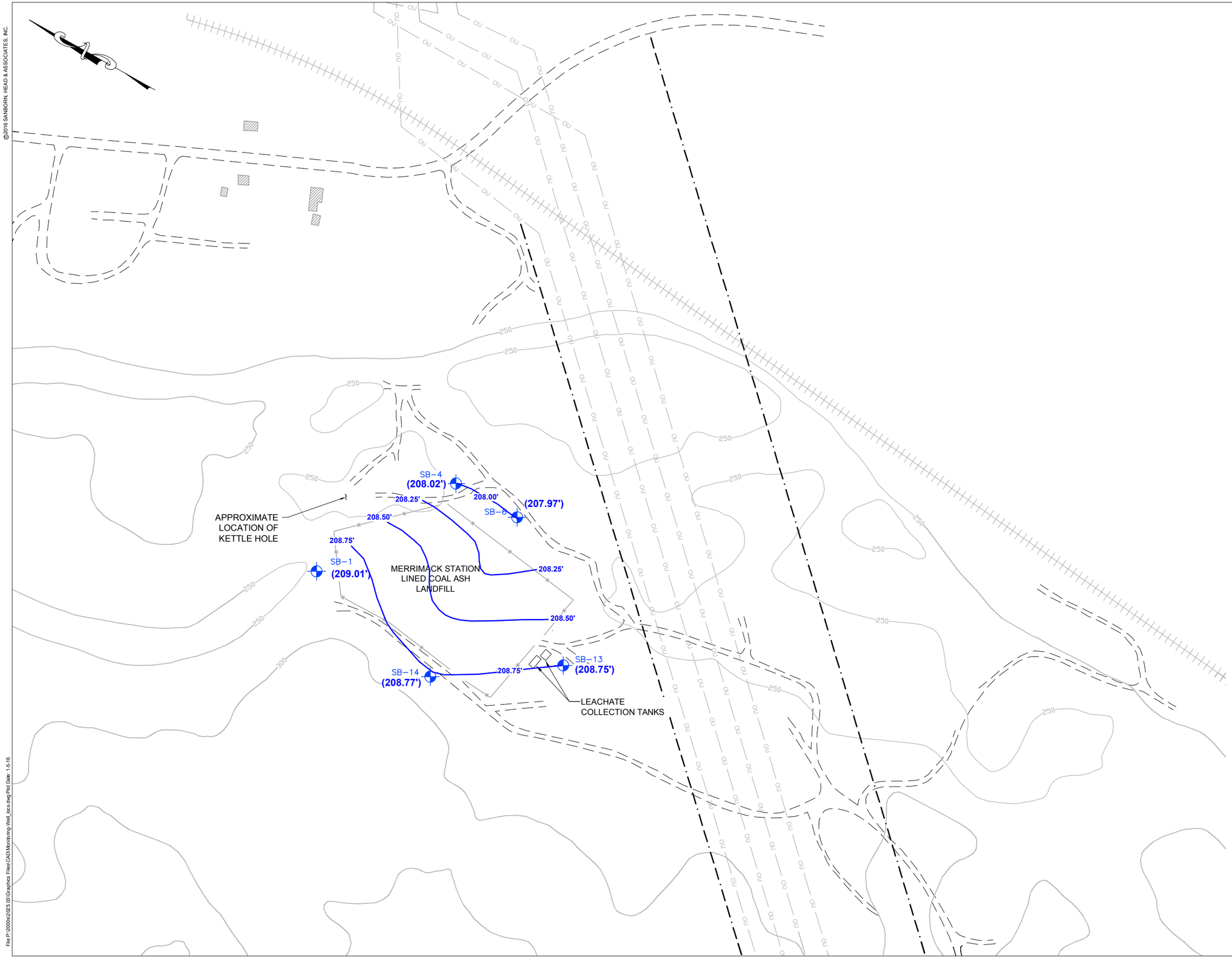


Figure 1.A

June 2016 Groundwater Contours

Merrimack Station
Coal Ash Landfill
Bow, New Hampshire

Drawn By: L. Teal
Designed By: H. Roakes
Reviewed By: L. Damiano
Project No: 2025.07
Date: October 2018

Notes

1. The base map was developed from a drawing prepared by Public Service Company of New Hampshire's Engineering Division entitled, "Area Plan, Merrimack Station, Bow, N.H." The drawing was dated 5/1/90 and was last revised on 6/28/95.

2. The location of site and site features shown should be considered approximate only.

3. Groundwater contours shown on this plan were developed based on groundwater level measurements in the monitoring wells made on June 6, 2016.

Legend

- SB–4 — Monitoring Well
- (209.01') — Groundwater Elevation Measured on June 6, 2016
- Right-Of-Way
- Fence
- OU — Overhead Utilities
- 250 — Elevation Contour
- 208.50' — Groundwater Contour (dashed where less constrained)

150' 75' 0 150' 300' Feet

SANBORN HEAD

File:P:\2000s\2025.03\Graphics Files\CAD\Monitring Well_locs.dwg Plot Date: 1-5-16

SB–4
(204.33')

204.20'
SB–6
(204.08')

APPROXIMATE
LOCATION OF
KETTLE HOLE

204.40'

204.20'

SB–1
(204.45')

MERRIMACK STATION
LINED COAL ASH
LANDFILL

204.40'

204.60'

204.60'

204.80'

SB–14
(204.90')

204.80'

SB–13
(204.72')

LEACHATE
COLLECTION TANKS

250 250 250 250 250 250 250 250 250 250 250 300

OU

Figure 1.B

November 2016 Groundwater Contours

Merrimack Station
Coal Ash Landfill
Bow, New Hampshire

Drawn By: L. Teal
Designed By: H. Roakes
Reviewed By: L. Damiano
Project No: 2025.07
Date: October 2018

Notes

1. The base map was developed from a drawing prepared by Public Service Company of New Hampshire's Engineering Division entitled, "Area Plan, Merrimack Station, Bow, N.H." The drawing was dated 5/1/90 and was last revised on 6/28/95.

2. The location of site and site features shown should be considered approximate only.

3. Groundwater contours shown on this plan were developed based on groundwater level measurements in the monitoring wells made on November 29, 2016.

Legend

- SB–4 — Monitoring Well
- (204.45') — Groundwater Elevation Measured on Nov. 29, 2016
- Right-Of-Way
- Fence
- OU — Overhead Utilities
- 250 — Elevation Contour
- 204.60' — Groundwater Contour (dashed where less constrained)

150' 75' 0 150' 300' Feet

SANBORN HEAD

File:P:\2000s\2025.03\Graphics Files\CAD\Monitring Well_locs.dwg Plot Date: 1-5-16

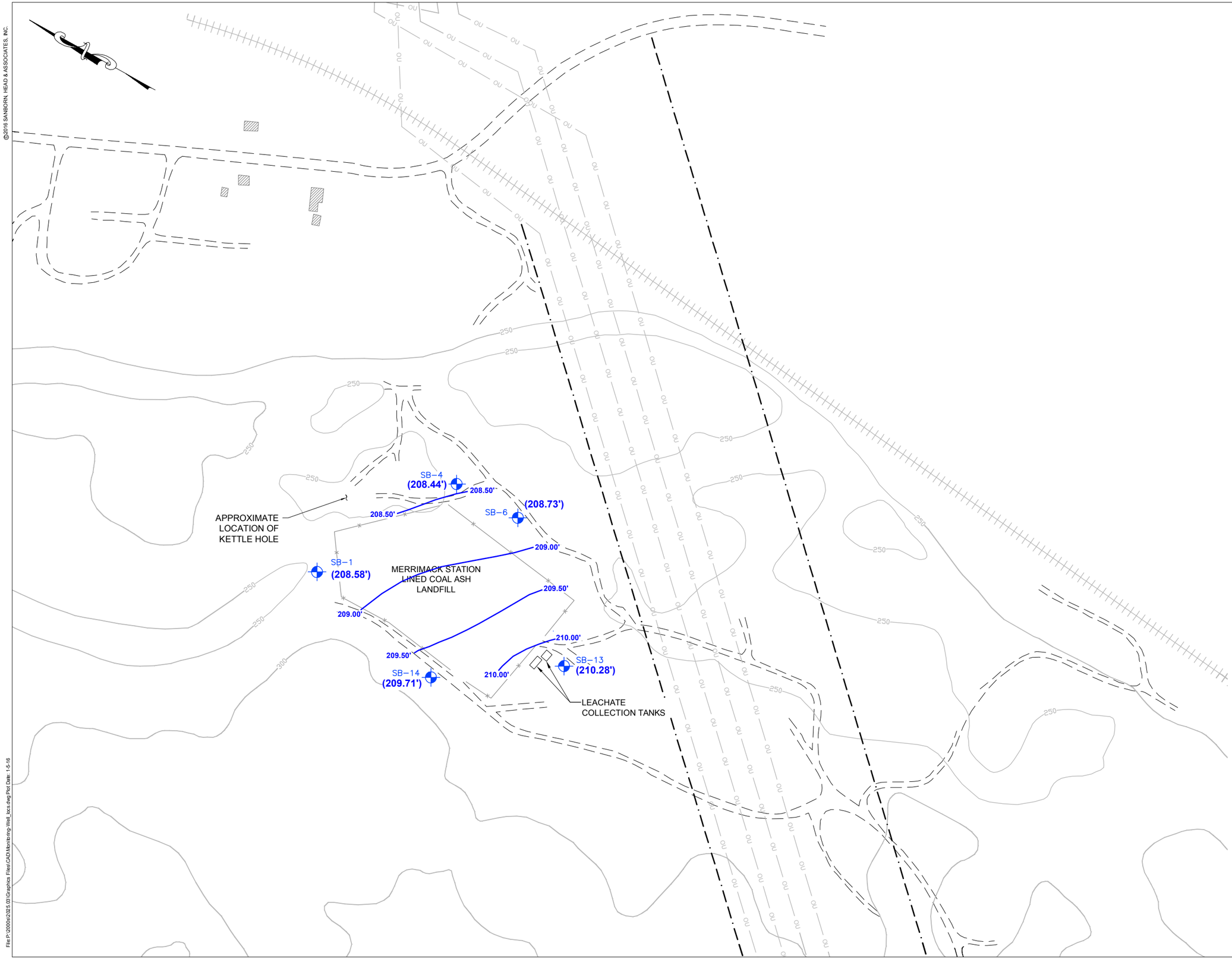


Figure 1.C

April 2017 Groundwater Contours

Merrimack Station
Coal Ash Landfill
Bow, New Hampshire

Drawn By: L. Teal
Designed By: H. Roakes
Reviewed By: L. Damiano
Project No: 2025.07
Date: October 2018

Notes

1. The base map was developed from a drawing prepared by Public Service Company of New Hampshire's Engineering Division entitled, "Area Plan, Merrimack Station, Bow, N.H." The drawing was dated 5/1/90 and was last revised on 6/28/95.

2. The location of site and site features shown should be considered approximate only.

3. Groundwater contours shown on this plan were developed based on groundwater level measurements in the monitoring wells made on April 19, 2017.

Legend

- SB–4 — Monitoring Well
- (208.58') — Groundwater Elevation Measured on April 19, 2017
- Right-Of-Way
- Fence
- OU — Overhead Utilities
- 250 — Elevation Contour
- 209.50' — Groundwater Contour (dashed where less constrained)

150' 75' 0 150' 300' Feet

SANBORN HEAD

File:P:\2000s\2025.03\Graphics Files\CAD\Monitoring Well_locs.dwg Plot Date: 1-5-16

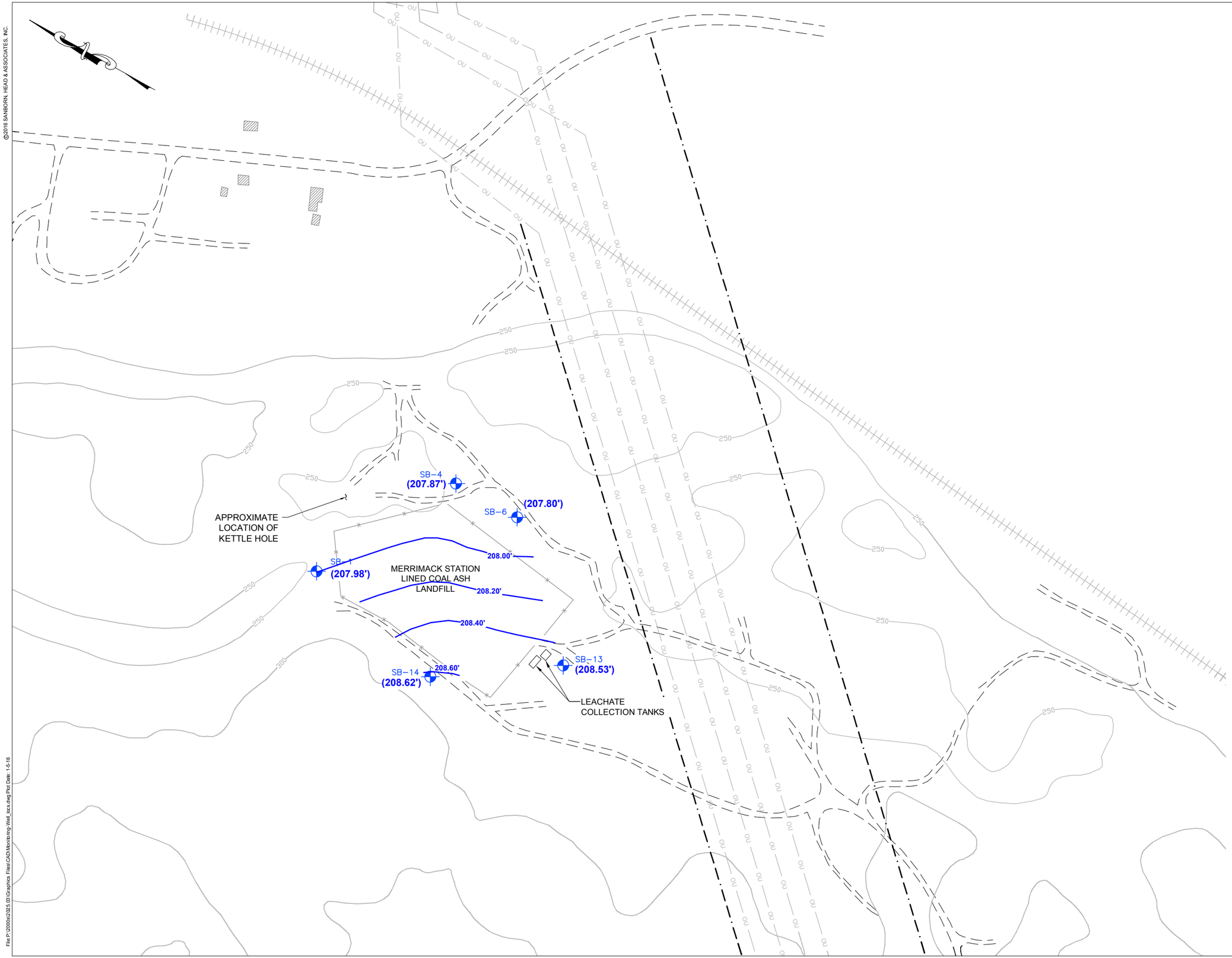


Figure 1.D

November 2017 Groundwater Contours

Merrimack Station
Coal Ash Landfill
Bow, New Hampshire

Drawn By: L. Teal
Designed By: H. Roakes
Reviewed By: L. Damiano
Project No: 2025.07
Date: October 2018

Notes

1. The base map was developed from a drawing prepared by Public Service Company of New Hampshire's Engineering Division entitled, "Area Plan, Merrimack Station, Bow, N.H." The drawing was dated 5/1/90 and was last revised on 6/28/95.

2. The location of site and site features shown should be considered approximate only.

3. Groundwater contours shown on this plan were developed based on groundwater level measurements in the monitoring wells made on November 17, 2017.

Legend

- SB-4 — Monitoring Well
- (207.98') — Groundwater Elevation Measured on Nov. 17, 2017
- Right-Of-Way
- Fence
- OU — Overhead Utilities
- 250 — Elevation Contour
- 208.20' — Groundwater Contour (dashed where less constrained)

150' 75' 0 150' 300' Feet

SANBORN HEAD

File:P:\2000s\2025.03\Graphics Files\CAD\Monitoring Well_locs.dwg Plot Date: 1-5-16

Figure 1.E

April 2018 Groundwater Contours

Merrimack Station
Coal Ash Landfill
Bow, New Hampshire

Drawn By: L. Teal
Designed By: H. Roakes
Reviewed By: L. Damiano
Project No: 2025.07
Date: October 2018

Notes

1. The base map was developed from a drawing prepared by Public Service Company of New Hampshire's Engineering Division entitled, "Area Plan, Merrimack Station, Bow, N.H." The drawing was dated 5/1/90 and was last revised on 6/28/95.

2. The location of site and site features shown should be considered approximate only.

3. Groundwater contours shown on this plan were developed based on groundwater level measurements in the monitoring wells made on April 9, 2018.

Legend

- SB-4 — Monitoring Well
- (207.98') — Groundwater Elevation Measured on April 9, 2018
- Right-Of-Way
- Fence
- OU — Overhead Utilities
- 250 — Elevation Contour
- 208.20' — Groundwater Contour (dashed where less constrained)

SB-4 (209.68')
SB-6 (209.84')
SB-1 (209.72')
SB-13 (211.12')
SB-14 (210.76')
APPROXIMATE LOCATION OF KETTLE HOLE
MERRIMACK STATION LINED COAL ASH LANDFILL
LEACHATE COLLECTION TANKS
210.00'
210.50'
211.00'

150' 75' 0 150' 300' Feet

SANBORN HEAD

File:P:\2000s\2025.03\Graphics Files\CAD\Monitoring Well_locs.dwg Plot Date: 1-5-16

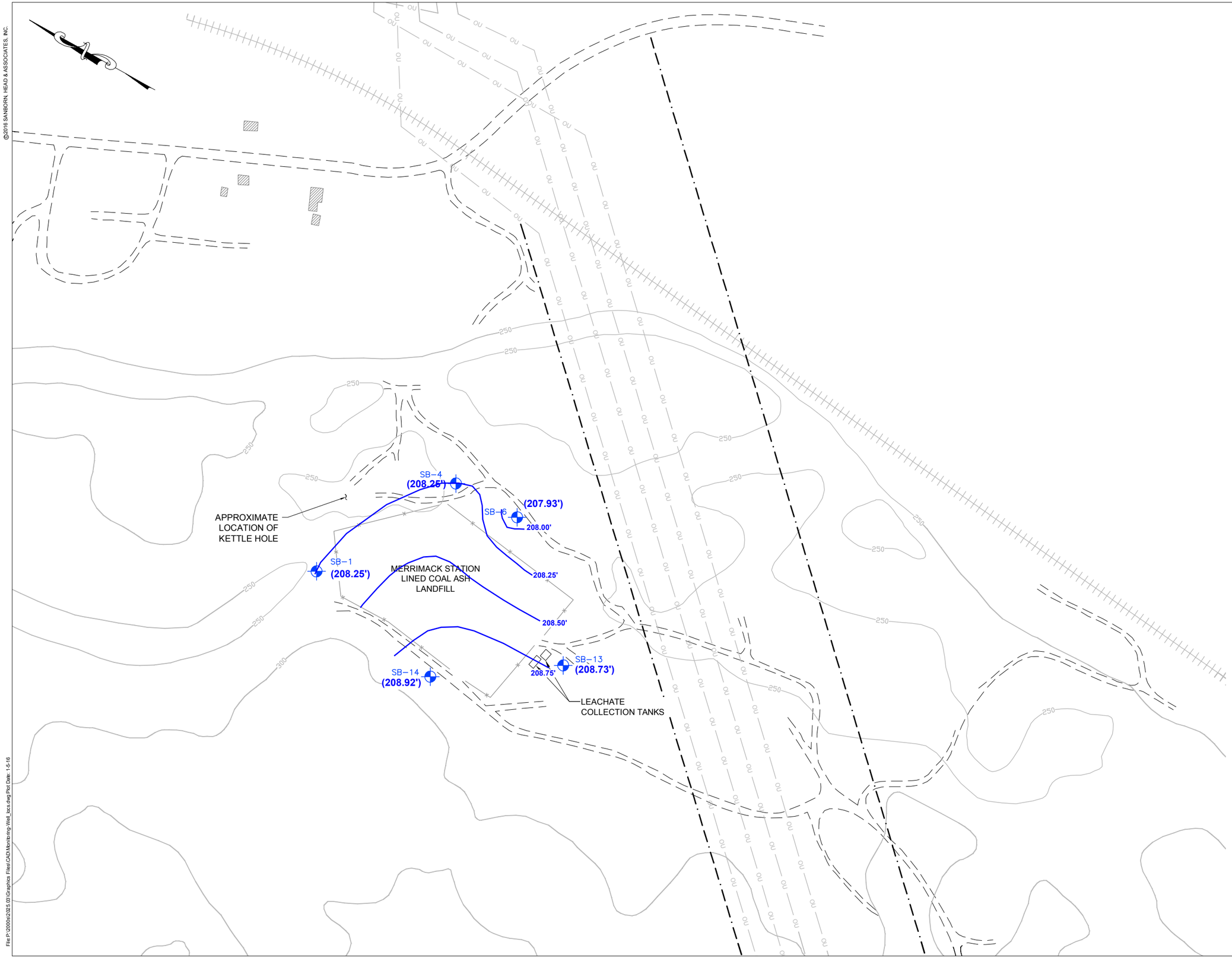


Figure 1.F

July 2018 Groundwater Contours

Merrimack Station
Coal Ash Landfill
Bow, New Hampshire

Drawn By: L. Teal
Designed By: H. Roakes
Reviewed By: L. Damiano
Project No: 2025.07
Date: October 2018

Notes

1. The base map was developed from a drawing prepared by Public Service Company of New Hampshire's Engineering Division entitled, "Area Plan, Merrimack Station, Bow, N.H." The drawing was dated 5/1/90 and was last revised on 6/28/95.

2. The location of site and site features shown should be considered approximate only.

3. Groundwater contours shown on this plan were developed based on groundwater level measurements in the monitoring wells made on July 25, 2018.

Legend

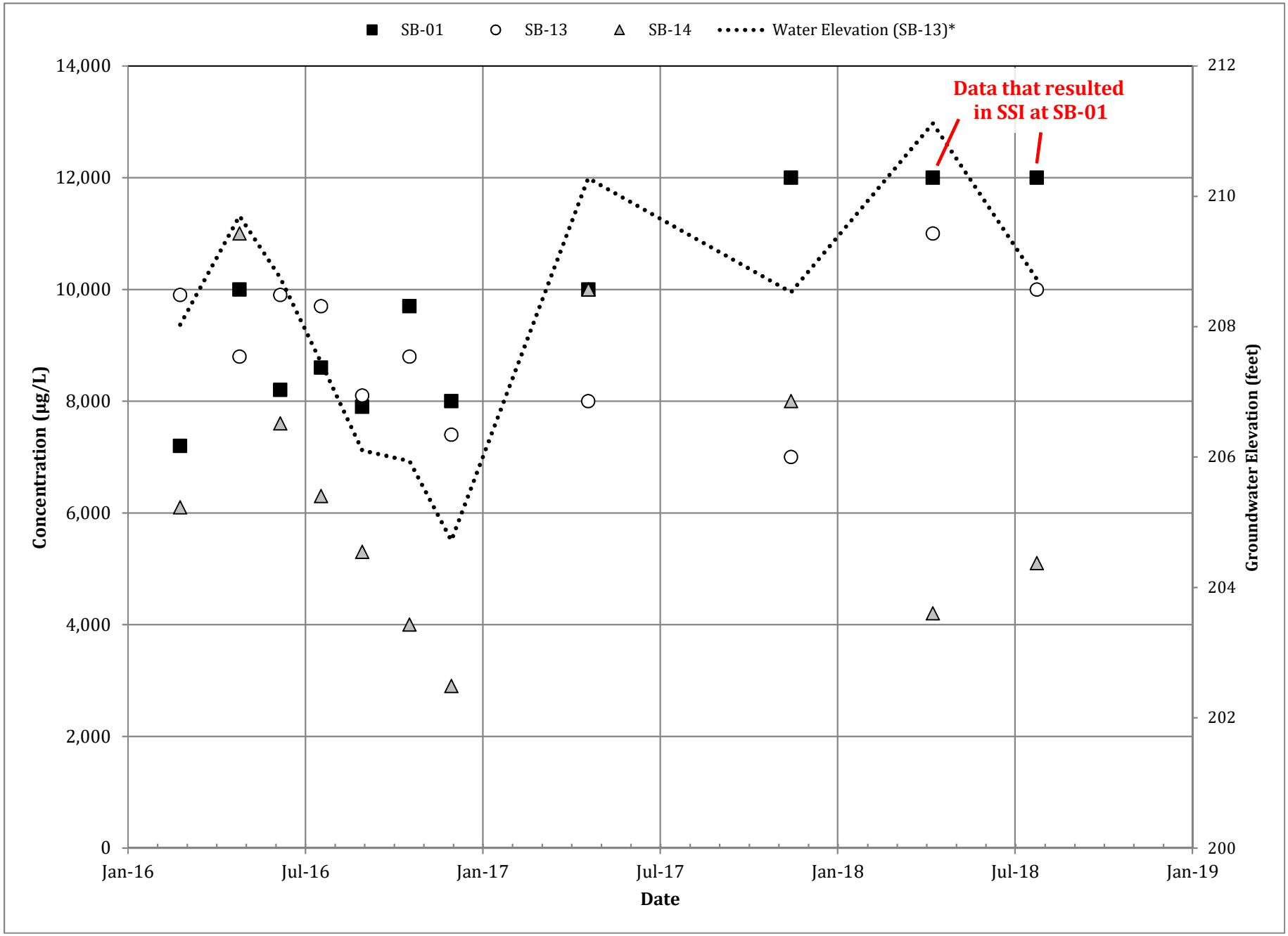
- SB-4 — Monitoring Well
- (207.93') — Groundwater Elevation Measured on July 25, 2018
- Right-Of-Way
- Fence
- OU — Overhead Utilities
- 250 — Elevation Contour
- 208.25' — Groundwater Contour (dashed where less constrained)

150' 75' 0 150' 300' Feet

SANBORN HEAD

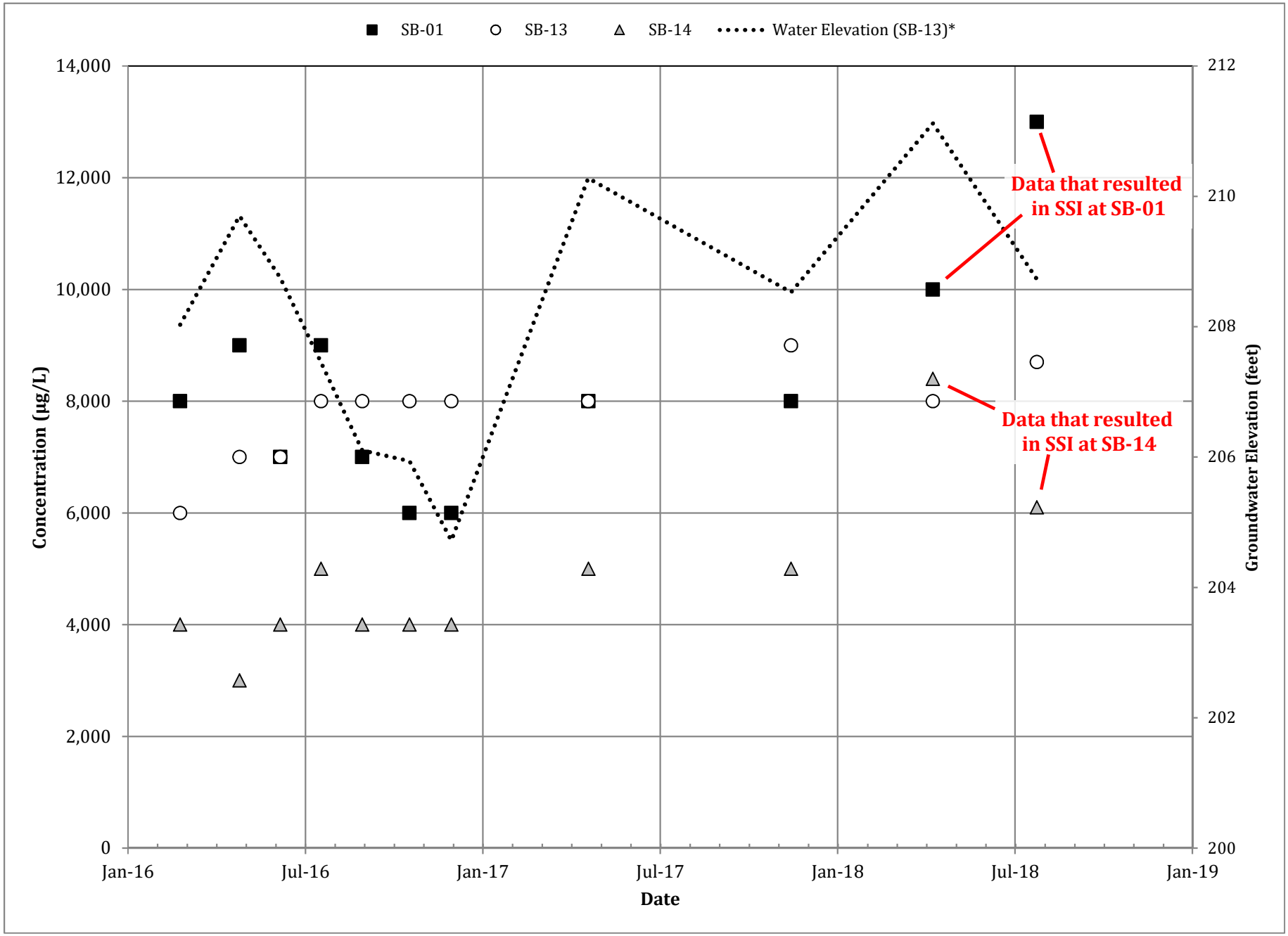
File:P:\2000s\2025.03\Graphics Files\CAD\Monitoring Well_locs.dwg Plot Date: 1-5-16

Figure 2A - Calcium Timeseries
Select Monitoring Wells



* For simplicity, only the water elevations for SB-13 are displayed. The trends in water elevations at SB-13 are considered representative of the trends in water elevations at SB-01 and SB-14.

Figure 2B - Sulfate Timeseries
Select Monitoring Wells



* For simplicity, only the water elevations for SB-13 are displayed. The trends in water elevations at SB-13 are considered representative of the trends in water elevations at SB-01 and SB-14.

Figure 3 - Piper Diagram
Merrimack Station
Coal Ash Landfill
Bow, New Hampshire

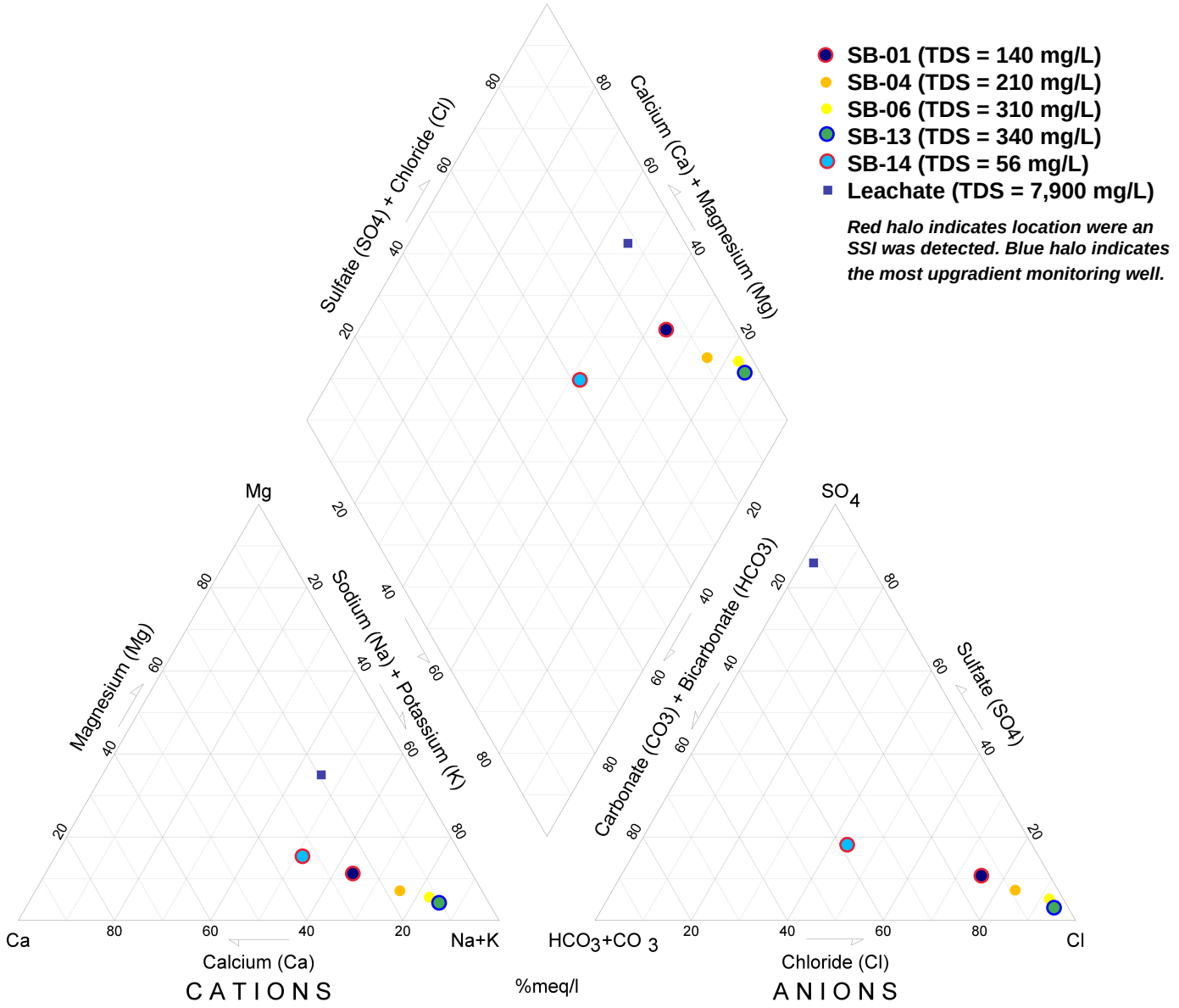
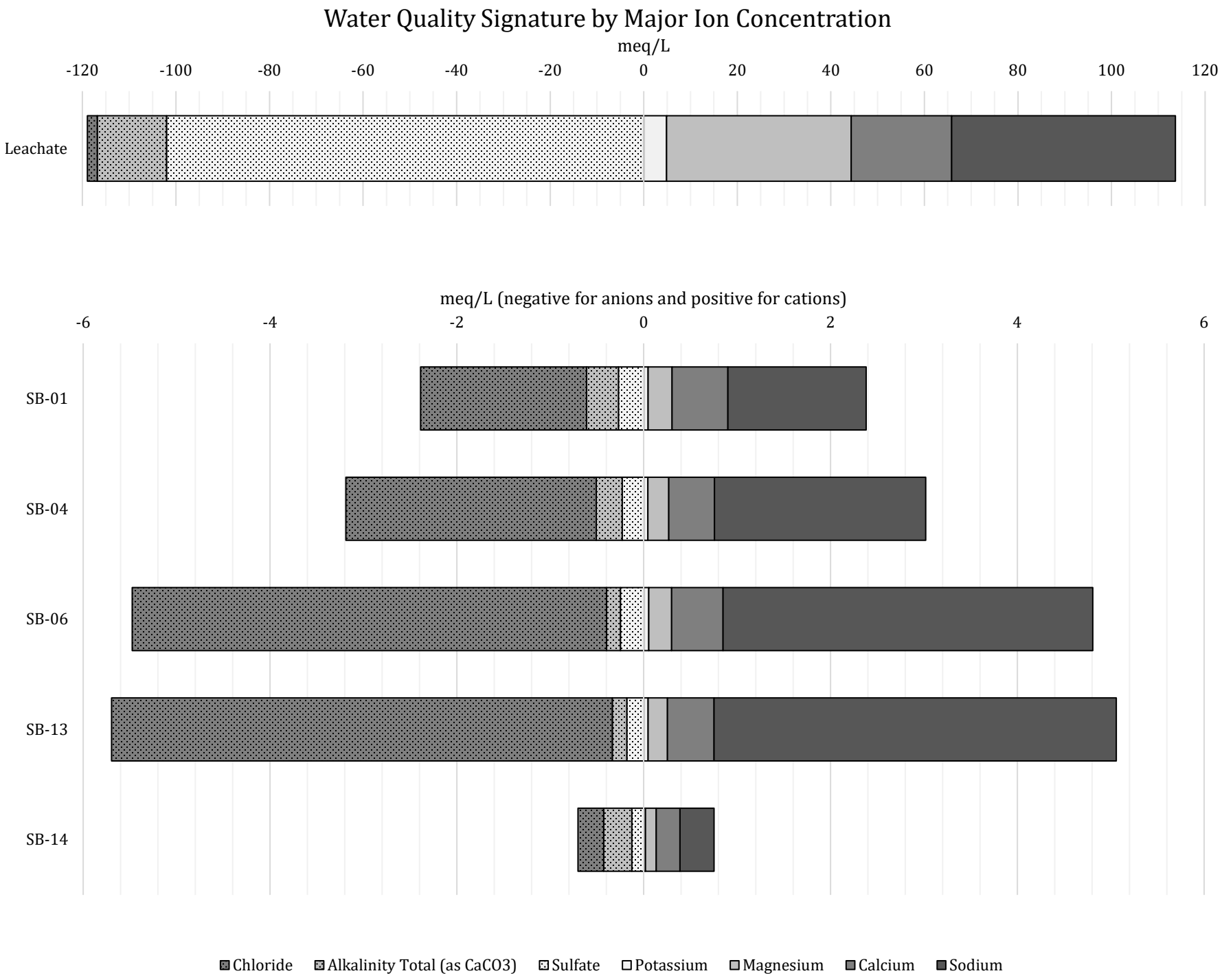
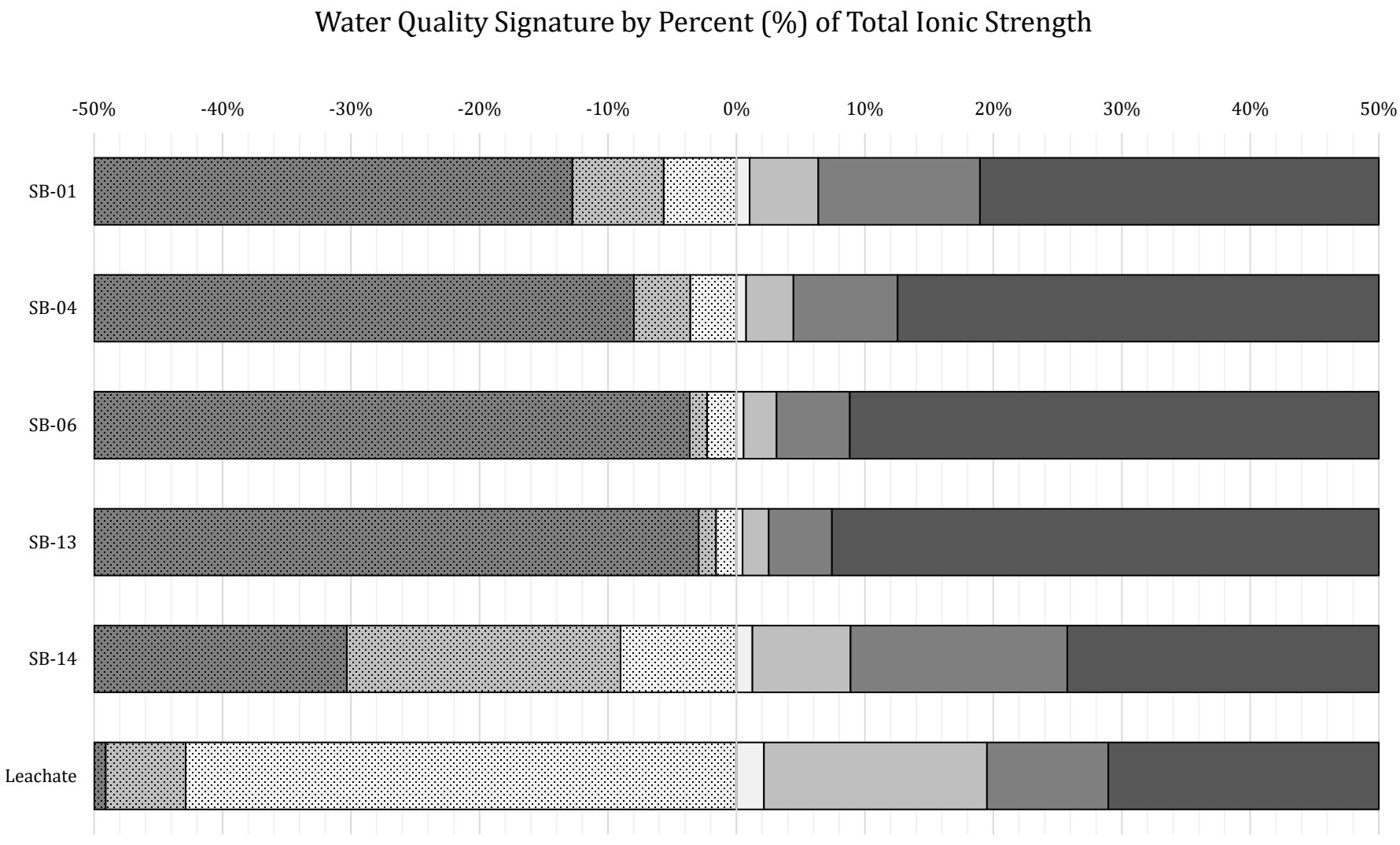


Figure 4 - Water Quality Signatures
Merrimack Station Coal Ash Landfill
Bow, New Hampshire





ATTACHMENT B

ANALYTICAL LABORATORY REPORTS

April 2018

Eastern Analytical, Inc.

professional laboratory and drilling services

Allan Palmer
Eversource Energy
780 North Commercial Street, PO Box 330
Manchester , NH 03105-0330

ACCREDITED IN ACCORDANCE WITH nelac

Subject: Laboratory Report

Eastern Analytical, Inc. ID: 180458
Client Identification: Merrimack Station - Coal Ash
Date Received: 4/9/2018

Dear Mr. Palmer:

Enclosed please find the laboratory report for the above identified project. All analyses were performed in accordance with our QA/QC Program. Unless otherwise stated, holding times, preservation techniques, container types, and sample conditions adhered to EPA Protocol. Samples which were collected by Eastern Analytical, Inc. (EAI) were collected in accordance with approved EPA procedures. Eastern Analytical, Inc. certifies that the enclosed test results meet all requirements of NELAP and other applicable state certifications. Please refer to our website at www.eailabs.com for a copy of our NELAP certificate and accredited parameters.

The following standard abbreviations and conventions apply to all EAI reports:

Solid samples are reported on a dry weight basis, unless otherwise noted
< : "less than" followed by the reporting limit
> : "greater than" followed by the reporting limit
%R : % Recovery

Eastern Analytical Inc. maintains certification in the following states: Connecticut (PH-0492), Maine (NH005), Massachusetts (M-NH005), New Hampshire/NELAP (1012), Rhode Island (269) and Vermont (VT1012).

The following information is contained within this report: Sample Conditions summary, Analytical Results/Data, Quality Control data (if requested) and copies of the Chain of Custody. This report may not be reproduced except in full, without the the written approval of the laboratory.

If you have any questions regarding the results contained within, please feel free to directly contact me or the chemist(s) who performed the testing in question. Unless otherwise requested, we will dispose of the sample(s) 30 days from the sample receipt date.

We appreciate this opportunity to be of service and look forward to your continued patronage.

Sincerely,

Lorraine Olashaw, Lab Director | 4.23.18 Date | 5 # of pages (excluding cover letter)

SAMPLE CONDITIONS PAGE

EAI ID#: **180458**

Client: **Eversource Energy**

Client Designation: **Merrimack Station - Coal Ash**

Temperature upon receipt (°C): 5.0 **Received on ice or cold packs (Yes/No): Y**

Acceptable temperature range (°C): 0-6

Lab ID	Sample ID	Date Received	Date Sampled	Sample Matrix	% Dry Weight	Exceptions/Comments (other than thermal preservation)
180458.01	SB-1	4/9/18	4/9/18	aqueous		Adheres to Sample Acceptance Policy
180458.02	SB-4	4/9/18	4/9/18	aqueous		Adheres to Sample Acceptance Policy
180458.03	SB-6	4/9/18	4/9/18	aqueous		Adheres to Sample Acceptance Policy
180458.04	SB-13	4/9/18	4/9/18	aqueous		Adheres to Sample Acceptance Policy
180458.05	SB-14	4/9/18	4/9/18	aqueous		Adheres to Sample Acceptance Policy

Samples were properly preserved and the pH measured when applicable unless otherwise noted. Analysis of solids for pH, Flashpoint, Ignitability, Paint Filter, Corrosivity, Conductivity and Specific Gravity are reported on an "as received" basis.
Immediate analyses, pH, Total Residual Chlorine, Dissolved Oxygen and Sulfite, performed at the laboratory were run outside of the recommended 15 minute hold time.
All results contained in this report relate only to the above listed samples.
References include:
1) EPA 600/4-79-020, 1983
2) Standard Methods for Examination of Water and Wastewater,20th Edition, 1998 and 22nd Edition, 2012
3) Test Methods for Evaluating Solid Waste SW 846 3rd Edition including updates IVA and IVB
4) Hach Water Analysis Handbook, 2nd edition, 1992

LABORATORY REPORT

EAI ID#: **180458**

Client: **Eversource Energy**

Client Designation: **Merrimack Station - Coal Ash**

Sample ID:	SB-1	SB-4	SB-6	SB-13					
Lab Sample ID:	180458.01	180458.02	180458.03	180458.04					
Matrix:	aqueous	aqueous	aqueous	aqueous					
Date Sampled:	4/9/18	4/9/18	4/9/18	4/9/18		Analysis			
Date Received:	4/9/18	4/9/18	4/9/18	4/9/18	**Units**	**Date**	**Time**	**Method**	**Analyst**
Solids Dissolved	**160**	**220**	**240**	**330**	mg/L	04/09/18	16:45	2540C-97	ATA
Fluoride	< 0.1	< 0.1	< 0.1	< 0.1	mg/L	04/12/18	20:50	300.0	KD
Sulfate	**10**	**12**	**9.5**	**8**	mg/L	04/12/18	20:50	300.0	KD
Chloride	**55**	**93**	**120**	**170**	mg/L	04/10/18	9:02	4500CIE-97	KD

Sample ID:	SB-14						
Lab Sample ID:	180458.05						
Matrix:	aqueous						
Date Sampled:	4/9/18	Analysis					
Date Received:	4/9/18	**Units**	**Date**	**Time**	**Method**	**Analyst**	
Solids Dissolved	**80**	mg/L	04/09/18	16:45	2540C-97	ATA	
Fluoride	< 0.1	mg/L	04/12/18	21:44	300.0	KD	
Sulfate	**8.4**	mg/L	04/12/18	21:44	300.0	KD	
Chloride	**14**	mg/L	04/10/18	9:10	4500CIE-97	KD	

LABORATORY REPORT

EAI ID#: **180458**

Client: **Eversource Energy**

Client Designation: **Merrimack Station - Coal Ash**

Sample ID:	SB-1	SB-4	SB-6	SB-13					
Lab Sample ID:	180458.01	180458.02	180458.03	180458.04					
Matrix:	aqueous	aqueous	aqueous	aqueous					
Date Sampled:	4/9/18	4/9/18	4/9/18	4/9/18	**Analytical Matrix**	**Units**	**Date of Analysis**	**Method**	**Analyst**
Date Received:	4/9/18	4/9/18	4/9/18	4/9/18					
Boron	**0.067**	< 0.05	< 0.05	< 0.05	AqTot	mg/L	4/10/18	200.7	RJ
Calcium	**12**	**11**	**7.9**	**11**	AqTot	mg/L	4/10/18	200.7	RJ

Sample ID:	SB-14							
Lab Sample ID:	180458.05							
Matrix:	aqueous							
Date Sampled:	4/9/18	**Analytical Matrix**	**Units**	**Date of Analysis**	**Method**	**Analyst**		
Date Received:	4/9/18							
Boron	< 0.05	AqTot	mg/L	4/10/18	200.7	RJ		
Calcium	**4.2**	AqTot	mg/L	4/10/18	200.7	RJ		

LABORATORY REPORT

EAI ID#: **180458**

Client: **Eversource Energy**

Client Designation: **Merrimack Station - Coal Ash**

Sample ID:	SB-1	SB-13	Units	Date of Analysis	Method	Analyst
Lab Sample ID:	180458.01	180458.04				
Matrix:	aqueous	aqueous				
Date Sampled:	4/9/18	4/9/18				
Date Received:	4/9/18	4/9/18				
Field pH	**5.90**	**5.81**	SU	4/9/18	SM4500H	JG

Sample ID:	SB-4	SB-6	SB-14	Units	Date of Analysis	Method	Analyst
Lab Sample ID:	180458.02	180458.03	180458.05				
Matrix:	aqueous	aqueous	aqueous				
Date Sampled:	4/9/18	4/9/18	4/9/18				
Date Received:	4/9/18	4/9/18	4/9/18				
Field pH	**5.87**	**5.57**	**5.76**	SU	4/9/18	SM4500H	JL

CHAIN-OF-CUSTODY RECORD

eastern analytical
professional laboratory services

180458

5

aSampleID	Date/Time	aMatrix	Parameters	Sample Notes	# of containers
SB-1	04/09/18 12:01	GW	Total Boron, Calcium, Flouride, Chloride, Sulfate, Field pH, Total Dissolved Solids		3
preservative: HCL (HNO3) H_2SO_4 NaOH MEOH $Na_2S_2O_3$ (ICE)					
SB-4	04/09/18 10:09	GW	Total Boron, Calcium, Flouride, Chloride, Sulfate, Field pH, Total Dissolved Solids		3
preservative: HCL (HNO3) H_2SO_4 NaOH MEOH $Na_2S_2O_3$ (ICE)					
SB-6	04/09/18 12:08	GW	Total Boron, Calcium, Flouride, Chloride, Sulfate, Field pH, Total Dissolved Solids		3
preservative: HCL (HNO3) H_2SO_4 NaOH MEOH $Na_2S_2O_3$ (ICE)					
SB-13	04/09/2018 09:57	GW	Total Boron, Calcium, Flouride, Chloride, Sulfate, Field pH, Total Dissolved Solids		3
preservative: HCL (HNO3) H_2SO_4 NaOH MEOH $Na_2S_2O_3$ (ICE)					
SB-14	04/09/2018 13:35	GW	Total Boron, Calcium, Flouride, Chloride, Sulfate, Field pH, Total Dissolved Solids		3
preservative: HCL (HNO3) H_2SO_4 NaOH MEOH $Na_2S_2O_3$ (ICE)					

aClientID Merrimack Station - Coal Ash
nProjectID 3949 **nYearMonth** 2018.04
Client (Pro Mgr) Allan Palmer
Customer Eversource Energy
Address 780 North Commercial Street, PO
City Manchester **NH** 03105-0330
Phone 669-4000
Fax Choose one:

Results Needed by: Preferred date _____
Notes about project

ReportingOptions
☒ HC ☐ NO FAX ☐ EDD Disk
☐ Fax ☐ No partial FAX ☒ EDD emai

PO# _____
Quote# _____

Ice: Y☑ N☐
Temperature 5.0°C

Samples Collected by: JL, JG (EAI)

Relinquished by	Date/Time	Received by
	04/09/15 1450	
Relinquished by	**Date/Time**	**Received by**

July 2018

Eastern Analytical, Inc.
professional laboratory and drilling services

Allan Palmer
Granite Shore Power
431 River Road
Bow , NH 03304

Subject: Laboratory Report

Eastern Analytical, Inc. ID: 184694
Client Identification: Merrimack Station CA LF - CCR Rule
Date Received: 7/25/2018

Dear Mr. Palmer :

Enclosed please find the laboratory report for the above identified project. All analyses were performed in accordance with our QA/QC Program. Unless otherwise stated, holding times, preservation techniques, container types, and sample conditions adhered to EPA Protocol. Samples which were collected by Eastern Analytical, Inc. (EAI) were collected in accordance with approved EPA procedures. Eastern Analytical, Inc. certifies that the enclosed test results meet all requirements of NELAP and other applicable state certifications. Please refer to our website at www.easternanalytical.com for a copy of our NELAP certificate and accredited parameters.

The following standard abbreviations and conventions apply to all EAI reports:
Solid samples are reported on a dry weight basis, unless otherwise noted
< : "less than" followed by the reporting limit
> : "greater than" followed by the reporting limit
%R : % Recovery

Eastern Analytical Inc. maintains certification in the following states: Connecticut (PH-0492), Maine (NH005), Massachusetts (M-NH005), New Hampshire/NELAP (1012), Rhode Island (269), Vermont (VT1012) and New York (12072).

The following information is contained within this report: Sample Conditions summary, Analytical Results/Data, Quality Control data (if requested) and copies of the Chain of Custody. This report may not be reproduced except in full, without the the written approval of the laboratory.

If you have any questions regarding the results contained within, please feel free to directly contact me or the chemist(s) who performed the testing in question. Unless otherwise requested, we will dispose of the sample (s) 30 days from the sample receipt date.

We appreciate this opportunity to be of service and look forward to your continued patronage.

Sincerely,

Jennifer Gerard for
Lorraine Olashaw, Lab Director

8.8.18
Date

6
# of pages (excluding cover letter)

SAMPLE CONDITIONS PAGE

EAI ID#: **184694**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station CA LF - CCR Rule**

Temperature upon receipt (°C): 3.5 **Received on ice or cold packs (Yes/No): Y**

Acceptable temperature range (°C): 0-6

Lab ID	Sample ID	Date Received	Date Sampled	Sample Matrix	% Dry Weight	Exceptions/Comments (other than thermal preservation)
184694.01	SB-1	7/25/18	7/25/18	aqueous		Adheres to Sample Acceptance Policy
184694.02	SB-4	7/25/18	7/25/18	aqueous		Adheres to Sample Acceptance Policy
184694.03	SB-6	7/25/18	7/25/18	aqueous		Adheres to Sample Acceptance Policy
184694.04	SB-13	7/25/18	7/25/18	aqueous		Adheres to Sample Acceptance Policy
184694.05	SB-14	7/25/18	7/25/18	aqueous		Adheres to Sample Acceptance Policy

Samples were properly preserved and the pH measured when applicable unless otherwise noted. Analysis of solids for pH, Flashpoint, Ignitability, Paint Filter, Corrosivity, Conductivity and Specific Gravity are reported on an "as received" basis.
Immediate analyses, pH, Total Residual Chlorine, Dissolved Oxygen and Sulfite, performed at the laboratory were run outside of the recommended 15 minute hold time.

All results contained in this report relate only to the above listed samples.

References include:

1) EPA 600/4-79-020, 1983
2) Standard Methods for Examination of Water and Wastewater,20th Edition, 1998 and 22nd Edition, 2012
3) Test Methods for Evaluating Solid Waste SW 846 3rd Edition including updates IVA and IVB
4) Hach Water Analysis Handbook, 2nd edition, 1992

Eastern Analytical, Inc. www.easternanalytical.com | 800.287.0525 | customerservice@easternanalytical.com

LABORATORY REPORT

EAI ID#: **184694**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station CA LF - CCR Rule**

Sample ID:	SB-1	SB-4	SB-6	SB-13					
Lab Sample ID:	184694.01	184694.02	184694.03	184694.04					
Matrix:	aqueous	aqueous	aqueous	aqueous					
Date Sampled:	7/25/18	7/25/18	7/25/18	7/25/18		Analysis			
Date Received:	7/25/18	7/25/18	7/25/18	7/25/18	**Units**	**Date**	**Time**	**Method**	**Analyst**
Solids Dissolved	**140**	**210**	**310**	**340**	mg/L	07/26/18	11:10	2540C-11	ATA
Sulfate	**13**	**11**	**12**	**8.7**	mg/L	08/01/18	11:13	300.0	KD
Chloride	**63**	**95**	**180**	**190**	mg/L	08/01/18	11:13	300.0	KD

Sample ID:	SB-14						
Lab Sample ID:	184694.05						
Matrix:	aqueous						
Date Sampled:	7/25/18	Analysis					
Date Received:	7/25/18	**Units**	**Date**	**Time**	**Method**	**Analyst**	
Solids Dissolved	**56**	mg/L	07/26/18	11:10	2540C-11	ATA	
Sulfate	**6.1**	mg/L	08/01/18	12:13	300.0	KD	
Chloride	**9.8**	mg/L	08/01/18	12:13	300.0	KD	

LABORATORY REPORT

EAI ID#: **184694**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station CA LF - CCR Rule**

Sample ID:	SB-1	SB-4	SB-6	SB-13					
Lab Sample ID:	184694.01	184694.02	184694.03	184694.04					
Matrix:	aqueous	aqueous	aqueous	aqueous					
Date Sampled:	7/25/18	7/25/18	7/25/18	7/25/18	**Analytical Matrix**	**Units**	**Date of Analysis**	**Method**	**Analyst**
Date Received:	7/25/18	7/25/18	7/25/18	7/25/18					
Calcium	**12**	**9.8**	**11**	**10**	AqTot	mg/L	7/26/18	200.7	RJ

Sample ID:	SB-14								
Lab Sample ID:	184694.05								
Matrix:	aqueous								
Date Sampled:	7/25/18				**Analytical Matrix**	**Units**	**Date of Analysis**	**Method**	**Analyst**
Date Received:	7/25/18								
Calcium	**5.1**				AqTot	mg/L	7/26/18	200.7	RJ

LABORATORY REPORT

EAI ID#: **184694**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station CA LF - CCR Rule**

Sample ID:	SB-1	SB-13				
Lab Sample ID:	184694.01	184694.04				
Matrix:	aqueous	aqueous				
Date Sampled:	7/25/18	7/25/18				
			Units	**Date of Analysis**	**Method**	**Analyst**
Temperature	**16**	**16**	°C	7/25/18	SM2550B	JG
Field pH	**5.94**	**5.69**	SU	7/25/18	SM4500H	JG
Field Conductivity	**270**	**600**	uS/cm	7/25/18	SM2510B	JG
Field Turbidity	**2.8**	**1.9**	NTU	7/25/18	Field	JG

Sample ID:	SB-4	SB-6	SB-14				
Lab Sample ID:	184694.02	184694.03	184694.05				
Matrix:	aqueous	aqueous	aqueous				
Date Sampled:	7/25/18	7/25/18	7/25/18				
				Units	**Date of Analysis**	**Method**	**Analyst**
Temperature	**17**	**16**	**12**	°C	7/25/18	SM2550B	JL
Field pH	**5.68**	**5.44**	**5.61**	SU	7/25/18	SM4500H	JL
Field Conductivity	**360**	**580**	**86**	uS/cm	7/25/18	SM2510B	JL
Field Turbidity	**1.1**	**1.0**	**3.6**	NTU	7/25/18	Field	JL

CHAIN-OF-CUSTODY RECORD

184694

1 of 2

Sample IDs	Date/Time (Composites need start and stop dates/times)	Matrix	Parameters and Sample Notes	# of containers
SB-1	7/25/18 1304	aqueous (Grab) or Comp	AqTot/ICPMets.Ca/Cl/SO4/TDS/FieldTemp/FieldCond/FieldpH/FieldTurb	3
☐ Sampler confirms ID and parameters are accurate			*Circle preservative/s:* HCL (HNO$_3$) H_2SO_4 NaOH MEOH $Na_2S_2O_3$ (ICE)	Dissolved Sample Field Filtered ☐
SB-4	7/25/18 11:30	aqueous (Grab) or Comp	AqTot/ICPMets.Ca/Cl/SO4/TDS/FieldTemp/FieldCond/FieldpH/FieldTurb	3
☐ Sampler confirms ID and parameters are accurate			*Circle preservative/s:* HCL (HNO$_3$) H_2SO_4 NaOH MEOH $Na_2S_2O_3$ (ICE)	Dissolved Sample Field Filtered ☐
SB-6	7/25/18 13:44	aqueous (Grab) or Comp	AqTot/ICPMets.Ca/Cl/SO4/TDS/FieldTemp/FieldCond/FieldpH/FieldTurb	3
☐ Sampler confirms ID and parameters are accurate			*Circle preservative/s:* HCL (HNO$_3$) H_2SO_4 NaOH MEOH $Na_2S_2O_3$ (ICE)	Dissolved Sample Field Filtered ☐
SB-13	7/25/18 15:10	aqueous (Grab) or Comp	AqTot/ICPMets.Ca/Cl/SO4/TDS/FieldTemp/FieldCond/FieldpH/FieldTurb	3
☐ Sampler confirms ID and parameters are accurate			*Circle preservative/s:* HCL (HNO$_3$) H_2SO_4 NaOH MEOH $Na_2S_2O_3$ (ICE)	Dissolved Sample Field Filtered ☐

Please ensure this auto COC is accurate, adheres to permit or sampling requirements for this sampling event, and modify as necessary.

EAI Project ID 3949
Project Name Merrimack Station CA LF - CCR Rule
State NH
Client (Pro Mgr) Allan Palmer
Customer Granite Shore Power
Address 431 River Road
City Bow NH 03304
Phone 224-4081 **Fax** 224-4081
Email: allan.palmer@graniteshorepower.com
Direct (603) 230-7951

Results Needed by: Preferred date _____
Notes:

QC deliverables
☒ A ☐ A+ ☐ B ☐ B+ ☐ C ☐ MA MCP

ReportingOptions
☒ HC
☒ EDD PDF
☒ EDD email
☒ PDF prelim, NO FAX
☐ e-mail Login Confirmation
☐ NO FAX
☐ Partial FAX
☐ PDF Invoice
☐ EQUIS

PO#
Quote#:
Temp 3.5°C
Ice Y ☒ N ☐

Samples Collected by: JG, JW/EAI

Relinquished by	Date/Time	Received by
	7/25/18 1645	
Relinquished by	Date/Time	Received by

CHAIN-OF-CUSTODY RECORD

184694

PSNMK

6

Sample IDs	Date/Time Composites need start and stop dates/times	Matrix	Parameters and Sample Notes	# of containers
SB-14	2 of 2 7/25/18 1502	aqueous (Grab) or Comp	AqTot/ICPMets.Ca/Cl/SO4/TDS/FieldTemp/FieldCond/FieldpH/FieldTurb	3

BA – 7/26/18

☐ **Sampler confirms ID and parameters are accurate**

Circle preservative/s: HCL (HNO$_3$) H_2SO_4 NaOH MEOH $Na_2S_2O_3$ (ICE)

Dissolved Sample Field Filtered ☐

Please ensure this auto COC is accurate, adheres to permit or sampling requirements for this sampling event, and modify as necessary.

EAI Project ID 3949

Project Name Merrimack Station CA LF - CCR Rule

State NH

Client (Pro Mgr) Allan Palmer

Customer Granite Shore Power

Address 431 River Road

City Bow NH 03304

Phone 224-4081 **Fax** 224-4081

Email: allan.palmer@graniteshorepower.com

Direct (603) 230-7951

Results Needed by: Preferred date _____

Notes:

QC deliverables

☒ A ☐ A+ ☐ B ☐ B+ ☐ C ☐ MA MCP

ReportingOptions

☒ HC
☒ EDD PDF
☒ EDD email
☒ PDF prelim, NO FAX
☐ e-mail Login Confirmation
☐ NO FAX
☐ Partial FAX
☐ PDF Invoice
☐ EQUIS

PO#

Quote#:

Temp 3.5 °C

Ice Y☒ N☐

Samples Collected by: JG, JL/EAI

Relinquished by	Date/Time	Received by
	7/25/18 1645	
Relinquished by	**Date/Time**	**Received by**

November 2018

SANBORN HEAD

Eastern Analytical, Inc.

professional laboratory and drilling services

Allan Palmer
Granite Shore Power
431 River Road
Bow , NH 03304

Subject: Laboratory Report

Eastern Analytical, Inc. ID: 189622
Client Identification: Merrimack Station - Coal Ash
Date Received: 11/29/2018

Dear Mr. Palmer :

Enclosed please find the laboratory report for the above identified project. All analyses were performed in accordance with our QA/QC Program. Unless otherwise stated, holding times, preservation techniques, container types, and sample conditions adhered to EPA Protocol. Samples which were collected by Eastern Analytical, Inc. (EAI) were collected in accordance with approved EPA procedures. Eastern Analytical, Inc. certifies that the enclosed test results meet all requirements of NELAP and other applicable state certifications. Please refer to our website at www.easternanalytical.com for a copy of our NELAP certificate and accredited parameters.

The following standard abbreviations and conventions apply to all EAI reports:

Solid samples are reported on a dry weight basis, unless otherwise noted
< : "less than" followed by the reporting limit
> : "greater than" followed by the reporting limit
%R : % Recovery

Eastern Analytical Inc. maintains certification in the following states: Connecticut (PH-0492), Maine (NH005), Massachusetts (M-NH005), New Hampshire/NELAP (1012), Rhode Island (269), Vermont (VT1012) and New York (12072).

The following information is contained within this report: Sample Conditions summary, Analytical Results/Data, Quality Control data (if requested) and copies of the Chain of Custody. This report may not be reproduced except in full, without the the written approval of the laboratory.

If you have any questions regarding the results contained within, please feel free to directly contact me or the chemist(s) who performed the testing in question. Unless otherwise requested, we will dispose of the sample (s) 30 days from the sample receipt date.

We appreciate this opportunity to be of service and look forward to your continued patronage.

Sincerely,

Jennifer Scott for — 12.14.18 — 5

Lorraine Olashaw, Lab Director — Date — # of pages (excluding cover letter)

SAMPLE CONDITIONS PAGE

EAI ID#: **189622**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash**

Temperature upon receipt (°C): 3.3 **Received on ice or cold packs (Yes/No): Y**

Acceptable temperature range (°C): 0-6

Lab ID	Sample ID	Date Received	Date Sampled	Sample Matrix	% Dry Weight	Exceptions/Comments (other than thermal preservation)
189622.01	SB-1	11/29/18	11/29/18	aqueous		Adheres to Sample Acceptance Policy
189622.02	SB-4	11/29/18	11/28/18	aqueous		Adheres to Sample Acceptance Policy
189622.03	SB-6	11/29/18	11/28/18	aqueous		Adheres to Sample Acceptance Policy
189622.04	SB-13	11/29/18	11/28/18	aqueous		Adheres to Sample Acceptance Policy
189622.05	SB-14	11/29/18	11/28/18	aqueous		Adheres to Sample Acceptance Policy

Samples were properly preserved and the pH measured when applicable unless otherwise noted. Analysis of solids for pH, Flashpoint, Ignitability, Paint Filter, Corrosivity, Conductivity and Specific Gravity are reported on an "as received" basis.
Immediate analyses, pH, Total Residual Chlorine, Dissolved Oxygen and Sulfite, performed at the laboratory were run outside of the recommended 15 minute hold time.

All results contained in this report relate only to the above listed samples.

References include:

1) EPA 600/4-79-020, 1983
2) Standard Methods for Examination of Water and Wastewater, 20th, 21st, 22nd & 23rd Edition or noted Revision year.
3) Test Methods for Evaluating Solid Waste SW 846 3rd Edition including updates IVA and IVB
4) Hach Water Analysis Handbook, 4th edition, 1992

LABORATORY REPORT

EAI ID#: **189622**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash**

Sample ID:	SB-1	SB-4	SB-6	SB-13					
Lab Sample ID:	189622.01	189622.02	189622.03	189622.04					
Matrix:	aqueous	aqueous	aqueous	aqueous					
Date Sampled:	11/29/18	11/28/18	11/28/18	11/28/18					
Date Received:	11/29/18	11/29/18	11/29/18	11/29/18					
						Analysis			
					Units	**Date**	**Time**	**Method**	**Analyst**
Solids Dissolved	**100**	**83**	**140**	**260**	mg/L	12/03/18	14:45	2540C-11	SR
Fluoride	< 0.1	< 0.1	< 0.1	< 0.1	mg/L	12/06/18	2:26	300.0	KD
Sulfate	**10**	**13**	**11**	**7.2**	mg/L	12/06/18	2:26	300.0	KD
Chloride	**66**	**86**	**150**	**200**	mg/L	12/06/18	2:26	300.0	KD
Alkalinity Total (CaCO3)	**14**	**17**	**9.4**	**7.2**	mg/L	12/03/18	11:44	2320B-11	ATA

Sample ID:	SB-14							
Lab Sample ID:	189622.05							
Matrix:	aqueous							
Date Sampled:	11/28/18				**Analysis**			
Date Received:	11/29/18	**Units**	**Date**	**Time**	**Method**	**Analyst**		
Solids Dissolved	< 5	mg/L	12/03/18	14:45	2540C-11	SR		
Fluoride	< 0.1	mg/L	12/06/18	3:31	300.0	KD		
Sulfate	**6.3**	mg/L	12/06/18	3:31	300.0	KD		
Chloride	**7.8**	mg/L	12/06/18	3:31	300.0	KD		
Alkalinity Total (CaCO3)	**13**	mg/L	12/03/18	11:44	2320B-11	ATA		

SB-14: Solids Dissolved were below the total concentration of the anions analyzed. Both Sulfate and Chloride are near the Solid Dissolved reporting limit.

LABORATORY REPORT

EAI ID#: **189622**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash**

Sample ID:	SB-1	SB-4	SB-6	SB-13					
Lab Sample ID:	189622.01	189622.02	189622.03	189622.04					
Matrix:	aqueous	aqueous	aqueous	aqueous					
Date Sampled:	11/29/18	11/28/18	11/28/18	11/28/18	**Analytical Matrix**	**Units**	**Date of Analysis**	**Method**	**Analyst**
Date Received:	11/29/18	11/29/18	11/29/18	11/29/18					
Boron	**0.087**	< 0.05	< 0.05	< 0.05	AqTot	mg/L	12/3/18	200.8	DS
Calcium	**13**	**12**	**11**	**13**	AqTot	mg/L	12/3/18	200.8	DS
Magnesium	**3.0**	**2.8**	**2.5**	**2.8**	AqTot	mg/L	12/3/18	200.8	DS
Potassium	**1.7**	**2.0**	**1.8**	**2.1**	AqTot	mg/L	12/3/18	200.8	DS
Sodium	**37**	**63**	**86**	**110**	AqTot	mg/L	12/3/18	200.8	DS

Sample ID:	SB-14						
Lab Sample ID:	189622.05						
Matrix:	aqueous						
Date Sampled:	11/28/18	**Analytical Matrix**	**Units**	**Date of Analysis**	**Method**	**Analyst**	
Date Received:	11/29/18						
Boron	< 0.05	AqTot	mg/L	12/3/18	200.8	DS	
Calcium	**4.5**	AqTot	mg/L	12/3/18	200.8	DS	
Magnesium	**1.1**	AqTot	mg/L	12/3/18	200.8	DS	
Potassium	**0.77**	AqTot	mg/L	12/3/18	200.8	DS	
Sodium	**8.9**	AqTot	mg/L	12/3/18	200.8	DS	

LABORATORY REPORT

EAI ID#: **189622**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash**

Sample ID:	SB-1	SB-4	SB-6	SB-13				
Lab Sample ID:	189622.01	189622.02	189622.03	189622.04				
Matrix:	aqueous	aqueous	aqueous	aqueous				
Date Sampled:	11/29/18	11/28/18	11/28/18	11/28/18				
					Units	**Date of Analysis**	**Method**	**Analyst**
Field pH	**6.07**	**6.28**	**5.86**	**5.77**	SU	11/29/18	SM4500H	JG

Sample ID:	SB-14							
Lab Sample ID:	189622.05							
Matrix:	aqueous							
Date Sampled:	11/28/18							
					Units	**Date of Analysis**	**Method**	**Analyst**
Field pH	**5.96**				SU	11/28/18	SM4500H	JG

plotH

5

CHAIN-OF-CUSTODY RECORD

eastern analytical
professional laboratory services

189622

aSampleID	Date/Time	aMatrix	Parameters	Sample Notes	# of containers
SB-1	11/29/18 0757	GW	Total Boron, Calcium, Magnesium, Potassium, Sodium, Flouride, Chloride, Sulfate, Field pH, Total Dissolved Solids, Total Alkalinity		4
preservative: HCL (HNO3) H_2SO_4 NaOH MEOH $Na_2S_2O_3$ (ICE)					
SB-4	11/28/18 10:59	GW	Total Boron, Calcium, Magnesium, Potassium, Sodium, Flouride, Chloride, Sulfate, Field pH, Total Dissolved Solids, Total Alkalinity		4
preservative: HCL (HNO3) H_2SO_4 NaOH MEOH $Na_2S_2O_3$ (ICE)					
SB-6	11/28/18 12:55	GW	Total Boron, Calcium, Magnesium, Potassium, Sodium, Flouride, Chloride, Sulfate, Field pH, Total Dissolved Solids, Total Alkalinity		4
preservative: HCL (HNO3) H_2SO_4 NaOH MEOH $Na_2S_2O_3$ (ICE)					
SB-13	11/28/18 14:24	GW	Total Boron, Calcium, Magnesium, Potassium, Sodium, Flouride, Chloride, Sulfate, Field pH, Total Dissolved Solids, Total Alkalinity		4
preservative: HCL (HNO3) H_2SO_4 NaOH MEOH $Na_2S_2O_3$ (ICE)					
SB-14	11/28/18 15:48	GW	Total Boron, Calcium, Magnesium, Potassium, Sodium, Flouride, Chloride, Sulfate, Field pH, Total Dissolved Solids, Total Alkalinity		4
preservative: HCL (HNO3) H_2SO_4 NaOH MEOH $Na_2S_2O_3$ (ICE)					

aClientID Merrimack Station - Coal Ash
nProjectID 3949 **nYearMonth** 2018.11
Client (Pro Mgr) Allan Palmer
Customer Granite Shore Power
Address 431 River Road
City Bow **NH** 03304
Phone 224-4081
Fax 224-4081

Results Needed by: Preferred date _____
Notes about project

ReportingOptions
☒ HC ☐ NO FAX ☐ EDD Disk
☐ Fax ☐ No partial FAX ☒ EDD emai

PO# _____
Quote# _____

Ice: Y☒ N☐
Temperature 3.3 °C

Samples Collected by: J.Gagne /EA/

Relinquished by	Date/Time	Received by
	11/29/18 0920	
Relinquished by	Date/Time	Received by