

Superfund Remediation Center
SITE Coakley Landfill
BREAK 5.4
OTHER 581119

**FINAL
FIFTH EXPLANATION OF SIGNIFICANT DIFFERENCES
(ESD) FOR OPERABLE UNIT – 1
AND THIRD ESD FOR OPERABLE UNIT – 2**

**COAKLEY LANDFILL SUPERFUND SITE
EPA ID: NHD064424153**

NORTH HAMPTON AND GREENLAND, NH

August 2015



Fifth Explanation of Significant Differences (ESD) for Operable Unit – 1 (OU-1)
And Third ESD for Operable Unit – 2 (OU-2)
Coakley Landfill Superfund Site

August 2015

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Final
FIFTH EXPLANATION OF SIGNIFICANT DIFFERENCES
OPERABLE UNIT – 1
SECOND EXPLANATION OF SIGNIFICANT DIFFERENCES
OPERABLE UNIT – 2

COAKLEY LANDFILL SUPERFUND SITE

I. INTRODUCTION

A Site Name and Location

Coakley Landfill Superfund Site (Site) is located at 480 Breakfast Hill Road, Greenland, New Hampshire, and includes a large area in the Town of North Hampton, New Hampshire

B Lead and Support Agencies

Lead Agency United States Environmental Protection Agency (EPA)
Contact Gerardo Millan-Ramos, Remedial Project Manager (617) 918-1377

Support Agency New Hampshire Department of Environmental Services (NHDES)
Contact Andrew Hoffman, P E , Project Manager (603) 271-6778

C Legal Authority

Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U S C Section 9617(c), requires that, if the remedial action being undertaken at a site differs significantly from the Record of Decision (ROD) for that site, EPA shall publish an ESD and the reasons such changes were made. The National Contingency Plan (NCP), 40 C F R § 300.435(c)(2)(i), and Office of Solid Waste and Emergency Response (OSWER) Directive 9200.1-23P, indicate that an ESD, rather than a ROD Amendment, is appropriate where the adjustments being made to the ROD are significant, but do not fundamentally alter the remedy with respect to scope, performance, or cost. This ESD documents changes to certain components of the remedy set forth in the June 1990 ROD for OU-1 and the September 1994 ROD for OU-2 and subsequent ESDs to those RODs¹. EPA has determined that the adjustments to the 1990 and 1994 RODs provided in this ESD are significant, but do not fundamentally alter the overall remedy for OU-1 and OU-2 with respect to scope, performance or cost. Therefore, this ESD is properly issued.

¹ ESDs for the June 1990 ROD for OU-1 were issued on March 22, 1991, May 17, 1996, September 29, 1999, and September 28, 2007 with a reissue on July 1, 2009. An ESD for the September 1994 ROD for OU-2 was issued on September 28, 2007 with a reissue on July 1, 2009. These ESDs and the RODs for the Coakley Landfill Superfund Site may be found at the EPA-maintained website

http://yosemite.epa.gov/r1/npl_pad.nsf/701b6886f189ceae85256bd20014e93d/406c3d9b0f2c81c58525690d00449684?OpenDocument

In accordance with Section 300 825(b) of the NCP, EPA voluntarily chose to hold a public comment period on this draft document from April 1, 2015 to April 30, 2015 to ensure that all interested parties had an opportunity to provide input to EPA before its final decision on this modification to the remedy

D Summary of the Circumstances Necessitating this ESD

In January 2008, New Hampshire began requiring groundwater sampling for 1,4-dioxane at all hazardous waste sites. Since 2009, the contaminant 1,4-dioxane has been observed at both Operable Units of the Coakley Landfill Superfund Site, in both overburden and bedrock groundwater monitoring wells. These wells include a number of wells located inside and outside the Groundwater Management Zone (GMZ). Some concentrations observed inside the GMZ have exceeded the New Hampshire Department of Environmental Services (NHDES) 1,4-dioxane Ambient Groundwater Quality Standard (AGQS) of 3 µg/L, including 1,4-dioxane concentrations at the northwestern boundary of the GMZ. An expansion of the GMZ in this area was determined to be warranted and the NHDES issued a renewed Groundwater Management Permit on January 7, 2014, which expanded the GMZ and required the installation of two additional overburden/bedrock monitoring well couplets in the expansion area (see Attachment 3).

At the present time, the concentrations observed outside the expanded GMZ have not exceeded the AGQS, but based on all the available hydrogeological information, interpretation and evaluation of that information by the PRPs' consultant, and the review of such evaluation by NHDES and the EPA, the contaminant plume appears to be migrating westerly away from the landfill area toward the Berry's Brook Valley, and then turning to the north/northeast. The detection pattern for 1,4-dioxane at the Site has been consistent with this interpretation of groundwater flow.

Aware of potential residential development plans that include bedrock drinking water wells on property located at 410 Breakfast Hill Road, directly north of the Coakley Landfill, both EPA and NHDES expressed oral and written reservations about placement of additional bedrock wells in this area given the strong potential for these wells to cause groundwater contaminant migration, including 1,4-dioxane, from the Site towards the proposed residential development. Other existing residential drinking water wells may also be impacted by such development. Both EPA and NHDES have notified the Town of Greenland, the Town of North Hampton, the Town of Rye, and the potential developer of the existence of 1,4-dioxane exceedances in the groundwater plume at the northwestern-most corner of the GMZ boundary and the north/northeast direction of the groundwater flow and potential migration of the contaminant plume.

Subsequent to these notices from the Agencies, on September 24, 2013, the Town of Greenland issued a conditional approval for the construction of a ten-lot residential subdivision development and associated bedrock drinking water wells on a property located at 410 Breakfast Hill Road (Tax Map R-1, Lot #10). As set forth in the Notice of Decision, the Town's approval was conditioned on the developer satisfactorily addressing, among other things, the Agencies' concerns about potential contamination migration and interfering with

the ongoing remedy at the Site EPA understands that the Town of Rye Water District recently agreed to provide potable water that the City of Portsmouth can use to supply the potential ten-lot subdivision and a nearby church, and that such agreement has been recently ratified by the parties' governing bodies

EPA has determined that 1,4-dioxane is a contaminant in the groundwater that should be added to the list of Contaminants of Concern (COC) for the Site, and that a cleanup level (CL) for 1,4-dioxane in groundwater should be established

Therefore, for the reasons described above, this ESD includes the following

- 1 Formal incorporation of 1,4-dioxane as a Site COC in groundwater with the NHDES AGQS (3 µg/L) as a performance standard for monitoring the protectiveness of the remedy at OU-1 and as a CL at OU-2
- 2 Documentation of changes that have been made to the GMZ, Institutional Controls (ICs), and the Site's monitoring network
- 3 Institutional controls shall be established in accordance with the following
 - a Land use restrictions, and/or other institutional controls (for example, a municipal ordinance regarding well drilling), prohibiting or restricting the installation of new wells and the increased use of existing wells, except those needed for response actions at the Site and approved by EPA, shall be implemented as approved by EPA for the properties located in the Town of Greenland identified on Tax Map R-1 as Lots #10, 11, 11A, 11B, and 12 The land use restriction(s), and/or other institutional controls, on these properties shall remain in place until—or shall not be required in the first instance if—further study is done, under EPA supervision and approval, concluding that such new wells or any increased use of existing wells will not cause groundwater contaminant migration from the Site, and that they will not interfere with the remedy at the Site
 - b The groundwater monitoring program shall continue, in accordance with the RODs, ESDs, and associated EPA-approved Statements of Work and Work Plans (e.g. Sampling and Analysis Plan) If any existing or future wells in the monitoring program for OU-2 indicate exceedances of Cleanup Levels for Contaminants of Concern, further response actions shall be taken, which may include measures such as land use restriction(s), or other institutional controls, to restrict any use or extraction of groundwater, and/or provision of an alternate water source, such as connection to a public water supply line If any existing or future wells in the monitoring program for OU-2 indicate the potential for groundwater migration or interference with the remedy, further studies and/or response actions shall be taken
 - c Any wells installed after the date of this ESD, as recorded in the inventory maintained by the New Hampshire State Water Well Board, within one mile to

the north and northwest of the Landfill property, shall be reported by the PRPs annually to EPA. Any proposals for new well installations, as submitted to the Town of Greenland, shall also be reported by the PRPs every six months to EPA.

- 4 A change to terminology regarding groundwater cleanup levels in order to better reflect the changed process described below. Specifically, Interim Cleanup Levels identified in the RODs and any subsequent ESDs are now considered Cleanup Levels. While the term "Interim" is being eliminated, there is no change in the numeric groundwater cleanup levels identified in the RODs and subsequent ESDs that must be attained.
- 5 Clarification on the approach that will be utilized to determine that groundwater Cleanup Levels have been attained, the groundwater restoration remedy is protective, and support for a determination that groundwater restoration is complete.

E Availability of Documents

EPA considered and responded to all formal comments received during the comment period before issuing a final ESD. EPA's response to these comments is attached as a Responsiveness Summary to this final ESD (Attachment 7). The ESD, supporting documentation for the ESD, and the Administrative Record are available to the public at the following locations and may be reviewed at the times listed below:

U S Environmental Protection Agency
Office of Site Remediation and Restoration Records Center
5 Post Office Square, Suite 100
Boston, MA 02109-3912
Tel (617) 918-1440
Hours Monday - Friday 9 00 a m to 5 00 p m
Website <http://www.epa.gov/region1/cleanup/resource/records/>

North Hampton Public Library
237-A Atlantic Avenue North Hampton, NH 03862
Tel (603) 692-4587
Hours Monday/Wednesday 10 00 a m - 8 00 p m Tuesday/Thursday/Friday 10 00 a m - 5 00 p m Saturday 10 00 a m - 2 00 p m
Website <http://nhplib.org>

Greenland (Weeks) Public Library
36 Post Road, Greenland NH 03840
Tel (603) 436-8538
Hours Mon - Thu 10 00 am - 8 00 pm, Fri 10 00 am - 5 00 pm, Sat 9 00 am - 1 00 pm
Website <http://www.weekslibrary.org>

This ESD and the Administrative Record are available for public viewing at the locations and times listed above as well as on the internet at <http://www.epa.gov/region1/superfund/sites/coakley/>

Adobe Reader is required to review the documents

II. SUMMARY OF SITE HISTORY, CONTAMINATION PROBLEMS AND SELECTED REMEDY

A Site History and Contamination Problems

The Coakley Landfill Superfund Site includes approximately 92 acres located within the towns of Greenland and North Hampton, Rockingham County, New Hampshire. The actual landfill covers approximately 27 acres. The Site is located about 400 to 800 feet west of Lafayette Road (U.S. Route 1), directly south of Breakfast Hill Road, and about 2.5 miles northeast of the center of the town of North Hampton. The landfill borders farmland, undeveloped woodlands and wetlands to the north and west and commercial and residential properties to the east and south.

Landfill operations began in 1972, with the southern portion of the Site used for waste disposal from the New Hampshire municipalities of Portsmouth, North Hampton, Newington, and New Castle, along with Pease Air Force Base. Concurrent with landfill operations, rock quarrying was conducted at the Site from approximately 1973 through 1977. Much of the refuse disposed of at Coakley Landfill was placed in open (some liquid-filled) trenches created by rock quarrying and sand and gravel mining.

From July 1982 through July 1985, Pease Air Force Base and the municipalities of Rye, North Hampton, Portsmouth, New Castle, Newington and Derry, among others, began transporting their refuse to a new incineration plant within the Pease Air Force Base. The Coakley Landfill generally accepted residue from the incineration plant beginning in July 1982. In March 1983, the New Hampshire Office of Waste Management (formerly the New Hampshire Bureau of Waste Solid Management) ordered the landfill closed to all waste disposal except burnt residue from the incinerator and in July 1985, the landfill was closed to all disposal activities.

In 1979, the New Hampshire Office of Waste Management received a complaint concerning leachate breakouts in the area. A subsequent investigation resulted in the discovery of allegedly empty drums with markings indicative of cyanide waste. A second complaint was received in early 1983 by the New Hampshire Water Supply and Pollution Control Commission regarding the water quality from a domestic drinking water well. Testing revealed the presence of five different volatile organic compounds (VOCs). Subsequent confirmatory sampling beyond these initial wells detected VOCs to the south, southeast, and northeast of the Coakley Landfill. As a result, the town of North Hampton extended public water to Lafayette Terrace in 1983 and to Birch and North Roads in 1986. Prior to this time, commercial and residential water supply came from private wells.

Also in 1983, the Rye Water District completed a water main extension along Washington Road to the corner of Lafayette Road (U S Route 1) and along Dow Lane. This extension brought the public water supply into the area due east and southeast of the intersection of Breakfast Hill Road and U S Route 1. In December 1983, the Coakley Landfill was proposed for listing on the National Priorities List (NPL) and was eventually listed in 1986.

In June 1990, EPA issued a ROD for the source control operable unit of the Site (OU-1) and in March 1991, EPA issued an OU-1 ESD concerning modifications related to landfill cap construction and emissions from air strippers that would treat the leachate. The ROD for the management of groundwater migration operable unit (OU-2) was issued in September 1994. A second OU-1 ESD was issued in May 1996, which changed active landfill gas collection and treatment to a passive collection system. A third OU-1 ESD was issued in September 1999, which documented the decision to eliminate leachate collection and treatment. A fourth OU-1 ESD and the first OU-2 ESD were issued on September 2007 to document revisions to the MCL for arsenic, the EPA Health Advisory for Manganese, State standards, and to add tetrahydrofuran as a Site Contaminant of Concern. The 2007 OU-2 ESD was re-issued on July 2009 in order to clarify a revision to the arsenic MCL. A similar ESD was re-issued on July 2009 for OU-1.

On-site groundwater is contaminated with arsenic, phenol, 1,4-dioxane, and methyl ethyl ketones, while off-site groundwater is contaminated with heavy metals, including arsenic, chromium, and lead, and VOCs, including benzene, 1,4-dioxane, tetrahydrofuran, and methyl ethyl ketones. On-site soils and sediments are contaminated with arsenic and lead, stream sediment contaminants include arsenic and VOCs, among others, leachate contaminants include VOCs, tetrahydrofuran, and ketones, and nearby wetlands have shown detections of metals and VOCs. Potential use of the groundwater as a drinking water supply remains the main threat to human health.

In January 2008, following the establishment of the AGQS for 1,4-dioxane, NHDES required that the groundwater at all sites with hazardous waste be tested for 1,4-dioxane. Subsequently, in August 2009, 1,4-dioxane was added to the list of groundwater parameters being tested for at the Site. See Part III (Discussion of Significant Differences and the Basis for These Differences) for a further discussion of contamination problems at the Site associated with 1,4-dioxane.

B Summary of the Selected Remedy

The remedy for the Site is divided into two operable units: OU-1 (source control) and OU-2 (management of migration).

1 OU-1

The remedial objectives, as stated in the OU-1 ROD, are to

- Prevent ingestion of groundwater containing contamination in excess of federal and state drinking water standards or criteria, or that poses a threat to public health and the environment
- Prevent the public from direct contact with contaminated soils, sediments, solid waste and surface water which may present a health risk
- Eliminate or minimize the migration of contaminants from the soil into groundwater
- Prevent the off-site migration of contaminants above levels protective of public health and the environment
- Restore ground and surface water, soils and sediments to levels which are protective of public health and the environment

The major components of the source control portion of the remedy as modified by prior ESDs are

- Excavation with disposal onto the landfill, of contaminated sediment in the wetlands
- Consolidate solid waste
- Cap the landfill
- Fence the landfill
- Collect and vent landfill gases
- Long-term environmental monitoring
- Institutional controls – to prevent contact with site contaminants and to protect components of the remedy

ii OU-2

The ROD for the management of migration operable unit (OU-2) at the Site was issued in September 1994. The ROD, as modified by all prior ESDs, calls for the following

- Natural attenuation of the contaminated groundwater, which had migrated from beneath the landfill into off-site areas
- Long-term environmental monitoring and institutional controls

The 1990 OU-1 ROD and the 1994 OU-2 ROD identified Safe Drinking Water Act (42 U S C §300f et seq) Maximum Contaminant Levels (MCLs) (40 C F R 141, Subpart B and G) as chemical-specific Applicable or Relevant and Appropriate (ARARs) for the purposes of establishing groundwater cleanup standards for groundwater at OU-1 and OU-2.² The RODs also identified State standards, such as the New Hampshire Ambient Groundwater Quality Standards (AGQS), as ARARs. The 1994 ROD explained that the AGQS have been established for Site groundwater contaminants for which no MCLs are established and are derived to be protective for drinking water uses

² The OU-1 ROD was later modified in the 2007 ESD to revise the MCLs to be action-specific standards to be used to monitor the protectiveness of the source control remedy rather than to establish cleanup standards for groundwater within the OU-1 compliance boundary. MCLs continue to be chemical-specific cleanup levels for groundwater in the OU-2 ROD

The 1994 ROD set forth a process to evaluate attainment of remedial action objectives and overall protectiveness of groundwater restoration. This process required that Interim Cleanup Levels be achieved and not be exceeded for a period of three (3) consecutive years, after which time a risk assessment on the residual groundwater contamination would be completed to confirm the protectiveness related to ingestion of water. The potential risk associated with the inhalation of volatile organic compounds during showering would be comparable to those risks predicted for the ingestion route of exposure. The 1994 ROD further stated that if the results of this risk assessment conclude that the remedy was not protective, remedial actions would continue until 1) protective levels were achieved and were not exceeded for three (3) consecutive years or 2) until the remedy was otherwise deemed protective. It should be noted that the groundwater remediation at this Site addresses only those contaminants related to the Site.

III. DESCRIPTION OF SIGNIFICANT DIFFERENCES AND THE BASIS FOR THESE DIFFERENCES

A. Adding 1,4-dioxane as a Site Contaminant of Concern

1,4-dioxane is a clear liquid with a faint pleasant odor that mixes easily with water. Once dissolved into water, it does not easily leave the water and enter into the air. It is used primarily as a solvent in the manufacture of other chemicals and as a laboratory reagent. 1,4-dioxane may also be present in trace amounts in cosmetics, detergents and shampoos. Government agencies believe that 1,4-dioxane is likely to be carcinogenic to humans.³

Currently, there is not a federal enforceable drinking water standard for 1,4-dioxane. However, under New Hampshire Statutes (RSA 485-C:6), the NHDES Commissioner is directed to establish and adopt an Ambient Groundwater Quality Standard (AGQS) for contaminants which adversely affect human health or the environment. Under the statute, where health advisories have been established for a contaminant and where such standards are based on a cancer risk, the AGQS for a contaminant shall be equivalent to a lifetime exposure risk of one cancer in one million (1 in 1,000,000 or 10^{-6}) exposed population.⁴ According to NHDES regulations, ambient groundwater quality standards are also considered drinking water standards if a Maximum Contaminant Level (MCL) standard has not been developed for a particular compound.⁵

In 2005, NHDES adopted an AGQS for 1,4-dioxane of 3 micrograms per Liter ($\mu\text{g/L}$) based on information provided at the time by EPA's Integrated Risk Information System (IRIS) toxicological review.

³ See Public Health Statement, 1,4-Dioxane, CAS#123-91-1 (April 2012, ATSDR, available at <http://www.atsdr.cdc.gov/phs/phs.asp?id=953&tid=199>)

⁴ Letter from Frederick J. McGarry (NHDES Assistant Director, Waste Management Division) to all environmental professionals, Re "Change in Reporting Limit for 1,4-Dioxane" October 19, 2011

⁵ NHDES Environmental Fact Sheet (WD-DWGB-3-24), 2011

In 2010, EPA developed a cancer risk screening level, which was updated in May 2014, for 1,4-dioxane in tap water of 0.78 µg/L using risk assessment guidance from the EPA Superfund program. This federal screening level guideline of 0.78 µg/L is equivalent to 1 in one million (1 in 1,000,000 or 10^{-6}) cancer risk which is at the most conservative end of EPA's acceptable risk range of between 10^{-6} (1 in 1,000,000) to 10^{-4} (1 in 10,000) cancer risk. The federal screening level for 10^{-4} (or 1 in 10,000) cancer risk is 78 µg/L. These screening values are considered by EPA to be protective of humans (including sensitive groups) over a lifetime. The New Hampshire's AGQS concentration of 3 µg/L for 1,4-dioxane is well within EPA's acceptable risk range for Superfund Sites.⁶

In January 2008, following the establishment of the AGQS for 1,4-dioxane, NHDES required that the groundwater at all sites with hazardous waste be tested for 1,4-dioxane. Subsequently, in August 2009, 1,4-dioxane was added to the list of parameters being tested for in the Site's groundwater. During that year, a subset of five bedrock wells, four within OU-1 (MW-5S, MW-5D, MW-8, and MW-11) and one within OU-2 (MW-6), were tested for 1,4-dioxane. The contaminant was not detected at the well in OU-2. However, it was detected at all four wells within OU-1 at concentrations ranging from 70 to 310 µg/L.

From 2009 to the present, the number of wells tested for 1,4-dioxane has increased. In general, results of long-term monitoring events in 2009, 2010, 2011, 2012, and 2013 have documented the presence of 1,4-dioxane at several wells, with the highest concentrations at wells in close proximity to the landfill. Historically, the highest observed level was 310 µg/L, at bedrock well MW-8 in 2009. See Attachments 3 and 5 for the location of these monitoring wells and currently known extent of 1,4-dioxane contamination.

Based on these and the subsequent sampling results discussed below, 1,4-dioxane is now incorporated as a contaminant of concern in groundwater for both OU-1 and OU-2 at the Coakley Landfill Superfund Site. A Cleanup Level of 3 µg/L is established through this ESD and all future monitoring activities and long-term monitoring plans, including monitoring performed as part of the Groundwater Management Plan, shall include sampling for 1,4-dioxane. New Hampshire's AGQS for 1,4-dioxane is identified as an applicable requirement and the State's fact sheet (WD-DWGB-3-24), 2011, stating that AGQS are considered drinking water standards if an MCL standard has not been developed for a particular compound, is identified as a guidance to be considered for the remedy. All other ARARs identified in the OU-1 and OU-2 RODs and subsequent ESDs remain the same (see Attachment 6).

The costs associated with this change, which includes costs related to sampling for one additional contaminant, 1,4-dioxane, are expected to be insignificant.

⁶ See Memorandum from Meghan Cassidy, Chief, Technical and Enforcement Support Section, EPA Office of Site Remediation & Restoration, to Gerardo Millan-Ramos, EPA Remedial Project Manager, "1,4-Dioxane, Coakley Landfill, North Hampton, NH," dated February 4, 2015.

B Expansion of the Existing Groundwater Management Zone

In 2008, NHDES approved a Groundwater Management Permit (GMP) application submitted by the Coakley Landfill Group (CLG). By this approval, a Groundwater Management Zone (GMZ) was established, which delineated the area around the landfill in which contaminated groundwater would be monitored. Deed notices were also recorded to restrict the use of groundwater on parcels within the GMZ. Beginning in 2009, after New Hampshire began requiring testing for 1,4-dioxane in groundwater, 1,4-dioxane has been observed at both Operable Units of the Coakley Landfill Superfund Site, in both overburden and bedrock groundwater monitoring wells. These wells include a number of wells located inside and outside the former boundaries of the established GMZ for the Site.

In 2009, five wells within OU-1 were sampled for 1,4-dioxane for the first time. 1,4-dioxane was detected at concentrations ranging from 70 µg/L to 310 µg/L, well exceeding the AGQS, in four of the five monitoring wells tested. Based on these results, it was recommended that additional monitoring wells be tested in both the overburden and the bedrock.

Sampling results from 2010 showed that 1,4-dioxane was detected in samples collected from thirteen of fifteen monitoring wells at concentrations as high as 230 µg/L. Eleven of the thirteen wells detected levels that exceeded the New Hampshire AGQS of 3 µg/L. Concentrations of 1,4-dioxane were generally greater in bedrock wells compared to adjacent overburden wells.

In 2011, sampling again was extended to additional wells. 1,4-dioxane was detected at eight of ten monitoring wells sampled in OU-1 and in seven of 22 monitoring wells in OU-2. Thirteen of the fifteen detections exceeded the NH AGQS. Detections of 1,4-dioxane in OU-2 were generally in wells close to OU-1 and these were again generally greater in bedrock wells compared to adjacent overburden wells.

In the August 2012 sampling event, 1,4-dioxane was detected at eight of nine monitoring wells collected from OU-1, six at levels exceeding the AGQS, and in eleven of 22 monitoring wells in OU-2, eight at levels exceeding the AGQS. The sampling results indicated that 1,4-dioxane concentrations at the perimeter of the then existing Site GMZ ranged from < 0.25 µg/L (below detection limit or BDL) at the farthest monitoring wells (both bedrock and overburden) west of the landfill (FPC-4B, AE-4A, and AE-4B), to 23 µg/L and 31 µg/L (above the AGQS) at the northernmost bedrock and overburden monitoring wells (FPC-6A and FPC-6B).⁷ The August 2012 sampling event is also noteworthy because it showed detections of 1,4-dioxane for the first time (albeit below the AGQS) at a residential well (R-3) outside the GMZ, to the north of the landfill.

During the August 2013 sampling event, groundwater samples from a subset of thirty bedrock and overburden monitoring wells in both OUs were submitted for analysis of 1,4-dioxane. These included eleven wells in OU-1 (MW-4, MW-5S, MW-5D, MW-6, MW-8,

⁷ See Attachment 3 for the locations of the monitoring wells at the Site. Attachment 2 shows the extent of the Coakley Landfill, which comprises Operable Unit 1. The management of groundwater migration operable unit (Operable Unit 2) comprises the rest of the Site.

MW-9, MW-10, MW-11, OP-2, OP-5, and BP-4) and nineteen wells in OU-2 (FPC-4B, FPC-5A, FPC-5B, FPC-6A, FPC-6B, FPC-7A, FPC-7B, FPC-8A, FPC-8B, FPC-9A, AE-1A, AE-1B, AE-2A, AE-2B, AE-3A, AE-3B, AE-4A, AE-4B, and GZ-105)

1,4-dioxane was reported at concentrations exceeding the AGQS at 16 (53%) of all wells sampled. The sixteen wells showing exceedances include seven wells at OU-1 (MW-4, MW-5S, MW-5D, MW-8, MW-9, MW-11, and BP-4) and nine wells at OU-2 (FPC-5A, FPC-5B, FPC-6A, FPC-6B, AE-2A, AE-2B, AE-3A, AE-3B, and GZ-105). These concentrations ranged from 4.6 to 250 µg/L at OU-1 and from 5.3 to 88 µg/L at OU-2, and they showed that the highest concentration observed (250 µg/L at MW-8) was approximately 19% higher than the highest value reported in the previous (August 2012) sampling event (210 µg/L at MW-8).

As part of the 2013 groundwater monitoring effort, isoconcentration maps showing the lateral and vertical distributions of total arsenic, total manganese and 1,4-dioxane concentrations in groundwater were prepared and interpreted by the PRPs' consultant. From both the lateral and vertical distributions of these contaminants, and for 1,4-dioxane in particular, the following general conclusions were drawn⁸

- *In general, 1,4-dioxane concentrations in bedrock and overburden groundwater decrease with distance from the landfill area.*
- *The horizontal and vertical distributions of 1,4-dioxane concentrations in bedrock and overburden groundwater are generally consistent with groundwater flow directions established using groundwater potentiometric surface elevations at wells and well couplets.*
- *The pattern of the 1,4-dioxane-impacted groundwater area in bedrock and overburden groundwater is consistent with the predominant direction of groundwater flow being westerly away from the landfill area toward the Berry's Brook valley, where the direction of groundwater flow then turns to the north-northeast.*
- *The extent of the 1,4-dioxane-impacted groundwater area extends beyond the area where elevated redox metal (arsenic, iron and manganese) concentrations are observed. This result is consistent with previous interpretations (Summit, 2013a) indicating that 1,4-dioxane defines the leading edge of the impacted groundwater area.*

See Attachment 5 for isoconcentration maps depicting the estimated contours of 1,4-dioxane concentrations in overburden and bedrock groundwater on the Site from 2010 to 2013. The maps illustrate the change in the areal extent of the 1,4-dioxane plume based on the highest concentrations detected across the years, indicating migration of the contaminant plume from the landfill to the north/northeast towards the Berry's Brook Valley.

⁸ 2013 Annual Summary Report Summit Environmental Consultants January 17, 2014

Wells at the northwestern boundary of the former GMZ⁹ (FPC-6A and FPC-6B) could not demonstrate a clean edge of the plume, as they showed exceedances of the 1,4-dioxane AGQS, the Arsenic Cleanup Level (CL) of 10 µg/L, and the Manganese CL of 300 µg/L. As a result, an approximately 30-acre expansion of the GMZ in this area, along the northwestern boundary, was determined to be warranted. This expansion was accomplished through the process and procedures contained in the New Hampshire regulations for Contaminated Site Management (NH Admin Code Env-Or 600, 607, 608, 610, 611) which were identified as applicable regulations in the OU-2 ROD and subsequent ESDs.

The expansion of the GMZ has been documented in the Renewal of the Groundwater Management Permit (GMP) issued by NHDES to the CLG on January 7, 2014. It is an expanded portion of the Sewall parcel (Tax Map R1 Lot #13), as shown on the updated plot plan entitled “Groundwater Monitoring Zone Plan,” prepared by Richard D. Bartlett & Associates, LLC, certified on December 11, 2013, and described as follows:

Commencing at a point on the easterly line of land now or formerly of the Boston and Maine Corporation, said point being a distance of 600.93 feet as measured along a curve to the left, having a central angle of 01°54'46" and a radius of 18,000.00 feet, from a steel pin set on the southerly sideline of Breakfast Hill Road marking the northeasterly most corner of said Boston and Maine land identified on tax map R1 as lot 11, thence by a curve to the left, having a central angle of 00°33'15" and a radius of 18,000.00 feet, a distance of 174.06 feet to a point, thence by a curve to the left, having a central angle of 00°24'32" and a radius of 11,425.51 feet, a distance of 81.56 feet to a point, thence S13°08'30"W a distance of 1,419.54 feet to a point, thence, N76°51'30"W a distance of 99.00 feet to a point at land now or formerly of Elmer M. Sewall Revocable Trust 96, thence, along said Sewall land, N35°09'35"E a distance of 88.02 feet to a point, thence, continuing by said Sewall land, N13°08'30"E a distance of 163.21 feet to a point, thence N76°51'30"W a distance of 434.00 feet, through said Sewall land to a point, thence S17°29'30"W a distance of 1,097.80 feet to a point on the Greenland-North Hampton town line, said point being N79°55'00"W a distance of 18.99 feet from a concrete bound, on said town line, engraved "G" and "N-H", thence, along said town line, N79°55'00"W a distance of 345.00 feet to a point, thence N23°21'55"E a distance of 2,504.63 feet to a point, thence N25°28'15"E a distance of 551.47 feet to a point, thence S72°51'15"E a distance of 221.87 feet to a point, thence S15°37'10"W a distance of 441.43 feet to a point, thence S75°34'35"E a distance of 166.70 feet continuing through said Sewall land and said Boston and Maine land to the point of beginning. Containing 1,306,532 square feet or 29.99 acres, of which 27.42 acres is the land of the Elmer M. Sewall Revocable Trust 96 and 2.57 acres is the land of the Boston and Maine Corporation.

The 2014 Notice of Groundwater Management Permit can be located at Book 5515, Page 1046 at the Rockingham County Registry of Deeds. The map in Attachment 3 shows the expanded GMZ.

The new GMP also requires the installation of four new GMZ compliance wells (two overburden/bedrock monitoring well couplets) near the expanded GMZ boundary. Those

⁹ See Attachment 3 for a site plan of the former and extended boundaries of the GMZ and the locations of groundwater monitoring wells.

wells should be installed and sampled as part of the 2015 annual sampling event. Their exact location will be confirmed with NHDES and EPA prior to construction.

The costs associated with this change, which includes costs related to the installation of wells, sampling and long-term monitoring, are expected to be minimal.

C Land Use Restrictions or other Institutional Controls

Notably, 1,4-dioxane has been consistently detected at drinking water wells north of the boundary of the GMZ expansion area (R-3 and 339BHR) for the past three years. The August 2013 sampling event detected levels of 1,4-dioxane at 0.45 µg/L at R-3 and 0.42 µg/L at 339BHR. The February 2014 semi-annual long-term sampling event, which is required by NHDES as part of the GMZ permit, indicated similar levels, 0.41 µg/L at R-3 and 0.63 µg/L at 339BHR. The detection of 1,4-dioxane at these locations is consistent with the pattern of 1,4-dioxane impacted groundwater and with the direction of groundwater flow being westerly away from the Coakley Landfill area toward the Berry's Brook Valley, where the direction of the flow turns to the north/northeast.

Through discussions with NHDES, EPA has become aware of a potential residential subdivision, including the installation of bedrock drinking water wells, in an area directly north of the Coakley Landfill, in the Town of Greenland (Tax Map R-1, Lot 10). Both EPA and NHDES have notified the Town of Greenland, the Town of North Hampton, the Town of Rye, and the potential developer of the existence of 1,4-dioxane exceedances in the groundwater plume at the northwestern-most corner of the former GMZ boundary and the north/northeast direction of the groundwater flow within Berry's Brook Valley. Both EPA and NHDES expressed oral and written reservations about development in this area given the strong potential for associated new wells to cause groundwater contaminant migration, including 1,4-dioxane, from the Coakley Landfill Site. Other existing residential drinking water wells, located further north from the Coakley Landfill and the area of the proposed development, could also be impacted by such development.

Subsequent to these notices, EPA and NHDES became aware that on September 24, 2013, the Town of Greenland issued a conditional approval related to the construction of a proposed ten-lot residential subdivision development and associated bedrock drinking water wells at 410 Breakfast Hill Road (Tax Map R-1, Lot #10), located at the southwest corner of the intersection of Breakfast Hill Road and the Boston & Maine Railroad, nearly abutting a portion of the expanded GMZ to the west. As set forth in the Notice of Decision, the Town's approval was conditioned on the developer satisfactorily addressing, among other things, the Agencies' concerns about potential contamination migration and interfering with the ongoing remedy at the Site.

Based on the sampling results from bedrock and overburden wells from 2009 to the present time that are discussed above and other Site information and data, EPA and NHDES believe the installation of drinking water wells in the proposed ten-lot residential subdivision development at 410 Breakfast Hill Road (Tax Map R-1, Lot #10) would have the strong potential to pull the contaminated groundwater plume, including 1,4-dioxane, from the Site.

into residential drinking water wells on the proposed development property, as well as existing residential properties to the north of the proposed development. In addition, new wells or the increased use of existing wells in the area near the proposed residential subdivision have the strong potential to influence the groundwater plume.

In order to prevent the potential for further migration of the groundwater contamination plume from the Site, including 1,4-dioxane, and to ensure contaminated groundwater migrating from Coakley Landfill is not used as drinking water and for other uses, institutional controls shall be implemented in accordance with the following:

- a. Land use restrictions, and/or other institutional controls (for example, a municipal ordinance regarding well drilling), prohibiting or restricting the installation of new wells and the increased use of existing wells, except those needed for response actions at the Site and approved by EPA, shall be implemented as approved by EPA for the properties located in the Town of Greenland identified on Tax Map R-1 as Lots #10, 11, 11A, 11B, and 12. The land use restriction(s), and/or other institutional controls, on these properties shall remain in place until—or shall not be required in the first instance if—further study is done, under EPA supervision and approval, concluding that such new wells or any increased use of existing wells will not cause groundwater contaminant migration from the Site, and that they will not interfere with the remedy at the Site.
- b. The groundwater monitoring program shall continue, in accordance with the RODs, ESDs, and associated EPA-approved Statements of Work and Work Plans (*e.g.* Sampling and Analysis Plan). If any existing or future wells in the monitoring program for OU-2 indicate exceedances of Cleanup Levels for Contaminants of Concern, further response actions shall be taken, which may include measures such as land use restriction(s), or other institutional controls, to restrict any use or extraction of groundwater, and/or provision of an alternate water source, such as connection to a public water supply line. If any existing or future wells in the monitoring program for OU-2 indicate the potential for groundwater migration or interference with the remedy, further studies and/or response actions shall be taken.
- c. Any wells installed after the date of this ESD, as recorded in the inventory maintained by the New Hampshire State Water Well Board, within one mile to the north and northwest of the Landfill property, shall be reported by the PRPs annually to EPA. Any proposals for new well installations, as submitted to the Town of Greenland, shall also be reported by the PRPs every six months to EPA.

See Attachment 4 for a depiction of the approximate location of the land use restriction(s) or other institutional controls described in subparagraph (a) above. See Attachment 3 for a map showing the currently existing monitoring wells in the monitoring program. If necessary, a survey of the exact location of the area subject to the land use restriction(s), or other institutional controls, will be conducted by the PRPs.

As for the potential ten-lot subdivision to the north of the landfill, EPA understands that the Town of Rye Water District recently agreed to provide potable water that the City of Portsmouth can use to supply the subdivision and a nearby church

An agreement for the supply of such water has been executed by the Water District and the City, the agreement has been ratified by the parties' governing bodies. Given the known potential for groundwater contamination to migrate due to the installation of new wells in this area, EPA will continue to coordinate with the Town and the State on other future development projects in this area

The costs associated with this change in regards to the implemented remedy, which may include costs related to the development and/or installation of wells, sampling and monitoring, are expected to be minimal. There may be some additional costs associated with securing land use restrictions

D Change in Terminology for Groundwater Cleanup Levels

The 1994 ROD and subsequent ESDs established Interim Groundwater Cleanup Levels for site-related Contaminants of Concern (COCs) in groundwater. The Interim Cleanup Levels were selected based on Maximum Containment Levels (MCLs) and non-zero Maximum Containment Level Goals (MCLGs) established under the federal Safe Drinking Water Act, or more stringent New Hampshire AGQS. For contaminants without federal/state drinking water standards (ARARs), site-specific, risk-based Interim Cleanup Levels were calculated. If a groundwater cleanup value identified by any of the methods described above was not capable of being detected with good precision and accuracy, or was below what was deemed to be the background value, then the practical quantification limit or background value was selected as the Interim Cleanup Level. This ESD, while not changing any of the numeric groundwater cleanup values, adds a groundwater cleanup level for 1,4-dioxane and changes the terminology such that the Interim Cleanup Levels are now referred to as the Cleanup Levels for groundwater.

The costs associated with this change are expected to be insignificant.

E Evaluation of Cleanup Level Attainment

The 1994 ROD and subsequent ESDs described a process for evaluating when groundwater Cleanup Levels have been achieved. Through this ESD, the evaluation of attainment of groundwater Cleanup Levels is being clarified and updated, as follows:

The determination that groundwater Cleanup Levels have been met will now be based on site-specific considerations. In particular, EPA will consider historical and current monitoring data, contaminant distribution, trend analysis, and the appropriateness of the compliance monitoring program (i.e., locations, frequency of monitoring, sampling parameters, etc.). At the time this determination is made, EPA will provide a complete description of this technical evaluation documenting attainment of groundwater Cleanup Levels.

After all groundwater Cleanup Levels have been met, as determined by EPA consistent with Agency guidance at the available time, EPA will perform a risk evaluation which considers additive risk from remaining COCs considering all potential routes of exposure to document the residual risk based on exposure to groundwater at the Site. The residual risk evaluation will document the potential risk associated with the concentrations of COCs remaining in groundwater at the Site (if detected).

This updated approach to evaluating attainment of groundwater Cleanup Levels, protectiveness of the groundwater remedy, and completion of groundwater restoration efforts reflects 1) acknowledgement that MCLs established under the Safe Drinking Water Act are deemed protective by EPA, 2) consideration of all potential routes of exposure for groundwater, 3) improved methods for assessing data variability and other dynamic aquifer conditions that impact monitoring data, and 4) reliance on up-to-date technical guidance and tools. This updated approach will support determinations when groundwater at the Site has been restored for its permissible, beneficial use, and that the groundwater no longer presents an unacceptable risk to human health due to the presence of site-related contaminants.

The costs associated with this change are expected to be minimal.

IV. SUPPORT AGENCY COMMENTS

The NHDES reviewed the draft ESD and supports the changes to the 1990 ROD for OU-1 and the 1994 ROD for OU-2. The NHDES evaluated public comments on the draft ESD and concurs with this final ESD.

V. STATUTORY DETERMINATIONS

In accordance with Section 121 of CERCLA, EPA, in consultation with NHDES, has determined that the modified remedy remains protective of human health and the environment, complies with all Federal and State requirements that are applicable or relevant and appropriate to the remedy as modified herein and is cost-effective. Because the modifications are limited to addition of a COC and institutional controls, the revised remedy does not utilize permanent solutions and alternative treatment technologies to the maximum extent practicable for this Site.

VI. PUBLIC PARTICIPATION

In accordance with Section 300.825(b) of the National Contingency Plan, EPA voluntarily chose to allow a 30-day public comment period prior to the finalization and signing of this ESD. Such comment period was designed to allow consideration of any possible concerns from the public, local municipalities and/or the PRPs. A draft of this ESD was issued publicly on April 1, 2015. A formal public comment period regarding the draft ESD was held from April 1, 2015 to April 30, 2015. EPA accepted written and e-mailed comments on

this ESD which have been included in the administrative record, and provided a response to those comments in a Responsiveness Summary attached to this ESD (see Attachment 7)

VII. DECLARATION

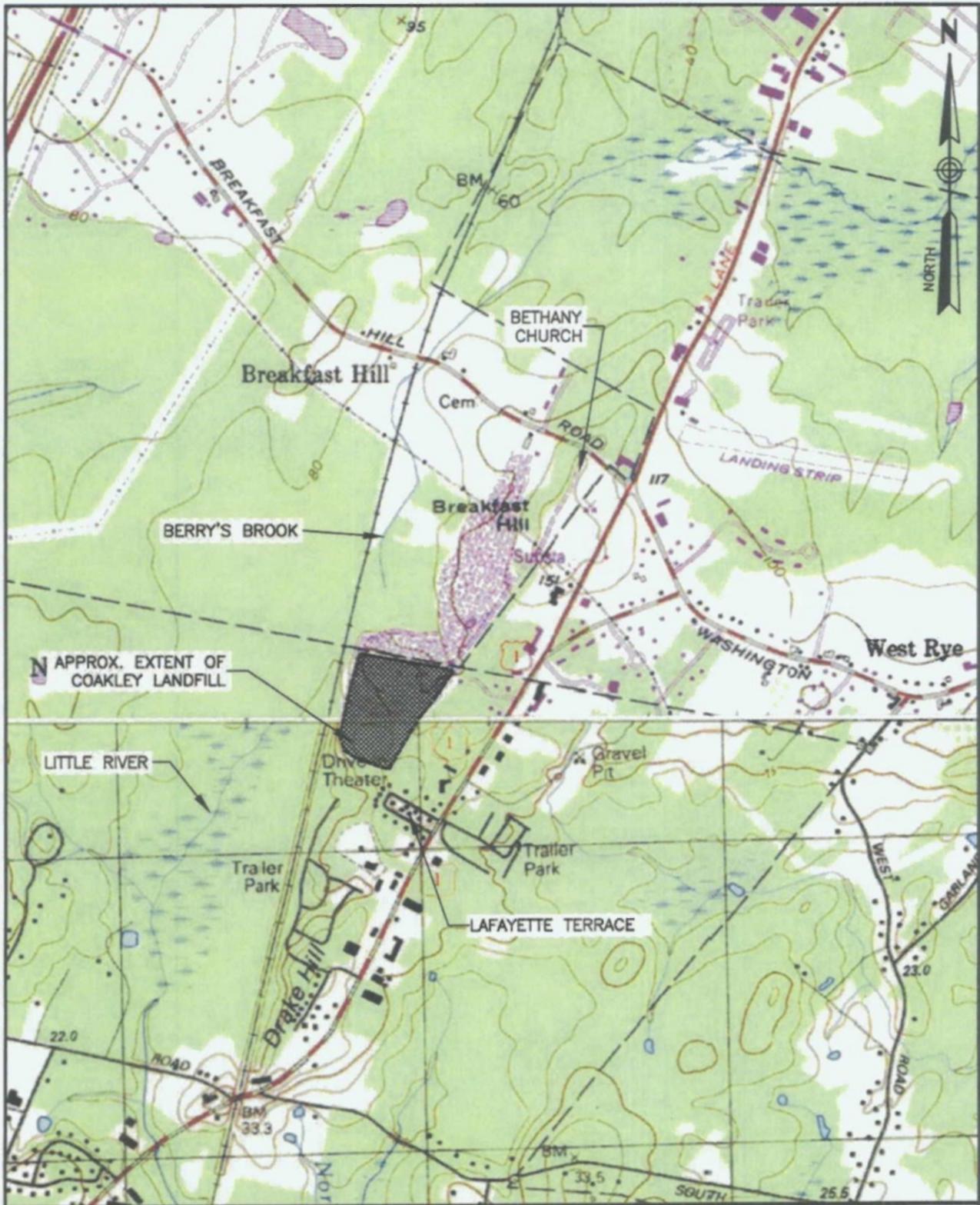
For the foregoing reasons, by my signature below, I approve the issuance of this Fifth Explanation of Significant Differences for Operable Unit 1 and Second Explanation of Significant Differences for Operable Unit 2 of the Coakley Landfill Superfund Site in North Hampton and Greenland, New Hampshire, and the changes and conclusions stated therein

08/04/15
Date


Nancy Barmakian, Acting Director
Office of Site Remediation and Restoration
U S Environmental Protection Agency
Region 1 - New England

ATTACHMENT 1

Site Location Map of the Coakley Landfill Superfund Site



**FIGURE 1
SITE LOCATION MAP**

COAKLEY LANDFILL – NORTH HAMPTON, NH
PREPARED FOR
THE COAKLEY LANDFILL GROUP



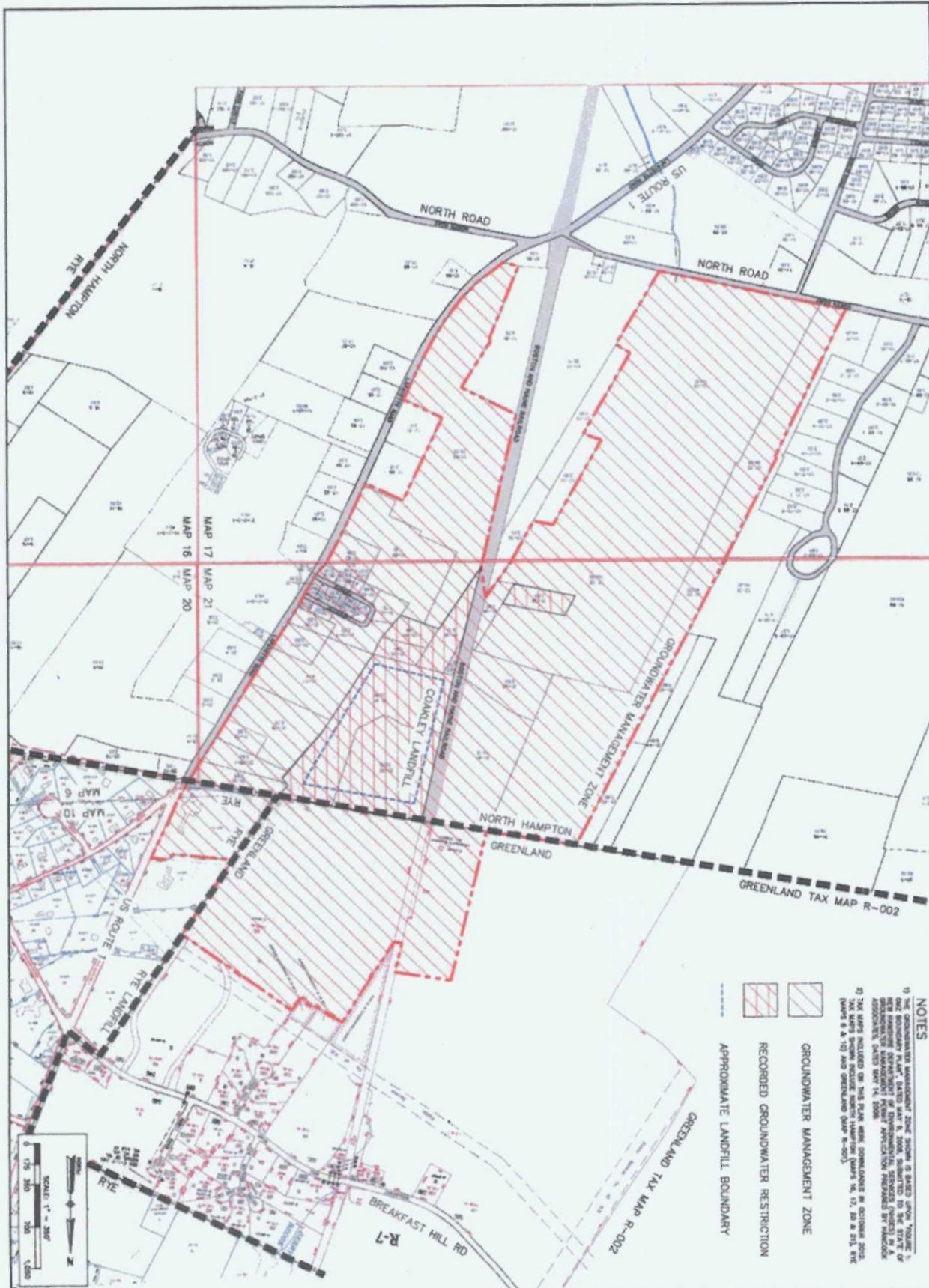
DATE: JAN. 2014	DRAWN BY: SBM	CHECKED BY: MAD
JOB: 12-3173	1" = 1,500 FEET	FILE: 12-3173FIG1

640 MAIN ST.
LEWISTON, MAINE 04240

Tel.: (207) 795-6009
Fax: (207) 795-6128

ATTACHMENT 2

**Map Showing OU-1 (area within landfill boundaries) and OU-2 (area within GMZ boundaries)
prior to the GMZ extension approved by NHDES on January 7, 2014**



640 BIRCH ST.
LEWISTON, ME 04240

Summit
Environmental Consultants, Inc.

TEL: (207) 790-8000
FAX: (207) 790-9138
WWW.SUMMITME.COM

PROJECT: COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

CLIENT: COAKLEY LANDFILL GROUP
1 JARVIS AVE., PORTSMOUTH, NH 03801

SHEET: 17-313
FIGURE 3

SHEET TITLE: GROUNDWATER MANAGEMENT ZONE TAX MAP OVERLAY

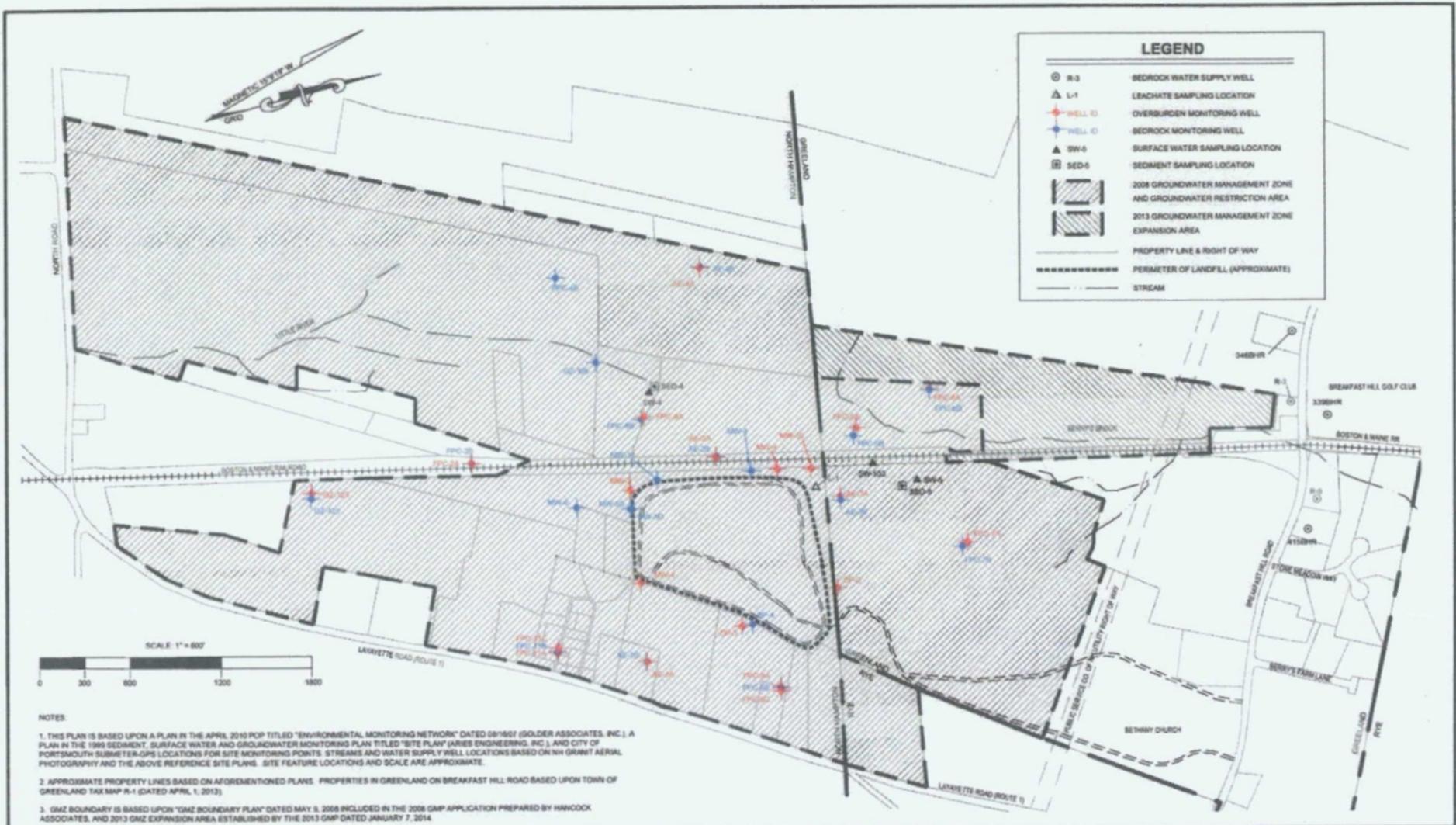
DATE: NOV. 1, 2012
SCALE: 1" = 300'

DRAWN BY: SEM
REVIEWED BY: MAD

NO.	REVISION	DATE

ATTACHMENT 3

Site Plan showing GMZ expansion and monitoring wells



NOTES

1. THIS PLAN IS BASED UPON A PLAN IN THE APRIL 2010 POP TITLED "ENVIRONMENTAL MONITORING NETWORK" DATED 08/15/07 (GOLDER ASSOCIATES, INC.), A PLAN IN THE 1999 SEDIMENT, SURFACE WATER AND GROUNDWATER MONITORING PLAN TITLED "SITE PLAN" (ARIES ENGINEERING, INC.), AND CITY OF PORTSMOUTH SUBMETER-GPS LOCATIONS FOR SITE MONITORING POINTS, STREAMS AND WATER SUPPLY WELL LOCATIONS BASED ON NH GRANT AERIAL PHOTOGRAPHY AND THE ABOVE REFERENCE SITE PLANS. SITE FEATURE LOCATIONS AND SCALE ARE APPROXIMATE.
2. APPROXIMATE PROPERTY LINES BASED ON AFOREMENTIONED PLANS. PROPERTIES IN GREENLAND ON BREAKFAST HILL ROAD BASED UPON TOWN OF GREENLAND TAX MAP R-1 (DATED APRIL 1, 2013).
3. GMZ BOUNDARY IS BASED UPON "GMZ BOUNDARY PLAN" DATED MAY 9, 2008 INCLUDED IN THE 2008 GMP APPLICATION PREPARED BY HANCOCK ASSOCIATES, AND 2013 GMZ EXPANSION AREA ESTABLISHED BY THE 2013 GMP DATED JANUARY 7, 2014.

PROJECT TITLE COAKLEY LANDFILL SUPERFUND SITE NORTH HAMPTON & GREENLAND, NEW HAMPSHIRE	DSG FIGURE 1-2	BY WAB	REV 1	DESCRIPTION
	DATE 10/24/02	DATE 2014-09-05	REV DATE	DESCRIPTION
SHEET TITLE GROUNDWATER MANAGEMENT ZONE & ENVIRONMENTAL MONITORING NETWORK	SCALE 1"=600'	APPROVED BY SBM	ISSUE DATE	DESCRIPTION
		CHECKED BY SBM	ISSUE DATE	



ATTACHMENT 4

Tax map showing the approximate location of land use restrictions to be implemented



FOR AGENCY PURPOSES ONLY
 NOT FOR PROPERTY CONVEYANCE

THIS PLAN LINE IS BASED ON THE MAP DATED MAY 17, 2005
 THERE IS NO RESPONSIBILITY FOR ANY ERROR IN LOCATION

NORTH HAMPTON

PREPARED BY PHOTOGRAMMETRIC METHODS OF
 JOHN E. O'DONNELL & ASSOCIATES
 ALBURN, MAINE
 1976

LEGEND
 ALTERNATE SHEET NO. 12
 COMMON OVERLAP
 DEVELOPMENT LOT NO.
 SCALE: UNKNOWN

CATCH BASIN
 DRIVE PILE
 STREET NO.

PROPERTY MAP
GREENLAND
 NEW HAMPSHIRE

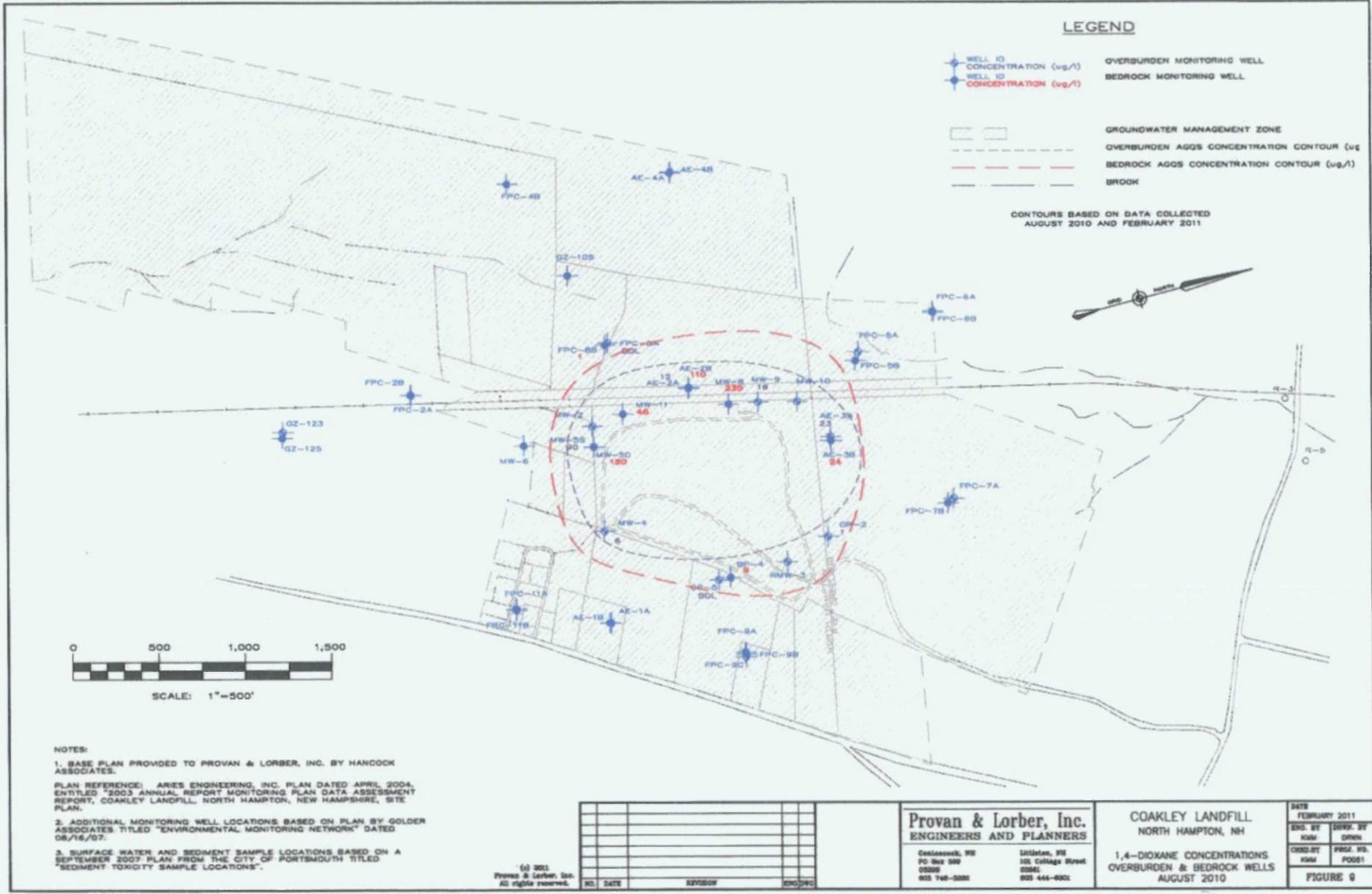
REVISED TO APRIL 1, 2013
 JOHN E. O'DONNELL & ASSOCIATES
 New Brunswick, Maine

SCALE IN FEET
 0 200 400

R-1

ATTACHMENT 5

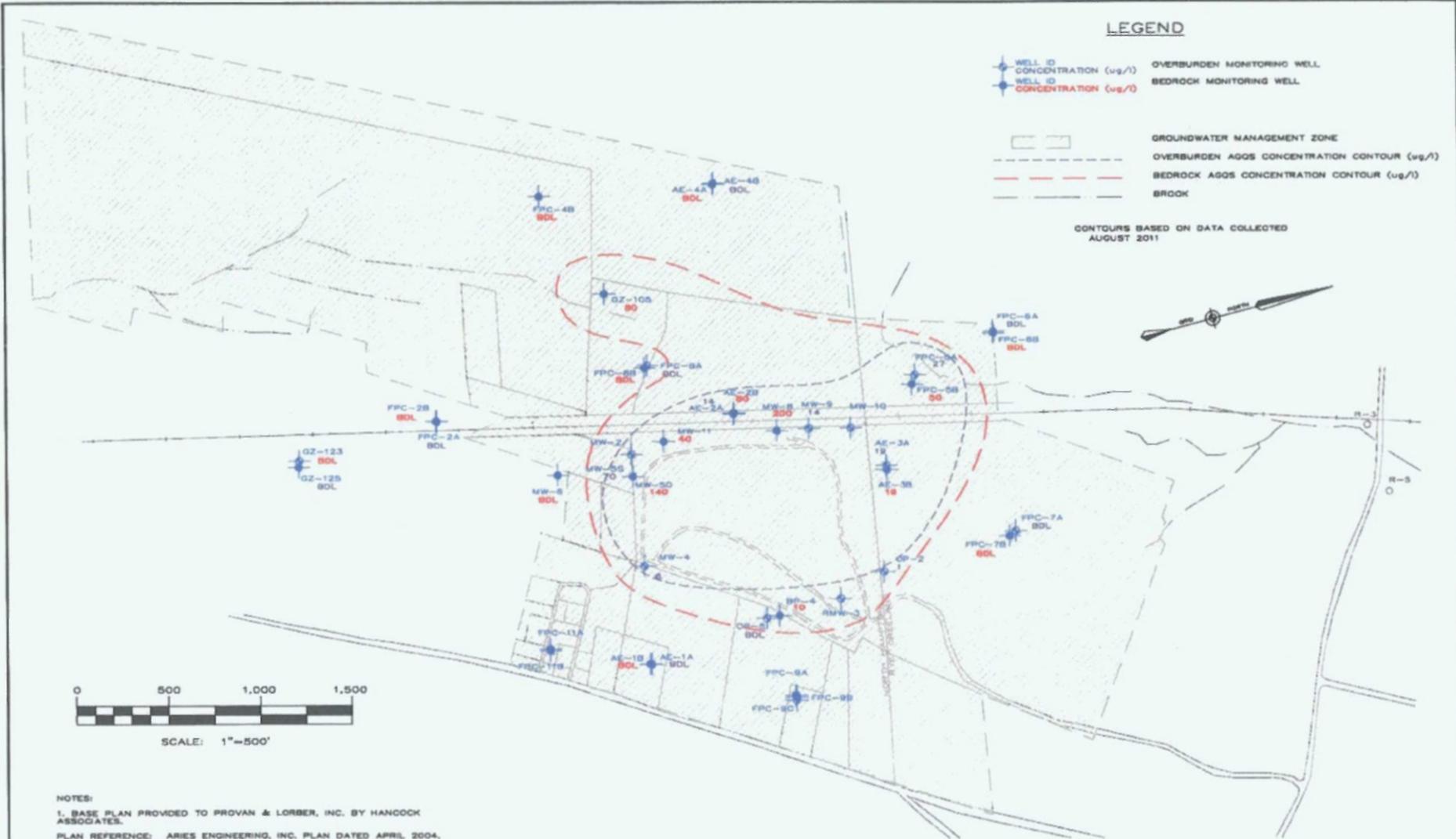
Isoconcentration Maps showing contours of 1,4-Dioxane contamination from 2010 to 2013



LEGEND

- WELL ID CONCENTRATION (ug/l) OVERBURDEN MONITORING WELL
- WELL ID CONCENTRATION (ug/l) BEDROCK MONITORING WELL
- GROUNDWATER MANAGEMENT ZONE
- OVERBURDEN AGCS CONCENTRATION CONTOUR (ug/l)
- BEDROCK AGCS CONCENTRATION CONTOUR (ug/l)
- BROOK

CONTOURS BASED ON DATA COLLECTED AUGUST 2011



- NOTES:**
1. BASE PLAN PROVIDED TO PROVAN & LORBER, INC. BY HANCOCK ASSOCIATES.
 2. ADDITIONAL MONITORING WELL LOCATIONS BASED ON PLAN BY GOLDER ASSOCIATES TITLED "ENVIRONMENTAL MONITORING NETWORK" DATED 08/16/07.
 3. SURFACE WATER AND SEDIMENT SAMPLE LOCATIONS BASED ON A SEPTEMBER 2007 PLAN FROM THE CITY OF PORTSMOUTH TITLED "SEDIMENT TOXICITY SAMPLE LOCATIONS".

(c) 2011
Provan & Lorber, Inc.
All rights reserved.

NO.	DATE	REVISION	BY/CHK

Provan & Lorber, Inc.
ENGINEERS AND PLANNERS

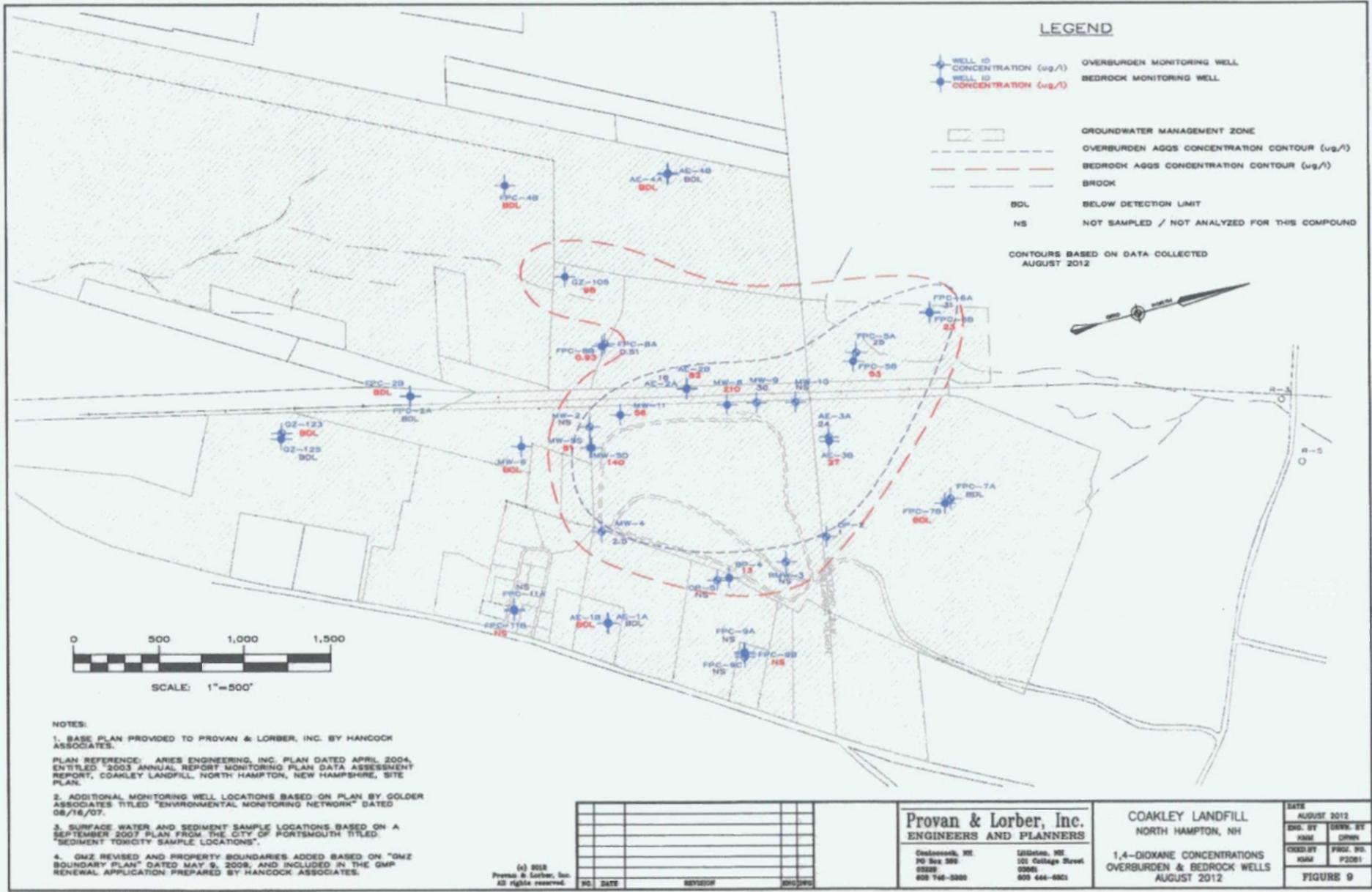
Concord, NH
PO Box 389
03309
603 748-3300

Lisette, NH
100 Cottage Street
03055
603 444-8301

COAKLEY LANDFILL
NORTH HAMPTON, NH

1,4-DIOXANE CONCENTRATIONS
OVERBURDEN & BEDROCK WELLS
AUGUST 2011

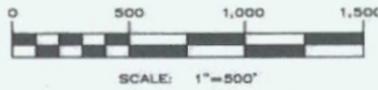
DATE	
AUGUST 2011	
ENG. BY KML	DRAWN BY DMM
CHECKED BY HML	PROJECT NO. P1081
FIGURE 9	



LEGEND

- WELL ID CONCENTRATION (ug/l) OVERBURDEN MONITORING WELL
- WELL ID CONCENTRATION (ug/l) BEDROCK MONITORING WELL
- GROUNDWATER MANAGEMENT ZONE
- OVERBURDEN AGGS CONCENTRATION CONTOUR (ug/l)
- BEDROCK AGGS CONCENTRATION CONTOUR (ug/l)
- BROOK
- BDL BELOW DETECTION LIMIT
- NS NOT SAMPLED / NOT ANALYZED FOR THIS COMPOUND

CONTOURS BASED ON DATA COLLECTED AUGUST 2012



NOTES:

1. BASE PLAN PROVIDED TO PROVAN & LORBER, INC. BY HANCOCK ASSOCIATES.
2. PLAN REFERENCE: ARIES ENGINEERING, INC. PLAN DATED APRIL 2004, ENTITLED "2003 ANNUAL REPORT MONITORING PLAN DATA ASSESSMENT REPORT, COAKLEY LANDFILL, NORTH HAMPTON, NEW HAMPSHIRE, SITE PLAN."
3. ADDITIONAL MONITORING WELL LOCATIONS BASED ON PLAN BY GOLDER ASSOCIATES TITLED "ENVIRONMENTAL MONITORING NETWORK" DATED 08/16/07.
4. GAZZ REVISD AND PROPERTY BOUNDARIES ADDED BASED ON "GMZ BOUNDARY PLAN" DATED MAY 9, 2008, AND INCLUDED IN THE GMP RENEWAL APPLICATION PREPARED BY HANCOCK ASSOCIATES.

(v) BDL
Provan & Lorber, Inc.
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NO.	DATE	REVISION	BY/APP

Provan & Lorber, Inc.
ENGINEERS AND PLANNERS

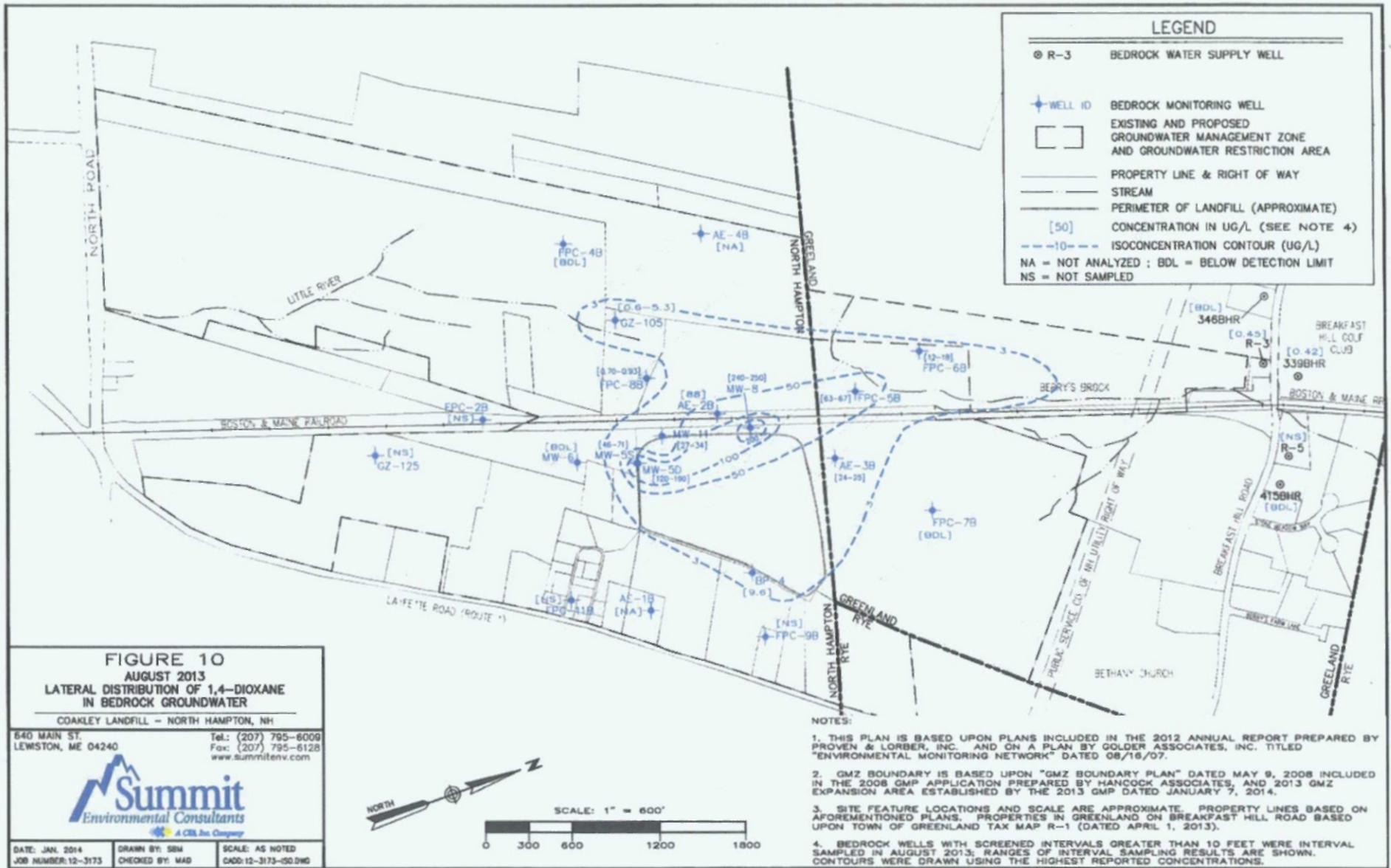
Colchester, ME
70 Box 580
05520
603 748-5300

Colchester, ME
101 Cottage Street
05501
603 444-6801

COAKLEY LANDFILL
NORTH HAMPTON, NH

1,4-DIOXANE CONCENTRATIONS
OVERBURDEN & BEDROCK WELLS
AUGUST 2012

DATE	
AUGUST 2012	
ENG. BY	DRWN. BY
KAM	CMH
CHECK BY	PROJ. NO.
KAM	P2081
FIGURE 9	



LEGEND

- ⊙ R-3 BEDROCK WATER SUPPLY WELL
- ◆ WELL ID BEDROCK MONITORING WELL
- ▭ EXISTING AND PROPOSED GROUNDWATER MANAGEMENT ZONE AND GROUNDWATER RESTRICTION AREA
- PROPERTY LINE & RIGHT OF WAY
- STREAM
- PERIMETER OF LANDFILL (APPROXIMATE)
- [50] CONCENTRATION IN UG/L (SEE NOTE 4)
- - -10- - - ISOCONCENTRATION CONTOUR (UG/L)
- NA = NOT ANALYZED ; BDL = BELOW DETECTION LIMIT
- NS = NOT SAMPLED

FIGURE 10
AUGUST 2013
LATERAL DISTRIBUTION OF 1,4-DIOXANE
IN BEDROCK GROUNDWATER

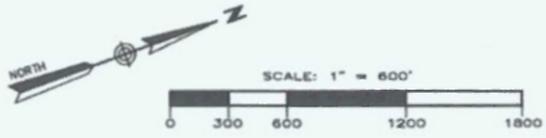
COAKLEY LANDFILL -- NORTH HAMPTON, NH

640 MAIN ST.
LEWISTON, ME 04240

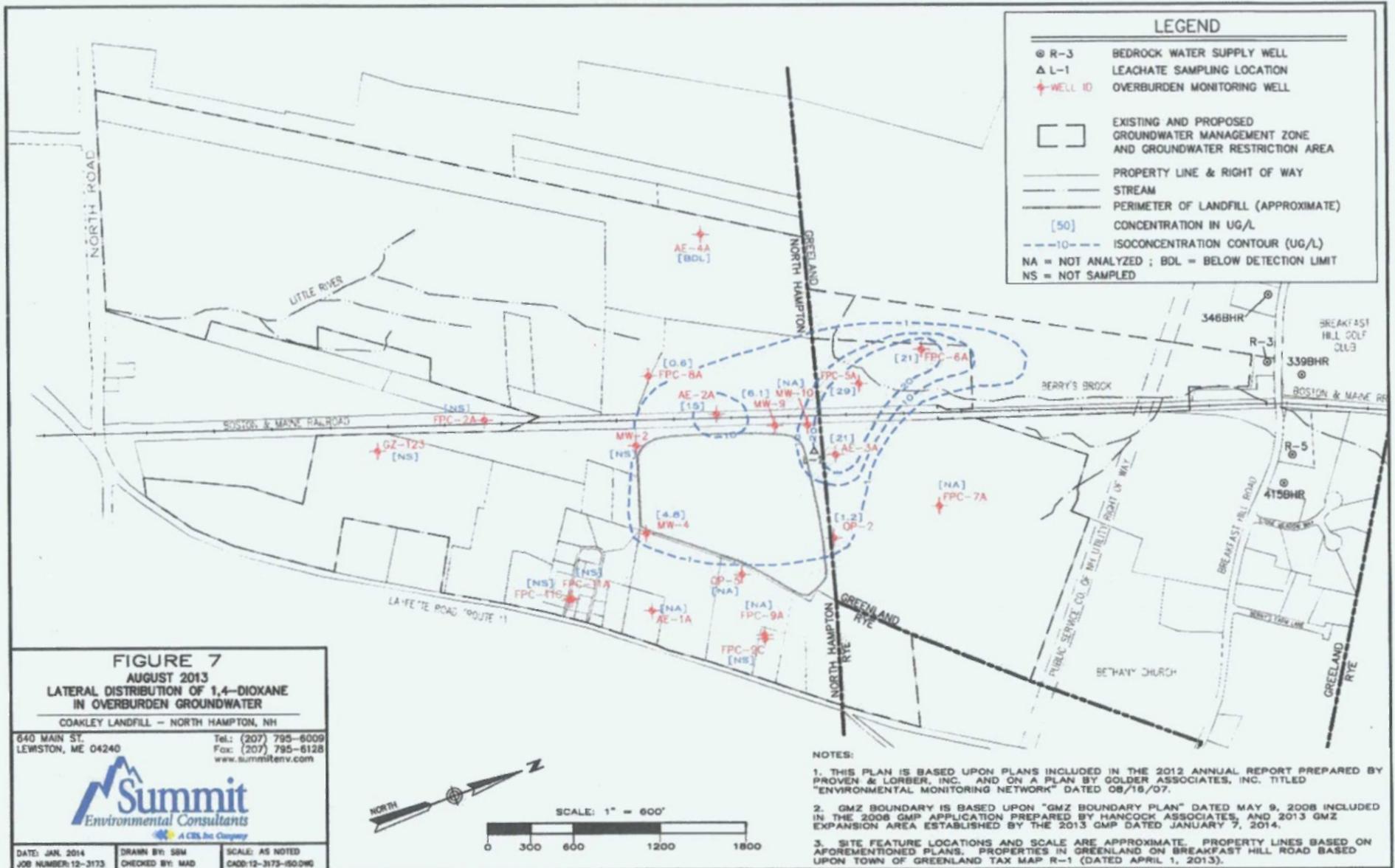
Tel.: (207) 795-6009
Fax: (207) 795-6128
www.summitenv.com

A C&I, Inc. Company

DATE: JAN. 2014	DRAWN BY: SBH	SCALE: AS NOTED
JOB NUMBER: 12-3173	CHECKED BY: MAD	CDD: 12-3173-00.DWG



- NOTES:
1. THIS PLAN IS BASED UPON PLANS INCLUDED IN THE 2012 ANNUAL REPORT PREPARED BY PROVEN & LORBER, INC. AND ON A PLAN BY GOLDR ASSOCIATES, INC. TITLED "ENVIRONMENTAL MONITORING NETWORK" DATED 08/16/07.
 2. GMZ BOUNDARY IS BASED UPON "GMZ BOUNDARY PLAN" DATED MAY 9, 2008 INCLUDED IN THE 2008 GMP APPLICATION PREPARED BY HANCOCK ASSOCIATES, AND 2013 GMZ EXPANSION AREA ESTABLISHED BY THE 2013 GMP DATED JANUARY 7, 2014.
 3. SITE FEATURE LOCATIONS AND SCALE ARE APPROXIMATE. PROPERTY LINES BASED ON AFOREMENTIONED PLANS. PROPERTIES IN GREENLAND ON BREAKFAST HILL ROAD BASED UPON TOWN OF GREENLAND TAX MAP R-1 (DATED APRIL 1, 2013).
 4. BEDROCK WELLS WITH SCREENED INTERVALS GREATER THAN 10 FEET WERE INTERVAL SAMPLED IN AUGUST 2013; RANGES OF INTERVAL SAMPLING RESULTS ARE SHOWN. CONTOURS WERE DRAWN USING THE HIGHEST REPORTED CONCENTRATIONS.



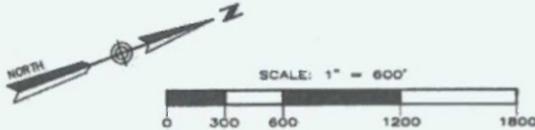
LEGEND	
⊙ R-3	BEDROCK WATER SUPPLY WELL
△ L-1	LEACHATE SAMPLING LOCATION
⊕ WELL 10	OVERBURDEN MONITORING WELL
[]	EXISTING AND PROPOSED GROUNDWATER MANAGEMENT ZONE AND GROUNDWATER RESTRICTION AREA
—	PROPERTY LINE & RIGHT OF WAY
—	STREAM
---	PERIMETER OF LANDFILL (APPROXIMATE)
[50]	CONCENTRATION IN UG/L
---10---	ISOCONCENTRATION CONTOUR (UG/L)
NA	NOT ANALYZED ; BDL = BELOW DETECTION LIMIT
NS	NOT SAMPLED

FIGURE 7
AUGUST 2013
LATERAL DISTRIBUTION OF 1,4-DIOXANE
IN OVERBURDEN GROUNDWATER
 COAKLEY LANDFILL -- NORTH HAMPTON, NH

640 MAIN ST.
 LEWISTON, ME 04240
 Tel: (207) 795-6009
 Fax: (207) 795-6128
 www.summitenv.com

Summit
 Environmental Consultants
 A CBS, Inc. Company

DATE: JAN. 2014 DRAWN BY: SBW SCALE: AS NOTED
 JOB NUMBER: 12-3173 CHECKED BY: MAD CADD: 12-3173-ISO096



NOTES:

1. THIS PLAN IS BASED UPON PLANS INCLUDED IN THE 2012 ANNUAL REPORT PREPARED BY PROVEN & LORBER, INC. AND ON A PLAN BY GOLDBER ASSOCIATES, INC. TITLED "ENVIRONMENTAL MONITORING NETWORK" DATED 08/16/07.
2. GMZ BOUNDARY IS BASED UPON "GMZ BOUNDARY PLAN" DATED MAY 9, 2008 INCLUDED IN THE 2008 GMP APPLICATION PREPARED BY HANCOCK ASSOCIATES, AND 2013 GMZ EXPANSION AREA ESTABLISHED BY THE 2013 GMP DATED JANUARY 7, 2014.
3. SITE FEATURE LOCATIONS AND SCALE ARE APPROXIMATE. PROPERTY LINES BASED ON AFOREMENTIONED PLANS. PROPERTIES IN GREENLAND ON BREAKFAST HILL ROAD BASED UPON TOWN OF GREENLAND TAX MAP R-1 (DATED APRIL 1, 2013).

ATTACHMENT 6

Table of Applicable or Relevant and Appropriate Standards (ARARs)

Table 1. Coakley Landfill – OU-1
Action-Specific ARARs

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR
Federal Requirements			
ATSDR Public Health Statement, 1,4-Dioxane CAS#123-91-1 (April 2012)	To Be Considered	Public Health Statement from the Department of Health and Human Services provides information about 1,4-dioxane and effects of exposure to it	EPA considered this Statement when modifying the remedy.
State Requirements			
New Hampshire Ambient Groundwater Quality Standard (NH AGQS) for 1,4-Dioxane (Env-Or 603.03, Table 600-1)	Applicable	The NH AGQS for 1,4-dioxane is 3.0 µ/L. NH AGQS have been established for site groundwater contaminants for which no MCLs are established, and are derived to be protective for drinking water uses. The NH AGQS will be used for site contaminants where MCLs are not currently established	1,4-dioxane has been added as a contaminant of concern in groundwater for the Site. The NH AGQS of 3.0 µg/L for 1,4-dioxane is added as a performance standard for monitoring Site groundwater as part of the remedy
NHDES Environmental Fact Sheet, 1,4-Dioxane and Drinking Water (WD-DWGB-3-24) 2011	To Be Considered	This fact sheet describes New Hampshire's drinking water health standards as related to 1,4-Dioxane.	NH Fact Sheet states that by regulation, ambient groundwater quality standards are also considered drinking water standards if a Maximum Contaminant Level standard has not been developed for a particular compound.

Table 2. Coakley Landfill – OU-2
Chemical-Specific ARARs

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR
Federal Requirements			
USEPA Risk Reference Dose (RfDs)	To Be Considered	Reference Doses (RfDs) are estimates of the daily exposure levels that are unlikely to cause significant adverse non-carcinogenic effects over time	RfDs are used to characterize human health risks due to non-carcinogens in site media.
USEPA Cancer Slope Factors (CSFs)	To Be Considered	Cancer slope factors (CSFs) represent the upper-bound probability of an individual developing cancer as a result of a lifetime of exposure to a particular concentration of a potential carcinogen.	CSFs are used to compute the individual incremental cancer risk resulting from exposure to carcinogens in site media
Guidelines for Carcinogen Risk Assessment EPA/630/P-03/001F (March 2005)	To Be Considered	These guidelines provide guidance on conducting risk assessments involving carcinogens	Guidelines are used to evaluate all risk assessments on carcinogenicity
Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens EPA/630/R-03/003F (March 2005)	To Be Considered	These guidelines provide guidance on conducting risk assessments involving carcinogens.	Guidelines are used to evaluate all risk assessments on carcinogenicity in children
ATSDR Public Health Statement, 1,4-Dioxane CAS#123-91-1 (April 2012)	To Be Considered	Public Health Statement from the Department of Health and Human Services provides information about 1,4-dioxane and effects of exposure to it	EPA considered this Statement when modifying the remedy

Table 2. Coakley Landfill – OU-2
Chemical-Specific ARARs

State Requirements			
New Hampshire Ambient Groundwater Quality Standard (NH AGQS) for 1,4-Dioxane (Env-Or 603.03, Table 600-1)	Applicable	The NH AGQS for 1,4-dioxane is 3.0 µ/L. NH AGQS have been established for site groundwater contaminants for which no MCLs are established, and are derived to be protective for drinking water uses. The NH AGQS will be used for site contaminants where MCLs are not currently established.	1,4-dioxane has been added as a contaminant of concern in groundwater for the Site. The NH AGQS of 3.0 µg/L for 1,4-dioxane is added as a cleanup level for Site groundwater as part of the remedy. Long-term monitoring will include 1,4-dioxane and will be performed to evaluate whether the natural attenuation remedy is effective.
NHDES Environmental Fact Sheet, 1,4-Dioxane and Drinking Water (WD-DWGB-3-24) 2011	To Be Considered	This fact sheet describes New Hampshire's drinking water health standards as related to 1,4-Dioxane.	NH Fact Sheet states that by regulation, ambient groundwater quality standards are also considered drinking water standards if a Maximum Contaminant Level standard has not been developed for a particular compound.

ATTACHMENT 7
Responsiveness Summary

ATTACHMENT 7 RESPONSIVENESS SUMMARY

A. PREFACE

The purpose of this Responsiveness Summary is to document EPA's responses to the written questions, comments, and concerns raised during the public comment period on the draft fifth Explanation of Significant Differences (ESD) for OU-1 and third ESD for OU-2, prepared by the EPA for the Coakley Landfill Superfund Site (the "Site"). A Responsiveness Summary, although not required, is allowed under CERCLA §117 and the NCP §§300.430(f)(3)(i)(F) and 300.430(f)(5)(iii)(B).

The EPA held a 30-day comment period from April 1st to April 30th, 2015 on the draft ESD. Written comments were received by e-mail from two entities, a law firm representing the Sewall family (owners of land abutting the Site and the Site's Groundwater Management Zone (GMZ)), and Mr. Robert P. Sullivan, representing the Coakley Landfill Group (CLG). The CLG are the Settling Defendants in the Consent Decree for the Site. The letters and comments submitted to EPA are included in the Administrative Record. No other parties submitted comments to the EPA.

EPA considered all of the comments provided during the comment period, which are summarized in this document, before finalizing for signature this ESD for the Site. The comments received by EPA express opposition to or concerns about the Institutional Controls to be established in areas adjacent to the GMZ; however, none of the comments were in opposition to the other changes brought forth by the ESD. The State of New Hampshire concurs with and is supportive of this ESD for the Site.

B. COMMENTS RECEIVED AND EPA RESPONSES

The comments provided by the two entities are summarized below and the EPA response follows.

- I. Peter V. Doyle from Shaines and McEachern, PA, a law firm representing the Sewall family, submitted a 10 page letter with four exhibits as attachments on April 29, 2015. The letter contains 10 specific questions (reproduced below).

The specific questions contained in the letter and EPA responses are as follows:

1. Questions about Institutional Controls and Public Water Supply

"Q. 1, a: What are the full array of steps being considered by the EPA, which fall under the general category of "institutional controls"?"

EPA Response:

The institutional controls that EPA will consider include, without limitation, restrictive easements, deed notices, advisories, the monitoring of well installations, and municipal by-laws or regulations. The goal of these controls is to prevent the exposure to Site contaminants by prohibiting the use of groundwater in the area highlighted in Attachment 4 of the ESD as drinking water. The controls also aim to prevent alterations to the groundwater flow that may hamper the effectiveness of the ongoing remedy, by causing plume migration and complexities adding to the cost and timeline of the cleanup.

“Q. 1, b: Has the EPA considered the impact on neighborhood homeowners and businesses if the proposed one mile prohibition against digging new wells is adopted? If so, in what way?”

EPA Response:

To clarify, the prohibition against digging new wells will be limited to the area highlighted in Attachment 4 of the ESD. The prohibition will not be applied to properties within a mile radius from the Site other than those already implemented by the CLG on various properties surrounding the Coakley Landfill. For properties within one mile to the north and northwest of the Landfill property (that is, the fenced area), the CLG, among other requirements, will be required to report annually to EPA any wells installed after the date of the ESD, as recorded in the inventory maintained by the New Hampshire State Water Well Board. Also, every six months the CLG will have to report to EPA any proposals for new well installations that have been submitted to the Town of Greenland.

“Q. 1, c: The Sewall family has five wells in or near the proximity to the Site. What happens if an existing well fails or, unacceptable contamination levels are found in the well?”

EPA Response:

Although it is unclear what specific wells are being referenced in the question, if any existing or future wells in the monitoring program for OU-2 of the Site, including drinking water wells, indicate exceedances of Cleanup Levels for Contaminants of Concern, further response actions shall be taken to protect human health and the environment. Such actions may include measures such as additional monitoring, land use restriction(s) (or other institutional controls) to restrict any use or extraction of groundwater, and/or provision of an alternate water source, such as connection to a public water supply line.

More specifically, should an existing Coakley Landfill monitoring well exceed applicable standards, EPA, in consultation with NHDES, will review the historical concentrations in that well and other proximal wells to determine the existence of any trends indicating attenuation, lack thereof, and/or migration. If such trends are detected, depending on the location of the well, additional response actions will be considered, including an increase

or decrease in the frequency of monitoring, the installation of additional monitoring wells, and the provision of alternative water supplies. A recent example is what occurred with the Coakley Landfill monitoring well FPC-6A, which showed concentrations of arsenic and manganese above the NHDES standards in 2013. Because that well was considered a well demonstrating a clean edge of the GMZ, EPA and NHDES required the extension of the GMZ further north/north-east from the Landfill, and required the CLG to install two additional monitoring well couplets (overburden and bedrock well) within the extended GMZ. (Note that well FPC-6A is not a drinking water well.)

If a new drinking water supply well is installed on any undeveloped lot, or portion thereof, which is within the Groundwater Management Zone and becomes impacted above applicable standards, consistent with the GMP, the NHDES will require the CLG to provide an alternative source of drinking. The goal of the GMP, and the associated residential and Site groundwater monitoring program, is to delineate and monitor for contaminated groundwater impacts.

“Q. 1, d: In the event of a failure of a well for reasons other than contamination, will the purpose of the well make a difference (irrigation v. drinking water) as to whether it can be replaced?”

EPA Response:

EPA assumes that this comment refers to wells that belong to the Sewall family or other parties that are not part of the Site’s monitoring program. However, it is difficult to respond to this question in the abstract, without knowing details about the particular well, such as location, pumping rate, depth of the well, and contaminant levels in and near the well. Nevertheless, as a general matter, if the well in question presented a risk to human health or the environment, EPA probably would give a higher priority to the replacement of a drinking water well rather than an irrigation well.

2. Questions about a subtle shift between the EPA September 25, 2013 letter and the draft proposal.

“Q 2,a: In the draft proposal the language that wells were proposed for development might possibly draw contaminants toward them has become “strong” probability in the draft for public comment. What is the new evidence to support this change in language?”

EPA Response:

Between September 25, 2013 and April 1, 2015, the regulatory agencies (EPA and NHDES) obtained additional information (that is, increased concentrations of contaminants at some existing and new monitoring wells) that reinforced and augmented EPA’s concern about plume migration to the north/north-east of the GMZ boundary. Specifically the February 2014 Data Transmittal dated April 25, 2014 revealed the presence of manganese in residential wells for the first time and the continued presence

of 1,4-dioxane in those wells (R-3 and 339BHR). Also, the 2013 Annual Summary Report dated July 28, 2014 showed an increasing concentration trend of manganese and arsenic at well FPC-6A and an exceedance of the NHDES AGQS for 1,4 dioxane in this same well plus well couplet FPC-5A/B, among others. When compared to previous data, an increasing contaminant trend appears to be developing in the area north/north-east of the GMZ boundary. This observation, together with the available information about the general groundwater flow direction in the area, supports EPA's increased concern about contaminant migration.

"Q. 2,b: While proposing to impose institutional controls (prohibiting use of ground water, deed restrictions, drilling prohibitions etc.) the draft proposal also states that provision of a potable public water supply might also be required (page 14, paragraph b) Is the EPA prepared to stand behind and fight for this necessary provision?"

EPA Response:

EPA is strongly in favor of the construction of an extension to the existing public water supply to serve residential homes in the proposed subdivision located along the southern side of Breakfast Hill Road. EPA has had several conversations with the CLG about this water line extension. EPA understands that an Agreement between interested stakeholders for the supply of water for the proposed subdivision has very recently been executed and ratified by the City of Portsmouth and the Town of Rye. In addition, EPA realizes the additional agreements that must be achieved among all stakeholders in order for the public water extension to proceed. Also, see EPA's response to Q. 1, c. above.

"Q 2,c. The language in the Millán-Ramos letter of September 25, 2013, assigning blame to nearby residents for using ground water and threatening them with PRP status is absent from the draft proposal. Does this absence reflect a repudiation of the initial EPA approach of blaming the neighborhood property owners for the ground water attenuation plume?"

EPA Response:

EPA's letter did not blame the residents for using groundwater nor did it threaten them with responsible party status. The September 25, 2013 letter simply informed Mr. Stuart Gerome, Chairman of the Town of Greenland Planning Board, and Mr. Christian Smith, Engineer at Beals and Associates Inc., about EPA's concern that the proposed residential wells and other existing wells could pull contaminated groundwater from the Site and the nearby Rye Landfill. The letter also described the potential liabilities that could arise from using the groundwater and thus causing the plume to migrate beyond its current known limits. These potential liabilities are a legal reality under CERCLA. Nothing in the draft ESD language changes EPA's position as expressed in the aforementioned letter.

3. Questions about EPA and the Responsible Parties v. the Neighborhood.

“Q. 3, a: How is EPA or its scientists able to know when and where the 1,4 dioxane first migrated offsite?”

EPA Response:

The current state of the science does not allow EPA to pinpoint the exact time a release of 1,4 dioxane first migrated from the Landfill. However, EPA is able to identify the general location and direction of the plume migration by evaluating all the existing information about the geology and hydrology of the Site and the area around the Site, and by testing for the presence of 1,4 dioxane and other contaminants throughout the network of monitoring wells near the landfill and within the GMZ.

In the commenter’s letter, the preceding paragraph to the question above, states that *“The first 1,4 dioxane samples were taken in 2009, about fifteen years after capping the landfill.”*

EPA would like to clarify that 1,4-dioxane is an emergent contaminant that was not known to exist at the time the Site’s Remedy was selected. The first sampling took place in 2009 as a result of an NHDES initiative mandating testing for 1,4 dioxane for all CERCLA sites within New Hampshire.

“Q. 3,b: How does it know that the 1,4 dioxane was not present offsite [sic] a decade earlier?”

EPA Response:

It is not possible to ascertain whether 1,4 dioxane was present prior to 2009 because sampling for 1,4 dioxane began in 2009. Please see response to Q. 3,a above.

“Q. 3,c: In the absence of such knowledge how does the EPA conclude that using ground water from offsite [sic] wells will draw the contaminant plume in that direction?”

EPA Response:

The current knowledge of the Site’s geology, hydrology, groundwater flow, contaminant concentration trends within the network of monitoring wells, and evaluations performed by the PRP’s consultant, all indicate that a component of the groundwater flow is moving from the landfill generally along the valley of Berry’s Brook to areas north and north-east from the landfill. Any extraction of groundwater in those areas, especially those closest to the Berry’s Brook valley, has the potential to draw Site’s contaminants further in that direction (north/north-east of the Site). This is a likely and reasonable expectation given the known Site-specific conditions at this time.

In addition to the specific questions above, there are a couple of comments in Mr. Doyle's letter to which EPA gives a response:

Comment:

On page 4, the letter argues that the ESD establishes a one-mile prohibition on the installation of drinking water wells, making existing groundwater sources not useable, which leads to property losses. It also states that, accordingly, the Responsible Parties should be required to deliver a source of potable water to all impacted properties, including all of Breakfast Hill Road.

EPA Response:

EPA is not establishing a one-mile prohibition on the installation of drinking water wells. Please see the response to question Q. 1,b above.

EPA believes that the CLG should address potable water for the proposed subdivision and any other property with exceedances of applicable contaminant standards due to contaminated groundwater migrating from the Site. Note that the Groundwater Management Permit granted by NHDES also requires that the CLG provide potable water in certain circumstances.

Comment:

On page 8, the Section titled "Anticipated Costs", states that although EPA claims that there will be minimal costs, there will be substantial costs to innocent landowners if institutional controls are imposed without a requirement that the Responsible Parties provide potable water. The Section also states that the only just compensation for the loss of free access to property ground water and the stigma created by the institutional controls, is the mandatory provision of potable water to Breakfast Hill Road.

EPA Response:

EPA understands the concerns about substantial costs to landowners if the restriction on the drilling of new wells and the increased use of existing wells is imposed without a provision of an alternate source of potable water. To that effect, EPA plans to coordinate the timing of the institutional controls with the extension of the existing waterline to service the proposed residential subdivision.

- II. Robert P. Sullivan, Chair of the CLG submitted a three page letter on April 30, 2015. The letter basically asks EPA to delete the requirement to implement institutional controls (ICs) as described in Section III.C.a. of the draft ESD, or to make those ICs more regulatory than prohibitive. They argue that other elements of the ESD (*e.g.* the expansion of the groundwater management zone for the Site under the State program, the monitoring program, and the required notification to EPA of new wells installed in the area) are more than adequate to provide EPA and the Group notice of any uses of uncontaminated land in the vicinity of the Site that might warrant concern about groundwater plume migration, and the flexibility to craft appropriate measures to address

such uses. They also argue that the land use restrictions would be neither necessary nor appropriate in light of the fact that they would be more onerous than existing ICs on properties where contamination has been detected, and the fact that one portion of the proposed IC area, where a development has been proposed, can be provided with public water.

The following is a list of the significant assertions included in Mr. Sullivan's letter and a specific response from EPA:

1. On the first page, second paragraph: *"The CES Report concluded that private groundwater withdrawals at the proposed subdivision could be accomplished without adversely impacting the migration of the existing groundwater plume."*

EPA Response:

EPA disagrees with the conclusion above from the May 2, 2014 CES Report (the Report). The Report does not provide enough data and hydrogeological analysis to support such a conclusion. A more robust study (for example, a prolonged pumping test to evaluate the possibility of fracture interconnections) is necessary in order to determine with better certainty if a pumping rate exists that can be deemed safe (that is, not capable of adversely impacting the migration of the existing plume). The statements of a previous report (Groundwater Management Zone Evaluation, February 2013) by the same consultants (known as Summit Environmental Consultants at the time) appear to be at odds with the conclusion in the Report noted above. Specifically the February 2013 Evaluation indicates that a component of the groundwater flow moves to the west of the landfill and then north, basically following the valley of Berry's Brook. This assertion was also expressed in the 2013 Annual Summary Report prepared by Summit Environmental Consultants in January 17, 2014. See third bullet on page 11 of the ESD. Absent a more rigorous study about the effect of pumping rates upon the Site's plume, EPA cannot accept CES's conclusion and must implement a restriction on the drilling of new wells and the increased use of existing wells to prevent potential exposures to the Site's contaminated groundwater.

Another concern and reason to implement ICs is that the Report appears to be based on an EPM ("equivalent porous medium") assumption for bedrock. In other words, they are analyzing the bedrock groundwater data as if it behaves just like overburden (above the bedrock). This assumption is simplistic, unlikely to be accurate, and does not capture the nature of the bedrock which needs further expert examination of the data as a whole. For example, it is very likely that North East-striking fractures extend from the Coakley landfill in the direction of the proposed subdivision. If this is true, fracture pathways may allow for a preferential pathway for contaminant migration in this direction either through pumping or just by ambient gradients.

2. On the first and second page, second and third paragraph: *"...The idea that it is necessary to impose land use restrictions...appears overly conservative, is well beyond typical*

measures imposed for other sites...given that other elements of the draft ESD appropriately provide...EPA and the Group notice of any activities or conditions that might warrant greater attention. All of these provisions will provide a more than sufficient early warning system...

EPA Response:

The other IC elements (that is, the expansion of the GMZ under the State Program, the monitoring program described in Section III.C.b. of the ESD, and the required notification to EPA of new wells installed in the area, as provided in Section III.C.c. of the ESD) are not sufficient by themselves. Although they form part of an early warning system, by themselves these measures do not prevent the possibility of plume migration, human exposures to the contaminated groundwater, and the ongoing remedy being compromised. EPA guidance encourages the “layering” of ICs to provide more protectiveness. See Page 9, December, 2012, *Institutional Controls: A Guide to Planning, Implementing, Maintaining, and Enforcing Institutional Controls at Contaminated Sites* (“Often ICs are more effective if they are layered or implemented in series”). Also it should be noted that not all ICs will apply to the same areas around the Site.

3. On the second page, the last sentence of the first partial paragraph: *“It would be unnecessarily overbroad for EPA to impose blanket land use restrictions...when other ICs in the draft ESD are available to facilitate a more focused and flexible approach to address in a timely manner any problematic situations only if and when they arise.”*

EPA Response:

EPA disagrees with this assertion. These groundwater use restrictions are to be applied to a limited area adjacent to the Site’s Groundwater Management Zone as depicted in Attachment 4 to the ESD. The restrictions could be removed if an appropriate study confirms the existence of a pumping rate that is reasonable for that area. Also, as expressed above, the other ICs are not sufficient protection tools by themselves but are additional protective measures. Relying on such other ICs alone to deal with the problems caused by new wells or the increased use of existing wells, after the fact would not be a proactive and protective approach.

4. On the second page, last sentence of the first complete paragraph: *“Given the availability of this public water supply, it would be inappropriate to implement such onerous ICs on uncontaminated properties.”*

EPA Response:

ICs, including the restriction on groundwater wells, are needed even if a water line is available. The provision of public water to the area is highly encouraged by EPA as it takes care of the immediate most pressing problem: human exposures to contaminants due to ingestion of the groundwater. However, the water line does not preclude the increased use of existing wells or the installation of new wells that are extremely likely to

exert hydraulic pressures or demands capable of further expanding the groundwater plume of contaminants towards them. Such extraction of groundwater also has the potential to alter the groundwater flow and direction, and chemistry in ways that could increase the areal extent of the contamination at the Site, thus increasing the overall timeframe for achieving the remedy's cleanup levels and increasing the overall cost of the remedy's implementation.

5. On the second page, first sentence of the second full paragraph: *"The imposition of ICs seems particularly inappropriate given that they go farther than the ICs that are required over much of the GMZ and the Site itself, where contamination has been detected."*

EPA Response:

EPA believes that the CLG has misinterpreted the IC provisions stated in the ESD. EPA is not necessarily requiring deeded land use restrictions as the only IC to be implemented over the highlighted area on Appendix 4 of the draft ESD. An ordinance or a deed notice also could be sufficient for this area. Accordingly EPA would not be necessarily imposing ICs over the highlighted area that are more restrictive than at other areas of the Site.

In the particular case of this Site, one component of the groundwater flow is moving through the area where ICs are proposed and observed concentrations of contaminants within the monitoring well network suggest plume migration in that direction. Furthermore, recent detections of 1,4-dioxane offer additional concern of such migration as it is known to be a contaminant that travels very quickly, often ahead of other contaminants within a groundwater plume. Therefore, EPA believes that in some particular areas of the Site, given their high susceptibility to be impacted by the plume's migration, the existence of current and future human exposure pathways, and the pattern of contaminant concentrations that are being observed, it is justified to implement restrictive ICs.

6. On the third page, last sentence of the second paragraph: *"The Group therefore asks EPA to revise the draft ESD to eliminate the requirement to implement ICs as described in Section III.C.a. of the draft ESD, or at the very least to make those ICs more regulatory than prohibitive in approach."*

EPA Response:

EPA understands the concerns of the CLG but declines their proposal to eliminate ICs or make them regulatory in approach. As expressed in response to Comment #2 above, ICs in the proposed area shown on Attachment 4 to the draft ESD are necessary to prevent potential human exposures to contaminants from the Site, which appear to be migrating towards this area, and to assure the effectiveness of the ongoing remedy. Without more detailed hydro-geologic studies, anything short of those restrictions preventing the

consumption of the water would not offer the needed protection to human health and the environment. The restrictions could be removed if an appropriate study confirms the existence of a pumping rate that is reasonable for that area.