

Paul Gildersleeve

North Country Environmental Services, Inc.



408 East Montpelier Road  
Montpelier, VT 05602

(802) 223-7221  
(802) 223-7128 Fax

August 30, 2009

Ms. Karlee Kenison, P.G.  
New Hampshire Department of Environmental Services  
Waste Management Division  
29 Hazen Drive, P.O. Box 95  
Concord, New Hampshire 03302-0095

**Re: North Country Environmental Services, Inc.  
Landfill Facility – Bethlehem, New Hampshire  
Groundwater Performance Standards Work Plan**

Dear Ms. Kenison:

NCES (North Country Environmental Services, Inc.) is in receipt of your July 17, 2009 letter requesting a revised comprehensive work plan relative to performance standards resulting from the Leachate Management Improvements Project at select monitoring points at our facility in Bethlehem, New Hampshire. In response to the NHDES (New Hampshire Department of Environmental Services) request we re-typed your comments in *italic print* with our responses in **bold** print.

We wish to preface this submittal with the observation that, while we are prepared to work with NHDES in a sincere and good-faith effort to achieve background conditions in the release detection wells, we believe that the scientific evidence demonstrates beyond serious question that conditions observed in the downgradient monitoring wells are not related to a release from the containment system of landfill. We also make this submission without prejudice to the claims NCES has asserted or may later assert against NHDES or any other party arising from NHDES' denial of NCES's applications for modification of its Stage IV standard permit, including, without limitation, any claims that the performance standards NHDES is seeking to impose on NCES are inconsistent with determinations NHDES has made with respect to the NCES landfill and other landfills in the state.

#### *Historical Timeline Comments*

*The history and historical timeline sections are not required elements of the Work Plan nor did the Department request them to be included in the Work Plan. As such, the Department has not verified the accuracy of all the information provided in those sections and requests that this type of information be omitted from any future Corrective Action Plan submittals. Nonetheless, based on a cursory review of the Historical Timeline section, we*

did note one very important issue that requires clarification before providing further comment on the Work Plan itself. That is, in the timeline, NCES indicates that on May 28, 2008, the Department approved a Corrective Action Plan for the facility. However, the approval issued on May 28, 2008 was for a Type II modification of the facility's Solid Waste Facility Permit (SW Permit) and was not an approval of the Corrective Action Plan document. See enclosed May 28, 2008 Record of Modification to Solid Waste Management Facility. Specifically, we refer you to Section III that states the Type II modification constitutes approval of the design plans for the construction of the Leachate Management Improvements. This is not the same as approving the Corrective Action Plan. An important element of any Corrective Action Plan is establishing performance standards to determine the success or failure of the prescribed remedial work. The design plans for the leachate management improvement project that were approved per modification of the SW Permit on May 28, 2008, do not include the required corrective action performance standards. Furthermore, Corrective Action Plans are a requirement of the Groundwater Release Detection Permit or, in this case, the Groundwater Management and Release Detection Permit (GW Permit). To further clarify the record regarding approval of the Corrective Action Plan, the Department offers the following timeline:

**Each of the two work plans developed in 2007 and submitted to the NHDES were created to address impacted soils and to propose upgrades to our leachate collection systems as the means to address the low-level contaminants in the downgradient wells. These plans were developed as Remedial Action Plans as requested by the NHDES and permitted accordingly. In this context a remedial action plan is equivalent to a corrective action plan. While NHDES may have been within its rights to request groundwater performance standards as part of the remedial action plan, it elected not to do so and approved the plan as submitted.**

**The approved Work Plan included elements that would necessitate modification to the Facility Operating Permit. There was no reason to request this modification until the Work Plan had been approved by the NHDES. Please refer to page 3 of the September 10, 2008 NHDES correspondence from Mr. Wimsatt, last sentence of the first paragraph, "On May 28, 2008, when the department approved the Type II Permit Modification Application for the Leachate Management Improvements, NCES was directed to proceed with the Work Plan." Thus, at this point NCES had the directive to implement the approved Work Plan.**

- On November 8, 2007, the Department informed NCES that the scope of work included in CMA Engineers, Inc.'s (CMA's), September 2007 document entitled "Work Plan Remedial Activities Of Soil Potentially

*Impacted By Leachate, Alternative Leachate Management Modifications and Improvements (Work Plan)," was acceptable in concept, but further advised NCES that prior to implementing the Work Plan, NCES would have to submit more details.*

The April 2007 Permit (Groundwater Management and Release Detection Permit #GWP-198704033-B-004) required a scope of work (special condition #16) for remedial activities near the leachate loading area and groundwater sampling wells MW-402 and MW-403. That plan was submitted on May 31, 2007, and proposed that the remedial action plan be carried out as part of the construction of Stage IV, Phase II. On July 31, 2007, NHDES requested that the plan be resubmitted in an alternative form so that performance of the remedial work would proceed irrespective of whether NCES's pending Type I-B application was granted. Accordingly, NCES resubmitted the plan on September 13, 2007. On November 15, 2007, NCES received a revised Groundwater Management and Release Detection Permit (dated November 9, 2007) from which condition #16 (referenced above) was deleted and replaced with new conditions requiring updates on the progress of remedial activities "near monitoring well couplets MW-402 and MW-403 and the present/former leachate loading areas." NCES understood with the removal of a condition to develop a work plan and its replacement with a directive for progress reports for the same work, approval of the project had been granted.

To our knowledge we were never informed that the approval was granted "in concept" as your letter states. If you are aware of any such notification sent to NCES, please provide a copy of that document to us at our new address, 408 East Montpelier Road, Montpelier, Vermont, 05602, for our file.

- When the May 28, 2008 Type II SW Permit modification was issued, the Department advised NCES to move forward with the leachate management improvements. At that time, no additional details (i.e., groundwater performance standards) had been provided to complete the September 2007 Work Plan.

The May 28, 2008 approval was necessary to implement the work plan approved by NHDES in November 2007. Again, the corrective action/remedial action plan did not contain groundwater performance standards because NHDES did not request them and approved the plan without them. The approval clearly contemplated that the source of the contamination was leachate spills outside the perimeter of the containment system and that remediation of the soils

**in that area would fully address the source. If that were not the case, NHDES would not have approved the corrective action plan in the form it was approved in November of 2007.**

- *By letter dated September 10, 2008, the Department notified NCES of the groundwater performance standards deficiency and directed NCES to submit proposed groundwater performance standards.*

**On September 10, 2008 NCES did receive correspondence from Mr. Michael Wimsatt, Director of the Waste Management Division under the subject heading "Type 1B and II Permit Modification Application" for the Stage IV Phase II landfill expansion request that at the time was before the Department for permit modification review.**

**Within this correspondence related to the Stage IV Phase II permit modification request was a section discussing the Groundwater Management and Release Detection Permit outlining certain issues.**

**This was the first time NHDES had raised the concept of formulating groundwater performance standards. It is neither fair nor accurate to describe the absence of groundwater performance standards from the corrective action plan as a "deficiency." Nothing in the rules requires groundwater performance standards, and the NHDES had approved a corrective action plan without them. This signified to NCES that the approved corrective action plan satisfied the requirements of the Env-Or 700 rules.**

**Throughout 2007 and continuing with the issuance of the May 28, 2008 permit modification and NHDES authorization to begin construction in August 2008, NCES and NHDES had collaborated to develop a practical and reasonable remedial action plan to remove impacted soils and address the source of the low-level contamination, and NCES had begun executing the plan.**

**Since the receipt of the September 10, 2008 correspondence from the NHDES we have proposed performance standards and begun monitoring groundwater monthly at the request of NHDES. We have continued to cooperate with NHDES despite the agency's decision to impose groundwater performance standards before we were able to fully execute the corrective action plan DES had already approved.**

*Work Plan – Soil Restoration*

*The Soil Restoration scope of work that NCES presents in the subject Work Plan*

*differs from the information presented in CMA's September 2007 Work Plan. The Department notes the following discrepancies that need clarification and/or correction:*

- *Item 2- NCES indicates that all soil removed from the project site will be transported to the landfill for use as daily cover. This differs from the September 2007 Work Plan that states that the soil excavated from the region above the tanks and piping will be stockpiled with other clean soil and used as backfill if it appears to be free of impacts. If this soil will actually be used as daily cover, then Item 5 of the subject Work Plan, which refers to sampling the clean soil stockpiles, needs to be modified accordingly or eliminated.*

**All soils were removed to the operating landfill area and used as daily cover. As requested, the approved September 2007 Work Plan prepared by CMA has been modified and is attached to this correspondence.**

- *Item 7- The September 2007 Work Plan indicates that samples will be analyzed for one or more of the following compounds: chloride, bromide, and the Department's full list of volatile organic compounds using EPA Method 8260B. However, the subject document indicates that samples may versus will, be analyzed. It is unclear to the Department why this wording has been changed. Please provide clarification and the rationale for determining which parameters will be analyzed.*

**The reference to may versus will is because sampling at individual wells could be different. A sampling table in the attached Work Plan should clarify the sampling requirements at each location.**

- *Item 8 – If all soils removed from the project will be transported to the landfill and used as daily cover, provide clarification as to which soils will be used to backfill the excavations.*

**During excavation and removal of the underground storage tanks, the General Contractor completed backfilling of the excavations closest to the Stage I Landfill (Stage I – Phase III and IV tanks) with common borrow material procured from the on-site borrow pit. Following the completion of the 2008 phase of the work, NCES removed the backfilled materials and existing soils from the Stage I leachate storage and loadout area. This additional soil excavation work was summarized in the "Report on Additional Soil Excavation and Removal" that was provided to the Department with the last**

**quarterly report. This area has been graded, seeded and mulched and will be left undisturbed.**

- *Item 11 – NCES indicates that within two months of completing the final soil removal, it will submit a final Construction Quality Assurance Report summarizing the work completed and documenting all test results. This is a SW Permit requirement. The Department advises that all soil removal documentation, including the laboratory data and analysis of that data, also must be included in the Corrective Action Plan Report that is required under the GW Permit.*

**Accordingly, a copy of the CMA Engineering, Inc. Construction Quality Assurance Report for soil excavation and removal will be included with the Corrective Action Plan Report. Any soil testing associated with the 2009 phase of the Leachate Management Improvements Project will also be provided.**

- *CMA's Construction Quality Assurance Plan, as submitted to the Department on March 5, 2009, contains raw soil analytical data with no supporting analysis of the data. Again, NCES must include this data and a supporting analysis in the Corrective Action Plan Report that is required by the GW Permit.*

**See response to Item #11 above.**

#### *Groundwater Restoration*

*This section does not clearly present the final agreed upon groundwater performance sampling plan, i.e., it does not clearly indicate which wells will be sampled monthly or the applicable test parameters. Although it is appropriate to include the established background concentrations in their own tables, a separate table should be provided that clearly identifies the wells that will be sampled on a monthly basis and, for each well, the applicable analytical tests.*

**We propose to continue the monthly groundwater sampling program of select monitoring wells, as previously agreed upon with NHDES. As requested, the following table provides a summary of "... the wells that will be sampled on a monthly basis and, for each well, the applicable analytical tests."**

**This table along with a table outlining background concentrations for each compound at each sampling location can be found in the revised Work Plan**

attached to this correspondence.

### MONTHLY GROUNDWATER SAMPLING PROGRAM SUMMARY

MONITORING WELL	PARAMETERS	USEPA Method
MW-402U	VOCs and Bromide	8260B & 300.0
MW-403L	VOCs and Bromide	8260B & 300.0
B-304U	VOCs and Bromide	8260B & 300.0
B-913M	VOCs and Bromide	8260B & 300.0
B-919U	VOCs	8260B
B-921U	Bromide	300.0
B-921M	VOCs	8260B

#### *Corrective Action Plan Report*

The submitted Work Plan does not specify the content of the Corrective Action Plan Report. As indicated above, the Corrective Action Plan must include all soil analytical data collected under the SW Permit as part of the Leachate Management Improvement project and CMA's Construction Quality Assurance Plan. In addition, the Corrective Action Plan Report must include the analytical results of the groundwater and surface water samples collected to support the corrective action (i.e., soil removal activities). Soil data shall be presented in summary tables and, as appropriate, on maps and cross-sections. Groundwater data shall also be presented in summary tables and, as appropriate, in time-series graphs and on maps and cross sections. The Corrective Action Plan Report shall also (1) identify any potential sources of bromide and VOCs that are detected in groundwater during excavation; (2) assess the effectiveness of any remedial actions taken; and (3) propose additional corrective action work if no such sources are identified.

**As mentioned above, a final Corrective Action Plan Report will be prepared and submitted once all the work is completed and the Report is prepared.**

#### *Request for Revised Comprehensive Work Plan*

No later than August 30, 2009, please submit a revised comprehensive Work Plan that clearly identifies the soil and groundwater performance standards to be achieved as a result of the proposed corrective action work, and that also addresses the comments provided in this letter. In the meantime, and until a revised Work Plan is approved, NCEs should implement the agreed upon monthly groundwater sampling and assessment monitoring.

**The revised Work Plan is attached.**

*North Country Environmental Services, Inc.*  
*Permit Number: GWP-1987704033-B-004*

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**WORK PLAN FOR  
REMEDIAL ACTIVITIES OF SOIL POTENTIALLY  
IMPACTED BY LEACHATE**

**ALTERNATIVE LEACHATE MANAGEMENT  
MODIFICATIONS AND IMPROVEMENTS**

**SEPTEMBER 2007  
(APPROVED NOVEMBER 2007)  
(MODIFIED AUGUST 2009)**

*Submitted by:*

**NORTH COUNTRY ENVIRONMENTAL SERVICES, INC.**  
Bethlehem, New Hampshire

*Prepared by:*

**CMA ENGINEERS, INC.**  
35 Bow Street  
Portsmouth, New Hampshire



# WORK PLAN

## Remedial Activities of Soil Potentially Impacted By Leachate

### Alternative Leachate Management Modifications and Improvements

**North Country Environmental Services, Inc.  
Bethlehem, New Hampshire**

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#### INTRODUCTION

On behalf of North Country Environmental Services, Inc. (NCES), and in accordance with former Special Condition 16 of the Revised Groundwater Management and Release Detection Permit GWP-198704033-B-004, CMA Engineers, Inc. prepared this Work Plan for remedial actions to remove soil that might be impacted by leachate. This work plan was presented as an alternative to a plan entitled "Work Plan, Remedial Activities of Soil Potentially Impacted By Leachate, Leachate Management Modifications and Improvements," dated May 2007. NHDES approved the work plan in November 2007.

The work area is located upgradient of monitoring well couplets MW-402 and MW-403, and in the vicinity of the former leachate loading, storage and transfer areas. A site plan is included as Figure 1.

The likely source of the low level volatile organic compounds (VOCs) detected in groundwater samples from well MW-402U is remnants of leachate released into the upgradient vadose zone soils. A potential source of these compounds is leachate that was collected, stored and transferred in underground facilities in this area, and transferred to tank trucks by an above ground facility. The locations of these leachate management facilities are shown on Figures 2 through 4.

The November 2006, Sanborn Head & Associates, Inc. (SHA) report included drilling 18 soil borings on a grid pattern. The borings were necessarily located to avoid damaging active underground leachate storage tanks and transfer piping. As such, soil samples located adjacent to or below these facilities were not collected or analyzed. SHA did not observe or smell evidence of leachate contamination, and field screening and laboratory analyses of the soil samples did not detect leachate constituents in concentrations that would indicate a source for the observed groundwater impacts at well MW-402U.

Existing force mains, leachate piping and underground storage tanks (USTs), and the leachate unloading facility have already been removed from the area to the north of Stage I and replaced by an improved system pursuant to NHDES approvals. As part of the demolition of these facilities, the tanks, piping, and surrounding soil were observed for evidence of prior leakage and leachate impacts. Impacted soils were removed and placed in the landfill.

The modifications/improvements are depicted on Figures 1 through 4. Reference the March 2007 Type I-B permit modification application construction drawings for details related to

construction of the force main, above-ground leachate holding tank, and replacement leachate loading facility.

The following Work Plan includes additional requirements imposed by NHDES beginning in September 2008.

### OBJECTIVE AND SCOPE OF WORK

The objective of the Work Plan was to delineate soils that might be impacted by leachate, and excavate and place any impacted soil in the landfill. The targeted soils were located adjacent to or below leachate handling, storage and transfer facilities that were demolished and replaced at different locations. These facilities were installed above the water table. This scope of work was intended to remove impacted soil above the water table that were the likely source for downgradient groundwater quality impacts. This scope of work applies to demolition activities outside of the limits of the lined landfill.

The 2008 phase was and 2009 phase of the work will be conducted as part of construction of leachate management modifications, and specifically as part of the current leachate management system demolition. The construction is being conducted by a Contractor (or its subcontractors) contracted directly with NCES. The construction work related to soil remedial actions was and will be conducted under the guidance and supervision of the Engineer engaged by NCES. Meeting the project objective, NCES has and will continue to complete the following scope of work:

1. Demolish the leachate structures and remove the underground storage tanks and leachate force main piping, as indicated on Figures 2 and 3. Demolition involves excavation of soil, protection of existing utilities and other facilities, and segregation of clean and impacted soils as determined by the Engineer. Any usable equipment will be salvaged by NCES. All other demolished materials will be hauled to locations on the site designated by NCES for recycling or disposal.
2. Actual vertical and horizontal limits of the excavations around the tanks and piping will be determined by the Engineer in the field based on indications of leachate and other factors. All impacted soil, as determined by the Engineer based on appearance, odor and organic vapor readings (using a photoionization detector), shall be excavated and disposed in the active landfill area at a location designated by NCES. The excavations are not anticipated to extend below the water table. Soil located above the tanks and piping that appears to be free of impacts (clean), along with other excavated clean soil, shall be relocated to the landfill for use as daily cover material by NCES. NCES may elect to excavate additional soils beyond the limits of impacted soils and those required for demolishing the existing leachate structures and underground storage tanks. All disturbed areas will be stabilized with hydroseeding and mulching as applicable.
3. The Engineer will inspect and document the condition of all underground storage tanks and piping relative to evidence of damage, corrosion or leakage. Documentation will include photographs and a written assessment of each tank and length of piping.

4. After all impacted soils are removed, as determined in the field by the Engineer, the Engineer will screen and sample soils on the excavation side walls and bottom for the presence of leachate impacts. Two discrete samples will be obtained from each tank excavation, and one sample will be obtained for each 100-foot length of piping removed. Additional samples will be obtained at the discretion of the Engineer based on the observed limits of the impacts.
5. Soil samples will be collected in accordance with NHDES Env-Or 600 and Env-Or 700. Samples will be obtained by a trowel, scoop or spade. All samples will be identified, handled, shipped, tracked and maintained under chain of custody.
6. Each soil sample will be analyzed by a laboratory certified by the State of New Hampshire. The samples will be analyzed for chloride, bromide and the NHDES full list of volatile organic compounds using Method 8260B.
7. The tanks and associated piping may be located at considerable depth below the ground surface. The Contractor is responsible for maintaining a safe excavation and protecting adjacent structures, utilities and the landfill. Excavations shall comply with all applicable OSHA regulation, and the project Excavation specifications, Section 02222, that are included in Appendix A to this Work Plan.
8. Backfill of the excavations, if desired by NCES, will not be completed until the results of confirmatory laboratory tests indicate the remaining soils are not impacted above NHDES Risk Characterization and Management Policy (RCMP) Method 1 Soil Standards, Category S-1, revised in April 2007. Backfilling of excavations, and placement, compaction and grading of fill materials will be conducted in accordance with the Filling specifications, Section 02223 (Appendix A). Backfill materials will be obtained from the on-site borrow pit operation.
9. The work will be conducted in compliance with all applicable provisions of federal, state and local health and safety statutes, codes and regulations, including 29 CFR Parts 1910 and 1926. A health and safety plan will be prepared in accordance with Section 13001 of the specifications (Appendix A).
10. Existing monitoring wells and gas probes will be protected throughout the course of the work. Any wells that are modified through lowering, extension, decommissioning or replacement of monitoring wells will be completed by a licensed New Hampshire well contractor in accordance with Section 02960 of the specifications (Appendix A).
11. The work will be conducted in full accordance with project erosion and sedimentation control plans and Site Specific Permit conditions.
12. The Engineer will prepare a Corrective Action Plan report summarizing the work completed and documenting all soil, groundwater, and surface water test results, the proper disposition of the excavated soils, and the quality of soils left in place. All analytical data will be presented in summary tables and will be supplemented with plan and cross-section views and time-series graphs if necessary to a full understanding of the

data. Finally, the report will identify the likely source of any bromide or VOC detected in groundwater during excavation and will assess the effectiveness of the remedial action NCES has taken under this plan.

## SCHEDULE

In accordance with NHDES's letter of July 31, 2007, the alternative work plan was only to be implemented if the Stage IV, Phase II project was not developed. NCES nonetheless commenced the work called for under the corrective action plan before NHDES rendered a decision on NCES's Type I-B modification application.

## GROUNDWATER QUALITY MONITORING AND PERFORMANCE STANDARDS

The monitoring well locations to be included in the monthly sampling program are listed in Table 1. These locations were selected by NHDES. Sampling will continue on a well-by-well basis until the Groundwater Performance Standards presented in Table 2 for that well are achieved for two consecutive rounds. Upon meeting the performance standards, the monitoring schedule for that location will revert to that specified in the site Groundwater Management and Release Detection Permit. Table 1 includes the parameters to be analyzed and the analytical methods. Table 2 also includes a summary of the recent history of parameter (bromide and individual VOC) detections at each location.

## SPECIFICATIONS AND FIGURES

The specifications set forth in Appendix A and the attached figures are those that were approved by NHDES in November of 2007. The specifications and figures have not been updated to reflect the work that has already taken place pursuant to the approved plan.

**TABLE 1: MONTHLY GROUNDWATER SAMPLING PROGRAM SUMMARY**

<b>MONITORING WELL</b>	<b>PARAMETERS</b>	<b>USEPA Method</b>
MW-402U	VOCs and Bromide	8260B <sup>1</sup> & 300.0
MW-403L	VOCs and Bromide	8260B <sup>1</sup> & 300.0
B-304UR	VOCs and Bromide	8260B <sup>1</sup> & 300.0
B-913M	VOCs and Bromide	8260B <sup>1</sup> & 300.0
B-919U	VOCs	8260B <sup>1</sup>
B-921U	Bromide	300.0
B-921M	VOCs	8260B <sup>1</sup>

Notes to table:

- VOCs will be analyzed using USEPA Method 8260B (as indicated), following the NHDES "Full List" of analytes, which will include 1,4-dioxane by Method 8260B using Selective Ion Monitoring (SIM), and "low-level" ethylene dibromide (EDB) and 1,2-dibromo-3-chloropropane (DBCP) analyses by USEPA Method 504.1.
- Bromide will be analyzed using USEPA Method 300.0, as indicated.

**TABLE 2. GROUNDWATER PERFORMANCE STANDARDS SUMMARY**

<b>PARAMETER</b>	<b>RECENT DETECTIONS<sup>1</sup></b>	<b>PERFORMANCE STANDARD CONCENTRATION</b>
<b>Bromide</b>	<b>B-304UR, B-913M, B-921U, MW-402U</b>	<b>Non-detect (&lt; 0.1) mg/l</b>
<b>Dichloroethane 1,1</b>	<b>MW-402U</b>	<b>Non-detect (&lt; 2.0) ug/l</b>
<b>Diethyl Ether</b>	<b>MW-402U</b>	<b>Non-detect (&lt; 5.0) ug/l</b>
<b>Dichlorodifluoromethane</b>	<b>B-304UR, B-919U, B-921M</b>	<b>QL 5.0 ug/l</b>
<b>Dioxane 1,4</b>	<b>B-913M</b>	<b>Non-detect (&lt; 1.0) ug/l</b>
<b>Butanol</b>	<b>None</b>	<b>Non-detect (&lt; 30.0) ug/l</b>
<b>Tetrahydrofuran</b>	<b>B-913M</b>	<b>Non-detect (&lt; 10.0) ug/l</b>

Notes to table:

1. Based on 2 groundwater monitoring results (one or more detections for the listed monitoring wells).
2. QL = typical laboratory quantitation limit.
3. mg/l = milligrams per liter.
4. ug/l = micrograms per liter.

*APPENDIX A*

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**SPECIFICATIONS**

**02222 – EXCAVATION**

**02223 – FILLING**

**02960 – DECOMMISSIONING/EXTENSION OF  
MONITORING WELLS**

**13001 – SITE SAFETY AND CONTINGENCY WORK  
PLAN OUTLINE**

SECTION 02222  
EXCAVATION

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Excavation and processing of excavated materials.
- B. Stockpiling of fill materials.
- C. Excavation for utilities, roadways and tanks.
- D. Excavation and disposal of unsuitable and excess materials.
- E. Excavation of MSW and transport of excavated materials to the active landfill on site.

1.02 RELATED REQUIREMENTS

- A. Section 01400 - Quality Assurance/Quality Control
- B. Section 01500 - Construction Facilities and Temporary Controls
- C. Section 02223 - Filling
- D. Section 02270 - Erosion Control
- E. Section 13001 - Safety and Health Plan

1.03 PROTECTION

- A. Protect the bench-marks established for project construction.
- B. Protect excavations by shoring, bracing, sheet piling, underpinning or other methods required to prevent cave-in or loose soil from falling into the excavation.
- C. Notify the Engineer of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.
- D. Grade the perimeter to prevent surface water run-off into the excavation.
- E. Barricade or otherwise protect, consistent with the project safety program, open excavations occurring as part of this work and post with warning lights.

- F. Protect adjacent structures and facilities from damage caused by settlement, movement, undermining and other hazards created by earthwork operations.
- G. Dust Control: Use all necessary means to control dust caused by the Contractor's operation. Prevent dust from being a nuisance to the public. The use of calcium chloride is not acceptable. Moisture addition must be limited so as not to adversely affect soil handling. The use of other agents for dust control is subject to the approval of the Engineer.
- H. Dewatering: Remove water from excavations to a point lower than the proposed subgrade of the work.
- I. Odor Control: The Contractor shall install the temporary geomembrane cover and extend the existing landfill gas collection system to assist with the control of odors when final waste excavation grades are completed. At the end of each day of waste excavation, Contractor shall install a minimum of 4-inches of common borrow cover over exposed waste materials.

#### 1.04 JOB CONDITIONS

- A. SITE CONDITIONS: Data referring to subsurface conditions in Appendix A are not intended as representations or warrants of continuity of such conditions between soil borings. The information is made available for the convenience of the Contractor and the Owner will not be responsible for interpretations or conclusions drawn by the Contractor.

#### 1.05 DISTURBANCE OF EXCAVATED AND FILLED AREAS DURING CONSTRUCTION

- A. The Contractor shall take the necessary steps to avoid subgrade disturbance during excavations, including dewatering and restricting the use of equipment in areas above optimum moisture level.
- B. All areas disturbed during excavation that will not meet compaction requirements shall be removed and replaced with fill meeting structural requirements at no extra cost to Owner.

### PART 2 PRODUCTS

#### 2.01 MATERIALS

- 1. Loam/Topsoil - Topsoil materials shall be excavated and may be processed, as necessary, to meet the requirements of loam in Section 02930 for re-use.
- 2. Common Borrow - Excavated soil to be utilized as common borrow fill shall have all rocks and material greater than eight (8) inches in diameter removed and no



more than 30% fines passing the #200 sieve. Common Borrow in contact with geosynthetic materials shall have a maximum particle size of one (1) inch. Suitable fill shall be free from combustible, organic, and frozen materials, loam, roots, topsoil, wood, trash, snow, ice and other objectionable material, or as identified by the Engineer, or laboratory analysis. Granular materials excavated from the existing landfill cover system may be segregated from waste, till, and/or sludge and topsoil material and re-used if it meets the requirements above.

3. Unclassified Waste - Waste materials including soil cover and cover to be excavated from areas as indicated on the Drawings. May include refuse, wood chips, metal, masonry, concrete, boulders, or debris and other unclassified waste.
4. Till- Existing stockpiled till materials or till materials to be excavated shall be processed as necessary to meet the requirements of Common Borrow or Screened Till in Section 02223, for use as fill beneath the liner system and other areas indicated on the Drawings.
5. Unsuitable Fill - Excavated material not meeting the requirements for reuse as topsoil, common borrow or screened till that which may not be used as fill due to excess moisture, trash, organics, or other unsatisfactory materials.
6. Boulders- Existing stockpiled or excavated rock boulders greater than 12 inches in diameter shall be crushed on site for use as 1 ½" crushed stone fill per Section 02232 or crushed stone per Section 02541.

## PART 3 EXECUTION

### 3.01 PREPARATION

- A. Set and verify required lines and grades prior to starting the excavation. This work should be performed and verified by a registered land surveyor or professional engineer licensed to practice in the State of New Hampshire.
- B. It will be the responsibility of the Contractor to establish a construction baseline on-site. The Contractor shall perform all necessary construction layout from this baseline, maintain the baseline as necessary, and perform whatever survey is required to control his work.

### 3.02 EXCAVATION

- A. Excavation consists of the removal and stockpiling or disposal of materials encountered when establishing required grade elevations as shown on the Plans and in accordance with these Specifications. If rock boulders greater than twelve (12) inches diameter are encountered within six (6) inches of the depth of excavation, they shall be removed and the resulting hole shall be backfilled with Common Borrow, or Screened Till.

- B. Excavation for utilities: The trench for the pipes shall be excavated to the required line and grade and of sufficient width to permit thorough compacting and tamping of the fill material under the haunches and around the pipe. In general, utility trenches shall be excavated to 6 inches below the bottom of the utility line to accommodate bedding material as specified hereinafter. Soft or unsuitable material encountered below the normal bedding line of the pipe shall be removed as directed, replaced with regular fill, and thoroughly compacted.
- C. Excavation for structures: Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 feet, and extending a sufficient distance from structures to permit installation of service, other construction required, and for inspection.
- D. Excavation of Unclassified Waste Material: Excavation of existing cover material and waste material shall be completed to the limits indicated on the Drawings. All work will be completed in accordance with the Safety and Health Plan developed by the Contractor, in accordance with Section 13001. Excavated capping system materials may be utilized for fill in areas as required to achieve proposed subgrade. Excavated waste materials and shall be placed in the active landfill at a location designated by the Owner.

Excavation of waste materials shall be performed in a manner which controls odors, dust, vectors, and migration of waste. At a minimum, the "active area" of the excavation shall be covered with a minimum four (4) inches of suitable fill at the end of each day.

### 3.03 COMPACTION OF EXCAVATED SUBGRADE

- A. Upon completion of the excavation to proposed subgrade, the conditions shall be inspected by the Engineer for acceptance. The entire area shall be fine graded to remove undulations or isolated high or low spots. The subgrade shall be proof rolled, and any soft yielding areas shall be excavated and backfilled with common borrow, or screened till.
- B. Upon completion of excavation in areas beneath the proposed liner system, the natural subgrade shall be compacted to at least 95% of the maximum dry density as determined by ASTM D698, Method C.
- C. Compaction equipment in open areas shall consist of vibratory rollers, or other equivalent compaction equipment reviewed by the Engineer.
- D. Compaction equipment in confined areas (in trenches and adjacent to walls, piers, footings and standpipes) shall consist of hand-guided vibratory equipment or mechanical tampers reviewed by the Engineer.

- E. Upon completion of the excavation in areas outside the landfill where fill will be placed, the subgrade shall be proof-rolled by two coverage's of the rear wheels of a fully loaded ten-wheel dump truck, or by other suitable equipment as reviewed by the Engineer.

### 3.04 STOCKPILING

- A. Suitable fill excavated including borrow, till materials, and topsoil shall be stockpiled until required for filling. Place, grade and shape stockpiles for proper drainage. Erosion control devices shall be used as necessary to minimize sediment transport away from the area.
- B. Fill unsuitable for use as regular fill and excess materials shall be handled in accordance with Part 3.05.

### 3.05 DISPOSAL OF UNSUITABLE and EXCESS MATERIALS

The Contractor shall dispose of all unsuitable and excess materials on-site in a location or locations designated by the Owner or as shown on the Plans. Contractor shall take no material from the site.

Unsuitable and excess materials are defined as follows:

- A. Unsuitable Material - Material containing significant clay, silt, or organic material, or material greater than eight inches (8") in diameter, or other materials identified on the contract drawings.
- B. Excess Materials - Materials not meeting the definition in "A" above but which do not meet any of the specifications for materials required for this project, and/or materials in excess of the total quantity of materials required for this construction project.
- C. No material shall be removed from the site. Unsuitable and excess materials shall be stored at separate locations on site as directed by the Owner.

### 3.06 STABILITY OF EXCAVATIONS

- A. Slope sides of excavations to comply with OSHA regulations and local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible due to space restrictions or instability of material excavated. Maintain the sides and the slopes of excavations in a safe condition until completion of backfilling.
- B. Shoring and bracing: Provide adequate shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition. Trench shoring and bracing shall comply with local codes and authorities having jurisdiction. Maintain shoring and bracing in excavation regardless of time period

excavations will be open. Carry down shoring and bracing as excavation progresses. All temporary shoring and bracing plans shall be designed and stamped by a New Hampshire licensed professional engineer.

### 3.07 DEWATERING

- A. Control of surface water is a critical requirement of the work. All necessary actions shall be taken to minimize the effect of precipitation and runoff on the work. Upgradient runoff shall be diverted from active or completed work areas, and all work shall be graded and crowned to promote runoff.
- B. The Contractor shall prevent surface water and subsurface or groundwater from flowing into excavations or onto any work and from flooding the project site and surrounding area.
- C. Water shall not accumulate in excavations. Contractor shall remove water to prevent softening of subgrades and soil changes detrimental to stability of the subgrade. The Contractor shall dewater excavated areas as required to perform the work, and in such a manner as to preserve the undisturbed state of subgrade material.
- D. The Contractor shall provide and maintain pumps, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
- E. The Contractor shall prevent migration of sediment in accordance with erosion control requirements of this Contract.

### 3.08 COLD WEATHER PROTECTION

- A. Protect excavation bottoms against freezing when the atmospheric temperature is less than 35° F. The Contractor shall take whatever actions are necessary during the period of construction, to prevent freezing of any areas which are to receive fill as part of this work. No fill shall be placed on areas which are frozen. The Contractor shall also comply with the requirements of Section 203, Paragraph 3.7.8 of the NH DOT Standard Specifications.

### 3.09 REMOVAL OF UNSATISFACTORY SOIL MATERIALS

- A. Unsatisfactory soil materials shall be as defined in Paragraph 3.05 (unsuitable materials).
- B. Excavate unsatisfactory soil materials encountered that extend below required elevations, to the additional depth directed by the Engineer. Do not over-excavate without prior authorization of the Engineer.

- C. Such additional excavation, provided it is not due to fault or neglect of Contractor, will be measured as directed by Engineer and paid for in accordance with the measurement and payment section.
- D. Material that is above or below optimum moisture for compaction of the particular material in place as determined by the Engineer, and is disturbed by the Contractor during construction operations so that proper compaction cannot be reached shall be construed as unsuitable bearing material or unsatisfactory soil material. This material shall be removed and replaced with compacted gravel fill at no additional charge to the Owner.

END OF SECTION

SECTION 02223  
FILLING

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Furnishing, placing, and compaction of suitable fill (borrow) and bedding sand.
- B. Production, placing and compaction of screened till from on-site till materials.
- C. Coordination with the Engineer for completion of all required tests.

1.02 RELATED REQUIREMENTS

- A. Section 01300 - Submittals
- B. Section 01400 - Quality Assurance/Quality Control
- C. Section 02222 - Excavation
- D. Section 02232 - Stone Fill
- E. Section 02234 - Select Sand
- F. Section 02270 - Erosion Control
- G. Section 02541 - Gravel Roadway
- H. Section 02930 - Loaming and Seeding

1.03 REFERENCES

- A. ASTM D422 - Standard Methods for Particle Size Analysis of Soils.
- B. ASTM D1557 Method "C" - Moisture-Density Relations of Soils and Soil-Aggregate Mixture using 10 lb. (4.54 kg) Hammer and 18-inch (457 mm) Drop.
- C. ASTM D1556 - Standard Test Method for Density of Soil in Place by the Sand-Cone Method.
- D. ASTM D2922 - Standard Test Method for Density of Soil and Soil - Aggregate in Place by Nuclear Methods (Shallow Depth).
- E. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
- F. ASTM D5084 - Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.

1.04 TESTS

- A. Soil testing and compaction tests shall be performed by the Engineer in coordination with the Contractor.
- B. Test and analysis of fill materials shall be performed by the Engineer in coordination with the Contractor.

- C. Tests and analyses of fill materials will be performed in accordance with ASTM D422, ASTM D2922, ASTM D3017, ASTM D1557, and ASTM D5084 and conditions set forth in Section 02223, 2.02 "Quality Control and Quality Assurance."

PART 2 PRODUCTS

2.01 FILL

A. General

For all fill materials to be used, samples, sieve analysis, and laboratory data indicating maximum dry densities and optimum moisture for field control tests shall be reviewed by the Engineer prior to use as fill on site. Where materials for fill may be available on-site for common borrow, screened till and loam, the Contractor shall be required to excavate test pits as required from processed or existing stockpiles to allow sampling and evaluation of the materials by the Engineer. The Contractor shall excavate, screen, and stockpile materials for sampling purposes prior to placement within proposed fills.

B. Common Borrow Fill

Suitable borrow, either from on-site or off-site sources, to be utilized as regular fill shall consist of sands with all rocks or material greater than 8" removed and no more than 30% passing the No. 200 sieve. Suitable fill shall be free from combustible, organic and frozen materials, loam, roots, topsoil, wood, trash, snow, ice, and other objectionable materials, or as identified by the Engineer. The on-site till materials (some of which are anticipated >30% passing No 200 sieve and stones larger than 8" removed) may be used for common borrow fill, provided the Contractor properly manages soil water content and the materials can be properly compacted and maintained.

C. Screened Till

Screened Till for use as the 12 inches of secondary liner subgrade fill shall consist of inorganic mineral soil free of organic material, loam, trash, snow, ice, frozen soil, or other unsuitable materials and shall conform to the following gradation:

U. S. Standard Sieve Size	% Finer By Weight
1 inch	100
No. 4	80-100
No. 40	60-100
#200	20 - 70

Screened till shall have a hydraulic conductivity of less than  $1 \times 10^{-4}$  cm/sec when as demonstrated by ASTM D5084, when placed and compacted as specified as a subgrade fill beneath the secondary liner.

1. Interface Shear Strength: Testing completed by the Engineer shall demonstrate that the interface shear strength is equal to or greater than a strength envelope of  $26^0$  between the 60-mil textured HDPE liner and the proposed screened till.
2. The interface shear strength shall be determined by an interface shear test performed in accordance with ASTM D5321. The normal stresses applied shall be 1, 3, 10, 25, and 50 psi. The strain rate shall not exceed 0.04 inches per minute. The 60-mil textured HDPE geomembrane shall be tested in the machine direction. The tests shall be continued until residual shear strengths are achieved, or to a maximum 2-inch displacement. The Screened Till shall be compacted to 95% of maximum dry density per ASTM D1557, and a moisture content of 2% wet of optimum.

The laboratory test reports shall include plots of shear strength versus normal stress for peak and large displacement values, and stress versus strain plots for tests run at each normal load application. A minimum of two (2) tests shall be completed.

3. Test results not meeting the minimum requirements shall be reviewed by the Engineer for possible conformance with the overall design objectives.
- D. Sand bedding for leachate force main pipes shall be free of ice, snow, roots, sod and other organic matter and conform to the following gradation requirements:

<u>U. S. Standard Sieve Size</u>	<u>% Finer By Weight</u>
1 inch	100
No. 4	80-100
No. 10	60-95
No. 40	10-50
#200	0 - 20

- E. For other fill materials see Section 02234 Select Sand, Section 02541 - Gravel Roadway, and Section 02930 - Loaming and Seeding.
- F. The on-site 'till' soils anticipated to be excavated as part of the earthwork operation may be considered for use as Screened Till provided that the Contractor screen the materials to remove all stones 1" or larger (anticipated to be significant effort) and the material meets all other requirements of this section. Otherwise, Screened Till for the select secondary subgrade fill shall be provided from off-site sources at no additional cost to the Owner.

## 2.02 QUALITY CONTROL AND QUALITY ASSURANCE



- A. During earthwork operations, the Engineer will be present on the site to monitor and document the Contractor's activities relative to contract compliance.
- B. The Engineer shall complete laboratory analyses of a minimum of two (2) representative samples of common borrow and screened till. The Engineer shall conduct laboratory grain size analysis, moisture density testing, and permeability in accordance with ASTM D442, ASTM D1557, and ASTM D5084, respectively, to demonstrate conformance with Parts 2.01 and 3.02 of this Section.
- C. The Contractor shall provide a sample for Engineer's laboratory analyses of at least one (1) representative sample of common borrow fill and screened till for each 5,000 cubic yards of material to be placed. The Engineer shall conduct laboratory grain size analysis and moisture density testing in accordance with ASTM D442 and D1557, respectively, to demonstrate conformance with Parts 2.01 and 3.02 of this Section.
- D. The results of laboratory testing shall be reviewed by the Engineer prior to placement of fill materials. Costs for re-sampling and subsequent laboratory testing of all non-complying materials shall be borne by the Contractor.
- E. Field tests will be performed by the Engineer on in-place fill and backfill materials to confirm that specified densities are being achieved with the minimum required coverage's and compaction equipment utilized by the Contractor. The Engineer will select locations and frequency for in-place density testing. At a minimum, the frequency of field tests shall be as follows:
  - 1. Common Borrow Fill: 1 test per lift per 10,000 ft<sup>2</sup>
  - 2. Screened Till: 1 test per lift per 10,000 ft<sup>2</sup>
- F. Acceptable materials placed and compacted to below the specified density shall alternatively be:
  - 1. Re-compacted as required to achieve the specified density.
  - 2. Removed and replaced with properly placed and acceptably compacted material.
- G. Materials placed and compacted which do not conform to project specifications for the area placed shall be removed and replaced with suitable material by the Contractor.
- H. The Contractor will bear all costs incurred in the re-compaction, removal, and replacement of fill not meeting density requirements.

## PART 3 EXECUTION

### 3.01 PREPARATION

- A. Fill to be used must be reviewed by the Engineer.

- B. The subgrade which is to receive the fill shall be fine-graded and compacted in accordance with Section 02222 "Excavation" and reviewed by the Engineer.
- C. All excavated surfaces shall be within 0.10'(+) and 0.20'(-) ft. of required line and grade.
- D. Surfaces to be filled against which are steeper than 4:1 shall be scarified or stepped and compacted to provide a bond with the new material.
- E. Fill materials will not be placed or compacted on frozen ground or during unfavorable weather conditions. Backfill operations will not be resumed until the moisture content and fill density is satisfactory to the Engineer.
- F. All fill material shall be placed "in-the-dry" on a prepared ground surface acceptable to the Engineer. The Contractor shall drain away ponded areas as required to perform the placement of fill in-the-dry.

3.02 FILLING AND COMPACTION

- A. Approved suitable material shall be installed in lifts no greater than as specified.
- B. Lifts shall be compacted to at least the specified percentage of maximum dry density, within 3% of optimum moisture content. Field testing of these lifts will be performed in accordance with ASTM D3017, ASTM D2922, and Paragraph 2.02 of this Section.
- C. Do not proceed with the next layer of fill until the preceding layer has been tested and approved by the Engineer.
- D. Areas at which tests indicate insufficient compaction shall be re-compacted and retested until the areas conform to the requirements of this specification.
- E. For the materials specified herein, the following placement and compaction requirements are included:

	Maximum Lift Before Compaction	Minimum % of Maximum Density per ASTM D1557
Common Borrow Fill	12"	95
Screened Till	12"	95

### 3.03 BACKFILLING OF UTILITES AND PIPING

- A. After pipes and joints have been inspected and approved by the Engineer, sand bedding or crushed stone (See Section 02232) shall be carefully placed and compacted and tamped in 6-inch layers under, around, and to the spring line of the pipe to firmly support the pipe, and prevent lateral movement.
- B. Care shall be taken to provide recesses in the bedding or trench bottom, as required, to relieve each bell of any load.
- C. Backfill from the top of the bedding to 12-inches above the pipe shall be completed in 12-inch layers with bedding sand, evenly on both sides of the pipe.
- D. The remainder of the backfill may be material removed from the trench excavation and shall be placed in approximately 12-inch layers and compacted to 95% of the maximum dry density, as demonstrated by in-place density testing completed by the Engineer.

### 3.03 FINAL GRADING

- A. Perform all finish grading required to attain the elevations shown on the Plans, to within 0.1 feet, to eliminate ponding water, or as otherwise indicated.
- B. Areas to be seeded shall be raked to remove all stones and other unsatisfactory material, and shall be suitably compacted.

### 3.04 TREATMENT AFTER COMPLETION OF GRADING

- A. After grading is complete and the Engineer has finished his reviews, the Contractor shall permit no further excavating, filling, grading, or vehicular access except to maintain erosion or sediment control. Use all means necessary to prevent erosion of freshly graded areas during construction and until such time as permanent drainage and erosion control measures have been installed.

END OF SECTION

SECTION 02960  
DECOMMISSIONING/EXTENSION OF MONITORING WELLS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. The proper decommissioning and extension of monitoring wells within the work area of the Contract.
- B. The Contractor shall engage a licensed New Hampshire water well contractor, familiar with the installation, extension and decommissioning of monitoring wells and the NHDES guidelines and policy regarding this work.

1.02 RELATED REQUIREMENTS

- A. Section 02222: Excavation.

1.03 QUALITY ASSURANCE

- A. Powdered bentonite and Portland cement shall be of the type appropriate for the work.
- B. Monitoring wells shall be designed, installed, and decommissioned in accordance with the practices described in NHDES Groundwater Management and Groundwater Release Detection Permits, Env-Wm-1403.

1.04 SUBMITTALS

- A. Manufacturer and specification data on bentonite.
- B. Specific work plan, with descriptions of pumping equipment, for use in the specified work.

1.05 INSPECTION ON TESTING

- A. All work completed under this section shall be done in the presence of the Engineer.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Bentonite shall be of type appropriate for the intended use.

2.02 EQUIPMENT

- A. The pumps for the grouting operation shall be specifically suited for the intended use.

### PART 3 EXECUTION

#### 3.01 DECOMMISSIONING

Existing monitoring wells and piezometers will be abandoned as follows:

1. Each well will be sounded to determine the total depth of the well prior to abandonment procedures.
2. The well will be sealed by injecting cement/bentonite grout from the bottom of the well to 5.0 feet below ground surface with a tremie pipe. The tremie pipe will be placed near the bottom of the well installation. Continue to pump the grout into the well installation while removing the tremie pipe and any remaining casing. The grout level will be maintained at a depth of 5.0 feet below existing ground surface.
3. The grout will consist of approximately 5 lbs. of granular bentonite mixed with 7.5 gallons of water per bag of Portland cement (94 lbs.) Pumps for grouting operations shall be of the screw-feed or non-piston type, which will deliver an even, continuous flow. The grout will be allowed to set for 48 hours. The abandoned well will be checked for grout settling.
4. The existing cement grout surface seal and protective casing will be removed to a depth of 5.0 feet below ground surface with a hand held pneumatic jack hammer or backhoe powered hoe ram.
5. The remaining borehole annulus will be backfilled with native soils and hand compacted and mounded in a fashion to promote surface drainage away from the abandoned well. Several days after completion of the abandonment procedures, the surface grade will be checked and, if necessary, completed as described above.

#### 3.02 EXTENSION

- A. Any monitoring wells requiring extension through soil fill shall be performed without using a solvent seal. The PVC riser shall be extended to 2.8 feet above proposed grade.
- B. A protective casing with locking cap shall also be installed from the existing grade to three (3) feet above closure grade. The casing shall be sealed with cement grout below the existing grade to prevent movement during filling operations.

- C. The Contractor shall use caution during the filling process, so that the extended well is not disturbed. Any damages to the extended wells shall be repaired at no additional cost to the Owner.

### 3.03 SHORTENING

- A. Depths of any monitoring wells requiring shortening shall be confirmed prior to excavations around the monitoring wells.

Excavation should be performed in a manner which avoids damage to the wells. Any damage to the wells shall be repaired at no additional cost to the Owner.

- B. No monitoring well shall be shortened to a height below five feet above the top of the well screen.
- C. Excavation shall proceed to remove the existing well to the required grade. The PVC riser shall be cut at an elevation 2.8 feet above final grade.
- D. A protective casing with locking cap shall be installed to an elevation three (3) feet above final grade. The casing shall be sealed with cement grout below the final grade to anchor the casing.

END OF SECTION

SECTION 13001  
SITE SAFETY AND CONTINGENCY WORK PLAN OUTLINE

PART 1      GENERAL

1.01    DESCRIPTION

- A.      The North Country Environmental Services landfill site is located off Trudeau Road in the Town of Bethlehem. The existing landfill occupies approximately 34 acres of site. Elsewhere on the site are located the landfill gas and leachate management facilities, and truck scale.

The lined landfill was first permitted by NHDES in 1987 to accept municipal solid waste, construction and demolition debris, and non-hazardous special wastes including industrial wastes, wastewater sludge, and ash materials. Prior to the lined landfill operation, an unlined landfill was operated at the site. Waste materials from this landfill have been incorporated into the lined landfill, and the unlined area has been constructed over by portions of the lined landfill.

- B.      The leachate management system modifications and soil remediation activities will require excavation and relocation of soil potentially contaminated with leachate. Air quality degradation, potentially flammable gas, gas emissions, and noxious odors, and nauseating odors may occur during the execution of the Work due to the decomposition of waste.
- C.      Facility personnel and commercial haulers will be accessing the operating landfill disposal of solid waste during the expansion construction. The Contractor shall employ practices that ensure health and safety of others. Most of the landfill expansion and waste excavation work is not in the general vicinity of the operating area, however site access roads will be shared by the Contractor and the facility operators and commercial haulers.
- D.      The purpose of the Site Safety and Contingency Work Plan (SSACWP) outline is to assist the Contractor in assessing specific site hazards which may be encountered, to suggest safety procedures which will reduce personnel exposure to hazardous conditions, and to outline emergency response procedures. The Contractor shall prepare the final SSACWP for Contractor's work. The SSACWP shall be submitted to the Engineer for review and submittal to NHDES within two weeks following Notice of Award and prior to beginning site work. All comments from Engineer and NHDES must be addressed prior to commencing activities that disturb waste. The SSACWP will provide for the identification of hazardous site conditions and shall provide for discontinuance of the work in the area identified and notice to the Engineer of the location, time, type of waste and action taken.

- E. This Contract anticipates that the Work will be performed in Level D personal protective equipment (PPE), supported by health-and-safety monitoring and appropriate response actions.
- F. The Contractor shall be fully responsible for liabilities, claims, or damages, which are the result of the Contractor's negligence, willful misconduct or failure to comply with any part of this Contract.
- G. The Contractor shall be solely responsible for the safety of employees and subcontractors. The Contractor shall comply with all applicable provisions of National and Local safety laws and building codes to prevent accidents or injury to persons on, about or adjacent to the premises where the work is being performed. The Contractor shall erect and properly maintain at all times, as required by the conditions and progress of the Work, all necessary safeguards and barricades for the protection of employees on the Work and the safety of others employed near the Work and the public, and shall post danger signs and warning lights clearly indicating potential hazards created by features of the construction.
- H. The Contractor shall provide the developed SSACWP and shall coordinate safety requirements for all representatives visiting the site, including the Engineer (including resident engineer), the Owner, the NHDES, and all other visitors to the site.
- I. The Contractor shall immediately report in writing, giving full details to the Engineer, Contractor shall immediately report the accident by telephone or messenger whether the accident occurs on or adjacent to the site, causes death, serious personal injury or substantial property damage. If a claim is made or suit is filed by anyone against the Contractor or any subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the Engineer giving full details of the claim.

## PART 2 PRODUCTS

### 2.01 EQUIPMENT

- A. The Contractor is required to maintain appropriate health and safety equipment on-site for the use of personnel at times during excavation of waste materials, or when the potential exists for exposure to noxious or hazardous conditions.
- B. The Contractor shall maintain at the site, at a minimum, a combustible gas indicator, oxygen meter, and hydrogen sulfide detector for the duration of the work.
- C. In addition, the Contractor shall maintain fire extinguishers, first aid kits, eye wash and other related safety equipment on-site for the duration of the Work.



- D. All safety equipment shall be inspected periodically by the Contractor and maintained in good working order. The Contractor shall clearly tag and/or remove from the site, any equipment that does not pass the Contractor's inspection, and replace such equipment immediately.

### PART 3 EXECUTION

#### 3.01 SITE SAFETY AND CONTINGENCY WORK PLAN - GENERAL

- A. The Contractor shall prepare a SSACWP in accordance with 29 CFR 1910.120. The plan will include at a minimum, the following for each phase of the Work: identification of specific site hazards, risk analysis, personal protection program, and an air monitoring plan. In addition, the plan shall include a comprehensive work plan and also outline emergency contacts and response actions. The Contractor's SSACWP shall include the elements described in the SSACWP Required Elements Outline, Part 3.05 of this section.
- B. The Contractor's SSACWP shall be prepared by a certified industrial hygienist or a person certified as a safety professional experienced with similar types of projects. The Plan shall include a signed statement from the preparer attesting the adequacy of the Plan.
- C. The Contractor shall submit the prepared SSACWP to the Engineer within 2 weeks after Contract award and before initiating any site activities. Any comments provided by the Engineers and NHDES must be addressed prior to commencing work that will disturb waste. The Engineer's review does not relieve the Contractor of responsibilities for SSACWP completeness, accuracy, and implementation.
- D. All Work shall be consistent with the applicable provisions of Federal, State, and Local laws, including 29 CFR 1926. The Contractor shall comply with all applicable OSHA requirements.
- E. The Contractor shall provide copies of the Contractor's SSACWP to all emergency contacts, including the Engineer, Owner, Local Fire Department, Police Department, NHDES-Waste Management Division and Hospital identified in the Plan. The Contractor shall also provide notification of scheduled SSACWP meetings and provide briefings to the emergency contacts and agencies listed in this section.

#### 3.02 SAFETY PERSONNEL - GENERAL

- A. The Contractor's SSACWP shall identify a primary Site Manager who will be available on-site at all times while construction work is in progress. The Site Manager shall be responsible for site activities related to the performance of Work. The Site Manager shall also serve as the Contractor's representative and

point of contact for all on-site communications. All communication with the Site Manager shall be considered to be communication with the Contractor. An Alternate Manager shall also be designated to carry out the responsibilities of the primary Site Manager when the primary Site Manager is not available.

- B. The Contractor shall designate a site Safety Officer for the duration of the project. The Safety Officer shall be experienced with work similar in nature to this project along with hazardous materials identification and monitoring. The Contractor may designate an alternate Safety Officer having qualifications meeting this section, to carry out the responsibilities of the primary Safety Officer when the primary Safety Officer is unavailable.
- C. The Safety Officer shall be trained according to the requirements of CFR 29 1910.130 and shall maintain certification throughout the duration of the project.
- D. The Safety Officer shall be present on-site during all on-site activities that may potentially involve hazardous material, including waste excavation, or other intrusive activity.
- E. The Safety Officer shall be responsible for the SSACWP implementation.

### 3.03 ADDITIONAL CONSIDERATIONS FOR SSACWP DEVELOPMENT

Reports on the landfill operation and waste materials received at the facility will be made available to the Contractor. The Contractor is provided the following additional considerations for SSACWP development.

- A. Physical Hazards: The Contractor should recognize construction physical hazards. Physical hazards include the following: heavy equipment operation during excavation of solid waste, falling trees during clearing and grubbing, steep and potentially unstable slopes, bulky waste materials, boulders, or other objects which may become dislodged and move downslope during excavations, obscured vision due to dust or other obstructions, sharp objects and unstable footing on waste.
- B. Air: Decomposition of MSW organic materials may generate landfill gases such as methane, carbon dioxide and hydrogen sulfide. Landfill gas may migrate through the waste surface at the face of waste excavation. Excavating and regrading waste may also create dust which may contain trace concentrations of metals or organic compounds.

Excavation and relocation of waste is anticipated to result in the release of potentially obnoxious and nauseating odors. The SSACWP shall include provisions in the event of nauseating odors.

- C. Leachate: Landfill leachate will also be encountered during the waste excavation work and liner system construction.
- E. Storm Water: Storm water runoff may contain residual compounds resulting from contact with wastes in the landfill.

### 3.04 SITE SAFETY AND CONTINGENCY WORK PLAN REQUIRED ELEMENTS OUTLINE

The requirements for the Contractor's SSACWP shall be as described in the following outline. The order of the Contractor's SSACWP sections may be modified by the Contractor. The Contractor may also include additional sections or provisions as needed or required based on the Contractor's approach to completing the Work. The absence of particular provisions in the outline does not relieve the Contractor of developing appropriate sections or procedures for site work in accordance with applicable OSHA standards. The Contractor shall ensure that all subcontractors engaged to perform work for Contractor either adopt the Contractor's SSACWP provisions or develop a SSACWP consistent with the following outline.

- A. Introduction: This section shall describe the Contractor's SSACWP purpose. This section shall describe the health and safety responsibilities of the Contractor and subcontractors in performing the Work. This section shall describe the general OSHA training requirements for personnel involved in site field work.
- B. Site Description/History: This section shall briefly describe relevant physical site features including the following: location, size, layout, topography, surface water and ground water. The site history shall briefly describe relevant previous site activities which may assist site workers in understanding the nature of wastes anticipated during construction activities.
- C. Project Description and Work Plan: This section shall briefly describe the general tasks to be conducted by Contractor. The project description and work plan section shall include categories of site work such as excavation, grading, liner placement and methane vent pipe installation.
- D. Personnel, Responsibilities and Training Requirements: This section shall include the Contractor personnel names, company affiliation, responsibility and whether the individual will be on-site during specific tasks. This section shall name a Site Manager, Alternate Site Manager, Safety Officer, and an Alternate Safety Officer. Contractor's construction foreman, heavy equipment operators and laborers may be listed as "VARIOUS". All site personnel shall read and sign the Contractor's SSACWP. This section should also list Engineer representatives, municipal emergency response representatives and appropriate regulatory agency officials. The training and medical monitoring requirements specified in 29 CFR 1910.120 for each individual or class of individuals shall be specified in this section. The

level of training and medical monitoring per individual shall be appropriate for the tasks assigned.

- E. Hazardous Material Summary: This section shall include the general categories of the waste physical and chemical characteristics which may be encountered during site work.
- F. Hazards of Concern: This section shall include the applicable general hazards of concern for consideration during site work. Example hazards of concern include the following: heat stress, cold stress, explosive or flammable substances, oxygen deficiency, radiological, biological, noise, toxicity, corrosivity and physical hazards.
- G. Overall Hazard Evaluation Per Task: This section shall include a qualitative assignment of risks as high, medium, low or unknown to health and safety resulting from site work per task. This section shall include justification of the PPE level used for each site task based on the qualitative risk designation. Justification for selection of PPE may include: the hazards of anticipated wastes, the nature of the task, and selection of air monitoring procedures and/or frequency to evaluate that the proper level of PPE is maintained.
- H. Protective Clothing: This section shall establish the anticipated task-specific levels of PPE (such as A, B, C or D) based on the task-specific hazard evaluation. This section shall include a task-specific description of the levels of PPE including the anticipated respiratory and protective clothing requirements for each task.
- I. Environmental Monitoring Equipment and Procedures: This section shall establish the task-specific environmental monitoring equipment and monitoring procedures to be employed during site work. This section shall include the instrument type and the monitoring parameter (for example methane) for each monitoring device employed during site work and a description of calibration procedures to be followed for the instrument. This section shall establish task and instrument specific monitoring frequencies to be employed during site work. This section shall establish the task-specific conditions under which levels of PPE shall be upgraded in response to environmental monitoring.
- J. Mitigation of Physical Hazards: This section shall include a description of mitigating procedures for task-specific physical hazards that will be employed during site work. This section may include a description of mitigating procedures for fall prevention, fire and explosion hazards, electrical hazards and heavy equipment operation hazards.
- K. Personnel Decontamination Procedures: This section shall establish personnel decontamination procedures for each level of PPE (such as A, B, C or D) anticipated during site work, including personnel and equipment washing and

rinsing procedures. This section shall include a description of the on-site storage method to be employed during site work for used disposable and reusable protective clothing pending final off-site or on-site disposal.

- L. Equipment Decontamination Procedures: This section shall establish procedures to decontaminate equipment that contacts hazardous material, if applicable.
- M. Site Control: This section shall establish procedures to reduce contact of site personnel and equipment with contaminated or potentially contaminated materials, including procedures for reducing site access to non-project personnel or non-essential vehicular traffic.
- N. Heat/Cold Stress Monitoring: This section shall establish procedures to monitor site personnel and site weather conditions to control heat and cold stress. Monitoring may include ambient air temperature, cloud cover and site personnel heart rates and oral temperatures.
- O. Emergency Procedures: This section shall establish mitigation procedures to be followed for potential emergencies during the Work. Potential emergencies may include personnel chemical exposure through potential exposure pathways, personnel injury, fire or explosion and spills of hazardous or potentially hazardous materials. Mitigation procedures may include assessing personnel exposure pathways and vital signs, rendering appropriate first aid measures, contacting fire and/or ambulance units and spill assessment and containment measures. This section shall also establish emergency evacuation procedures if Work area evacuation is necessary during site work. Emergency evacuation procedures may include evacuation signals, evacuation routes and staging areas for the assembling of evacuated personnel.
- P. Emergency Equipment: This section shall designate emergency or safety equipment required on-site during the Work. Emergency equipment may include extra protective clothing, first aid kits, fire extinguishers, portable telephones, air horns, and air purifying respirators with suitable cartridges.
- Q. Emergency Contacts: This section shall include a listing all personnel or agencies that require notification during an emergency. The listing should include the contact name and phone number and where the contact can be located. The listing should include the Project Manager or supervisor, the Safety Officer, the Owner, the Engineer, the local fire and police departments, NHDES Waste Management Division, and appropriate State of New Hampshire and federal agencies. The listing should also include medical emergency contact information including the nearest hospital with emergency services with the hospital address and telephone number, the telephone number of the nearest ambulance service and directions with a map showing the most direct route to the hospital. The Emergency Contact list shall also be posted at the job site trailer.

### 3.05 RESPONSE PROCEDURES

- A. It is anticipated that materials encountered in the landfill will consist of household garbage, some construction/demolition waste, ash materials, and unclassified wastes. However, if potentially hazardous materials are encountered during the progress of the Work, the Contractor shall immediately implement the following:
- 1) All work in the immediate area will be suspended, and site personnel will be evacuated to a safe zone.
  - 2) All materials suspected of being hazardous shall immediately be reported to the Engineer and Owner.
  - 3) The Contractor's Safety Officer and the Engineer will assess if the material is hazardous by observation, screening, or if necessary, by sampling and analysis by the Contractor.
  - 4) The Contractor shall maintain a log of all incidents related to the discovery of potentially hazardous materials which shall be available to the Owner and Engineer at all times.
- B. If the material is assessed to be a hazard, the Contractor will notify the Engineer and Owner. The notification must include the following:
- 1) The name and telephone number of the person reporting.
  - 2) The landfill location where the material was observed.
  - 3) Identification and approximate quantity of materials discovered.
  - 4) The extent of on-site hazards and personnel injuries, if any.
  - 5) An assessment of hazards to health and safety of on-site personnel, and nearby people, if applicable.
  - 6) Recommendations to control or remove the site hazard.

END OF SECTION