Emery&
Garrett
GROUNDWATER
INVESTIGATIONS
A Division of GZA

GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION
MANAGEMENT

PO Box 1578
56 Main Street
Meredith, NH 03253
Tel: 603-279-4425
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www.gza.com

August 18, 2021
Project No.: 33.0083061.10

Jamie Colby
Solid Waste Management Division
New Hampshire Department of Environmental Services
P.O. Box 95
29 Hazen Drive
Concord, NH 03302-0095

Re: Type I-B Permit Modification Application Notice of Filing– New Hampton Landfill

On behalf of the Town of New Hampton, New Hampshire, Emery & Garrett Groundwater Investigations (EGGI), a Division of GZA GeoEnvironmental, Inc. (GZA) has prepared this document that serves as a notice of filing of a "Type I-B Modification To Solid Waste Management Facility Permit Application". The Town of New Hampton, the landfill site owner, located at 6 Pinnacle Hill Road, New Hampton, New Hampshire (phone#: 603-744-3559), is seeking to modify the current Landfill post-closure monitoring requirements at the New Hampton Landfill (NHDES Site #: 198704078; Permit No. DES-SW-TP-95-14) located on 4285 River Road, Bristol, New Hampshire. This application requests the decommissioning of the active gas management system. The active gas management system was installed for emergency use only to remove methane gas in the event methane migrated toward nearby residences. Methane levels have never been detected in the off-site gas probes above the established threshold that would trigger the use of the active gas management system, therefore this system has never been used. Methane levels have decreased significantly in all perimeter gas probes since the Landfill was capped in 1996. Please see attached *Type I Modification To Solid Waste Management Facility Permit Application* for further details.

Attached to this this notice of filing, is an application process flow chart, provided by the NHDES. This outlines the application process steps and schedule.

In accordance with Administrative Rules under the New Hampshire Department of Environmental Services (NHDES), copies of the permit modification application will be posted at the New Hampton Town Hall and Bristol Town Hall for public review. In addition, a copy of the application will also be submitted to the Rivest Residence at 4285 River Road, Bristol, New Hampshire, adjacent to the Landfill.

If you have any questions about this permit modification application please do not hesitate to contact us.

Very truly yours,

EMERY & GARRETT GROUNDWATER INVESTIGATIONS, A DIVISION OF GZA

Ryan Allen
Project Manager

Daniel J. Tinkham. P.G.
Senior Consultant/Hydrogeologist

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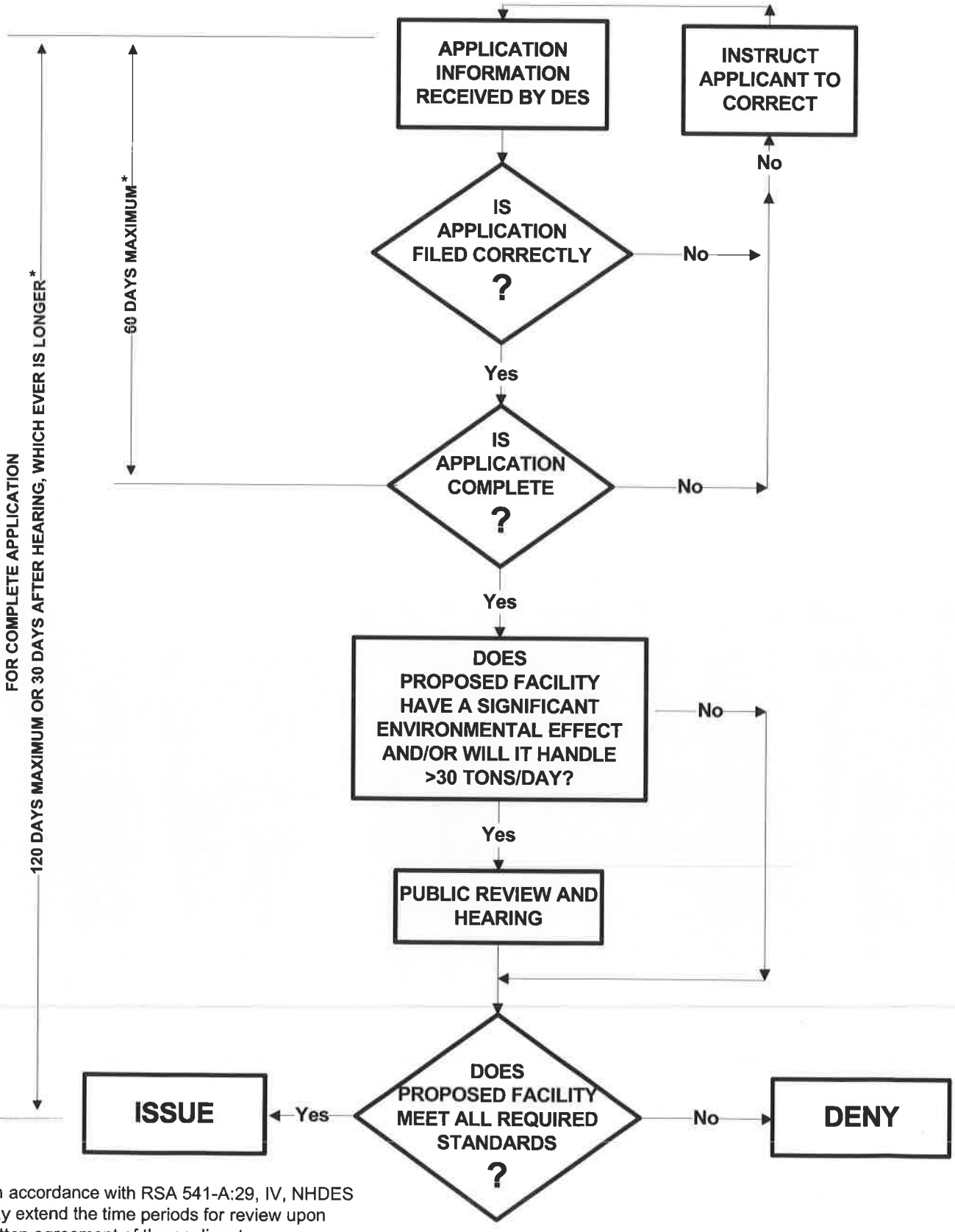
Attachment:

Application Process Flow Chart

STANDARD PERMIT APPLICATION PROCESSING PROVISIONS AS PROVIDED IN PARTS Env-Sw 303 - 305 OF THE *NEW HAMPSHIRE SOLID WASTE RULES*

NEW HAMPSHIRE DEPARTMENT OF Environmental Services



* In accordance with RSA 541-A:29, IV, NHDES may extend the time periods for review upon written agreement of the applicant.

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August 18, 2021
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Jamie Colby
Solid Waste Management Division
New Hampshire Department of Environmental Services
P.O. Box 95
29 Hazen Drive
Concord, NH 03302-0095

RE: Application for Type 1-B Modification to Solid Waste Management Facility Permit, New Hampton Landfill, 4285 River Road, Solid Waste Facility Permit Number DES-SW-TP-95-014; NHDES Site#: 198704078

Dear Ms. Colby,

Emery & Garrett Groundwater Investigations (EGGI), a Division of GZA GeoEnvironmental, Inc. (GZA) has prepared this Application for a Type 1-B Modification to Solid Waste Management Facility Permit on behalf of the Town of New Hampton, New Hampshire. The Town is requesting modification of the current post-closure monitoring requirements at the New Hampton Landfill as issued by the New Hampshire Department of Environmental Services (NHDES) in January 2006 (**Appendix B).**

The New Hampton Landfill, located on River Road in Bristol, accepted solid municipal waste until 1991 (**Figure 1**). Closure of the landfill occurred in 1996 and included the installation of an impervious cap, passive gas venting stacks, monitoring wells, and gas monitoring probes (**Figure 1**). Eleven gas probe monitoring points are installed around the western perimeter of the landfill.

Due to possible post-closure off-site methane migration, two gas probes (GP-2 and GP-5) were subsequently retrofitted with an active gas venting system. This system was installed for emergency mitigation of methane gas levels, in the event that methane gas levels became elevated above 25% of the Lower Explosive Limit (LEL) in off-site Gas Probes (GP-7, GP-8, GP-9, GP-10, GP-11) (**Figure 1**). When operating, the active gas management system is designed to mitigate (if necessary) elevated methane gas levels around the perimeter of the landfill before the gas could migrate to nearby residences, most notably the Rivest Residence approximately 175 feet from the landfill cap (**Figure 1**).

The following information is provided to support the "*Type I Modification To Solid Waste Management Facility Permit Application*"

Section V: Statement of Need

Landfill gas monitoring began in 1996 after installation of the landfill cap and has continued until the present. The New Hampton Landfill design plan/specification approved by the NHDES on May 7, 1996 can be found in **Appendix A.** The post-closure monitoring requirements were initially issued in March 1997, subsequently updated in 2002, then finally in 2006. Since 2006, landfill gas monitoring has continued four times a year.

The Rivest residence was provided gas detectors/meters and was monitored for landfill gas as part of the original post-closure plan. The 2006 updated landfill gas monitoring plan removed the requirement to record gas meter readings at the Rivest residence and instead information was provided to the homeowner regarding proper operation of the gas alarm that had been installed.

Historical methane levels have decreased significantly in all perimeter gas probes since the Landfill was capped in 1996 (**Table 1**). The active gas management system was installed for emergency use only to remove methane gas in the event methane migrated toward nearby residences. Methane levels have not been detected over 25% LEL in the off-site perimeter gas probes and have never been detected in the Rivest Residence. Therefore, the active gas venting system has never been used. This system has been idle since its inception, but has required more frequent maintenance in recent years. Therefore, EGGI recommends that the existing active gas management system be decommissioned.

If NHDES approves the recommendation modification, the existing active gas management system will be dismantled and removed from the Landfill property. In addition, the Rivest Residence will be notified about this amendment of the Solid Waste Facility Permit, but will be encouraged to continue following the emergency action plan outlined in the the 2006 Updated Monitoring and Maintenance Plan (**Appendix B**). All other requirements for monitoring stated in the 2006 Modification to the Solid Waste Facility Permit shall continue unchanged (**Appendix B**). Although, if approved, there is expected to be some limited cost savings realized by the Town as a result of not having to continue to maintain the system, EGGI expects future landfill post-closure costs to stay reasonably close to the same as recent years. The most recent facility financial assurance plan can be found in **Appendix C**.

Section VI: Impact Evaluation

1. Not Applicable
2. Historic methane levels collected since the cap on the landfill was completed have decreased significantly. EGGI does not expect a negative impact if the active gas management system is removed since methane levels are be expected to be remain low or below detection.
3. Not Applicable
4. Not Applicable
5. Not Applicable

Please do not hesitate to contact us, if you require any further information.

Very truly yours,

EMERY & GARRETT GROUNDWATER INVESTIGATIONS, A DIVISION OF GZA

Ryan Allen
Project Manager

Daniel J. Tinkham, P.G.
Senior Consultant/Hydrogeologist

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Attachments:

Application for Modification of Permit

Supporting Information

Table 1	Methane Concentrations (as percent LEL) in Gas Monitoring Points
Figure 1	Location Map
Appendix A	Facility Design Plans/Specifications
Appendix B	Updated Monitoring and Maintenance Plan – January 2006
Appendix C	Facility Financial Assurance Plan

Emery & Garrett
GROUNDWATER INVESTIGATIONS
A Division of GZA

Application for Modification of Permit

INSTRUCTIONS
for obtaining a

Type I Modification To Solid Waste Management Facility Permit

pursuant to
RSA 149-M and New Hampshire Administrative Solid Waste Rule Env-Sw 315

Read these instructions before completing the attached form. For additional assistance contact the NH Department of Environmental Services (DES), Permitting & Design Review Section (P&DRS) at (603) 271-2925 or the below noted mailing address or TDD Access: Relay NH 1-800-735-2964.

Note: All references on this form beginning with "Env-Sw" are citations from the New Hampshire Solid Waste Rules. To obtain a copy of the Rules, contact the DES Public Information & Permitting Office at (603) 271-2975 or above noted TDD Access. The Rules are also available on the Internet at http:\\www.des.nh.gov/rules .

Complete the attached form to obtain either a "type I-A" or "type I-B" permit modification pursuant to Env-Sw 315.02(b) or (c), respectively. **Before completing the form, be certain the proposed facility modification falls within the definition of either a type I-A or type I-B modification.** [If unfamiliar with how to make this determination, refer to the worksheet on the reverse side of this instruction sheet and/or contact the P&DRS for assistance.]

All requested information must be provided as specified. Do **NOT** skip any question, unless instructed to do so. Do **NOT** mark any question "not applicable." If you need more room than provided on the form to answer a particular question and are using a paper copy of the form, attach additional pages as necessary; mark each page clearly to show both the applicant name and the question being answered; and indicate on the form that the additional pages are attached.

Submit **THREE** copies of the completed form, **EACH bearing ORIGINAL signatures**. Applications may be submitted to the department electronically. If an applicant chooses to submit an application electronically, a single paper copy of the application shall also be submitted to the department to the following address:

NH Department of Environmental Services (DES)
Waste Management Division (WMD)
Permitting & Design Review Section (P&DRS)
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095

Include the required fee, as determined from the following table. Make checks or money orders payable to "TREASURER, State of New Hampshire":

Type I-A Modification, without a capacity increase	**$1500**
Type I-A Modification, with a capacity increase	**See Env-Sw 310.07(a)(2) for formula to calculate or contact the P&DRS for assistance, at (603) 271-2925**
Type I-B Modification	**$100**

Your application will be processed by DES in accordance with Env-Sw 304 and Env-Sw 305. If your application is correctly filed (i.e., you submit the right number of copies, each with original signatures, and the required fee), your application will be accepted for processing. Within 60 days of receipt, and earlier whenever possible, you will be notified whether the application is complete (i.e., whether the application provides all information required to support a full technical review and determine whether the proposed modification meets all requirements of the Rules). If incomplete, you will be given instructions for correcting the deficiencies. If complete, you will be notified in writing and the agency will undertake a technical review of the application to determine whether the proposal meets all requirements of the Rules. In addition, for certain type I-A modifications, the agency must also hold a public hearing within the host municipality during the technical review process. Following the close of the technical review process and the hearing, if held, DES will make a final decision to issue or deny the requested modification. You will be notified in writing, as will the host municipality and host solid waste management district.

WORKSHEET FOR DETERMINING MODIFICATION TYPE

STEP 1: In order to correctly use and complete the attached application form, you must first confirm that your proposed facility modification is a "type I" modification (as opposed to being either a "type II" through "type V" modification). If your response to each of the following questions is "FALSE," your proposed facility modification most likely falls within the scope of a "type I" modification:

☐ **True** ☒ **False** The proposed change is required by a condition of my permit which requires me to submit final plans for DES approval based on preliminary plans provided to DES on an earlier date. (Note: If this statement is "TRUE," your proposed modification is most likely a "type II" modification and you need to file your application by completing a "Type II Permit Modification Application Form.")

☐ **True** ☒ **False** The proposed change is one of the following **AND** I am able to certify compliance with each of the statements provided in Section X of this application form:

- A change in facility operating hours between the hours of 6 AM and 6 PM or within alternative limits specified in my permit, or for a private facility managing only on-site generated waste, within limits allowed by local ordinance.
- A change in a key above-ground site feature, for instance a facility structure or appurtenance, which will not alter the permitted function(s) of the facility, change the basis of the approved facility design or violate any applicable siting criteria specified in the Rules, and which is merely a change to improve facility operations within the limits specified in my permit.
- For a facility permitted to collect recyclable materials, a change in the type of select recyclable materials (paper, cardboard, glass, plastic, metal or textiles) to be collected which does not increase the facility's approved storage capacity or require a change in the approved financial assurance plan of record for the facility.
- For landfills, a change in the type of cover material to be used at the facility, pursuant to Env-Sw 806.03.
- A name change for the permittee or facility that does not constitute a change in ownership or operational control of the facility.
- A change in organizational structure, including a change in the individuals/entities holding 10% or more of the permittee's equity or debt and/or a change in officers, directors, partners or key employees, that does not constitute a change in ownership or operational control of the facility.

(Note: If you respond "TRUE" to the above statement, your proposed modification is most likely a "type III" modification and you need to file your application by completing a "Type III Permit Modification Application Form.")

☐ **True** ☒ **False** The proposed change is to transfer my permit or otherwise authorize a change in the ownership or operational control of the facility. (Note: If you respond "TRUE" to this statement, your proposed modification is most likely a "type IV" modification and you need to file your application by completing a "Type IV Permit Modification Application Form.")

☐ **True** ☒ **False** The proposed change is to authorize the destruction or relocation of facility records. (Note: If you respond "TRUE" to this statement, your proposed modification is most likely a "type V" modification and you need to file your application by completing a "Type V Permit Modification Application Form.")

STEP 2: If your response to each of the above is "FALSE," you may assume that the proposed modification is a type I modification. You must now determine whether the proposed change is a "type I-A" or "type I-B" modification, as defined by Env-Sw 315.02(b) or (c).

A "type I-A" modification is one that will change facility operations in a manner having the potential to adversely affect the state's ability to establish and maintain an integrated system of facilities which: (1) will assist in achieving the waste reduction/recycling goals in RSA 149-M:2; (2) is consistent with the hierarchy in RSA 149-M:3; and (3) will provide a substantial public benefit pursuant to RSA 149-M:11. Therefore, if any of the following statements are TRUE relative to the change you are proposing at your facility, the change falls within the definition of a "type I-A" modification.

☐ **True** ☒ **False** The proposed modification will increase the approved design capacity of the facility.

☐ **True** ☒ **False** The proposed modification will extend the expiration date of the permit.

☐ **True** ☒ **False** The proposed modification will reduce the operating life expectancy of a NH landfill without a comparable reduction in the permitted capacity of the landfill, as by directly or indirectly increasing the quantity of waste which will be received daily at a New Hampshire landfill.

☐ **True** ☒ **False** The proposed modification will expand the permitted service area of the subject facility.

☐ **True** ☒ **False** The proposed modification will change the subject facility service type from a "limited service" area facility (one which can accept waste from only certain sources specified in the permit) to an "unlimited service" area facility (one which can accept waste from any source).

☐ **True** ☒ **False** The proposed modification will change facility operations to include a waste management method less preferred in the RSA 149-M:3 hierarchy. The methods, in order of descending preference as specified in RSA 149-M:3 are: source reduction; recycling and reuse; composting; waste-to-energy technologies (including incineration); incineration without resource recovery; and landfilling.

If you answer "FALSE" to each of the above statements, your proposed modification is most likely a "type I-B" modification, i.e., a modification which is unlikely to have an adverse effect on the state's ability to establish and maintain an integrated system of facilities which (1) will assist in achieving the waste reduction/recycling goals in RSA 149-M:2; (2) is consistent with the hierarchy in RSA 149-M:3; and (3) provides a substantial public benefit pursuant to RSA 149-M:11.

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

Waste Management Division

For Office Use Only:
WMD Log #:
Date Rec'd.:
No. of Copies:
Fee: $ /Check #

APPLICATION FORM FOR

TYPE I MODIFICATION TO SOLID WASTE MANAGEMENT FACILITY PERMIT

pursuant to
RSA 149-M and New Hampshire Administrative Solid Waste Rule Env-Sw 315

SECTION I. FACILITY IDENTIFICATION

(1)	Facility name: New Hampton Municipal Landfill
(2)	Functional classification: ☐ collection/storage/transfer ☐ processing/treatment ☒ landfill
(3)	Mailing address: 6 Pinnacle Hill Road, New Hampton, NH
(4)	Permit number: DES-SW-TP-95-014
(5)	Location, by street address and municipality: 40285 River Road, Bristol, NH

SECTION II. PERMITTEE IDENTIFICATION

(1)	Permittee/applicant name: Town of New Hampton			
(2)	Mailing address: 6 Pinnacle Hill Road, New Hampton, NH			
(3)	Telephone number: 603-744-3559			
(4)	If different than above, identify the individual associated with and designated by the permittee/applicant to be the contact individual for matters concerning this application:			
	(a) Name:		(b)	Title:
	(c) Mailing address:			
	(d) Telephone number:	(e) E-Mail:		

SECTION III. DESCRIPTION OF PROPOSED MODIFICATION

Describe the proposed modification by answering each of the following questions. Use additional paper as necessary.

(1) Provide a **BRIEF** description of the proposed modification. [Check box if response is provided on separate paper ☒]

To decommisson the active gas management system that exists on the New Hampton Landfill property.

(2) Identify whether the proposed modification is a "type I-A" or "type I-B" modification. (If uncertain, use the worksheet provided with the instructions for this form): ☐ Type I-A ☒ Type I-B

(3) Identify, either below or on separate paper, each written permit condition that will require amendment to effect the proposed modification and provide draft language for the same. [Check box if response is provided on separate paper ☐]

No specific conditions required that will effect the proposed modification.

(4) Identify, below, each "last approved plan of record" identified in the permit which will be affected by the proposed modification and will therefore require amendment/revision:

Check here if affected	TYPE OF PLAN	DES APPROVAL DATE	WMD LOG # (Find this number on your copy of the approval)
☒	Facility design plans/specifications	May 7, 1996	1996-00052; 1996-00185
☐	Facility operating plan		
☒	Facility closure plan	January, 2006	
☒	Facility financial assurance plan	Dec. 13, 2013	
☐	Other plan (specify):		

(5)	Submit, on separate paper, the proposed amendments/revisions for each document identified pursuant to (4) above, based on the below listed instructions. (Note: The revisions may be presented in the form of replacement pages ready for substitution into the last approved plan of record, each page being clearly marked to show the date of revision. In the event there is no last approved plan of record for any of the following, you must prepare and submit a full plan, including the proposed modification(s), in accordance with the applicable cited Rules.)	
	☐	Facility design plans must be prepared in accordance with Env-Sw 1103.05.
	☐	Facility operating plans must be prepared in accordance with Env-Sw 1105.11.
	☒	Facility closure plans must be prepared in accordance with Env-Sw 1106.04.
	☒	Financial assurance plans must be prepared as specified in Env-Sw 1400 and must include all related draft financial assurance documents required to effect the proposed modification.
(6)	In order for DES to approve the proposed modification, the agency must be able to conclude from the information provided in this application that the proposed modification meets all applicable requirements of the Rules. Therefore, for any aspect of the proposed modification where it may not be self-evident that the proposed change meets all applicable requirements of the Rules, you should explicitly provide such information. Provide your response below and/or use separate paper as necessary. (Check box if response is attached on separate paper ☐)	
	See Section V. Statement of Need and Section VI. Impact Evaluation DO WE NEED TO CHECK BOX???	

SECTION IV. SCHEDULE

Provide a proposed schedule for implementing the modification. Use separate paper if necessary. (Check box if response is attached on separate paper ☐)

Implementing the modification would start January 1st, 2022.

SECTION V. STATEMENT OF NEED

Provide a statement of need describing why the proposed change is necessary or desirable. Use separate paper if necessary. (Check box if response is attached on separate paper ☒)

SECTION VI. IMPACT EVALUATION

On separate paper, identify all impacts, both positive and adverse, which the proposed modification will have, including each of the below listed considerations.

(1) The effect the modification will have on facility function, capacity, life expectancy, service type and service area.

(2) The effect the modification will have on the environment, public health and safety.

(3) The effect the modification will have on the state's ability to achieve the goals and objectives specified in RSA 149-M:2, namely achieving a 40% minimum weight reduction in the solid waste stream on a per capita basis by the year 2000 and avoiding the disposal of recyclable materials in a lined landfill with a leachate collection system.

(4) The effect the modification will have on establishing and maintaining integrated waste management systems consistent with the hierarchy of waste management methods in RSA 149-M:3 [the methods, in descending order of preference as specified in RSA 149-M:3, are: source reduction; recycling and reusing; composting; waste-to-energy technologies (including incineration), incineration without resource recovery; and landfilling].

(5) Consistency with the state solid waste management plan and the applicable district plan, pursuant to RSA 149-M:12,I(b). If necessary, contact the P&DRS at (603) 271-2925 for plan information.

SECTION VII. PUBLIC BENEFIT DEMONSTRATION

Provide a "demonstration of public benefit" based on the below listed instructions. Check which one of the listed instructions applies to your particular application.

☐	**For a type I-A modification of a standard permit**, provide a "demonstration of public benefit" in accordance with RSA 149-M:11 and in conformance with the provisions of Env-Sw 1005.05. Prepare and submit the demonstration on separate paper.
☐	**For a type I-A modification of an emergency permit or a research and development permit, or a permit-by-notification**, there is a presumption of public benefit, provided that the proposed modification meets all requirements of the Rules. Therefore, you may skip this section and go to Section VIII.
☒	**For a type I-B modification**, there is a presumption of public benefit, provided that the proposed modification meets all requirements of the Rules. Therefore, you may skip this section and go to Section VIII.

SECTION VIII. OTHER PERMITS

Complete the following table to identify and provide the status of all other permits or approvals necessary to effect the proposed modification.

Type of Permit/Approval Required	Date the Application was/will be Submitted	Status/Comments
None known		

SECTION IX. LEGAL NOTICES

Submit proof of having provided certain legal notifications and filings, as follows:

(1) You must send by certified mail, or deliver in hand, a complete copy of this application to the host municipality, host solid waste management district and other affected entities, with a "notice of filing," as specified by Env-Sw 303.

(2) For a type I-A modification, you must send by certified mail, or deliver in hand, a "notice of filing" to each owner of property abutting the facility site, as specified by Env-Sw 303. If the applicant/permittee or the owner of the facility site owns any abutting parcel of land, the "notice of filing" must be sent to the owner(s) of the next parcel(s) not owned by the permittee/applicant or facility site owner.

(3) You must also provide a "notice of filing" to the New Hampshire Department of Justice/Office of the Attorney General (NH DoJ/AGO) if, pursuant to Section X(2) of this form, you are required to submit business and personal disclosure information.

(4) You must attach to this application "proof" that notification has been provided as required by (1) through (3) above. Therefore, attach a copy of the notice(s) of filing and the signature(s) of all required recipients, acknowledging receipt.

SECTION X. CERTIFICATION OF COMPLIANCE/COMPLIANCE REPORT

All applications for permit modification must be submitted with either certification of compliance or a compliance report, as follows:

(1) If you are ABLE to certify that each of the statements numbered (1) - (8) below are true, do so by your signature.

(2) If you are UNABLE to certify that each of the statements numbered (1) - (8) below are true, you must:

- ☐ Prepare and submit a separate Compliance Report as specified by Env-Sw 303.15; and
- ☐ If the proposed modification involves a change in organizational structure, or a change in individuals/entities holding 10% or more of the permittee's debt or equity, or a change in officers, directors, partners or key employees, none of which constitutes a change in operational control of the facility or a change in ownership per Env-Sw 315.02(f), also submit completed "business and personal disclosure forms" for each non-compliant individual and entity involved in the change. Obtain the required forms from the P&DRS at (603) 271-2925. Submit the completed forms, with the notice of filing referenced by Section IX(3) of this form and a copy of the Compliance Report, direct to the New Hampshire Department of Justice/Office of Attorney General, Environmental Protection Bureau, 33 Capitol Street, Concord, NH 03301-6397. [Note: Copies of the completed disclosure forms should NOT be attached to this application when it is submitted to DES or to the host municipality, host solid waste management district and other effected entities, pursuant to Section IX(1) above. Only the NH DoJ/AGO should receive copies of the disclosure forms].

COMPLIANCE STATEMENT

The applicant shall certify that each of the statements listed in (1)-(8) below are true for each of the following individuals and entities:

- ☒ **The applicant, and**
- ☒ **The facility owner, and**
- ☒ **The facility operator, and**
- ☒ **All individuals and entities holding 10% or more of the applicant's debt or equity, and**
- ☒ **All of the applicant's officers, directors, and partners, and**
- ☒ **All individuals and entities having managerial, supervisory or substantial decision making authority and responsibility for the management of the facility operations or the activity(s) for which approval is being sought.**

(1)	No individual or entity listed above has been convicted of or plead guilty or no contest to a felony in any state or federal court during the 5 years before the date of the application.
(2)	No individual or entity listed above has been convicted of or plead guilty or no contest to a misdemeanor for a violation of environmental statutes or rules in any state or federal court during the 5 years before the date of the application.
(3)	No individual or entity listed above has owned or operated any hazardous or solid waste facility which has been the subject of an administrative or judicial enforcement action for a violation of environmental statutes or rules during the 5 years before the date of the application.

(4)	No individual or entity listed above has been the subject of any administrative or judicial enforcement action for a violation of environmental statutes and rules during the 5 years before the date of the application;	
(5)	All hazardous and solid waste facilities owned or operated in New Hampshire by any individual or entity listed above are in compliance with either.	
	(a)	All applicable environmental statutes, rules, and DES permit requirements; or
	(b)	A DES approved schedule for achieving compliance therewith.
(6)	All individuals and entities listed above are in compliance with all civil and criminal penalty provisions of any outstanding consent agreement, settlement, or court order to which DES is a party.	
(7)	All individuals and entities listed above have paid, or are in compliance with the payment schedule for any administrative fine assessed by DES.	
(8)	All individuals and entities listed above are in compliance with all terms and conditions under every administrative order, court order or settlement agreement relating to programs implemented by DES.	

Signature of the permittee/applicant certifying the above statements are true:

Permittee/Applicant Name **(Print Clearly or Type)** NEIL IRVINE, TOWN ADMINISTRATOR

Permittee/Applicant Signature _____

Date 8/23/2021

SECTION XI. PERMITTEE/APPLICANT SIGNATURE REQUIREMENTS

The permittee/applicant must sign the following statement prior to submitting this application. All copies of the application filed with DES must bear the permittee's/applicant's ORIGINAL signature. If the permittee/applicant is not an individual, an individual duly authorized by the permittee/applicant shall sign the application.

To the best of my knowledge and belief, the information and material submitted herewith is correct and complete. I understand that any approval granted by DES based on false and/or incomplete information shall be subject to revocation or suspension, and that administrative, civil or criminal penalties may also apply. I certify that this application is submitted on a complete and accurate form, as provided by DES, without alteration of the text.

Permittee/Applicant Name **(Print Clearly or Type)** NEIL IRVINE, TOWN ADMINISTRATOR

Permittee/Applicant Signature _____

Date 8/23/2021

SECTION XII. PROPERTY OWNER SIGNATURE

If the permittee and property owner are not the same, the property owner must also sign this form as follows. All copies of the application filed with DES must bear the property owner's ORIGINAL signature. If the property owner is not an individual, an individual duly authorized by the property owner shall sign the application.

(1)	I hereby affirm that the permittee/applicant has the legal right to occupy and use the property on which the subject facility is or will be located for the purposes specified in this application.
(2)	I hereby affirm that I shall grant access to the property for closure and post-closure monitoring of the subject facility and site as required by RSA 149-M and the New Hampshire Solid Waste Rules (Env-Sw 100 - 300 and Env-Sw 400 - 2000), as amended.

Property Owner Name **(Print Clearly or Type)** _____

Property Owner Signature _____

Date _____

Emery & Garrett
GROUNDWATER INVESTIGATIONS
A Division of GZA

Table

Table 1

Methane Concentrations (as percent LEL) in Gas Monitoring Points
New Hampton Landfill - Bristol, New Hampshire

Date	GP-1	GP-2	GP-3	GP-4	GP-5	GP-6	GP-7	GP-8	GP-9	GP-10	GP-11
6/23/1996	0.0	0.0	0.0	0.0	0.0	0.0	--	--	--	--	--
7/29/1996	0.0	0.0	0.0	100.0	100.0	100.0	--	--	--	--	--
8/8/1996	0.0	0.0	0.0	0.0	100.0	100.0	--	--	--	--	--
8/14/1996	0.0	0.0	0.0	0.0	0.0	0.0	--	--	--	--	--
8/16/1996	0.0	0.0	0.0	100.0	100.0	100.0	--	--	--	--	--
8/21/1996	--	--	--	0.0	0.0	0.0	--	--	--	--	--
8/22/1996	--	--	--	30.0	100.0	100.0	--	--	--	--	--
8/26/1996	0.0	0.0	0.0	0.0	0.0	100.0	--	--	--	--	--
8/30/1996	0.0	0.0	0.0	0.0	100.0	100.0	--	--	--	--	--
9/5/1996	--	--	--	0.0	100.0	100.0	--	--	--	--	--
9/9/1996	--	--	--	0.0	100.0	100.0	--	--	--	--	--
9/11/1996	--	--	--	0.0	100.0	100.0	--	--	--	--	--
9/13/1996	--	--	--	36.0	100.0	100.0	--	--	--	--	--
9/16/1996	0.0	0.0	0.0	0.0	0.0	0.0	--	--	--	--	--
9/19/1996	0.0	0.0	0.0	0.0	0.0	100.0	--	--	--	--	--
4/1/1997	0.0	0.0	0.0	0.0	0.0	0.0	--	--	--	--	--
4/29/1997	0.0	0.0	0.0	0.0	54.0	99.0	--	--	--	--	--
8/18/1997	0.0	30.0	0.0	0.0	55.0	100.0	--	--	--	--	--
11/23/1997	0.0	2.0	0.0	0.0	100.0	100.0	36.0	65.0	--	--	--
12/5/1997	0.0	65.0	0.0	0.0	100.0	100.0	54.0	66.0	--	--	--
12/29/1997	0.0	100.0	0.0	0.0	100.0	100.0	40.0	48.0	--	--	--
1/30/1998	0.0	69.0	0.0	2.0	100.0	100.0	4.0	3.0	--	--	--
2/7/1998	0.0	17.0	0.0	1.0	0.0	0.0	0.0	0.0	--	--	--
2/24/1998	0.0	100.0	0.0	35.0	100.0	100.0	9.0	38.0	--	--	--
3/2/1998	0.0	100.0	0.0	60.0	100.0	100.0	17.0	43.0	--	--	--
3/15/1998	0.0	8.0	0.0	11.0	0.0	0.0	0.0	0.0	--	--	--
3/30/1998	0.0	12.0	0.0	63.0	100.0	100.0	25.0	61.0	--	--	--
4/9/1998	0.0	0.0	0.0	0.0	100.0	100.0	65.0	88.0	--	--	--
4/10/1998	0.0	1.0	0.0	0.0	0.0	0.0	5.0	1.0	--	--	--
4/14/1998	0.0	0.0	0.0	0.0	406.0	784.0	32.0	90.0	--	--	--
4/14/1998	--	--	0.0	--	72.0	678.0	44.0	92.0	--	--	--
4/14/1998	--	--	0.0	--	22.0	420.0	46.0	90.0	--	--	--
4/14/1998	--	--	0.0	--	12.0	444.0	44.0	86.0	--	--	--
4/14/1998	--	--	0.0	--	--	342.0	42.0	104.0	--	--	--
4/14/1998	--	--	0.0	--	--	562.0		0.0	--	--	--
4/14/1998	0.0	0.0	0.0	0.0	0.0	696.0	36.0	0.0	--	--	--
4/15/1998	0.0	0.0	0.0	0.0	0.0	774.0	0.0	0.0	--	--	--
4/15/1998	0.0	0.0	0.0	0.0	0.0	780.0	0.0	24.0	--	--	--
4/15/1998	0.0	0.0	0.0	0.0	44.0	770.0	0.0	24.0	--	--	--
4/15/1998	--	--	--	--	--	756.0	0.0	22.0	--	--	--
4/15/1998	--	--	--	--	--	542.0	0.0	8.0	--	--	--
4/16/1998	0.0	0.0	0.0	0.0	24.0	280.0	0.0	18.0	--	--	--
4/16/1998	--	--	--	--	184.0	732.0	--	--	--	--	--
4/17/1998	--	--	--	--	216.0	882.0	0.0	16.0	--	--	--
5/19/1998	0.0	0.0	0.0	0.0	--	66.0	33.0	34.0	--	--	--
5/21/1998	0.0	0.0	0.0	1.0	100.0	95.0	47.0	51.0	--	--	--
5/22/1998	--	--	--	1.0	95.0	7.0	9.0	59.0	--	--	--
5/22/1998	--	--	--	1.0	100.0	15.0	1.0	23.0	--	--	--
5/22/1998	--	--	--	0.0	45.0	7.0	0.0	14.0	--	--	--
5/22/1998	--	--	--	--	--	15.0	1.0	12.0	--	--	--
5/22/1998	--	--	--	--	--	0.0	0.0	9.0	--	--	--
5/22/1998	--	--	--	--	--	8.0	0.0	5.0	--	--	--
5/23/1998	--	--	--	--	--	--	1.0	9.0	--	--	--
5/26/1998	--	--	--	1.0	91.0	35.0	1.0	13.0	--	--	--

Table 1

Methane Concentrations (as percent LEL) in Gas Monitoring Points
New Hampton Landfill - Bristol, New Hampshire

Date	GP-1	GP-2	GP-3	GP-4	GP-5	GP-6	GP-7	GP-8	GP-9	GP-10	GP-11
5/27/1998	--	--	--	0.9	--	0.6	0.2	2.0	--	--	--
5/27/1998	--	--	--	0.9	--	51.0		4.0	--	--	--
5/28/1998	--	--	--	1.0	--	20.0	0.8	1.0	--	--	--
5/28/1998	--	--	--	1.1	--	74.0	1.2		--	--	--
5/29/1998	--	--	--	1.0	--	84.0	1.0	16.0	--	--	--
5/29/1998	--	--	--	1.1	--	95.0	10.0	23.0	--	--	--
6/1/1998	--	--	--	1.0	--	97.0	4.0	33.0	--	--	--
6/2/1998	--	--	--	0.9	76.0	79.0	1.0	11.0	--	--	--
6/3/1998	--	--	--	0.9	51.0	21.0	0.9	11.0	--	--	--
6/4/1998	--	--	--	1.0	73.0	69.0	1.0	7.0	--	--	--
6/8/1998	--	--	--	0.8	35.0		0.3	1.6	--	--	--
8/31/1998	--	--	--	--	--	--	--	--	--	--	--
9/9/1998	0.0	33.0	0.0	1.0	10.0	24.0	0.0	0.0	--	--	--
9/14/1998	0.0	25.0	0.0	8.0	220.0	6.0	0.0	0.0	--	--	--
10/19/1998	0.0	13.0	0.0	2.0	240.0	100.0	1.0	1.0	--	--	--
11/23/1998	0.0	8.0	0.0	0.0	80.0	79.0	0.0	0.0	--	--	--
12/7/1998	0.0	6.0	0.0	15.0	340.0	340.0	1.0	1.0	--	--	--
12/23/1998	0.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	--	--	--
1/13/1999	0.0	31.0	0.0	0.0	33.0	62.0	0.0	0.0	--	--	--
1/28/1999	2.0	15.0	0.0	1.0	100.0	100.0	1.0	0.0	--	--	--
3/5/1999	1.0	200.0	0.0	3.0	180.0	55.0	1.0	0.0	--	--	--
3/9/1999	2.0	2.0	0.0	2.0	360.0	400.0	1.0	2.0	--	--	--
4/1/1999	0.0	1.0	0.0	5.0	320.0	96.0	1.0	2.0	0.0	0.0	0.0
4/16/1999	0.0	0.0	0.0	1.0	340.0	10.0	1.0	27.0	0.0	0.0	0.0
4/19/1999	1.0	1.0	0.0	2.0	6.0	1.0	1.0	25.0	0.0	0.0	0.0
5/31/1999	1.0	3.0	0.0	2.0	6.0	69.0	0.0	1.0	0.0	0.0	0.0
6/30/1999	0.0	1.0	0.0	0.0	1.0	7.0	0.0	0.0	0.0	0.0	0.0
7/23/1999	0.0	0.0	0.0	0.0	85.0	78.0	0.0	0.0	0.0	0.0	0.0
7/29/1999	0.0	6.0	0.0	0.0	78.0	78.0	0.0	0.0	0.0	0.0	0.0
8/14/1999	0.0	1.0	0.0	0.0	63.0	90.0	0.0	0.0	0.0	0.0	0.0
9/6/1999	0.0	3.0	0.0	0.0	85.0	83.0	1.0	0.0	0.0	0.0	0.0
9/14/1999	0.0	--	0.0	0.0	5.0	140.0	1.0	1.0	0.0	0.0	0.0
10/27/1999	0.0	180.0	0.0	1.0	51.0	15.0	0.0	2.0	0.0	0.0	0.0
11/1/1999	--	--	--	1.0	--	2.0	0.0	2.0	--	--	--
11/30/1999	1.0	280.0	0.0	1.0	18.0	6.0	0.0	1.0	0.0	0.0	0.0
12/13/1999	2.0	180.0	0.0	2.0	360.0	200.0	2.0	3.0	0.6	0.6	0.6
12/13/1999	18.0	220.0	0.0	1.0	220.0	100.0	0.0	2.0	0.6	0.6	0.6
12/13/1999	1.0	160.0	0.0	3.0	120.0	4.0	1.0	3.0	0.6	0.6	0.6
12/22/1999	3.3	18.0	0.0	3.5	15.0	120.0	3.6	4.1	0.9	0.8	1.7
12/29/1999	3.3	400.0	0.0	3.0	140.0	42.0	1.9	3.6	0.7	0.3	0.4
12/29/1999	3.3	--	0.0	2.6	200.0	14.0	1.6	3.4	0.9	0.7	0.5
12/29/1999	3.1	200.0	0.0	2.6	19.0	5.5	1.3	3.2	0.6	0.6	0.4
1/6/2000	3.0	200.0	0.0	3.4	100.0	40.0	3.0	3.9	0.7	0.5	0.9
1/12/2000	3.1	200.0	0.0	3.2	100.0	48.0	0.9	3.1	0.7	0.3	0.1
1/12/2000	2.7	--	0.0	2.6	21.0	21.0	0.9	2.7	0.3	0.7	0.4
1/12/2000	1.5	37.0	0.0	2.3	80.0	9.0	0.1	2.3	0.0	0.0	0.0
1/20/2000	2.9	220.0	0.0	3.4	100.0	48.0	1.9	4.1	0.5	0.3	0.4
1/27/2000	3.0	500.0	0.5	4.7	160.0	75.0	1.7	4.3	0.5	0.3	0.8
1/27/2000	3.8	200.0	0.8	5.4	12.0	99.0	0.9	3.3	0.8	0.6	0.9
1/28/2000	1.3	--	0.2	4.9	30.0	24.0	1.2	4.0	0.6	0.2	0.1
2/3/2000	4.9	380.0	0.7	5.7	280.0	51.0	4.0	5.3	1.1	1.0	1.0
2/9/2000	4.3	420.0	1.0	9.6	340.0	440.0	3.8	4.0	0.7	0.7	1.9
2/9/2000	4.3	--	1.2	8.0	260.0	290.0	3.6	4.7	0.9	0.7	1.9
2/9/2000	4.1	220.0	0.9	5.6	160.0	300.0	3.4	4.3	0.8	0.4	1.6
2/10/2000	4.3	20.0	2.1	5.7	42.0	83.0	2.8	4.5	1.4	1.2	1.5

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New Hampton Landfill - Bristol, New Hampshire

Date	GP-1	GP-2	GP-3	GP-4	GP-5	GP-6	GP-7	GP-8	GP-9	GP-10	GP-11
2/18/2000	8.7	380.0	2.9	12.5	300.0	120.0	4.3	7.3	1.5	1.3	2.7
2/24/2000	6.8	480.0	2.7	12.9	200.0	94.0	1.0	5.6	0.4	0.0	0.4
2/24/2000	4.8	240.0	1.4	7.7	--	320.0	0.8	4.9	1.4	0.6	1.8
2/24/2000	5.4	200.0	0.6	7.5	240.0	240.0	0.8	4.6	0.0	0.2	0.8
3/6/2000	9.5	31.0	3.1	11.1	26.0	67.0	1.8	6.1	2.6	3.7	3.9
3/6/2000	5.4	--	2.8	9.2	200.0	260.0	1.9	5.8	1.8	2.1	3.0
3/6/2000	5.6	180.0	4.7	12.8	57.0	160.0	1.2	5.3	1.2	2.2	3.5
3/7/2000	5.7	160.0	4.0	25.0	320.0	300.0	4.1	6.7	1.9	2.5	3.5
3/21/2000	7.4	200.0	4.2	21.0	300.0	77.0	4.1	8.0	1.6	1.8	3.8
3/21/2000	7.0	--	2.8	15.0	200.0	88.0	--	7.3	1.7	1.7	3.9
3/21/2000	7.6	120.0	3.7	16.7	250.0	66.0	--	7.3	2.0	1.6	4.1
3/22/2000	7.4	180.0	5.9	25.0	300.0	29.0	5.8	7.6	4.6	5.0	7.8
4/6/2000	8.6	66.0	2.7	27.0	30.0	6.0	5.9	8.1	2.5	2.5	3.9
4/26/2000	7.2	57.0	3.2	0.0	34.0	40.0	7.3	12.5	2.1	1.3	3.6
5/12/2000	5.3	5.0	2.4	9.4	13.0	66.0	7.7	11.4	1.5	0.4	2.4
5/17/2000	5.8	--	1.5	9.4	8.0	7.0	6.4	8.9	2.7	3.7	2.2
5/17/2000	5.3	--	1.5	7.3	10.0	6.0	5.6	7.6	1.9	2.7	1.9
5/17/2000	5.0	--	2.4	8.9	60.0	20.0	5.4	7.8	2.2	2.7	2.2
5/18/2000	5.8	--	2.3	10.6	44.0	75.0	9.0	12.7	2.4	2.6	2.7
7/7/2000	0.6	68.0	0.7	0.7	68.0	9.0	0.6	0.6	0.6	0.6	0.6
7/19/2000	0.6	29.0	0.7	0.4	5.0	2.7	0.6	0.6	0.4	0.1	0.0
8/31/2000	0.4	120.0	0.0	0.5	45.0	3.3	0.0	0.6	0.3	0.3	0.3
8/31/2000	0.5	100.0	0.2	0.4	--	0.7	0.2	0.9	0.3	0.3	0.2
8/31/2000	0.8	60.0	0.0	0.6	25.0	47.0	0.8	1.0	0.3	0.3	0.3
9/1/2000	0.6	160.0	0.0	0.8	40.0	0.9	0.8	1.1	0.2	0.3	0.3
9/13/2000	1.1	0.2	0.0	0.6	23.0	5.4	0.6	0.8	0.1	0.1	0.3
9/22/2000	0.5	0.3	0.0	0.2	31.0	0.6	0.7	0.9	0.2	0.2	0.4
9/28/2000	1.0	0.3	0.3	1.0	6.0	25.0	0.7	1.1	0.0	0.0	0.2
10/4/2000	1.0	7.0	0.0	1.3	5.0	35.0	0.7	1.0	0.0	0.0	0.0
10/11/2000	1.6	8.0	0.0	0.2	21.0	6.3	0.9	1.3	0.4	0.4	0.6
10/20/2000	0.0	180.0	0.0	0.0	54.0	0.0	0.0	0.0	0.0	0.0	0.0
10/27/2000	0.0	200.0	0.0	1.0	320.0	7.0	1.0	1.0	0.0	0.0	0.0
11/3/2000	0.0	260.0	0.0	1.0	6.0	21.0	0.0	1.0	0.0	0.0	0.0
11/10/2000	0.0	260.0	0.0	0.0	15.0	0.0	1.0	0.0	0.0	0.0	0.0
11/17/2000	0.0	300.0	0.0	1.0	320.0	6.0	1.0	1.0	0.0	0.0	0.0
11/21/2000	0.0	300.0	0.0	1.0	360.0	5.0	1.0	1.0	0.0	0.0	0.0
11/29/2000	1.0	300.0	0.0	1.0	7.0	4.0	0.0	1.0	0.0	0.0	0.0
12/6/2000	1.0	300.0	0.0	1.0	300.0	19.0	1.0	1.0	0.0	0.0	0.0
12/13/2000	1.0	300.0	0.0	1.0	26.0	1.0	1.0	1.0	0.0	0.0	0.0
12/21/2000	1.0	260.0	0.0	1.0	7.0	36.0	1.0	1.0	0.0	0.0	0.0
12/27/2000	1.0	8.0	0.0	2.0	300.0	360.0	1.0	1.0	0.0	0.0	0.0
1/3/2001	0.0	320.0	0.0	1.0	7.0	24.0	1.0	1.0	0.0	0.0	0.0
1/10/2001	0.0	420.0	0.0	1.0	160.0	1.3	0.9	1.2	0.0	0.0	0.0
1/18/2001	0.0	420.0	0.0	0.9	54.0	1.0	0.7	1.1	0.0	0.0	0.0
1/25/2001	0.0	400.0	0.0	1.1	30.0	30.0	1.2	1.4	0.0	0.0	0.0
2/1/2001	0.0	420.0	0.0	0.8	44.0	2.3	0.9	1.1	0.0	0.0	0.0
2/8/2001	0.8	420.0	0.3	1.6	20.0	1.6	1.0	1.4	0.1	0.1	0.1
2/22/2001	0.9	320.0	0.0	1.8	7.4	66.0	1.2	1.4	0.0	0.0	0.0
2/28/2001	1.2	320.0	0.0	2.2	7.5	19.5	1.5	1.5	0.0	0.1	0.5
3/8/2001	0.6	320.0	0.2	1.2	6.0	46.0	1.0	1.7	0.1	0.1	0.0
3/16/2001	1.2	320.0	0.2	1.6	6.2	25.0	1.2	1.2	0.2	0.1	0.2
3/21/2001	0.6	280.0	0.2	1.9	200.0	6.2	1.5	1.4	0.1	0.3	0.3
3/28/2001	0.8	260.0	0.6	1.6	0.2	8.3	1.2	1.6	0.3	0.0	0.2
4/4/2001	0.3	280.0	0.2	0.9	0.6	1.8	1.0	1.2	0.4	0.5	0.0
4/12/2001	0.9	300.0	0.3	8.7	10.4	7.2	0.8	1.5	0.1	0.1	0.0

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Date	GP-1	GP-2	GP-3	GP-4	GP-5	GP-6	GP-7	GP-8	GP-9	GP-10	GP-11
4/20/2001	0.3	286.0	0.0	15.9	15.4	6.2	0.2	1.3	0.0	0.0	0.0
4/25/2001	1.3	7.8	0.0	1.5	2.0	1.5	1.4	1.7	0.3	0.3	0.2
5/2/2001	1.3	8.6	0.4	23.8	220.0	6.0	2.1	3.2	0.2	0.2	0.3
5/9/2001	1.9	8.7	0.5	16.7	240.0	20.0	2.6	2.9	0.5	0.6	0.8
5/16/2001	0.2	7.7	0.0	0.7	12.0	8.2	0.6	1.3	0.0	0.0	0.8
5/23/2001	0.2	7.1	1.0	0.7	100.0	4.7	0.6	1.4	0.9	0.7	0.8
5/30/2001	0.4	10.3	1.0	0.9	10.2	7.6	1.0	1.7	1.0	0.6	0.8
6/6/2001	1.8	14.8	0.2	2.8	13.8	2.8	2.5	2.9	0.0	0.2	0.4
6/15/2001	0.0	180.0	0.0	0.4	100.0	3.4	0.6	1.1	0.0	0.0	0.0
6/20/2001	0.0	160.0	0.0	2.4	220.0	0.0	1.9	2.1	0.0	0.0	0.0
6/27/2001	0.0	10.8	0.0	1.1	260.0	16.8	1.7	1.8	0.0	0.0	0.0
7/5/2001	0.1	120.0	0.2	0.8	260.0	200.0	2.4	2.4	0.0	0.0	0.0
7/12/2001	1.7	160.0	0.4	2.1	77.0	9.8	3.2	3.8	0.4	0.2	0.0
7/18/2001	1.9	15.2	0.0	2.4	29.0	3.6	2.2	2.9	0.2	0.2	0.1
7/25/2001	3.8	15.3	0.0	2.5	160.0	17.5	2.3	2.7	0.0	0.0	0.0
8/1/2001	1.4	14.4	0.0	0.0	43.0	5.6	2.2	3.9	0.0	0.0	0.0
8/8/2001	1.3	14.3	0.0	0.8	220.0	160.0	2.7	2.4	0.0	0.0	0.0
8/14/2001	3.1	17.1	0.4	3.6	100.0	5.7	3.3	5.4	0.3	0.4	0.7
8/22/2001	1.7	15.0	0.0	2.6	120.0	5.7	2.4	4.6	0.0	0.4	0.6
8/29/2001	1.7	16.2	0.0	2.4	14.3	4.4	2.3	4.0	0.6	0.7	0.6
9/5/2001	0.8	13.6	0.0	2.2	100.0	4.4	2.4	4.8	0.0	0.6	0.0
9/12/2001	2.1	6.1	0.0	3.1	35.0	6.8	3.1	6.2	0.0	0.0	0.0
9/19/2001	0.1	0.8	0.0	0.2	0.9	0.3	0.1	0.4	0.0	0.1	0.0
9/26/2001	2.1	10.3	0.0	3.4	180.0	160.0	3.9	4.8	0.0	0.0	0.0
12/8/2001	1.8	8.6	2.7	20.2	0.2	1.1	1.8	0.9	2.8	2.8	2.8
12/19/2001	3.6	9.7	0.2	0.7	0.0	1.8	1.0	1.5	0.2	0.1	0.2
12/31/2001	1.6	140.0	0.2	2.2	0.7	3.2	1.7	2.0	0.2	0.1	0.3
1/11/2002	0.2	10.1	0.0	1.8	0.0	0.0	1.5	1.9	0.2	1.7	0.0
1/17/2002	1.2	9.0	0.5	2.3	57.0	43.0	1.0	1.5	0.6	0.8	0.3
1/22/2002	0.1	12.0	0.0	0.3	11.8	1.1	0.0	0.3	1.1	0.0	0.0
1/28/2002	1.8	8.0	0.0	3.1	10.0	13.2	0.8	1.2	0.0	0.0	0.0
2/5/2002	1.6	9.4	0.0	3.2	10.3	39.0	1.1	1.4	0.0	0.0	0.2
2/14/2002	1.4	9.0	0.0	1.1	8.4	10.7	0.7	1.2	0.1	0.0	0.0
3/6/2002	1.9	1.9	2.0	2.0	2.3	3.0	1.6	1.8	0.3	0.3	0.5
3/27/2002	0.0	40.0	0.0	2.0	160.0	3.0	1.0	1.0	0.0	0.0	0.0
4/5/2002	3.0	40.0	1.0	4.0	0.0	2.0	20.0	3.0	1.0	1.0	2.0
4/17/2002	3.0	40.0	2.0	3.0	200.0	20.0	20.0	2.0	0.4	1.0	1.0
4/25/2002	5.0	20.0	1.0	3.0	180.0	7.0	20.0	2.0	0.1	0.2	2.0
5/1/2002	2.0	40.0	0.2	2.0	100.0	20.0	20.0	20.0	0.2	0.3	0.5
5/9/2002	3.0	40.0	0.1	1.4	80.0	2.0	20.0	20.0	0.2	0.3	1.0
5/29/2002	2.0	40.0	0.5	1.0	100.0	6.0	1.0	1.0	0.6	0.6	0.6
6/11/2002	1.0	40.0	0.0	1.0	140.0	60.0	1.0	1.0	0.0	0.0	0.3
6/26/2002	3.0	40.0	0.0	1.0	140.0	140.0	20.0	0.8	1.0	1.0	1.0
7/10/2002	2.0	60.0	0.4	1.0	40.0	20.0	20.0	2.0	0.0	0.0	0.1
7/15/2002	2.0	60.0	0.4	1.0	180.0	160.0	1.0	1.0	0.2	0.3	0.2
7/16/2002	2.0	80.0	0.0	1.0	80.0	40.0	0.8	1.0	0.0	0.0	0.0
7/18/2002	2.0	20.0	0.4	2.0	160.0	100.0	20.0	20.0	0.0	0.0	0.4
8/14/2002	1.0	10.0	0.0	1.0	200.0	12.0	1.0	1.0	0.0	0.0	0.0
8/15/2002	1.0	3.0	0.0	1.0	100.0	2.0	0.4	0.0	0.0	0.0	0.0
8/21/2002	0.6	3.0	0.0	1.0	6.0	1.0	0.3	0.0	0.0	0.0	0.0
8/27/2002	2.0	4.0	0.7	2.0	160.0	4.0	2.0	3.0	0.0	0.5	0.0
9/4/2002	1.0	4.0	0.0	2.0	160.0	160.0	1.0	2.0	0.0	0.0	0.0
9/11/2002	1.0	5.0	0.0	2.0	200.0	300.0	0.7	1.0	0.0	0.0	0.0
9/17/2002	1.0	4.0	0.0	1.0	80.0	3.0	0.4	2.0	0.0	0.0	0.0
9/25/2002	1.0	4.0	0.0	1.0	85.0	2.0	0.0	2.0	0.0	0.0	0.0

Table 1

Methane Concentrations (as percent LEL) in Gas Monitoring Points
New Hampton Landfill - Bristol, New Hampshire

Date	GP-1	GP-2	GP-3	GP-4	GP-5	GP-6	GP-7	GP-8	GP-9	GP-10	GP-11
10/16/2002	2.0	27.0	2.0	3.0	180.0	200.0	4.0	4.0	0.0	0.0	0.0
10/31/2002	1.0	100.0	0.0	0.0	100.0	12.0	0.0	1.0	0.0	0.0	0.0
11/13/2002	7.0	25.0	0.0	7.0	59.0	160.0	0.5	2.0	13.0	0.0	0.0
12/4/2002	20.0	80.0	0.0	3.0	19.0	4.0	0.5	3.0	0.0	0.0	0.0
12/11/2002	6.0	40.0	0.4	6.0	120.0	7.0	5.0	5.0	1.0	1.0	1.0
12/18/2002	2.0	40.0	0.0	3.0	22.0	2.0	1.0	2.0	0.0	0.0	0.0
12/24/2002	7.0	25.0	0.0	2.0	100.0	2.0	0.0	1.0	0.0	0.0	0.0
1/30/2003	1.0	60.0	0.0	0.0	54.0	0.0	0.0	0.0	0.0	0.0	0.0
2/17/2003	3.0	40.0	0.0	5.0	20.0	4.0	3.0	3.0	0.0	0.0	0.0
3/14/2003	0.0	60.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3/31/2003	0.0	60.0	0.0	7.0	100.0	0.0	2.0	2.0	2.0	2.0	0.0
5/14/2003	15.0	36.0	9.0	14.0	12.0	11.0	11.0	14.0	10.0	10.0	10.0
6/25/2003	0.0	20.0	0.4	0.7	60.0	3.0	120.0	0.5	0.0	0.0	0.0
7/1/2003	0.0	2.0	0.0	0.0	280.0	80.0	0.0	0.0	0.0	0.0	0.0
7/9/2003	0.0	0.8	0.0	0.0	0.0	3.0	40.0	0.0	0.0	0.0	0.0
7/30/2003	0.0	2.0	0.0	0.1	0.3	0.2	0.0	0.2	0.0	0.0	0.0
8/14/2003	1.0	5.0	0.2	0.7	40.0	0.3	0.4	0.5	0.0	0.0	0.0
9/10/2003	0.0	3.0	0.4	0.8	180.0	0.5	0.7	0.8	0.0	0.0	0.0
9/24/2003	1.0	0.0	0.2	0.5	60.0	160.0	0.1	0.5	0.0	0.0	0.0
10/9/2003	1.0	80.0	0.8	0.8	43.0	2.0	1.0	1.0	1.0	1.0	0.0
12/22/2003	1.0	21.0	0.0	0.8	20.0	0.0	1.0	1.0	0.0	0.6	0.8
1/12/2004	1.0	60.0	0.0	2.0	180.0	0.0	20.0	20.0	1.0	0.0	1.0
2/3/2004	1.0	60.0	0.6	1.0	160.0	0.0	1.0	1.0	0.6	0.0	0.9
3/3/2004	1.0	80.0	0.7	0.9	3.0	2.0	1.0	1.0	0.7	0.4	0.6
3/17/2004	0.0	40.0	0.0	0.6	40.0	20.0	0.4	0.6	0.0	0.0	0.0
4/22/2004	0.7	20.0	0.0	20.0	40.0	0.8	0.9	20.0	0.7	0.6	0.5
5/19/2004	0.0	11.0	0.0	0.0	6.0	1.1	0.2	0.5	0.0	0.0	0.0
6/23/2004	0.0	3.0	0.0	0.3	1.0	5.0	0.8	1.0	0.0	0.0	0.0
7/28/2004	1.0	5.0	0.0	0.1	20.0	20.0	1.0	0.0	0.0	0.0	0.0
9/1/2004	0.0	4.0	0.0	0.0	27.0	0.0	0.5	0.0	0.0	0.0	0.0
10/11/2004	0.5	29.0	0.1	0.5	51.0	7.0	0.6	0.6	0.0	0.0	0.0
11/10/2004	0.6	26.0	0.1	1.0	19.0	1.0	1.0	1.0	0.0	0.0	0.0
2/24/2005	0.3	80.0	1.1	1.0	40.0	20.0	2.1	0.0	0.0	0.0	0.0
3/17/2005	2.0	140.0	0.0	0.0	0.6	20.0	0.7	0.0	0.2	0.5	0.0
5/25/2005	0.0	0.0	0.0	1.0	0.0	20.0	0.2	0.8	0.0	0.0	0.1
9/1/2005	2.0	1.0	2.0	3.0	3.0	5.0	2.0	2.0	0.0	0.0	0.0
1/11/2006	0.0	1.0	0.0	1.0	200.0	0.0	0.0	0.4	0.0	0.0	0.0
1/31/2006	0.0	0.0	0.0	0.0	180.0	0.0	0.0	0.4	0.0	0.0	0.0
2/27/2006	0.0	2.0	1.0	1.0	200.0	0.6	0.0	0.4	0.0	0.0	0.0
5/24/2006	2.0	1.0	0.0	1.0	2.0	2.0	2.0	1.0	0.0	0.2	0.0
8/2/2006	3.0	9.0	6.0	7.0	8.0	0.0	0.0	0.0	0.0	0.0	0.1
11/18/2006	2.0	8.0	7.0	4.0	9.0	0.0	2.5	3.7	0.0	0.0	0.0
1/31/2007	0.2	39.0	0.4	0.3	0.4	1.0	0.3	0.6	0.2	0.0	0.0
2/13/2007	0.0	8.0	0.0	0.0	0.0	0.4	0.0	0.6	0.2	0.0	0.0
6/13/2007	0.0	9.0	0.0	0.0	0.0	1.0	0.7	0.5	0.0	0.0	0.0
8/27/2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11/17/2007	0.0	0.0	0.0	0.0	0.4	0.0	0.1	0.0	0.0	0.0	0.0
3/27/2008	0.1	14.0	0.0	2.6	1.9	3.0	0.2	0.0	0.0	0.2	0.0
9/12/2008	0.6	12.0	0.1	0.5	1.0	0.8	0.8	1.0	0.4	0.4	0.7
12/16/2008	0.6	3.0	0.2	0.3	1.0	0.4	0.2	0.0	0.4	0.2	0.5
3/25/2009	0.7	1.0	0.0	0.3	1.0	0.0	0.0	0.1	0.0	0.3	0.4
6/3/2009	0.5	0.4	0.4	0.4	1.0	0.8	0.2	0.4	0.3	0.0	0.3
9/17/2009	0.8	6.0	0.1	0.6	30.0	1.0	0.6	0.4	0.5	0.4	0.6
12/17/2009	1.0	0.0	2.0	1.0	2.0	0.8	2.0	2.0	0.0	0.0	2.0
5/10/2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8/2/2010	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12/3/2010	0.0	182.0	0.0	0.0	8.0	0.0	0.0	0.0	0.0	0.0	0.0
12/22/2010	0.0	178.0	0.0	0.0	46.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 1

Methane Concentrations (as percent LEL) in Gas Monitoring Points
New Hampton Landfill - Bristol, New Hampshire

Date	GP-1	GP-2	GP-3	GP-4	GP-5	GP-6	GP-7	GP-8	GP-9	GP-10	GP-11
3/29/2011	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5/11/2011	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/21/2011	0.0	6.0	2.0	2.0	2.0	2.0	0.0	0.0	0.0	0.0	0.0
12/20/2011	0.0	214.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3/15/2012	0.0	4.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0	0.0	0.0
6/28/2012	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/27/2012	0.0	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12/7/2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3/27/2013	0.0	124.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6/27/2013	0.0	26.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/4/2013	0.0	36.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0
12/10/2013	0.0	120.0	0.0	0.0	180.0	0.0	0.0	0.0	0.0	0.0	0.0
3/27/2014	0.0	42.0	0.0	0.0	ns	0.0	0.0	0.0	0.0	0.0	0.0
6/25/2014	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/30/2014	0.0	0.0	0.0	0.0	8.0	0.0	0.0	0.0	0.0	0.0	0.0
12/5/2014	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3/31/2015	0.0	4.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0
6/22/2015	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/24/2015	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12/8/2015	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3/25/2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6/27/2016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/29/2016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12/20/2016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3/24/2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6/27/2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/29/2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12/4/2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3/21/2018	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6/5/2018	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/12/2018	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12/7/2018	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ns	0.0	0.0
3/20/2019	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6/12/2019	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/20/2019	0.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0	0.0	0.0
12/12/2019	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3/23/2020	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0
6/16/2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/25/2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12/14/2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3/23/2021	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6/23/2021	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ns-not sampled

Highlighted values that may be erroneous.

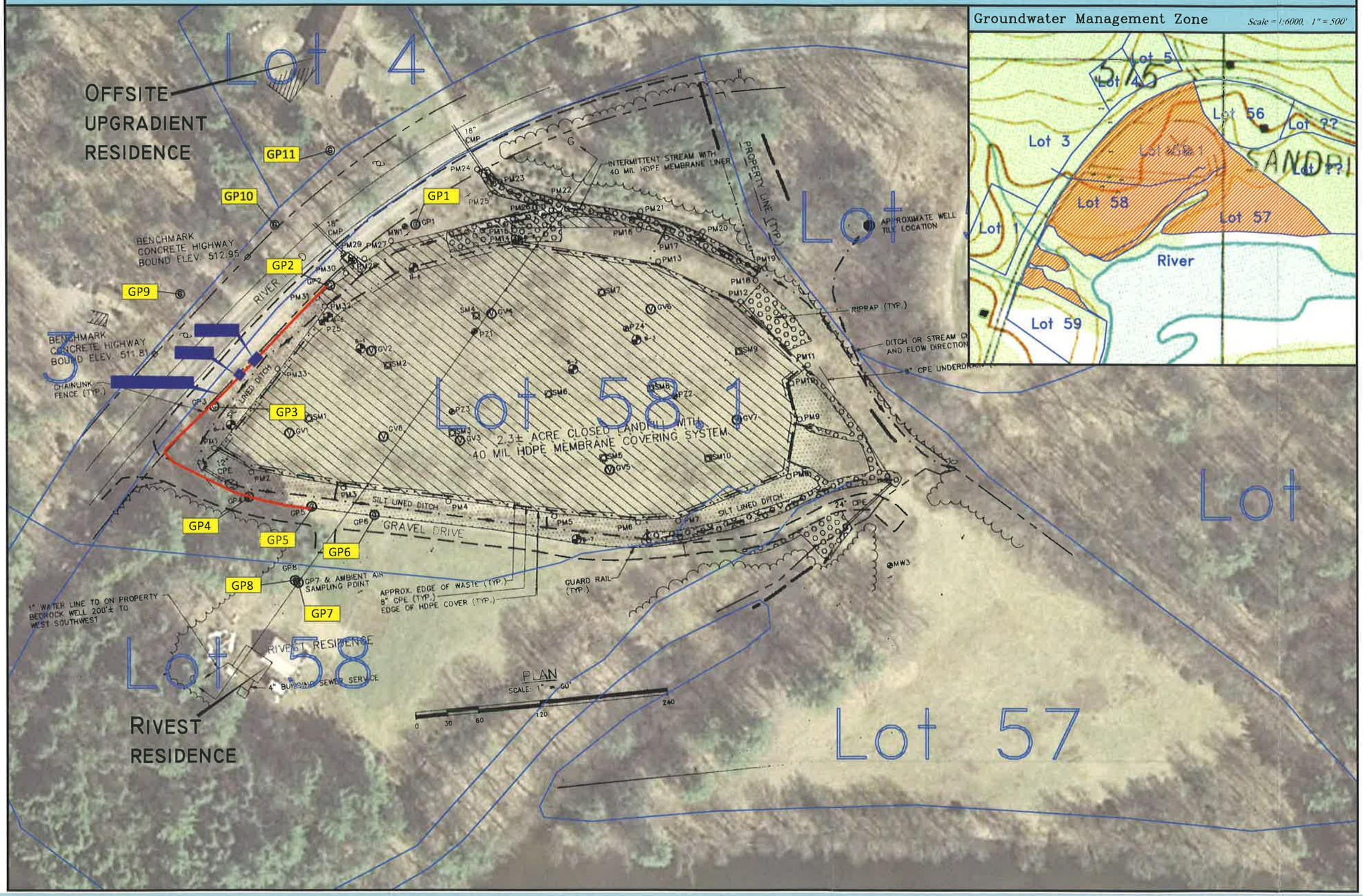
Emery & Garrett
GROUNDWATER INVESTIGATIONS
A Division of GZA

Figure

FIGURE 1. Aerial Photo and Site Plan of the New Hampton Landfill, Bristol, New Hampshire

Location of Gas Probes and Active Gas Management System

Scale = 1:1200, 1" = 100'

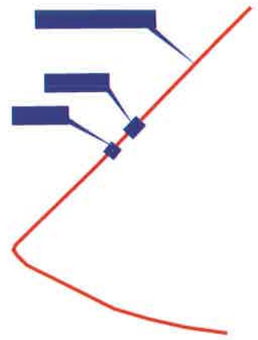


Groundwater Management Zone

Scale = 1:6000, 1" = 500'

Legend

- GV3 — Gas Vent Well With Horizontal Screens
- GP1 — Gas Monitoring Probe
- SM8 — Settling Monument
- Groundwater Management Zone
- Active Gas Management System



Air photo base map is from GRANIT GIS 2010–2011 1–foot Aerial Photos. Alignment is approximate.

Emery & Garrett Groundwater Investigations, A Division of GZA

Figure 1

Emery & Garrett
GROUNDWATER INVESTIGATIONS
A Division of GZA

Appendix A – Facility Design Plans/Specifications

ENGINEERING REPORT
NEW HAMPTON LANDFILL CLOSURE
BRISTOL, NEW HAMPSHIRE

FEBRUARY 1996

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Project No. 394.02

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APPENDICES

1.0 INTRODUCTION

PROVAN & LORBER, INC. was retained by the Town of New Hampton, New Hampshire to provide engineering services to prepare final closure plans and specifications and to obtain a Groundwater Management Permit (GMP) for the New Hampton Landfill. The Town of New Hampton's landfill is located on the southerly side of River Road in Bristol, New Hampshire (see USGS Location Map). The site is on the west side of the Pemigewasset River between River Road and the river. The river bends to the west at this location and the landfill is located on the southerly sloping alluvial terrace deposits associated with the river. An intermittent stream, tributary to the Pemigewasset River, borders the easterly side of the landfill. The landfill's existing solid waste footprint is approximately 2.5 acres. The Town of New Hampton currently leases the landfill area from Theodore Rivest, Jr., the property owner. The total parcel area owned by Mr. Rivest is 15± acres. The site is located in an area of mostly undeveloped forest land with limited residential development. Abutting properties to the north, east and west have been developed with residential dwellings. Residences in the vicinity of the landfill are serviced with private water and on-site septic systems.

The Town of New Hampton is actively pursuing the purchase of the landfill property with Mr. Rivest. Mr. Rivest recently constructed a residential home with on-site septic on the property, west of the landfill. Mr. Rivest has installed an on-site well for drinking water purposes, west of the house, within the proposed Groundwater Management Zone.

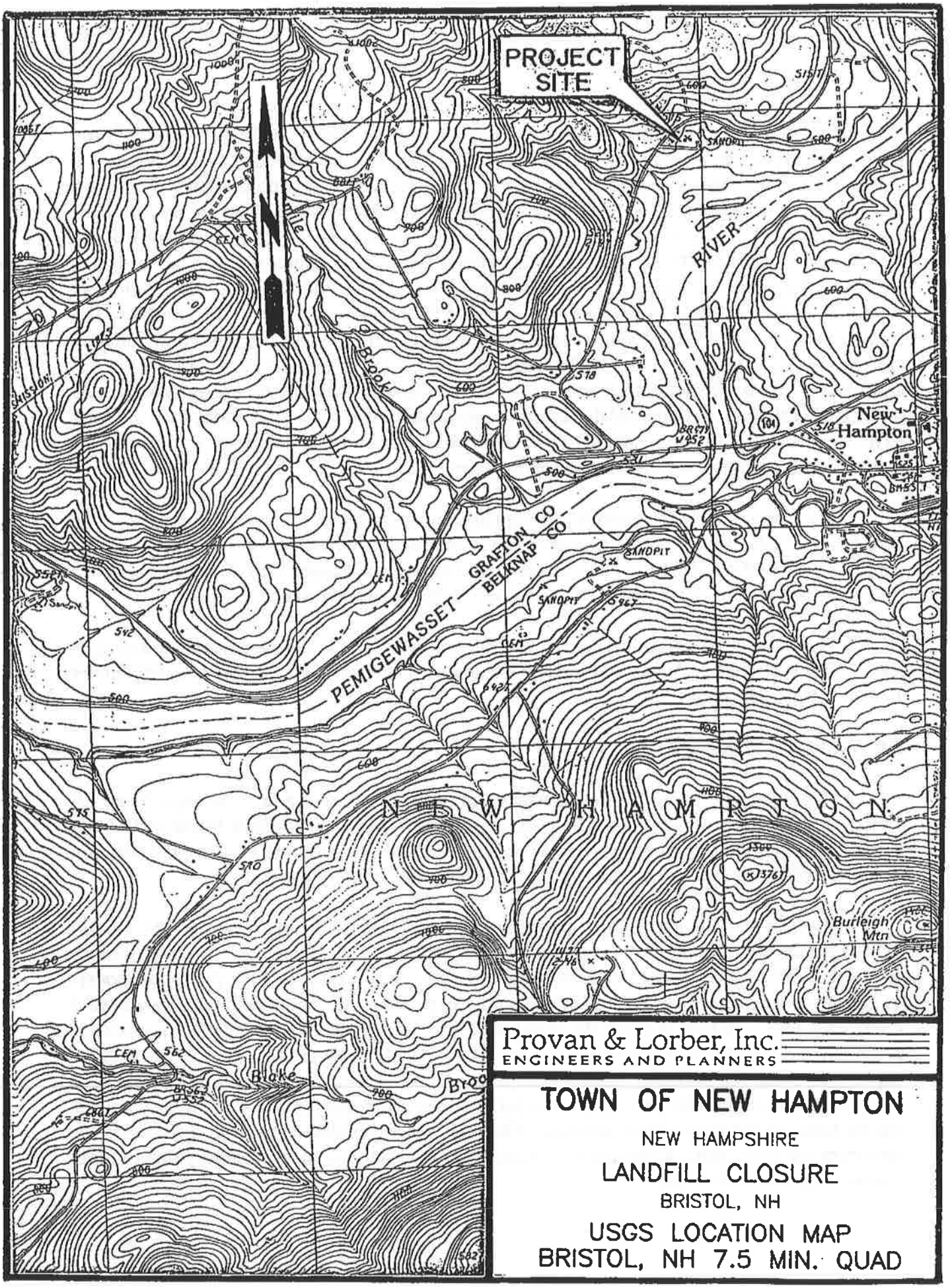
The Town discontinued use of the landfill circa 1992 following the construction of their transfer station off N.H. Route 104 in New Hampton. The landfill was regraded in September 1992 to its present grades.

2.0 SITE HYDROGEOLOGY

Hydrogeologic investigations conducted to date indicate that a layer of very dense till underlies the alluvial deposits on which the landfill is located and forms a lower hydrologic boundary for the shallow groundwater flow regime. Refusal was encountered along the northern perimeter of the landfill at approximately 13-16 feet below existing grade.

Historic test pit excavations performed along the northern perimeter of the landfill indicated there was groundwater in contact with the refuse. Subsequent subsurface explorations and water table elevations indicate the waste mass is not in contact with the groundwater, excepting some contact may occur along the northerly perimeter on the waste mass/native subsoil interface. This condition is likely the result of stormwater run-on and inadequate site drainage provisions. A 15" diameter culvert crosses beneath River Road and discharges to a non-draining depression along the northerly landfill perimeter. This causes perched water table conditions along the northerly landfill perimeter. The path of least resistance for this water to discharge is via the waste mass/native subsoil interface. Once this water percolates down this interface to the bottom of the waste mass, it appears to permeate the native subsoils and discharge without further contact with the waste mass.

UTM COORDINATES: LAT. N 43° 37' 10", LONG. W 71° 39' 55"



Provan & Lorber, Inc.
ENGINEERS AND PLANNERS

TOWN OF NEW HAMPTON

NEW HAMPSHIRE

LANDFILL CLOSURE

BRISTOL, NH

USGS LOCATION MAP
BRISTOL, NH 7.5 MIN. QUAD

Groundwater flow direction is consistent with the topography, sloping south towards the Pemigewasset River with the river being the discharge point for the flow regime. Water table elevations indicate a difference of close to 5 feet between spring and fall readings.

The site geology and hydrogeology are further described in the Application For Groundwater Management Permit - NHDES GWP #870478, prepared by **PROVAN & LORBER, INC.**, December 1995. Additional information is contained in the reports and investigative results referenced in the application and on file at the New Hampshire Department of Environmental Services.

3.0 WATER QUALITY IMPACT

Chlorinated and petroleum contamination of the groundwater on the southeastern portion of the site appears to fluctuate with the seasons and the water table elevation. While the source of chlorinates and BTEX in MW4 have never been precisely identified, the most logical source area appears to be the landfill itself. Natural attenuation of these contaminates has occurred over time and should continue to occur over time. Benzene levels detected in MW4 periodically exceed regulatory limits.

The greatest potential receptor within the 1000 foot radius of the GMZ is the Rivest well now located within the GMZ. Groundwater flow direction is to the south to the Pemigewasset River which abuts the SITE. Due to its side gradient and location, the potential does exist for some impact to the Rivest well. Water quality results to date do not indicate an impact to the river from the landfill. Specific conductance values appeared to approach background values in the Pemigewasset River just downstream of the landfill.

4.0 BASIS OF DESIGN

4.1 Footprint Reduction And Grading Improvements

The existing solid waste footprint is approximately 2.53 acres. The southwesterly waste boundary juts out from the rest of the waste mass. The design requires that this waste be relocated to the "Waste Relocation Receiving Area" within the proposed solid waste boundary. This is to facilitate drainage ditch and perimeter access construction. Additional, relatively minor, full depth waste excavation and relocation activities are proposed elsewhere along the perimeter for drainage ditch construction purposes. These full depth waste excavation and relocation activities combined with other waste relocation activities necessary to achieve the proposed membrane covering system 5% minimum and 22% maximum grades, require the relocation of approximately 3,700 cubic yards of waste. The proposed final grades have been set to accommodate this waste relocation volume within the limits of the proposed "Waste Relocation Receiving Area" (see Drawings Sheets 5 & 6). The proposed solid waste footprint following these waste relocation activities is approximately 2.32 acres.

4.2 Access Improvements

The design requires the relocation of a gravel drive along the westerly and southerly landfill perimeter (see Drawings Sheet 5). This drive is being relocated to facilitate construction of a silt lined perimeter drainage ditch. The silt lining will help prevent landfill stormwater run-off from infiltrating the ditch bottom and entering the waste mass via the waste/native subsoil interface. The drive has, and will continue to be, the Town's access to the landfill and related down-gradient monitoring wells. The current property owner also uses this drive to access his residence and a field located in the river floodplain.

4.3 Silt Lined Perimeter Ditches

The northwesterly and westerly perimeter ditches (Drawings Sheets 5 & 7, Section B) and southerly perimeter ditch (Drawings Sheet 5 & 7, Section C) are to be lined with a minimum of 10" silt. This will help prevent stormwater run-on, landfill cover run-off and cover drain discharge from infiltrating these ditch bottoms and entering the waste mass via the waste/native subsoil interface. The silt will also be more resistant to erosion, withstanding higher run-off velocities than the native loamy sands. Ditch velocity calculations are included in the NHDES-Site Specific Application.

4.4 Northerly Perimeter Ditch

The northerly perimeter ditch (Drawings Sheets 5 & 7, Section A) is to be an integral part of the geomembrane covering system. The design requires that the geomembrane have a textured surface due to the 3.5:1 ditch down-slope and 3:1 ditch back-slope. The geomembrane is to be overlaid with a geotextiles/geonet composite to protect the geomembrane from being punctured by the overlying crushed gravel course. The purpose of the crushed gravel course is to provide additional geomembrane cover soil erosion protection. The ditch will also be silt lined as further erosion protection. The primary function of this ditch lining system is to minimize perched water table conditions along this northerly perimeter. Stormwater run-on from a 15" diameter culvert crossing River Road presently discharges to a non-draining depression along this perimeter. This causes a perched water table and waste/groundwater interaction along the up-gradient landfill perimeter waste/native subsoil interface. The proposed ditch grading improvements will eliminate this depression. The ditch lining is intended to prevent this culvert discharge, as well as landfill cover run-off and cover drain discharge, from infiltrating the waste mass. This should reduce site leachate generation considerably. Ditch velocity calculations are included in the NHDES-Site Specific Application.

4.5 Relocated Intermittent Stream

Another 15" diameter culvert conveys intermittent stream flow across River Road. This culvert discharges to a stream channel paralleling the northeasterly landfill perimeter. This intermittent stream also causes perched water table conditions and may cause waste/groundwater interaction along this up-gradient landfill perimeter waste/native subsoil interface. The design requires that this stream channel be relocated slightly northeast to facilitate site grading improvements. This relocated stream channel (Drawings Sheets 5 & 7, Section F) is also to be an integral part of the geomembrane covering system. This geomembrane is to have a textured surface and is to be overlaid with a geotextiles/geonet composite to protect the geomembrane from being punctured by the overlying "Class C Stone Fill" course. The Class C Stone Fill is an under-filter to the riprap channel lining. The relocated stream channel lining is intended to prevent stream flow, landfill cover run-off and cover drain discharge from infiltrating the waste mass. This should reduce site leachate generation considerably. Channel velocity calculations are included in the NHDES-Site Specific Application.

4.6 Underdrain

An 8" diameter CPE underdrain is to be constructed along the entire easterly and north easterly perimeter. This underdrain is to be constructed at invert elevations approximating or slightly below the bottom of the waste mass. Prior to construction, test pits will be done along the underdrain alignment to confirm the vertical profile. It is possible that ledge may be encountered at elevations above the proposed underdrain trench bottom elevations. In this case the invert elevation will be raised to a minimum of 6" above bedrock. If the existing bedrock contains sags in the vertical profile, the sags in the trench bottom are to be shimmed out utilizing a silty crushed gravel. The silty crushed gravel will provide a stable trench bottom while minimizing the potential for groundwater to pass under the underdrain. The pipe will be bedded, haunched and initially backfilled with crushed stone. A layer of filter fabric is to separate the crushed stone and overlying gravel backfill. The gravel will extend upward to the cover system subgrade elevation. This system is intended to further minimize the groundwater elevation on the up-gradient landfill perimeter to prevent waste/groundwater interaction along the waste/native subsoil interface. To minimize the underdrain trench depth and cost of construction, this underdrain is to be installed beneath the lined relocated channel and a portion of the lined northerly perimeter ditch. Estimates of underdrain capacity and anticipated underdrain trench-wall inflow are included as **Appendix F**.

4.7 Rock Slope Stabilization

Due to property boundary constraints, a perimeter ditch was not feasible along a short length of landfill perimeter (Drawings Sheets 5 & 7, Section E). This non-cover system area is to be graded at a 2:1 maximum slope and is subject to sheet flow run-off discharge. The design requires that rock slope stabilization be applied to this slope. This is intended to prevent slope erosion and related siltation impacts to the intermittent stream, floodplain and wetlands.

4.8 Wetlands Impact

Site wetlands delineation was performed by Gove Environmental Services, Inc. Their Technical Report of Wetland Delineation is included as **Appendix A**. The closure design requires the relocation and lining of an intermittent stream along the northeasterly perimeter to facilitate closure grading and reduce leachate generation. Additional wetland disturbances are required to direct site drainage to a natural drainage course within the Pemigewasset River floodplain. The total dredge and fill disturbance from the proposed construction is estimated to be 2,575 square feet. Application has been made to the NHDES - Wetlands Board to permit these closure activities.

4.9 Floodplain Impact

The landfill is adjacent to the Pemigewasset River floodplain. The U.S. Department of Housing and Urban Development Federal Insurance Administration Flood Insurance Rate Map (FIRM) is included as **Appendix B**. The 100 year flood level for this section of the Pemigewasset River was not available from the New Hampshire Office of Emergency Management. Water elevations in this section of the Pemigewasset River are impacted by Public Service of New Hampshire's Ayers Island Hydroelectric Dam. Per Public Service of New Hampshire personnel, the probable maximum flood elevation is 473.2 feet (National Geodetic Vertical Datum). The proposed perimeter ditch grading, field access relocation and culvert installation construction activities will have an insignificant impact to the River Floodplain.

4.10 Geomembrane Covering System

The proposed geomembrane covering system cross-section consists of 12 inches intermediate cover, 12 inches buffer sand, a 40 Mil HDPE smooth geomembrane (excepting textured surface specified in northerly perimeter ditch and northeasterly relocated stream channel), 8 inches silt, and a 4-inch topsoil layer. The specified minimum and maximum cover system slopes for the smooth geomembrane are 5% (20:1) and 22% (4.5:1), respectively. A U.S. Army Corps Of Engineers Hydraulic Model of Landfill Performance (HELP) evaluation of the design cross-section is included as **Appendix C**. Slope stability and maintenance vehicle loading calculations are included as **Appendix D**. The design requires that 8" diameter CPE toe drains (Cover Drains) be installed in the geomembrane anchor trench around the cover system perimeter. Additionally, 12' wide panels of geotextiles/geonet drainage composite are to overlay the geomembrane, and traverse the westerly and southerly landfill faces. These panels are intended to maintain the free drainage sand drainage lengths at 150 feet or less. The silt layer is incorporated in the cross-section to sustain soil moisture for plant growth and to provide additional veneer stability and erosion resistance. The specifications allow for the use of a sludge/soil admixture as topsoil, if acceptable to the NHDES - Waste Management Division.

4.11 Stormwater Management

Proposed stormwater management provisions are depicted on the Final Grading Plan (Drawing Sheet 5) and are detailed. The sequencing of implementing erosion and sedimentation control is included in the "Construction Sequencing and Notes" (Drawing Sheet 2). The design requires the installation of combination silt fence/hay bale sediment barriers around the southerly and easterly work perimeter to prevent siltation of the intermittent stream, floodplain and wetlands. Silt fence is also to be installed along the southerly and westerly cover system perimeter to prevent silt from entering the perimeter ditch. Rock check dams are to be installed within the perimeter ditches to minimize silt migration via these ditches. Trap rock ditch/outlet lining is to be installed in the southerly perimeter ditch, at all drain outfalls, and at the culvert outfalls indicated. The relocated stream channel is to be lined with riprap. Riprap slope stabilization is to be installed along a short section of the easterly perimeter. Two permanent culverts are to be installed. One culvert is to be installed within the westerly perimeter ditch to provide maintenance vehicle access to the landfill. The other is to be installed across the relocated field access drive to discharge site drainage to a natural floodplain drainage course.

The cover system area will be graded to sheet flow stormwater runoff to the perimeter ditches. Surface roughening techniques will be employed following placement of cover system courses to minimize construction phase erosion. A silt layer has been incorporated into the covering system cross-section, directly below the topsoil. The purpose of this layer is to retain moisture for plant growth and to provide long-term erosion resistance. The "Construction Sequencing and Notes" require the Contractor to cover the silt with topsoil prior to adverse weather or to apply heavy mulch prior to a significant adverse weather event.

Drainage, culvert sizing and ditch velocity calculations are part of the NHDES Site Specific Alteration of Terrain Application. These calculations indicate that the proposed covering system and drainage improvements will short-circuit stormwater run-off from the site to the down-gradient wetlands and surface waters. Post-closure run-off will be significantly higher than pre-closure run-off. This is due to the impermeable nature of the proposed cover system, drainage conveyance improvements and the elimination of the non-draining areas. Due to the site's location abutting the Pemigewasset River floodplain, no down-gradient flood impacts are anticipated to result from the project.

4.12 Landfill Settlement

To counter the negative impacts of minor post-closure settlement, the final closure capping system has been designed with 5% minimum slopes. This should assure positive drainage during the post-closure period.

The gas vent pipe/membrane connection design includes overlapping (18" minimum) membrane pipe boots to prevent damage to the gas vent pipe/membrane due to minor waste settlement.

Proposed locations of settlement monuments are shown on the Final Grading Plan (Drawings Sheet 5). The monuments are to be constructed as detailed (Drawings Sheet 8). Installation of these monuments will enable post-closure settlement surveys from consistent points of reference.

4.13 Methane Gas Management Systems

The capping system must be vented to prevent gas build-up and heat generation from reaching combustible or membrane damaging levels. Additionally, the venting system must prevent the lateral migration of landfill gasses to prevent health and safety concerns within neighboring structures.

The design requires the installation of seven 24-inch bore hole diameter, crushed stone back-filled passive gas vents. These vents are to be installed at a maximum spacing not to exceed 250 ± feet (see gas vent spacing calculations, **Appendix E**) and are to penetrate the full depth of the landfill. Proposed locations of these vents are shown on the Final Grading Plan (Drawings Sheet 5). Construction of the vents is to be as detailed (Drawings Sheet 8).

Residential structures exist north of the landfill (across River Road) and west of the landfill (Rivest residence). Three (3) methane gas monitoring probes are to be installed on westerly perimeter and three (3) are to be installed on the northerly perimeter. Proposed locations of these probes are shown on the Final Grading Plan (Drawings Sheet 5). Construction of these probes is to be as detailed (Drawings Sheet 8). These probes will be monitored to determine if any significant concentration of methane is migrating toward these neighboring residences.

Although not anticipated, if post-closure monitoring indicates passive gas venting is inadequate to prevent lateral migration of gases toward either of these residences, either a forced ventilation system or a gas barrier (lined trench extending to below water table and vented to surface) will have to be designed and implemented.

4.14 Covering System Perimeter Marking

Capping system perimeter marking is a requirement of the NHDES-WMD Solid Waste Rules. The design requires the installation of pressure treated wood posts spaced at 100± feet minimum spacing or at significant change of direction. Proposed locations of these perimeter markers are shown (Drawing Sheet 5). Construction of these probes is to be as detailed (Drawings Sheet 8).

4.15 Post Closure Access Control

Post closure access control is a requirement of the NHDES-WMD Solid Waste Rules. This is to prevent damage to the capping and other closure systems due to unauthorized vehicle traffic.

An existing chain link fence parallels the River Road right-of-way. This fence is to be temporarily removed to facilitate closure grading and reinstalled upon closure construction completion. This fence precludes site access from River Road.

The relocated gravel drive on the west side of the landfill is to remain accessible to Mr. Rivest as it is his means of accessing his residence and his field in the floodplain. The Town is presently pursuing property acquisition and easements to formalize this access agreement. A galvanized steel post and beam guard rail is to be installed along the relocated drive to restrict unauthorized access. A farm gate (normally locked) will be installed across the drive.

The southerly and easterly landfill perimeters are bordered by woods, the river floodplain and intermittent stream and are inaccessible to vehicles.

5.0 CONSTRUCTION SCHEDULE

Assuming a positive bond vote at the March 1996 New Hampton Town Meeting and receipt of regulatory approvals, the closure construction contract should be awarded by mid April 1996. A tentative 1996 closure construction schedule is as follows:

Mid April	Award Construction Contract
Mid April - Mid May	Prepare HASP and Furnish Submittals
Mid May - End May	Commence Construction, Install Erosion Control, Clear & Grub, Dig Test Pits, Remove River Road Fence.
Early June - Mid June	Install Gas Monitoring Probes, Relocate Waste, Install Intermediate Cover, Install Gas Vents, Prepare Subgrades, Relocate Drive, Install Floodplain Culvert & Outlet Riprap.
Mid June - End June	Construct Underdrain, Relocate Stream, Install Perimeter Ditch Silt & Rock Lining, Install Sand Buffer.
Early July - Mid July	Install Geomembrane & Geonet, Install Relocated Stream Riprap, Install Cover Drains, Install Crushed Gravel & Free Draining Sand, Install Settlement Monuments.
Mid July - End July	Install Silt, Install Topsoil, Seed & Mulch.
Early August - End August	Reinstall River Road Fence, Install Perimeter Markers, Guard Rail, Farm Gate and Signs. Clean-up and Submit Project Closure Submittals. Final Completion.

6.0 STATEMENT OF PROBABLE CONSTRUCTION COST

A Statement of Probable Construction Cost is included as **Appendix G.** The New Hampton Landfill Closure Construction is a small project and may not attract the interest of larger General Contractors and geomembrane installers. **PROVAN & LORBER, INC.,** recommends that this project be bid over the Winter for Spring construction. This should attract numerous bidders and result in a competitive bid.

APPENDIX A
WETLANDS DELINEATION REPORT

TECHNICAL REPORT

OF

WETLAND DELINEATION

performed at:

NEW HAMPTON LANDFILL
River Road
Bristol, New Hampshire

prepared for:

PROVAN & LORBER, INC.
Maple & Prospect Streets
Contoocook, New Hampshire

prepared by:

GOVE ENVIRONMENTAL SERVICES, INC.
4 Franklin Street
Exeter, New Hampshire

WETLAND DELINEATION

PROJECT NO. 791

NOVEMBER 28, 1994

Location: New Hampton Landfill, River Road, Bristol, NH

Standards: 1) Federal Manual for Identifying and Delineating Jurisdictional Wetlands, 1989. (NH Wetlands Board standards of delineation)

2) National List of Plant Species That Occur in Wetlands: 1988 New Hampshire

3) Soil Drainage Class Guidelines, Army Corps of Engineers, New England Division, Waltham, MA

4) Corps of Engineers Wetlands Delineation Manual, 1987 (Federal standards of delineation)

5) U.S. Fish & Wildlife Service, Classification of Wetlands and Deepwater Habitats of the United States, 1979

6) Code of Administrative Rules, Wetlands Board, State of New Hampshire.

Date of Delineation: November 16, 1994

Delineator(s): J. P. Gove

Areas of Delineation:

1) Portion of flood plain wetland adjacent to southern edge of landfill.

2) Intermittent stream flowing from River Road south to flood plain wetland.

Types of Wetlands on Site:

a) Forested flood plain wetland -- classified as PFO1E

b) Wet meadow flood plain wetland -- classified as PSS1E

c) Forested intermittent stream way, not dominated by wetland vegetation, having a scoured channel.

"Wetland Boundary" flag locations:

a) No. 1 to 7, forested flood plain wetland, stopping at edge of wet meadow.

b) No. 8 to 11, starting at edge of wet meadow and access road, along forested flood plain to western side of intermittent stream.

c) No. 12 to 22, centerline of intermittent stream that is 2 to 3 feet wide extending north to River Road.

Attachments:

1) Routine Wetland Determination Data Form (taken off flag number 4 in the forested flood plain wetland)

2) Explanation of Wetland Classifications

Compiled by:

GOVE ENVIRONMENTAL SERVICES, INC.

JAMES P. GOVE
PRESIDENT OF GES
CERTIFIED SOIL SCIENTIST IN NEW HAMPSHIRE, NO. 004
CERTIFIED PROFESSIONAL SOIL CLASSIFIER, ARCPACS

NATIONAL

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: New Hampton Landfill in
Applicant/Owner: Bristol, NH
Investigator: J. Cove, CES

Date: 11/16/94
County:
State: NH

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID: PFO1E*
Transect ID: 1
Plot ID: A
15' downslope Fly 4

* Floodplain - active.

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Sensitive Fern	Herb	FACW
2. Jewel Weed	Herb	FACW
3. Flat-topped Aster	Herb	FACW
4. Oak - Red	SS	FACU
5. Red Maple	SS	FAC
6. Witch Hazel	SS	FAC-
7. Red Oak	Tree	FACU
8. Red Maple	Tree	FAC
9. White Pine	Tree	FACU
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 5/9

Remarks: Trees at edge of wetland. Wetland narrow channel to river.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: — (in.)
Depth to Free Water in Pit: 20 (in.)
Depth to Saturated Soil: 6 (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
✓ Saturated in Upper 12 Inches
✓ Water Marks
✓ Drift Lines
✓ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
✓ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): _____ Drainage Class: PD

Taxonomy (Subgroup): _____ Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Typical	Flood plain	with	Layers		
of usl	intermixed	with	layers of		
ls - usl	- 10YR 3/2		ls - 2.5Y 5/4		
all	mixed to	surface	- 5YR 5/6		

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ✓ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ✓ High Organic Content in Surface Layer in Sandy Soils
- ✓ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Typical Flood plain soil

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point Within a Wetland? (Circle) (Yes) No

Remarks: Flags 1 - 7 = Flood plain - PFO1E
WETLAND EXTENDS INTO open field.
Flags 8 - 11 = Flood plain - PFO1E
Flags 12 - 22 - Ct of ditch - 2'-3' wide.
only few carex in center, intermittent, scoured Channel

[*Classification of Wetlands and Deepwater Habitats of the United States*
U.S. Department of the Interiors, Fish & Wildlife Service, Dec. 1979]

P - PALUSTRINE - Freshwater Systems

- RB - ROCK BOTTOM
  - 1 - BEDROCK
  - 2 - RUBBLE
- UB - UNCONSOLIDATED BOTTOM
  - 1 - COBBLE GRAVEL
  - 2 - SAND
  - 3 - MUD
  - 4 - ORGANIC
- AB - AQUATIC BED
  - 1 - ALGAL
  - 2 - AQUATIC MOSS
  - 3 - ROOTED VASCULAR
  - 4 - FLOATING VASCULAR
  - 5 - *UNKNOWN SUBMERGENT*
  - 6 - *UNKNOWN SURFACE*
- US - UNCONSOLIDATED SHORE
  - 1 - COBBLE GRAVEL
  - 2 - SAND
  - 3 - MUD
  - 4 - ORGANIC
  - 5 - VEGETATED
- ML - MOSS-LICHEN
  - 1 - MOSS
  - 2 - LICHEN
- EM - EMERGENT
  - 1 - PERSISTENT
  - 2 - NONPERSISTENT
- SS - SCRUB-SHRUB
  - 1 - BROAD-LEAVED DECIDUOUS
  - 2 - NEEDLE-LEAVED DECIDUOUS
  - 3 - BROAD-LEAVED EVERGREEN
  - 4 - NEEDLE-LEAVED EVERGREEN
  - 5 - DEAD
  - 6 - DECIDUOUS
  - 7 - EVERGREEN
- FO - FORESTED
  - 1 - BROAD-LEAVED DECIDUOUS
  - 2 - NEEDLE-LEAVED DECIDUOUS
  - 3 - BROAD-LEAVED EVERGREEN
  - 4 - NEEDLE-LEAVED EVERGREEN
  - 5 - DEAD
  - 6 - DECIDUOUS
  - 7 - EVERGREEN
- OW - OPEN WATER
  - *UNKNOWN BOTTOM*

MODIFIERS

WATER REGIME

NON-TIDAL

- A - TEMPORARILY FLOODED
- B - SATURATED
- C - SEASONALLY FLOODED
- D - *SEASONALLY FLOODED WELL DRAINED*
- E - *SEASONALLY FLOODED SATURATED*
- F - SEMIPERMANENTLY FLOODED
- G - INTERMITENTLY EXPOSED
- H - PERMANENTLY FLOODED
- J - INTERMITTENTLY FLOODED
- K - ARTIFICIALLY FLOODED
- W - INTERMITTENTLY FLOODED TEMPORARY
- Y - SATURATED SEMIPERMANENT SEASONAL
- Z - INTERMITTENTLY EXPOSED PERMANENT
- U - *UNKNOWN*

SPECIAL MODIFIERS

- b - Beaver
- d - Partially drained - ditched
- f - Farmed
- h - Diked/Impounded
- r - Artificial Substrate
- s - Spoil
- x - Excavated

APPENDIX B
FLOOD MAP

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWN OF
BRISTOL,
NEW HAMPSHIRE
GRAFTON COUNTY

PANEL 1 OF 7
(SEE MAP INDEX FOR PANELS NOT PRINTED)

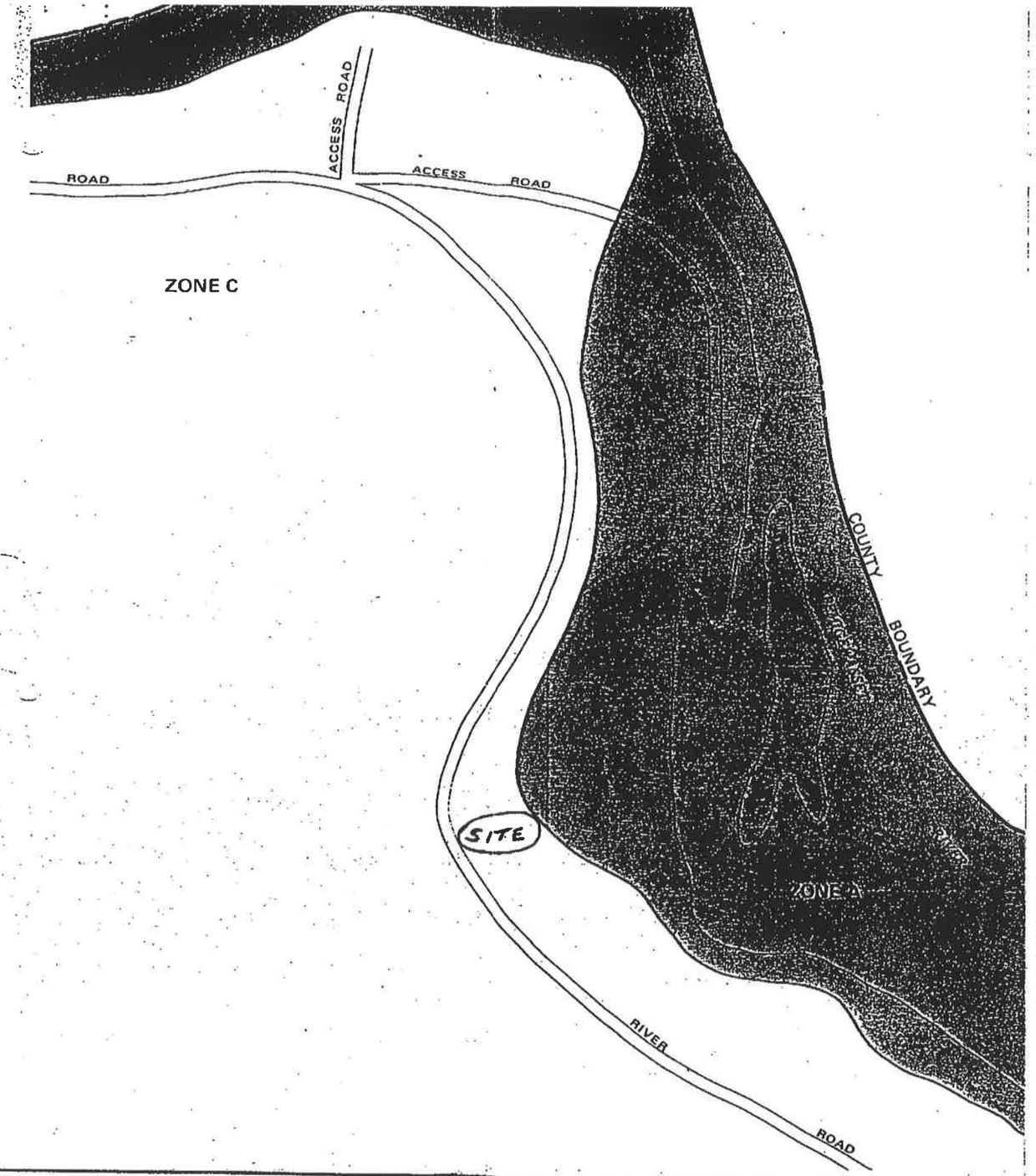
COMMUNITY-PANEL NUMBER
330047 0001 B

EFFECTIVE DATE:
APRIL 15, 1980

U.S. DEPARTMENT OF HOUSING
AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

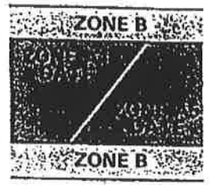
INITIAL IDENTIFICATION:
JUNE 21, 1974

FLOOD HAZARD BOUNDARY MAP REVISIONS:
SEPTEMBER 26, 1975



KEY TO MAP

500-Year Flood Boundary
100-Year Flood Boundary
Zone Designations* With Date of Identification e.g., 12/2/74
100-Year Flood Boundary
500-Year Flood Boundary



Base Flood Elevation Line With Elevation In Feet** — 513

Base Flood Elevation in Feet Where Uniform Within Zone** (EL 987)

Elevation Reference Mark RM7×

River Mile • M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
AO	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For adjoining map panels, see separately printed Index To Map Panels.

Provan & Lorber, Inc.
ENGINEERS AND PLANNERS
Post Office Box 167
Littleton, NH 03561
(603) 444-6301

TOWN OF NEW HAMPTON
LANDFILL CLOSURE
BRISTOL, NEW HAMPSHIRE

FLOOD MAP

APPENDIX C
HELP MODEL ANALYSIS OF LANDFILL CAPPING SYSTEM CROSS-SECTION

NEW HAMPTON LANDFILL CLOSURE - 11% SLOPE
BRISTOL, NEW HAMPSHIRE
JANUARY 19, 1996

GOOD GRASS

LAYER 1

LATERAL DRAINAGE LAYER

THICKNESS	=	4.00 INCHES
POROSITY	=	0.3762 VOL/VOL
FIELD CAPACITY	=	0.2029 VOL/VOL
WILTING POINT	=	0.1157 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2029 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.000077699995 CM/SEC
SLOPE	=	11.00 PERCENT
DRAINAGE LENGTH	=	150.0 FEET

LAYER 2

BARRIER SOIL LINER

THICKNESS	=	6.00 INCHES
POROSITY	=	0.4096 VOL/VOL
FIELD CAPACITY	=	0.2466 VOL/VOL
WILTING POINT	=	0.1353 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4096 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.000009500000 CM/SEC

LAYER 3

LATERAL DRAINAGE LAYER

THICKNESS	=	12.00 INCHES
POROSITY	=	0.4570 VOL/VOL
FIELD CAPACITY	=	0.0831 VOL/VOL
WILTING POINT	=	0.0326 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0831 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.003100000089 CM/SEC
SLOPE	=	11.00 PERCENT
DRAINAGE LENGTH	=	150.0 FEET

BARRIER SOIL LINER

THICKNESS	=	0.04 INCHES
POROSITY	=	0.0400 VOL/VOL
FIELD CAPACITY	=	0.0300 VOL/VOL
WILTING POINT	=	0.0200 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0400 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.000000000000 CM/SEC

LAYER 5

VERTICAL PERCOLATION LAYER

THICKNESS	=	12.00 INCHES
POROSITY	=	0.4570 VOL/VOL
FIELD CAPACITY	=	0.1309 VOL/VOL
WILTING POINT	=	0.0580 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0580 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.001000000047 CM/SEC

LAYER 6

VERTICAL PERCOLATION LAYER

THICKNESS	=	12.00 INCHES
POROSITY	=	0.4530 VOL/VOL
FIELD CAPACITY	=	0.1901 VOL/VOL
WILTING POINT	=	0.0848 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0848 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.000720000011 CM/SEC

LAYER 7

VERTICAL PERCOLATION LAYER

THICKNESS	=	240.00 INCHES
POROSITY	=	0.5200 VOL/VOL
FIELD CAPACITY	=	0.2942 VOL/VOL
WILTING POINT	=	0.1400 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1400 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.000199999995 CM/SEC

GENERAL SIMULATION DATA

SCS RUNOFF CURVE NUMBER	=	72.00
TOTAL AREA OF COVER	=	25000. SQ FT
EVAPORATIVE ZONE DEPTH	=	18.00 INCHES
UPPER LIMIT VEG. STORAGE	=	1.5048 INCHES
INITIAL VEG. STORAGE	=	0.6238 INCHES

INITIAL VEG. STORAGE = [illegible]
INITIAL SNOW WATER CONTENT = 0.0000 INCHES
INITIAL TOTAL WATER STORAGE IN SOIL AND WASTE LAYERS = 40.4008 INCHES

SOIL WATER CONTENT INITIALIZED BY PROGRAM.

CLIMATOLOGICAL DATA

DEFAULT RAINFALL WITH SYNTHETIC DAILY TEMPERATURES AND SOLAR RADIATION FOR CONCORD NEW HAMPSHIRE

MAXIMUM LEAF AREA INDEX = 3.30
START OF GROWING SEASON (JULIAN DATE) = 136
END OF GROWING SEASON (JULIAN DATE) = 271

NORMAL MEAN MONTHLY TEMPERATURES, DEGREES FAHRENHEIT

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
19.90	22.20	32.10	44.10	55.20	64.70
69.50	67.30	59.10	48.20	37.30	24.50

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 77 THROUGH 81

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	3.48	2.71	2.75	3.20	2.83	2.59
	2.73	3.56	3.20	4.23	2.87	2.76
STD. DEVIATIONS	3.49	2.92	1.36	0.76	1.41	1.09
	1.84	0.53	2.02	1.72	0.65	1.42
RUNOFF						
TOTALS	0.434	0.470	1.254	0.577	0.632	0.134
	0.348	0.565	0.697	1.213	0.509	0.381
STD. DEVIATIONS	0.747	0.800	1.032	0.572	0.834	0.107
	0.365	0.463	0.789	1.048	0.331	0.389
EVAPOTRANSPIRATION						
TOTALS	0.572	0.671	1.464	2.223	1.645	2.296
	2.189	2.638	1.762	1.756	1.087	0.534
STD. DEVIATIONS	0.194	0.148	0.240	0.335	0.460	0.915
	1.222	0.240	0.758	0.206	0.156	0.122
LATERAL DRAINAGE FROM LAYER 1						
TOTALS	0.0003	0.0003	0.0008	0.0003	0.0001	0.0000

	0.0000	0.0001	0.0002	0.0004	0.0002	0.0003

PERCOLATION FROM LAYER 2

TOTALS	0.7720	0.9397	2.6243	0.7468	0.4277	0.3510
	0.1892	0.3403	0.7200	1.1918	0.9769	1.3839
STD. DEVIATIONS	1.1997	1.2057	1.2301	0.6552	0.2534	0.2865
	0.2402	0.2689	0.5950	0.7119	0.4511	1.0864

LATERAL DRAINAGE FROM LAYER 3

TOTALS	1.0944	0.7954	1.7169	1.4886	0.9307	0.5969
	0.3530	0.3244	0.3647	0.8735	0.8690	1.2903
STD. DEVIATIONS	0.5151	0.6226	0.6524	0.6141	0.4859	0.2635
	0.1679	0.1256	0.2507	0.5469	0.5843	0.7717

PERCOLATION FROM LAYER 4

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

PERCOLATION FROM LAYER 7

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 77 THROUGH 81

	(INCHES)		(CU. FT.)	PERCENT
PRECIPITATION	36.92	(8.359)	76917.	100.00
RUNOFF	7.215	(3.083)	15030.	19.54
EVAPOTRANSPIRATION	18.836	(2.158)	39242.	51.02
LATERAL DRAINAGE FROM LAYER 1	0.0029	(0.0015)	6.	0.01
PERCOLATION FROM LAYER 2	10.6635	(4.6205)	22216.	28.88
LATERAL DRAINAGE FROM LAYER 3	10.6977	(4.0113)	22287.	28.98
PERCOLATION FROM LAYER 4	0.0000	(0.0000)	0.	0.00
PERCOLATION FROM LAYER 7	0.0000	(0.0000)	0.	0.00
CHANGE IN WATER STORAGE	0.169	(1.350)	352.	0.46

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PEAK DAILY VALUES FOR YEARS 77 THROUGH 81

	(INCHES)	(CU. FT.)
PRECIPITATION	2.43	5062.5
RUNOFF	1.747	3640.6
LATERAL DRAINAGE FROM LAYER 1	0.0005	1.0
PERCOLATION FROM LAYER 2	0.4456	926.3
HEAD ON LAYER 2	3.4	
LATERAL DRAINAGE FROM LAYER 3	0.1041	216.9
PERCOLATION FROM LAYER 4	0.0000	0.0
HEAD ON LAYER 4	10.0	
PERCOLATION FROM LAYER 7	0.0000	0.0
SNOW WATER	6.39	13320.9

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.3762
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.1068

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FINAL WATER STORAGE AT END OF YEAR 81

LAYER	(INCHES)	(VOL/VOL)
1	1.15	0.2864
2	3.28	0.4096
3	2.81	0.2342
4	0.00	0.0400
5	0.70	0.0580
6	1.02	0.0848
7	33.60	0.1400
SNOW WATER	0.55	

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APPENDIX D
SLOPE STABILITY AND MAINTENANCE VEHICLE LOADING CALCULATIONS

Provan & Lorber Inc.
(603) 746-3220 Contoocook NH
(603) 444-6301 Littleton NH
(802) 476-8343 Barre VT

JOB New Hampton Landfill
JOB # 394.01
CALCULATED BY LNK DATE 5/19/95
CHECKED BY _____ DATE _____
SHEET NO. 1 OF 3

Interface Sliding Slope Stability Analysis

A 40 mil smooth HDPE membrane is to be welded into a continuous sheet. The membrane is to drape the entire solid waste disposal area (graded in a dome-like fashion). No top of slope anchor trenches are proposed. Bearing load of membrane cover soils will prevent sheet slippage / potential for failure plane between base of membrane and underlying buffer Sand.

Stability Calculation:

For membrane / Sand interface

Assume infinite slope conditions

Failure is by sliding along soil / membrane interface

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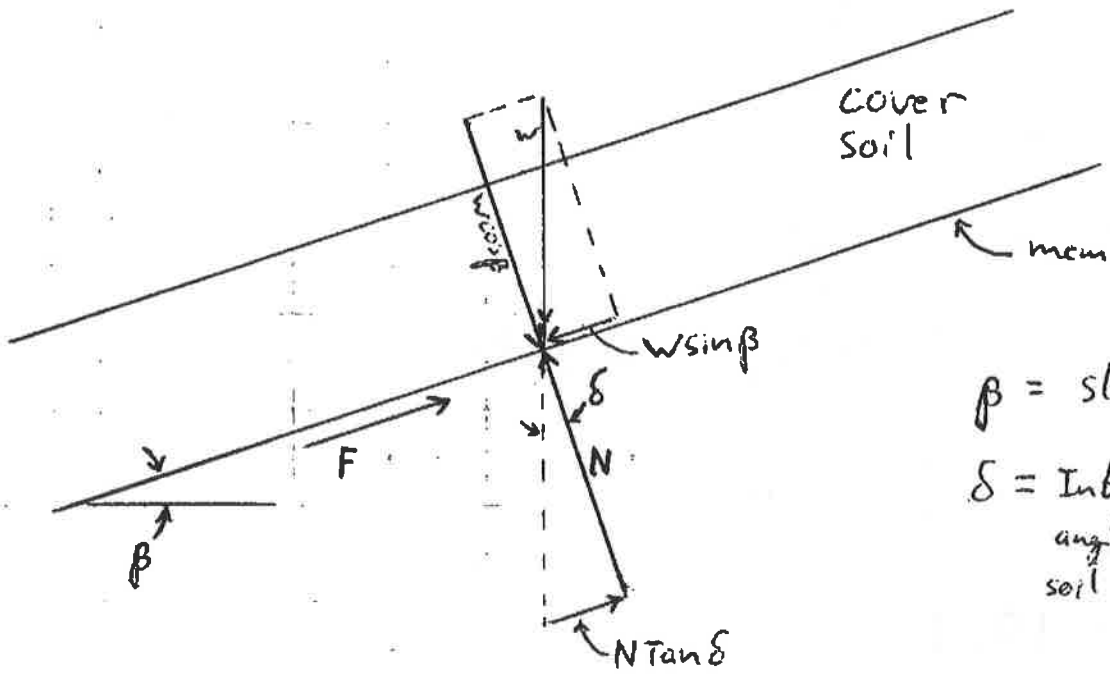
JOB New Hampton Landfill
JOB # 394.01
CALCULATED BY LNK DATE 5/19/95
CHECKED BY DATE
SHEET NO. 2 OF 3



β = slope angle

δ = Interface friction angle between soil and membrane

Factor of Safety, $FS = \frac{\text{Resisting Force}}{\text{Driving Force}} = \frac{F}{w \sin\beta}$

$FS = \frac{N \tan\delta}{w \sin\beta}$ $\quad N = w\cos\beta$

$FS = \frac{w \cos\beta \tan\delta}{w \sin\beta} = \left(\frac{\cos\beta}{\sin\beta}\right)(\tan\delta)$ $\quad \frac{\cos\beta}{\sin\beta} = \frac{1}{\tan\beta}$

$FS = \frac{\tan\delta}{\tan\beta}$

For a slope of 4.5 ft : 1 V, slope angle $\beta = 12.53°$

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JOB New Hampton Landfill
JOB # 394.01
CALCULATED BY LMC DATE 5/19/95
CHECKED BY _____ DATE _____
SHEET NO. 3 OF 3

Use a FS = 1.5

Solve for δ

$$\tan\delta = FS(\tan\beta)$$

$$\tan\delta = 1.5[\tan(12.53)] = 0.3333$$

$$\delta = \tan^{-1}[0.3333]$$

$$\delta = 18.4^\circ$$

Use $\delta = 18^\circ$

Typical soil to membrane friction angles range from 17° to 18° for HDPE Geomembranes ("Designing with geosynthetics", Koerner 1994)

Specifications call for direct shear testing of supplied membrane, free draining sand, and silt in accordance with ASTM-D-5321-92 to demonstrate a 1.5 min. factor of Safety against slope failure.

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JOB New Hampton Landfill
JOB # 394.01
CALCULATED BY LNK DATE 5/19/95
CHECKED BY _____ DATE _____
SHEET NO. 1 OF 1

Calculation of Load Bearing Capacity of Capping System

Gross vehicle weight = 5000 lbs.
Tire to surface contact area = 9" × 4" = 36 in.² each

Each tire carries 1250 lbs.

Puncture resistance of 40 mil smooth membrane = $\frac{52 \text{ lbs}}{0.098 \text{ in.}^2} = 530 \text{ psi}$

Soil Thickness = 2'
γ of soil = 125 pcf

$$\frac{125}{1}\frac{\text{lbs}}{\text{ft.}^3} \times \frac{2}{1}\text{ ft} \times \frac{1 \text{ ft.}^2}{144 \text{ in.}^2} \cong 2 \text{ psi}$$

Using 2:1 rule, compute equivalent load area @ liner:

Length @ liner = 9" + 2' = 2'-9" = 33"
width @ liner = 4" + 2' = 2'-4" = 28"

$A_L = 33 \times 28 = 924 \text{ in.}^2$

Load @ liner = $\frac{1250 \times 2}{923} + 2 = 5$ psi

5 psi << 530 psi ∴ O.K.

Gundle

BEARING PRESSURES ON LINER

One of the most frequently asked questions in the process of landfill design and construction concerns the depth of cover soil to be placed over top of the liner to protect it from loads applied. Even the process of placing the cover soils can subject the plastic flexible membrane to forces that are fairly high but short lived. This short paper will present a brief method for calculating the vertical pressures on a geomembrane and a calclation for determining the allowable stresses in the liner as a function of thickness. The barrier layer determined as a result of this calculation should be viewed as a minimum. Other factors not considered in this calculation may include but are not limited to, incidental fires that can occur as a result of burning trash requiring a thicker cover soil for a thermal barrier, thickness of the liner as a function of tensile stresses due to settlement and other loading conditions.

Geomembrane Puncture Load

The values listed in our liner specifications for the puncture load of the various thicknesses were determined through testing using FTMS 101B, Method 2065. A probe with a rounded point having a radius equal to one-eighth of an inch is pushed through the test specimen at a rate of 20 inches per minute. With a known surface area in contact with the liner, the value reported is a puncture load. In order to use this value as a basis for comparison for the loads applied, it is necessary to divide the load from the specifications by the surface area over which it is applied.

$$\text{Area of 1/2 Sphere} = 2\pi r^2$$

$$\text{Radius of Probe} = 1/8"$$

$$\text{Area} = 2\pi (1/8)^2$$

$$= 2\pi (.125)^2$$

$$= 0.098 \text{ in}^2$$

APPENDIX E
GAS VENT SPACING CALCULATIONS

Provan & Lorber Inc.
(603) 746-3220 Contoocook NH
(603) 444-6301 Littleton NH
(802) 476-8343 Barre VT

JOB New Hampton - Landfill spacing
JOB # 394.01
CALCULATED BY LMC DATE 5/19/95
CHECKED BY _____ DATE _____
SHEET NO. 1 OF 3

Methane Gas Production

Calculate weight of solid waste:

Average depth of Landfill = 25 feet
footprint area of Landfill = 100,917 feet^2

Volume = 2,522,925 feet.^{3}
= 93,441.7 yd.^{3}

40% of volume is soil, 60% is waste

Volume = 0.60(93,441.7) = 56,065 yd.^{3}
density of waste = 1000 lbs./yd.^{3} ①

Weight = 56,065,000 lbs.

Calculate Methane Production:

Typical Landfills generate 0.02 - 0.10 $\frac{\text{ft.}^3 \text{ of } CH_4}{\text{year. lbs.}}$ ②

Use 0.05

56,065,000 (0.05) = 2,803,250 ft.^{3} of CH_4/year

① "Professional Engineers Reference Manual", p. 8-31
② "Designing with geosynthetics", Robert Koerner, p. 563

Provan & Lorber Inc.
(603) 746-3220 Contoocook NH
(603) 444-6301 Littleton NH
(802) 476-8343 Barre VT

JOB New Hampton - Landfill - Spacing
JOB # 394.0
CALCULATED BY CMC DATE 5/19/95
CHECKED BY _____ DATE _____
SHEET NO. 2 OF 3

$2,803,250 \left(\frac{1}{365}\ \frac{\text{year}}{\text{days}}\right) = 7,680.1\ \text{ft.}^3\ \text{of CH}_4/\text{day}$

Calculate CH$_4$ volume released per square foot of landfill surface area:

$$\frac{7,680.1}{100,917\ \text{ft.}^2} = \boxed{0.076\ \frac{\text{ft.}^3\ \text{of CH}_4}{\text{day} \cdot \text{ft.}^2\ \text{of landfill}}}$$

Consider an area of 200 ft.^{2}: 200' long, 1' wide

flow rate, $q_{200} = 0.076(200) = 15.22\ \text{ft.}^3/\text{day} = 0.011\ \frac{\text{ft.}^3}{\text{min.}}$

Using Darcy's Formula:

$$q = kiA$$

$$q = ki(t \times w)$$

$$kt = \Theta_{req'd} = \frac{q}{i \times w}$$

where:
q = flowrate
i = critical slope
w = section width
t = section thickness
k = permeability coeff.
Θ = transmissivity

$$\Theta_{req'd} = \frac{0.011}{0.05(1)} = 0.22\ \frac{\text{ft.}^3}{\text{min} \cdot \text{ft.}}$$

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JOB New Hampton - Landfill spacing
JOB # 394.01
CALCULATED BY LMK DATE 5/22/95
CHECKED BY ____ DATE ____
SHEET NO. 3 OF 3

How much gas can the buffer sand transmit with a coefficient of permeability of 1×10^{-3} cm/sec. over a 200 ft.^{2} area with a slope of 0.05?

$$0.001 \frac{cm}{sec.}\left(\frac{1 \text{ foot}}{30.48 \text{ cm}}\right)\left(\frac{60 \text{ sec.}}{1 \text{ min.}}\right) = 0.002 \text{ ft./min.}$$

$$q = kiA = 0.002(0.05)(200) = 0.02 \text{ ft.}^3/\text{min.}$$

Only need 0.011 ft.^{3}/min. so O.K.

$$\theta_{Sand} = \frac{0.02}{0.05(1)} = 0.4 \frac{\text{ft.}^3}{\text{min} \cdot \text{ft.}}$$

Factor of Safety, $FS = \frac{\theta_{sand}}{\theta_{req'd}} = \frac{0.4}{0.22} = 1.8$

Determine the maximum distance for a factor of Safety = 1.5

$$FS = \frac{\theta_{sand}}{\theta_{req'd}} \Rightarrow \theta_{req'd} = \frac{\theta_{sand}}{FS} = \frac{0.4}{1.5} = 0.027$$

$$q = 0.027(0.05)(1) = 0.013 \text{ ft.}^3/\text{min.} = 19.2 \text{ ft.}^3/\text{day}$$

$$0.076(x) = 19.2$$

$$\boxed{X = 252.6 \text{ ft.}}$$

APPENDIX F
UNDERDRAIN CAPACITY AND TRENCH WALL INFLOW

Provan & Lorber Inc.
(603) 746-3220 Contoocook NH
(603) 444-6301 Littleton NH
(802) 476-8343 Barre VT

JOB New Hampton Landfill Closure
JOB # 394.01
CALCULATED BY GSW DATE 1/31/96
CHECKED BY VRT DATE 1/31/96
SHEET NO. 1 OF 1

Calculation of Minimum Capacity of 8" CPE Underdrain:

$A = \pi r^2$ $\quad R = \frac{A}{P} = \frac{.35}{\pi\ 8/12} = .167$

$= 3.14 \left(\frac{4}{12}\right)^2$

$= 0.35\ \square'$

$V = \frac{1.486}{n} R^{2/3} S^{1/2}$

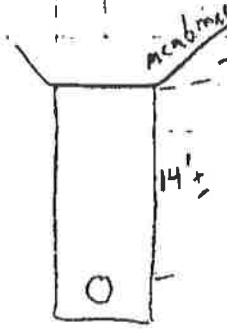
Assumed minimum hydraulic grade line = 2% pipe slope plus 1'/100' head = 3%

$V = \frac{1.486}{.016} (.167)^{.67} (.03)^{.5}$

$V = 4.85\ ft/sec$

$Q = AV = 0.35\ ft^2 \times \frac{4.85\ ft}{sec} \times \frac{60\ sec}{min} \times \frac{7.48\ gal}{ft^3} = 76.2\ gal/min$

Calculation of Estimated Trench Wall Inflow To Underdrain:



$K \approx 1.0 \times 10^{-4}$ cm/sec (med. - fine sand, some silt)

Area = 583 FT × 14 FT = 8162 ft^2

$Q = KiA$

$Q = \left(\frac{.0001\ cm}{sec} \times \frac{1\ in}{2.54\ cm} \times \frac{1\ ft}{12\ in} \times \frac{60\ sec}{min}\right)(0.20)(8162\ FT^2)$

$= 0.32 \frac{ft^3}{min} \times \frac{7.48\ gal}{ft^3} = 2.40\ gal/min.$

APPENDIX G
STATEMENT OF PROBABLE CONSTRUCTION COST

Date 6/22/95

STATEMENT OF PROBABLE CONSTRUCTION COST

PROJECT: NEW HAMPTON LANDFILL CLOSURE, BRISTOL, NH

PROJECT NO: 394.01 OWNER: TOWN OF NEW HAMPTON

PREPARED BY: PROVAN & LORBER, INC. PREPARER: GSW

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT COST ($)	TOTAL COST ($)
1.00	SILT FENCE	670.0	L.F	2.50	1675.00
2.00	HAY BALE SEDIMENT BARRIER	670.0	L.F.	2.50	1675.00
3.00	CLEAR & GRUB (LIGHT DEN.)	1.0	AC.	500.00	500.00
4.00	GAS MONITORING PROBES	6.0	EA.	300.00	1800.00
5.00	STRIP & ON-SITE DISPOSAL UNSUITABLE SUBGRADE MAT.	3062.0	C.Y.	2.50	7655.00
6.00	GRAVEL DRIVE & F. ACCESS	373.0	C.Y	10.00	3730.00
7.00	EXTEND PIEZOMETERS	4.0	EA.	100.00	400.00
8.00	18" DIA. CULVERT	50.0	L.F.	31.00	1550.00
9.00	RELOCATE WASTE MATERIALS	3660.0	C.Y.	5.00	18300.00
10.00	COM EARTH EXC. & ON-SITE REFILL/COMPACTION-SUBGRAD	3000.0	C.Y.	2.50	7500.00
11.00	COM EARTH EXC. & ON-SITE REFILL/COMPACTION-INT.COV	1424.0	C.Y.	2.50	3560.00
12.00	INTERMEDIATE COVER BORROW	2314.0	C.Y.	5.00	11570.00
13.00	SAND BUFFER BORROW	4414.0	C.Y.	8.00	35312.00
14.00	40-MIL TEXTURED HDPE	13242.0	S.Y.	4.05	53630.10
15.00	GEONET	2275.0	S.Y.	4.50	10237.50
16.00	COVER SYTEM DRAINS	1504.0	L.F.	15.00	22560.00
17.00	STABILIZATION FABRIC	1800.0	S.Y.	1.50	2700.00

18.00	FREE DRAINING SAND	4471.0	C.Y.	8.00	35768.00
19.00	CRUSHED GRAVEL	160.0	C.Y.	14.00	2240.00
20.00	CLASS C STONE	174.0	C.Y.	15.00	2610.00
21.00	SILT BORROW	3540.0	C.Y.	10.00	35400.00
22.00	4" PULP SLUDGE/SOIL ADMIX SEED & MULCH	18373.0	S.Y.	1.00	18373.00
23.00	UNDERDRAIN	583.0	L.F.	25.00	14575.00
24.00	TRAP ROCK	172.0	C.Y.	15.00	2580.00
25.00	LIGHT RIPRAP	240.0	C.Y.	20.00	4800.00
26.00	CHECK DAMS	12.0	EA.	250.00	3000.00
27.00	GAS VENTS	7.0	EA.	1500.00	10500.00
28.00	SETTLEMENT MONUMENTS	10.0	EA.	150.00	1500.00
29.00	CHAIN LINK FENCE	500.0	L.F.	10.00	5000.00
30.00	PERIMETER MARKERS	34.0	EA.	30.00	1020.00
31.00	GUIDE RAIL	510.0	L.F.	12.00	6120.00
32.00	BOLLARDS	0.0	EA.	30.00	0.00
33.00	GATES	1.0	EA.	250.00	250.00
34.00	SIGNS	5.0	EA.	100.00	500.00
35.00	BENCH MARKS	2.0	EA.	250.00	500.00
36.00	AS-BUILT SURVEY	1.0	EA.	1500.00	1500.00
	TOTAL				$ 330590.60

DESIGN/BID/CONSTRUCTION PHASE ENGINEERING	$ 63000.00
POST-CLOSURE OPERATION & MAINTENANCE MANUAL	1500.00
PROPERTY SURVEY	3600.00
COORDINATION & PERMITS	1150.00
PERMIT FEES	250.00
GEOTECHNICAL/GEOMEMBRANE INDEPENDENT TESTING	20000.00
ADVERTISEMENTS & MISC. LEGAL EXPENSES	5000.00
CONTINGENCY (10% OF CONSTRUCTION)	33000.00
TOTAL PROJECT COST	458090.60

USDA–SCS SOIL SURVEY LEGEND

ID	DESCRIPTION
35A	ADAMS LOAMY SAND, 0 TO 3 PERCENT
35E	ADAMS LOAMY SAND, 15 TO 60 PERCENT
57D	BECKET FINE SANDY LOAM, 15 TO 20 PERCENT VERY STONY
299	UDORTHENTS, SMOOTHED
613	CROGHAN LOAMY FINE SAND
210	ONDAWA

RECORD DRAWINGS

THESE RECORD DRAWINGS WERE PREPARED BY PROVAN & LORBER, INC. USING THE BEST AVAILABLE FIELD MEASUREMENTS, SURVEY, AND INFORMATION PROVIDED BY OTHERS. THE ACCURACY OF THE INFORMATION IS NOT WARRANTED. THE LANDFILL CLOSURE WAS CONSTRUCTED IN ACCORDANCE WITH THE N.H. SOLID WASTE RULES AND THE APPROVED FINAL PLANS
WMD LOG# 1996-00052
AND 1996-00185

ROAD

RIVER

EXISTING SOLID WASTE FOOTPRINT
110172 SQ. FT. 2.53 ACRES

T.B.M. BOTTOM RING AT S.W. GATE POST OF ENTRANCE GATE – APPPROXIMATE USGS ELEVATION 500.0

NEW HOUSE

APPROX. LOCATION OF EXIST. SUBSURFACE DISPOSAL SYSTEM

SITE PLAN

0 30' 60' 90'
SCALE IN FEET
1" = 30'

RECORD PLAN

BORING AND GROUNDWATER ELEVATION DATA

LOCATION	TOP OF CASING ELEVATION		GROUND ELEVATION	3/15/95 WATER TABLE ELEVATION	MAX. MEASURED WATER TABLE ELEVATION/DATE		BOT. REFUSE ELEVATION	REFUSAL ELEVATION	BOT. BORING ELEVATION
MW#1	509.64	METAL	506.39	497.22	499.65	6/93	–	480.99?	480.99
MW#2	459.95	METAL	456.74	454.58	455.96	7/87	–	–	411.54
MW#3	462.57	METAL	458.60	455.82	457.17	8/87	–	–	398.10
MW#4	460.59	METAL	458.6±	453.49	455.19	7/87	–	–	418.0±
PZ#1	510.99	METAL	507.77	480.24	481.19	6/93	482.8±	–	472.77
PZ#2	493.45	METAL	490.43	485.76	486.23	6/93	472.0±	–	458.47
PZ#3	507.54	METAL	503.96	467.62	468.52	6/93	470.6±	–	463.96±
PZ#4	500.0±	METAL	497.3±	470.0	470.0±	3/95	474.3±	–	467.3±
B-1	–		504.76	–	–		481.3±	–	477.76
B-2	–		499.52	–	–		471.0±	–	467.52
B-3	–		496.80	–	–		468.3±	–	464.80
B-4	–		428.5±	–	–		–	485.9±	485.9±
B-5 (PZ)	502.5±	PVC	500.2±	493.9	493.9±	3/95	–	483.7±	483.7±
B-6	–		501.0±	–	–		–	485.5±	485.5±
B-7	–		494.2±	–	–		474.2±	–	470.2
B-8 (PZ)	507.1±	PVC	504.1±	494.2	494.3±	3/95	–	479.1±	479.1±

1. FOR ADDITIONAL INFORMATION SEE GROUNDWATER PERMIT APPLICATION

NO.	DATE	REVISION	ENG. DWG.

Provan & Lorber, Inc.
ENGINEERS AND PLANNERS

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TOWN OF NEW HAMPTON
NEW HAMPSHIRE
LANDFILL CLOSURE
BRISTOL, NH

EXISTING CONDITIONS PLAN

DATE 11/17/96	PROJ. NO 79.04
ENG. BY GSW	DRWN. BY DEB
CHKD. BY SML	DRWG. NO 1104
SHEET 4 OF 8	

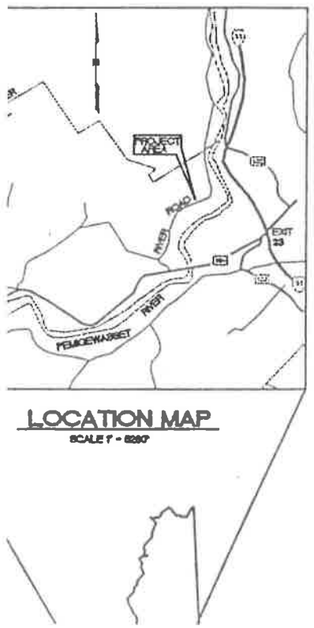
›WN OF NEW HAMPTON

NEW HAMPSHIRE

LANDFILL CLOSURE

BRISTOL, NEW HAMPSHIRE

RECORD PLANS



LOCATION MAP

SCALE 1" = 6280'

BOARD OF SELECTMEN

LAURENCE BLOOD
MARK DENONCOUR
HORACE BOYNTON

ENGINEER/SURVEYOR

PROVAN AND LORBER, INC.
P.O. BOX 389

SHEET INDEX

GENERAL LEGEND

ENGINEERING

EXISTING		PROPOSED
	INDEX CONTOUR (10 FOOT INTERVAL)	580
	INTERMEDIATE CONTOUR (2 FOOT INTERVAL)	
435.67	SPOT ELEVATION	421.70
	TRAVERSE POINT	NA
	WETLAND FLAGGING	NA
	IRON PIPE FOUND	NA
	IRON ROD FOUND	NA

R — CROSS-SECTION IDENTIFICATION
7 — CROSS-SECTION LOCATION
SHEET NUMBER

DRAINAGE AND EROSION CONTROL

EXISTING		PROPOSED
	CULVERT/STORM DRAIN	
NA	SEDIMENT FENCE	
NA	COMBINATION SEDIMENT FENCE/ HAYBALE BARRIER	
NA	TRAP ROCK OR RIPRAP	
NA	TRAP ROCK CHECK DAM	
NA	UNDERDRAIN	
	DRAINAGE DITCH	NA

BOUNDARIES

EXISTING		PROPOSED
P / L	PROPERTY LINE	P / L
	SOLID WASTE BOUNDARY	
	WETLAND BOUNDARY	NA
	100 YEAR FLOOD BOUNDARY	NA
299 / 36A	SOILS BOUNDARY	NA
NA	MEMBRANE COVER SYSTEM LIMITS	

UTILITIES

EXISTING		PROPOSED
	UTILITY POLE WITH GUY WIRE	NA
	OVERHEAD ELECTRICAL/ TELEPHONE LINES	NA

GENERAL CULTURE

EXISTING		PROPOSED
	GRAVEL DRIVE	
	BUILDING	NA
	WOODS LINE	
	FENCE	NA
NA	GUARD RAIL	
NA	SIGN	
NA	FARM GATE	

CLOSURE AND MONITORING SYSTEMS

EXISTING		PROPOSED
M.W. #1	MONITORING WELL LOCATION	NA
PZ #2	PIEZOMETER LOCATION	NA
TP #5	TEST PIT LOCATION	NA
B-3	BORING LOCATION	NA
	LEACHATE SEEPAGE	NA
NA	PASSIVE GAS VENT	
NA	SOLID WASTE RELOCATION RECEIVING AREA	
NA	SOLID WASTE TO BE REMOVED TO FULL DEPTH AND RELOCATED	
NA	SILT SOIL DITCH LINING	
NA	GEOTEXTILES/GEONET DRAINAGE COMPOSITE	
NA	GAS MONITORING PROBE	G
NA	COVER DRAIN	
NA	SETTLEMENT MONUMENT	
NA	GRANITE MONUMENT BENCH MARK	
NA	COVER SYSTEM PERIMETER MARKER	

PLAN REFERENCES

1. USDA - SOIL CONSERVATION SERVICE SOIL SURVEY DESCRIPTIONS ARE AS PROVIDED BY GRAFTON COUNTY CONSERVATION DISTRICT, FEBRUARY 28, 1995.
2. PROBABLE MAXIMUM FLOOD ELEVATION (AYERS ISLAND HYDRO ELECTRIC DAM) IS PER PUBLIC SERVICE OF NEW HAMPSHIRE APRIL 10, 1995. NO 100 YEAR FLOOD INFORMATION COULD BE OBTAINED FROM THE STATE OF NEW HAMPSHIRE OFFICE OF EMERGENCY MANAGEMENT.
3. PROPERTY LINE INFORMATION IS APPROXIMATE BASED ON LIMITED FIELD EVIDENCE AND TOWN OF BRISTOL, NH TAX MAPS. PROPERTY SURVEY AND SUBDIVISION AND/OR EASEMENT ACQUISITIONS ARE ON-GOING.
4. TOPOGRAPHIC SURVEY BASED ON APPROXIMATE USGS DATUM. POST CLOSURE AS-BUILT SURVEY AND RECORD DRAWINGS WILL TIE TO USGS SURVEY CONTROL.

RECORD DRAWINGS

THESE RECORD DRAWINGS WERE PREPARED BY PROVAN & LORBER, INC. USING THE BEST AVAILABLE FIELD MEASUREMENTS, SURVEY, AND INFORMATION PROVIDED BY OTHERS. THE ACCURACY OF THE INFORMATION IS NOT WARRANTED.

THE LANDFILL CLOSURE WAS CONSTRUCTED IN ACCORDANCE WITH THE N.H. SOLID WASTE RULES AND THE APPROVED FINAL PLANS
WMD LOG# 1996-00052
AND 1996-00185

NOTE:
IN ORDER TO MINIMIZE EROSION RISK, PLACEMENT OF SUCCESSIVE COVER SYSTEM COURSES SHALL BEGIN AS SOON AS POSSIBLE FOLLOWING PLACEMENT OF PRECEDING COURSE, BUT IN ALL CASES COMPLETION SHALL BE WITHIN 2 WEEKS OF PLACEMENT OF PRECEDING COURSE. PLACEMENT OF ALL COVER SYSTEM COURSES (I.E. INTERMEDIATE COVER THROUGH TOPSOILING) SHALL OCCUR WITHIN A 2 MONTH PERIOD.

GENERAL NOTES

1. THE DESIGN DRAWINGS SUBMITTED BY PROVAN & LORBER, INC. ARE BASED ON TOPOGRAPHIC SURVEYS AND LIMITED SUBSURFACE INVESTIGATIONS. ACTUAL CONDITIONS ENCOUNTERED IN THE FIELD DURING CONSTRUCTION MAY REQUIRE DESIGN MODIFICATIONS. PROVAN & LORBER, INC. CANNOT BE HELD ACCOUNTABLE FOR SYSTEM FAILURES WHEN CONSTRUCTION ACTIVITIES ARE NOT CONTINUOUSLY MONITORED BY OUR RESIDENT CONSTRUCTION ENGINEERS. FURTHERMORE, PROVAN & LORBER, INC. WILL NOT BE HELD ACCOUNTABLE FOR SYSTEM FAILURES WHERE CONSTRUCTION ACTIVITIES DEVIATE FROM THOSE SPECIFIED REGARDING MATERIALS AND WORKMANSHIP.
2. ALL CONSTRUCTION SHALL CONFORM TO THE REQUIREMENTS INDICATED BY THESE DRAWINGS, THE GENERAL PROVISIONS OF CONTRACT (INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS), THE PROJECT TECHNICAL SPECIFICATIONS, AND ALL APPLICABLE REGULATORY STATUES AND PERMIT CONDITIONS.
3. CONSTRUCTION PRACTICES SHALL COMPLY WITH ALL APPLICABLE LABOR SAFETY STANDARDS INCLUDING BUT NOT LIMITED TO ALL STATUES AND RULES IMPLEMENTED BY THE NEW HAMPSHIRE DEPARTMENT OF LABOR AND ALL REGULATIONS ADMINISTERED BY THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA). CONTRACTOR IS RESPONSIBLE FOR FURNISHING A PROJECT SPECIFIC CONSTRUCTION PHASE HEALTH AND SAFETY PLAN MEETING ALL APPLICABLE REGULATORY REQUIREMENTS.
4. LIMIT OF CONSTRUCTION FOR NON-PAVED AREAS SHALL BE THE LESSER OF THE MOST DOWN-GRADIENT SEDIMENT FENCE/HAY BALE SEDIMENT BARRIER SHOWN; OR 15 FEET BEYOND THE LIMIT OF FINAL GRADING INDICATED BY THE FINAL GRADING PLAN CONTOURS.
5. ALL EXISTING DIRT, GRAVEL, OR PAVED TRAVELED WAYS DAMAGED BY THE CONTRACTOR'S ACTIONS SHALL BE RESTORED BY THE CONTRACTOR WITHOUT ADDITIONAL COMPENSATION.
6. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR CONTROLLING EROSION IN ALL AREAS DISTURBED BY HIS ACTIONS. COSTS FOR REQUIRED EROSION CONTROL, REGARDLESS OF WHETHER OR NOT SUCH MEASURES ARE SHOWN ON THE ENGINEERING DRAWINGS, SHALL BE BORNE BY HIM. THE CONTRACTOR SHALL REPAIR ALL WORK AREAS AND WORK IMPACTED AREAS DAMAGED BY EROSION OF AND SEDIMENTATION FROM THE WORK FOR THE DURATION OF THE CONTRACT/WARRANTY PERIOD.
7. NO EXISTING MONUMENTS, BOUNDS, OR BENCHMARKS SHALL BE DISTURBED WITHOUT FIRST MAKING PROVISIONS FOR RELOCATION.
8. ALL WORK SHALL BE PERFORMED WITHIN THE PROPERTY OF, AND EASEMENTS SECURED BY, THE OWNER.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DATA COLLECTION AND PREPARATION OF RECORD DRAWINGS.
10. LOCATIONS OF UNDERGROUND UTILITIES ARE APPROXIMATE. UTILITY LOCATIONS ARE BASED ON THE BEST AVAILABLE INFORMATION. THE CONTRACTOR IS RESPONSIBLE FOR LOCATION AND PROTECTION OF EXISTING UTILITIES AND SHALL REPAIR ANY DAMAGE AS QUICKLY AS POSSIBLE AT HIS OWN EXPENSE. THE CONTRACTOR SHALL MAINTAIN A SUPPLY OF REPAIR CLAMPS, PIPES, AND OTHER NECESSARY REPAIR ITEMS ON THE JOB SITE AT ALL TIMES IN ORDER TO MINIMIZE THE INCONVENIENCE CAUSED BY DAMAGE. ALL UTILITIES ENCOUNTERED SHALL BE LOCATED BY DEPTH AND TIES AND SHOWN BY THE CONTRACTOR ON HIS "AS BUILT" DRAWINGS. HAND EXCAVATION SHALL BE DONE WHEREVER UNDERGROUND UTILITIES ARE SHOWN OR ANTICIPATED BY THE CONTRACTOR. THE CONTRACTOR SHALL CONTACT THE APPROPRIATE AUTHORITIES PRIOR TO ANY CONSTRUCTION IN ORDER TO VERIFY EXISTING CONDITIONS AND UTILITY LOCATIONS.
11. THE OWNER SHALL RETAIN A NEW HAMPSHIRE LICENSED PROFESSIONAL ENGINEER TO BE RESPONSIBLE FOR RESIDENT ENGINEERING SERVICES THROUGHOUT THE CONSTRUCTION PERIOD. THE ENGINEERS NAME AND QUALIFICATIONS SHALL BE SUBMITTED TO THE NHDES-WMD PRIOR TO COMMENCING CONSTRUCTION.

CONSTRUCTION SEQUENCING AND NOTES

1. THE CONSTRUCTION SEQUENCE TO FOLLOW IS INTENDED TO MEET NHDES-WMD SOLID WASTE RULES REGULATORY SUBMITTAL REQUIREMENT PART ENV-WM 309.03 SUB-PARAGRAPH (H). IT IS NOT THE ENGINEER'S INTENT TO DICTATE THE CONTRACTOR'S MEANS, METHODS OR SCHEDULE. ALTERNATIVE CONSTRUCTION SEQUENCING WILL BE CONSIDERED BY THE ENGINEER THROUGH THE CONSTRUCTION PHASE SUBMITTAL PROCESS.
2. INSTALL ALL DOWN-GRADIENT WORK AREA PERIMETER SILT FENCE AND SEDIMENT BARRIERS PRIOR TO COMMENCING SITE CLEARING AND GRUBBING OPERATIONS. CONTRACTOR SHALL INSPECT ALL EROSION CONTROL MEASURES DURING AND FOLLOWING SIGNIFICANT PRECIPITATION EVENTS AND SHALL HAVE SILT REMOVED FROM SEDIMENT BARRIERS AS WARRANTED. AT A MINIMUM, EROSION CONTROL MEASURES SHALL BE INSPECTED AND SERVICED WEEKLY.
3. CLEAR, GRUB AND PROPERLY DISPOSE OF ALL VEGETATION, STUMPS, ROOTS, AND OTHER DEBRIS FROM AREAS WITHIN THE PROPOSED GRADING LIMITS. ALL CLEARED AND GRUBBED MATERIALS SHALL BE DISPOSED OF OFF SITE UNLESS OTHERWISE APPROVED, IN WRITING, BY ENGINEER'S RESIDENT PROJECT REPRESENTATIVE.
4. CONFIRM EXISTING SOLID WASTE BOUNDARY BY EXCAVATING TEST PITS EVERY 100± FEET ALONG LANDFILL PERIMETER. TEST PITS ARE TO BE WITNESSED AND DOCUMENTED BY ENGINEER'S RESIDENT PROJECT REPRESENTATIVE. CONFIRMED SOLID WASTE BOUNDARY TO BE FIELD STAKED BY CONTRACTOR.
5. INSTALL LANDFILL GAS MONITORING PROBES.
6. REMOVE (AND STORE) FENCING FROM ALONG RIVER ROAD RIGHT-OF-WAY WHERE NECESSARY TO ALLOW CLOSURE CONSTRUCTION.
7. COMMENCE EARTH/WASTE MOVING OPERATIONS. ONLY THE SMALLEST PRACTICAL WORKING AREA OF THE SITE SHALL BE DISTURBED AT ANY GIVEN TIME.
8. EXCAVATE WASTE MATERIALS FROM AREAS BEYOND PROPOSED MAXIMUM SOLID WASTE LIMIT. RE-DISPOSE THESE WASTES IN AN ACCEPTABLE RECEIVING AREA WITHIN THE PROPOSED MAXIMUM SOLID WASTE LIMIT AND COMPACT THOROUGHLY. REFILL EXCAVATION TO APPLICABLE SURFACE TREATMENT SUBGRADE WITH COMPACTED COMMON EARTH SUITABLE FILL.
9. GRADE AREA WITHIN THE PROPOSED MAXIMUM SOLID WASTE LIMIT TO INDICATED SUBGRADE ELEVATIONS AND SMOOTH CONTOUR.
10. ONCE SUBGRADE ELEVATIONS HAVE BEEN ACHIEVED WITHIN THE PROPOSED MAXIMUM SOLID WASTE LIMIT, PLACE AND COMPACT INTERMEDIATE COVER AND GRADE TO A SMOOTH CONTOUR.
11. ROUGHEN INTERMEDIATE COVER SURFACE BY OPERATING TRACKED MACHINERY UP AND DOWN.
12. INSTALL GAS VENTS.
13. STRIP TOPSOIL AND UNSUITABLE MATERIALS FROM AREA BETWEEN PROPOSED MAXIMUM SOLID WASTE LIMIT AND PROPOSED GRADING LIMIT. LEGALLY DISPOSE OF ALL UNSUITABLE MATERIALS OFF SITE.
14. CONSTRUCT ROCK LINED OUTLET CHANNEL DOWN-GRADIENT OF PROPOSED 18" CULVERT.
15. CONSTRUCT RELOCATED GRAVEL DRIVE AND FIELD ACCESS.
16. CONSTRUCT PERIMETER DITCHES, BERMS, AND EMBANKMENTS SUBGRADES.
17. CONSTRUCT UNDERDRAIN AND RELOCATED STREAM CHANNEL SUBGRADE.
18. INSTALL ROCK CHECK DAMS WHERE INDICATED OR WARRANTED. REINSTALL CHECK DAMS FOLLOWING PLACEMENT OF ADDITIONAL COVER SYSTEM COURSES.
19. PLACE, GRADE AND COMPACT RELOCATED STREAM CHANNEL SAND BUFFER.
20. INSTALL RELOCATED STREAM CHANNEL MEMBRANE LINER.
21. SEAM/LEAK TEST RELOCATED STREAM CHANNEL MEMBRANE LINER AND REPAIR AS NECESSARY.
22. INSTALL RELOCATED STREAM CHANNEL GEOTEXTILES/GEONET COMPOSITE.
23. INSTALL RELOCATED STREAM CHANNEL CLASS C STONE.
24. INSTALL RELOCATED STREAM CHANNEL LIGHT RIPRAP.
25. PLACE AND COMPACT SAND BUFFER.
26. PLACE AND COMPACT NORTHERLY, WESTERLY AND SOUTHERLY PERIMETER DITCH SILT LAYER.
27. EXCAVATE COVER ANCHOR AND DRAIN TRENCHES.
28. FINE GRADE SAND BUFFER AND INSTALL MEMBRANE COVER.
29. INSTALL GAS VENT AND PIEZOMETER PIPE BOOTS.
30. SEAM/LEAK TEST MEMBRANE COVER AND REPAIR AS NECESSARY.
31. INSTALL STABILIZATION FABRIC IN AREA TO RECEIVE RIPRAP SLOPE STABILIZATION.
32. INSTALL DRAIN TRENCH FILTER FABRIC.
33. INSTALL DRAIN PIPE AND SCREENED GRAVEL ENVELOPE.
34. INSTALL CRUSHED GRAVEL BEDDING AND RIPRAP SLOPE STABILIZATION.
35. INSTALL NORTHERLY PERIMETER DITCH GEOTEXTILES/GEONET COMPOSITE.
36. INSTALL NORTHERLY PERIMETER DITCH CRUSHED GRAVEL.
37. PLACE AND COMPACT FREE DRAINING SAND.
38. ROUGHEN FREE DRAINING SAND SURFACE BY OPERATING TRACKED MACHINERY UP AND DOWN SLOPE.
39. INSTALL SETTLEMENT MONUMENTS.
40. PLACE AND COMPACT 6" SILT LAYER. PROTECT SILT FROM ADVERSE WEATHER. SEQUENCE PLACEMENT TO TOPSOIL SILT PRIOR TO THE NEXT SIGNIFICANT ADVERSE WEATHER EVENT OR APPLY HEAVY MULCH AS SHORT-TERM PROTECTION.
41. ROUGHEN SILT LAYER BY OPERATING TRACKED MACHINERY UP AND DOWN SLOPE.
42. INSTALL TRAP ROCK OUTLET LINING AT ALL COVER DRAIN OUTFALLS.
43. INSTALL TRAP ROCK CHANNEL LINING IN SOUTHERLY PERIMETER DITCH AND WITHIN 18" CULVERT INLET SUMP.
44. INSTALL MEMBRANE PERIMETER MARKING SYSTEM.
45. INSTALL GUARD RAILS, FARM GATE AND SIGNS. REINSTALL RIVER ROAD RIGHT-OF-WAY FENCE.
46. TOPSOIL (4"), SEED AND MULCH ALL AREAS DISTURBED BY CONTRACTOR'S ACTIVITIES, EXCEPT WHERE OTHER SURFACE TREATMENTS ARE INDICATED.
47. CONDUCT SITE CLEAN-UP. ONCE PERMANENT VEGETATION HAS ESTABLISHED, REMOVE ALL TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES. RESTORE SURFACES AS WARRANTED.

RECORD PLAN

NO.	DATE	REVISION	ENG'G
1	1/29/96	PROVEN GENERAL SITE PLAN AND CONSTRUCTION NOTES 11, 12, 13, AND 47.	GW / DH

Provan & Lorber, Inc.
ENGINEERS AND PLANNERS

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Northern Regional Office
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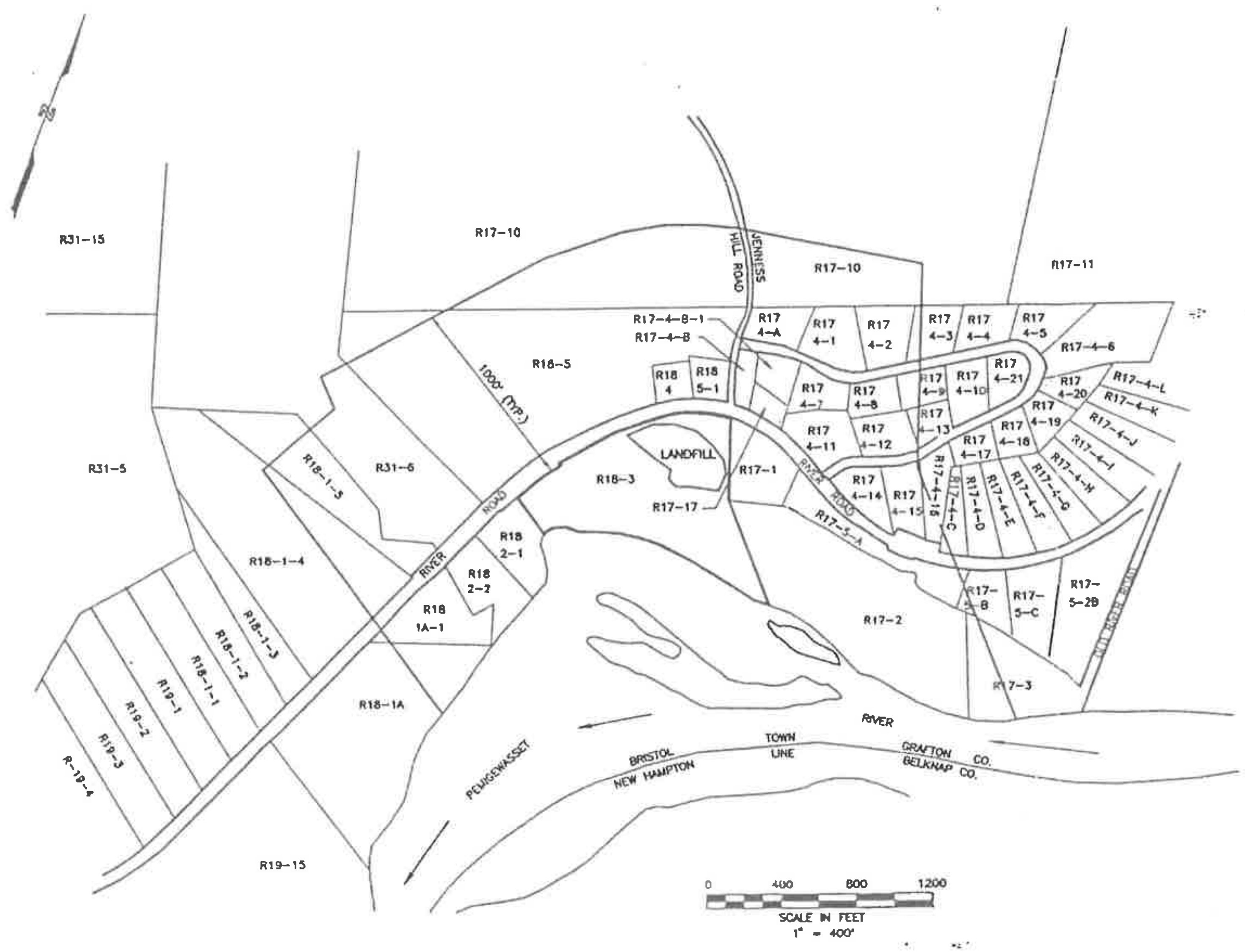
(603) 444-6301

TOWN OF NEW HAMPTON
NEW HAMPSHIRE
LANDFILL CLOSURE
BRISTOL, NH

GENERAL LEGEND AND NOTES

DATE 11/17/95	PROJ. NO 192.04
ENG. BY JRT	DRWN. BY WJR
CHKD. BY SML	DRWG. NO 1104
SHEET 2 OF 8	



ABUTTER'S LIST

Map #	Lot #		Owner's Name & Mailing Address
R18	1A		Mark Jenness Post Office Box 498 Bristol, NH 03222
R18	1A-1		Richard Wolenda c/o Bank of New Hampshire Central Square Bristol, NH 03222
R18	2-2		John S. & Sandra A. Faro RR2, Box 123, River Road Bristol, NH 03222
R18	2-1		John S. & Sandra A. Faro RR2, Box 123, River Road Bristol, NH 03222
R18	3		Theodore E. Rivest, Jr. RFD #2, Box 377 Plymouth, NH 03264
R17	1		Mitchell & Mary Jenness RFD #2 Plymouth, NH 03264
R17	5A		Mary E. Mofing 33 Lexington Ave., Apt. 6 Cambridge, MA 02138
R17	2		Ronald M. & Marcelle Abear Marjorie Glidden Trust 39 Higgins Road Meredith, NH 03253
R17	5B	1/2	Normand Belanger 65 Chase Road Londonderry, NH 03053
R17	5B	1/2	Joseph S. & John L. Tedeschi RR 2, Box 524 Bristol, NH 03222
R18	1-4		Leo W. Gilpatric SR #1, Box 60 Bristol, NH 03222
R18	1-5		Holly Jenness Post Office Box 416 New Hampton, NH 03256
R31	6		Ronald Benz 235 Elm Street North Reading, MA 01864
R18	5		Barbara J. Wood RRD, Box 503 Bristol, NH 03222
R18	4		Rhonda L. Downing RFD #2, Box 126 Bristol, NH 03222
R18	5-1		Arnold A. & Sandra F. Cote RFD 2 Bristol, NH 03222
R17	10		Ronald Benz 235 Elm Street North Reading, MA 01864
R17	4-B		Kerry J. & Elizabeth R. Mattson RR2, Box 142B Bristol, NH 03222
R17	4-B-1		Kerry J. & Elizabeth R. Mattson RR2, Box 142B Bristol, NH 03222
R17	4-1		Doreen & Dennis Mellon Post Office Box 195 Bristol, NH 03222
R17	4-2	1/2	Adelle A. Robinson 1243 Beacon Street Brookline, MA 02146
R17	4-2	1/2	Paul & Janice Robinson Post Office Box 7449 Ann Harbor, MI 48107
R17	4-3		Alan P. & Linda M. Faro Box 73 Bristol, NH 03222
R17	4-4		Michael F. Macri RFD #2, Box 565, Jenness Hill Bristol, NH 03222
R17	4-7		Kerry J. & Elizabeth Mattson RFD #2, Box 142B Bristol, NH 03222
R17	4-8		Peter D. Tedeschi 47 Lafayette Avenue Hingham, MA 02043
R17	4-9		Steven P. & Lisa M. White RR2, Box 127A Bristol, NH 03222
R17	4-11, 4-12 4-13, 4-15		David Robinson Post Office Box 510 River Road Weare, NH 03261
R17	4-14		David C. Field 448 Revere Beach Boulevard Revere, MA 02151
R17	4-16		Adelle A. Robinson 1243 Beacon Street Brookline, MA 02146
R17	4C	1/2	Lance & Rita Amabile 133 River Road Bristol, NH 03222
R17	4C	1/2	Martha F. Kuplin RR2, Box 133A, River Road Bristol, NH 03222
R17	4A		Doreen & Dennis Mellon Post Office Box 195 Bristol, NH 03222
R17	3		Lynne Spiegel RFD #2, Box 527 Bristol, NH 03222
R17	17		Patricia Avery RFD #2, Box 512 Bristol, NH 03222

RECORD DRAWINGS

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THE LANDFILL CLOSURE WAS CONSTRUCTED IN ACCORDANCE WITH THE N.H. SOLID WASTE RULES AND THE APPROVED FINAL PLANS WMD LOG# 1996-00052 AND 1998-00185

NO.	DATE	REVISION	ENG	DWG

RECORD PLAN

Provan & Lorber, Inc.
ENGINEERS AND PLANNERS

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Northern Regional Office
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Littleton, NH 03561
(603) 444-0301

TOWN OF NEW HAMPTON
NEW HAMPSHIRE
LANDFILL CLOSURE
BRISTOL, NH

AREA MAP

DATE	PROJ. NO
11/17/96	792.04
ENG. BY CSW	DRWN. BY DEB
CHKD. BY SML	DRWG. NO 1104

USDA–SCS SOIL SURVEY LEGEND

ID	DESCRIPTION
35A	ADAMS LOAMY SAND, 0 TO 3 PERCENT
35E	ADAMS LOAMY SAND, 15 TO 60 PERCENT
570	BECKET FINE SANDY LOAM, 15 TO 20 PERCENT VERY STONY
299	UDORTHENTS, SMOOTHED
613	CROGHAN LOAMY FINE SAND
210	OMDAWA

RECORD DRAWINGS

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ROAD

RIVER

EXISTING SOLID WASTE FOOTPRINT
110172 SQ. FT. 2.53 ACRES

PZ-1 PZ-2 PZ-3 PZ-4

B-1 B-2 B-3 B-4 B-5 B-6 B-7 B-8

TP1 TP2 TP3 TP4 TP5 TP6 TP7 TP8

TRAV #20 TRAV #21 TRAV #22

APPROX. WELL TILE LOCATION

T.B.M. BOTTOM RING AT S.W. GATE POST OF ENTRANCE GATE – APPPROXIMATE USGS ELEVATION 500.0

GRAVEL DRIVE

EXIST. GATE

NEW HOUSE

APPROX. LOCATION OF EXIST. SUBSURFACE DISPOSAL SYSTEM

570 35A 35E 299 36A 36C 613 210

SITE PLAN

0 30' 60' 90'
SCALE IN FEET
1" = 30'

BORING AND GROUNDWATER ELEVATION DATA

LOCATION	TOP OF CASING ELEVATION	GROUND ELEVATION	3/15/95 WATER TABLE ELEVATION	MAX. MEASURED WATER TABLE ELEVATION/DATE	BOT. REFUSAL ELEVATION	REFUSAL ELEVATION	BOT. BORING ELEVATION
MW#1	509.64 METAL	506.39	497.22	499.65 5/93	–	480.99?	480.99
MW#2	459.95 METAL	456.74	454.58	455.98 7/87	–	–	411.54
MW#3	482.57 METAL	458.60	455.82	457.37 8/87	–	–	398.10
MW#4	460.86 METAL	458.6±	453.49	455.19 7/87	–	–	419.0±
PZ#1	510.99 METAL	507.77	480.24	481.19 5/93	482.8±	–	472.77
PZ#2	493.45 METAL	490.47	465.70	466.23 5/93	472.0±	–	458.47
PZ#3	507.54 METAL	503.96	467.62	468.52 5/93	470.5±	–	463.96±
PZ#4	508.5± METAL	497.3±	470.0	470.0± 5/95	474.5±	–	467.3±
B-1	–	504.76	–	–	481.3±	–	477.76
B-2	–	499.52	–	–	471.0±	–	467.52
B-3	–	496.80	–	–	468.3±	–	464.80
B-4	–	496.9±	–	–	–	485.9±	485.9±
B-5 (PZ)	502.5± PVC	500.2±	493.9	493.9± 3/95	–	483.7±	483.7±
B-6	–	501.0±	–	–	–	485.5±	485.5±
B-7	–	494.2±	–	–	474.2±	–	470.2
B-8 (PZ)	507.1± PVC	504.1±	494.3	494.2± 3/95	–	479.1±	479.1±

1. FOR ADDITIONAL INFORMATION SEE GROUNDWATER PERMIT APPLICATION

RECORD PLAN

NO.	DATE	REVISION	ENG. INIT.

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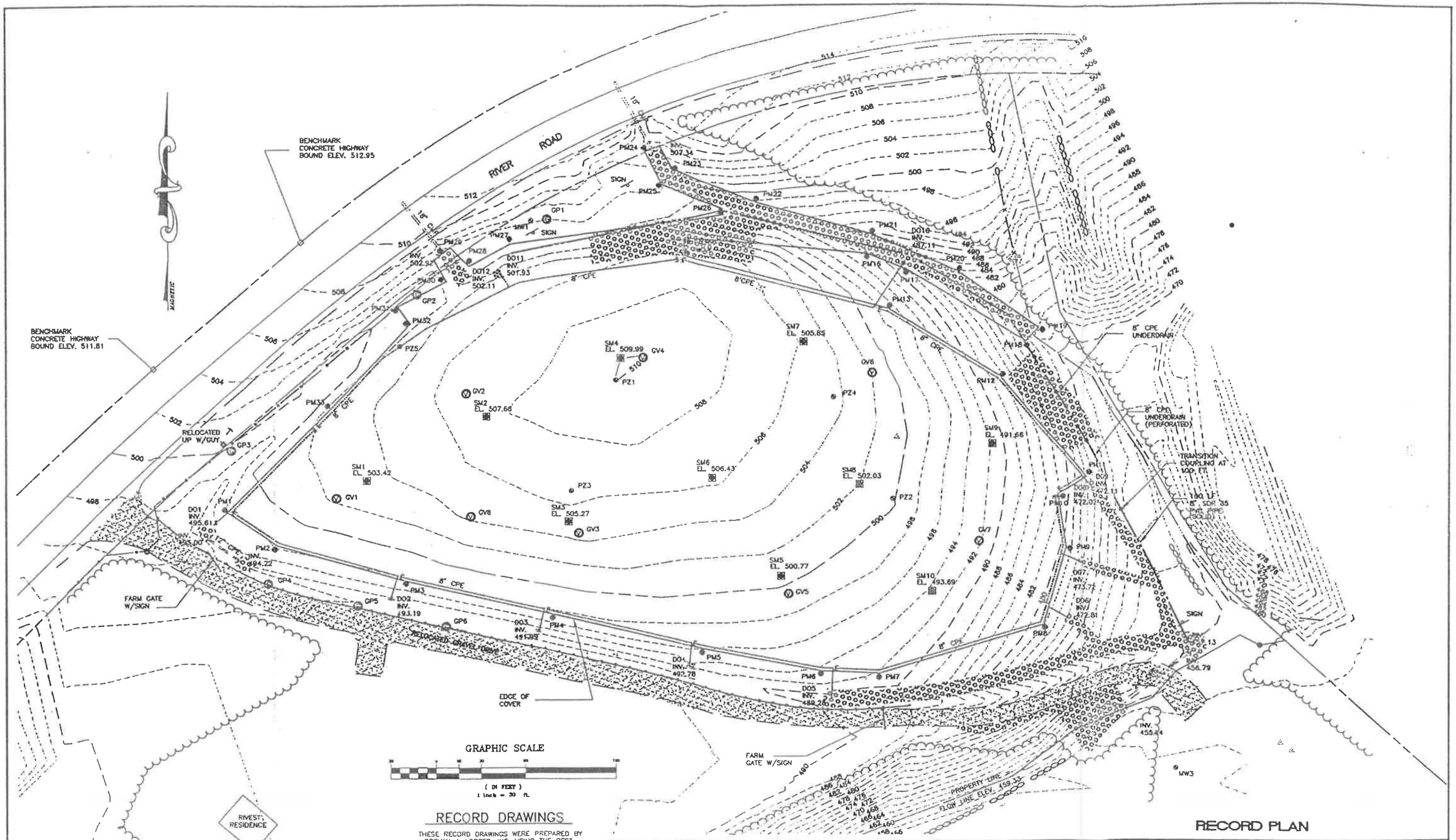
TOWN OF NEW HAMPTON
NEW HAMPSHIRE
LANDFILL CLOSURE
BRISTOL, NH

EXISTING CONDITIONS PLAN

DATE	PROJ. NO.
11/17/96	92.04
ENG. BY	DRWN. BY
GSW	DEB
CHKD. BY	DRWG. NO.
SML	1104



RECORD DRAWINGS

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THE LANDFILL CLOSURE WAS CONSTRUCTED IN ACCORDANCE WITH THE N.H. SOLID WASTE RULES AND THE APPROVED FINAL PLANS WMD LOGS 1996-00052 AND 1996-00185

NO.	DATE	REVISION	ENGINEER

Provan & Lorber, Inc.
ENGINEERS AND PLANNERS
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Northern NH Office: PO Box 187, Gilmanton, NH 03237 (603) 364-5324
Vermont Office: 7 Main St., Montpelier, VT 05602 (802) 229-1482

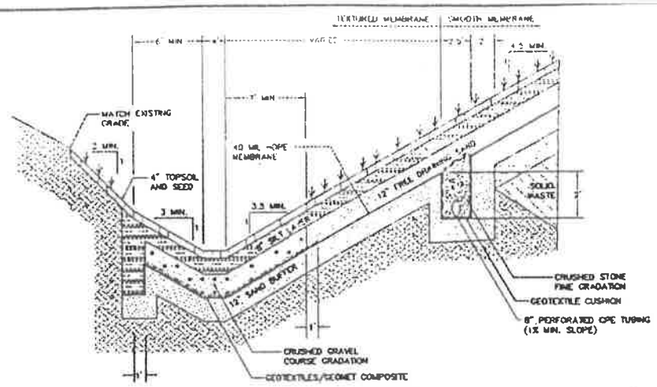
RECORD PLAN

TOWN OF NEW HAMPTON
NEW HAMPTON, NH
LANDFILL CLOSURE
BRISTOL, NH

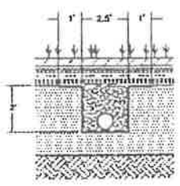
FINAL GRADING PLAN

DATE	PROJ. NO.
11-17-96	792.04
ENG. BY	DRWN. BY
JRH	WJR
CHKD. BY	DRWG. NO.
SAV	1104

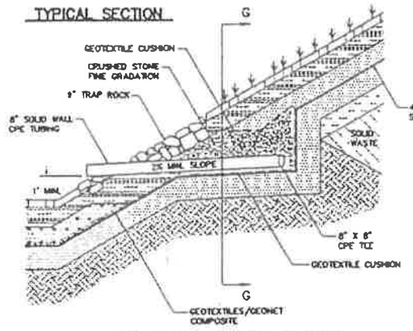
SHEET 5 OF 8



TYPICAL SECTION



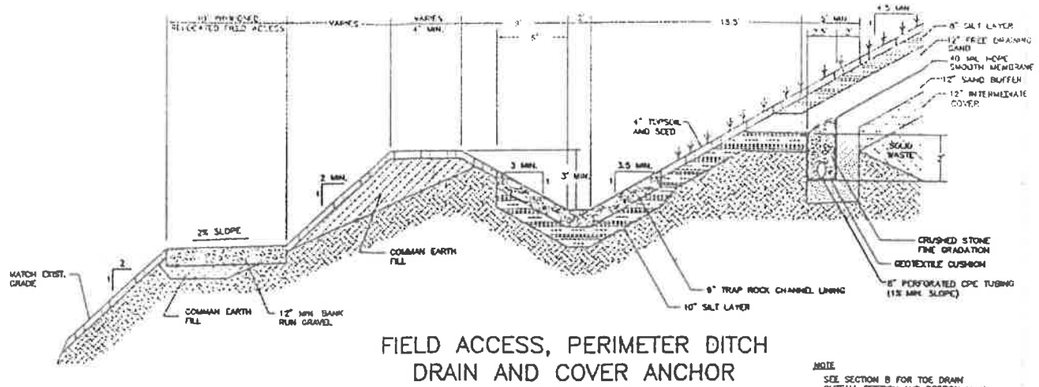
SECTION G-G



TOE DRAIN OUTFALL SECTION

PERIMETER DITCH, DRAIN AND COVER ANCHOR SECTION A

NOT TO SCALE



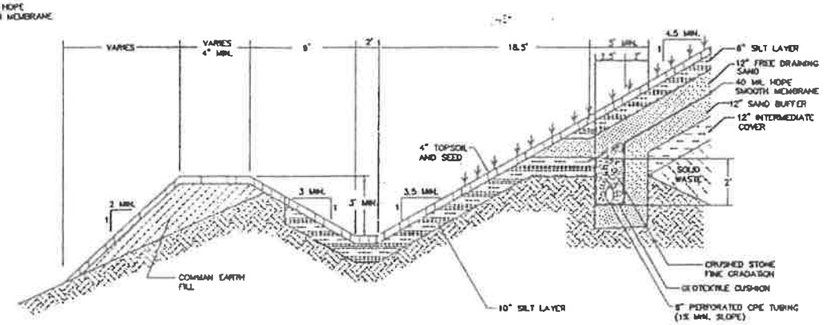
FIELD ACCESS, PERIMETER DITCH DRAIN AND COVER ANCHOR SECTION C

NOT TO SCALE

NOTE
SEE SECTION B FOR TOE DRAIN OUTFALL SECTION AND SECTION H-H

NOTES

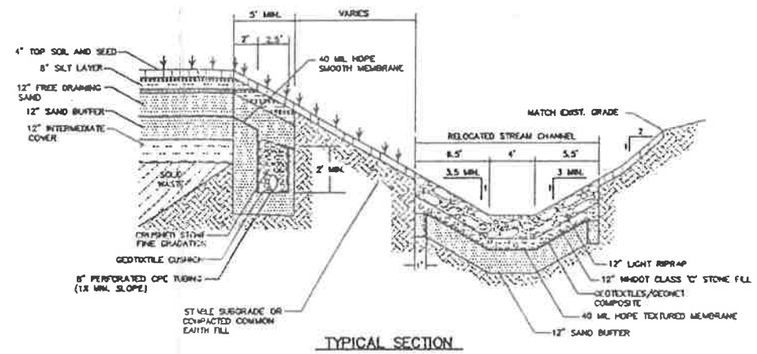
1. COVER DRAIN TRENCH GEOMETRIES, THIS SHEET, ARE DEPICTED AS RECTANGULAR AND REPRESENT MINIMUM CRITERIA. INSTALLED TRENCH GEOMETRY WILL DEPEND ON CONTRACTOR'S MEANS AND METHODS, AND MAXIMUM ANGLE OF REPOSE OF FURNISHED SAND BUFFER MATERIAL AT INSTALLED MOISTURE CONTENT AND COMPACTION. CONTRACTOR'S UNIT PRICE BID FOR COVER DRAIN, INCLUSIVE OF CRUSHED STONE AND FILTER FABRIC COSTS, SHALL BE RELATIVE TO CONTRACTOR'S ANTICIPATED TRENCH GEOMETRY.
2. 12" FREE DRAINING SAND COURSE THICKNESS REPRESENTS MINIMUM ACCEPTABLE COURSE THICKNESS ATOP GEOSYNTHETICS. SHOULD CONTRACTOR, FOR EASE OF CONSTRUCTION, ELECT TO INSTALL A THICKER COURSE, ADDITIONAL THICKNESS COSTS SHALL BE INCLUDED IN THE COVER SYSTEM UNIT PRICE BID.



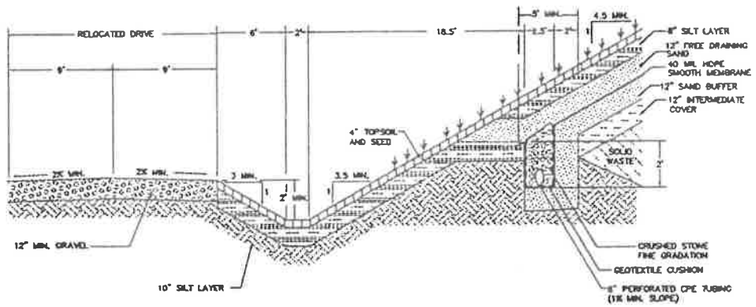
DRAIN, COVER ANCHOR AND, SLOPE PROTECTION SECTION D

NOT TO SCALE

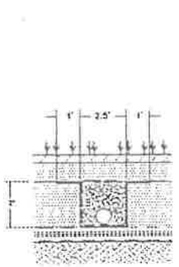
NOTE
SEE SECTION B FOR TOE DRAIN OUTFALL SECTION AND SECTION H-H



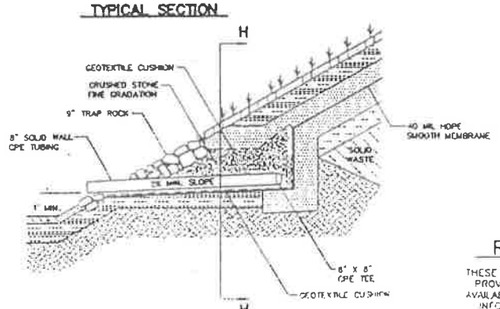
TYPICAL SECTION



TYPICAL SECTION



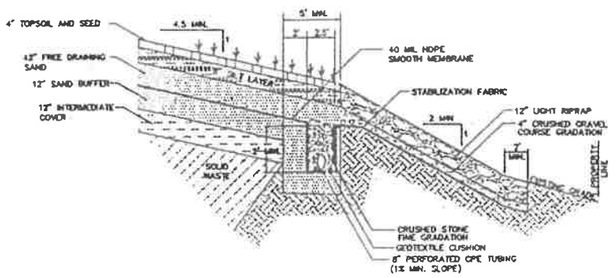
SECTION H-H



TOE DRAIN OUTFALL SECTION

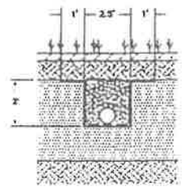
DRIVE, PERIMETER DITCH, DRAIN AND COVER ANCHOR SECTION B

NOT TO SCALE

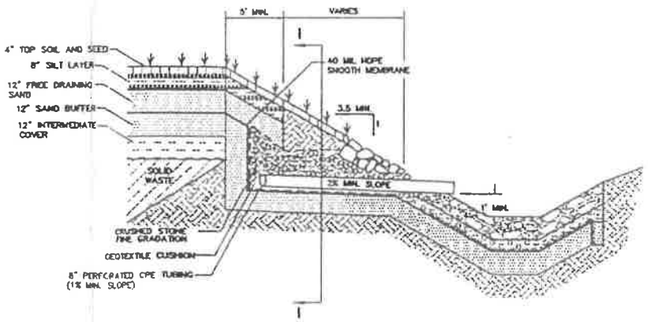


DRAIN, COVER ANCHOR AND LIGHT RIPRAP SLOPE PROTECTION SECTION E

NOT TO SCALE



SECTION I-I



TOE DRAIN OUTFALL SECTION

DRAIN, COVER ANCHOR AND LINED RELOCATED STREAM CHANNEL SECTION F

NOT TO SCALE

RECORD DRAWINGS

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WMD LOG# 1998-00052
AND 1998-00118

RECORD PLAN

NO.	DATE	REVISION	ENG	DWG
1	12/16/98	REVISED SILT LAYER FROM 20" TO 10"	GW	DB

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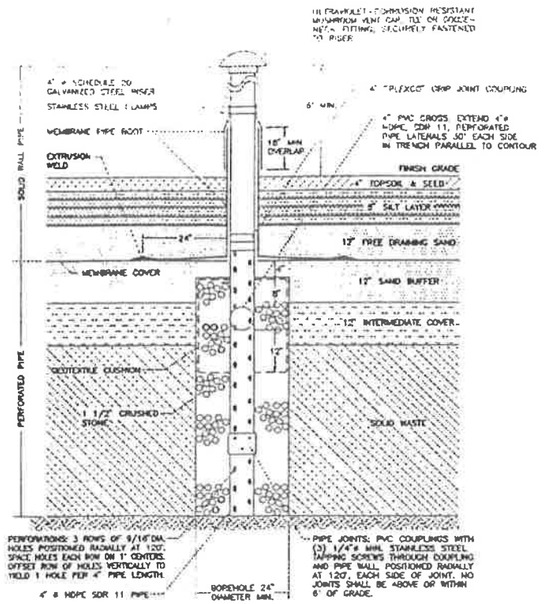
TOWN OF NEW HAMPTON
NEW HAMPSHIRE
LANDFILL CLOSURE
BRISTOL, NH

COVERING SYSTEM
TYPICAL SECTIONS

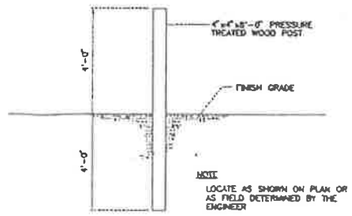
DATE 11/17/96	PROJ. NO 792.04
ENG. BY GSW	DRWN. BY DEB
CHKD BY SML	DRWG. NO 1104

SHEET 6 OF 8



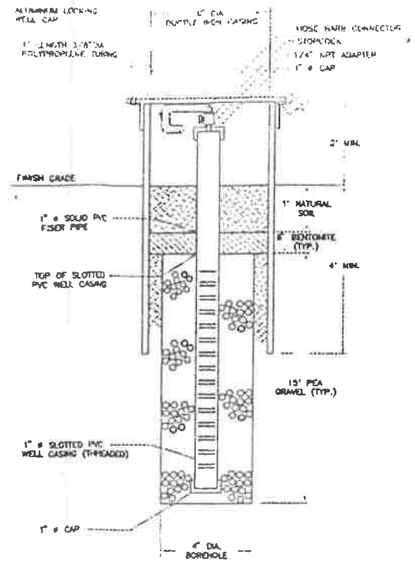
TYPICAL GAS VENT DETAIL

NO SCALE



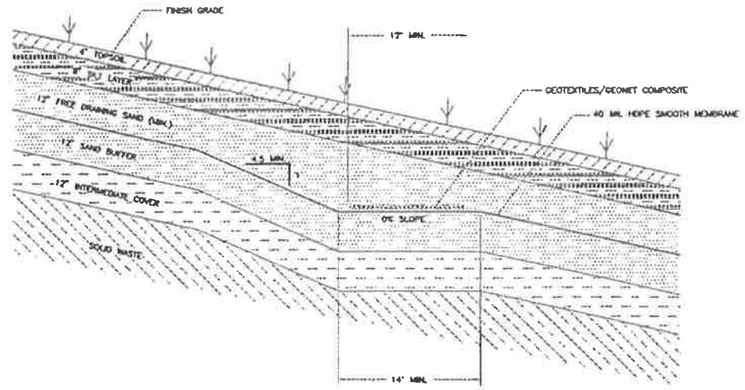
TYPICAL COVER SYSTEM PERIMETER MARKER

NO SCALE



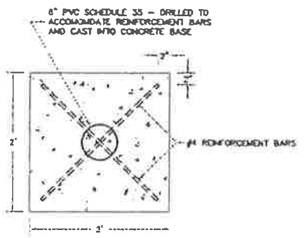
TYPICAL GAS MONITORING PROBE DETAIL

NO SCALE

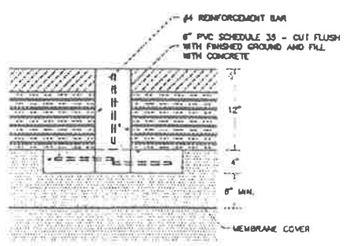


TYPICAL DRAINAGE COMPOSITE INSTALLATION CROSS SECTION

NO SCALE



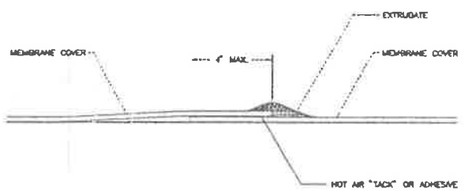
PLAN



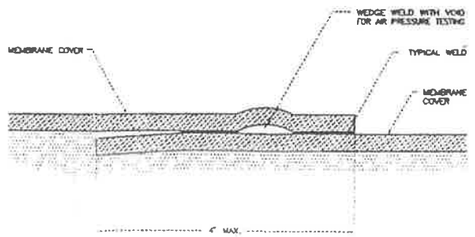
SECTION

SETTLEMENT MONUMENT

NO SCALE



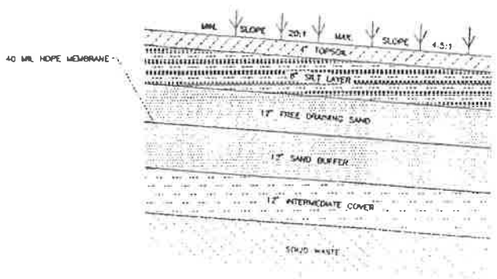
EXTRUSION WELD DETAIL



WEDGE WELD DETAIL

TYPICAL WELD DETAILS

NO SCALE



TYPICAL COVER SYSTEM CROSS-SECTION

NO SCALE

RECORD DRAWINGS

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WMD LOG# 1996-00052
AND 1996-00185

NO.	DATE	REVISION	ENG.	DR.
1	1/16/96	REVISED GAS VENT RISER PIPE	GW	DR

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TOWN OF NEW HAMPTON
NEW HAMPSHIRE
LANDFILL CLOSURE
BRISTOL, NH

GAS, SETTLEMENT AND COVERING SYSTEM DETAILS

RECORD PLAN

DATE	PROJ. NO.
11/17/96	792.04
ENG. BY	DRWN. BY
GSW	DEP
CHKD. BY	DRWG. NO.
SAL	1104

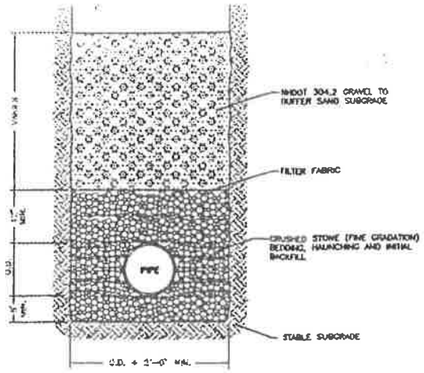
SHEET 7 OF 8

SIGN NOTES

1. RED LETTERS ON WHITE BACKGROUND.
2. SIGN BLANK TO BE ALLUMINUM, MINIMUM THICKNESS 0.10 INCHES
3. SIGNS FASTENED TO WOOD POSTS WITH NO LESS THAN FOUR GALVANIZED CARRIAGE BOLTS 8" LONG x 1/2" DIA. WITH NUT AND WASHER.
4. PLACE SIGNS AS SHOWN ON PLAN OR AS FIELD DETERMINED BY ENGINEER.

SIGN DETAIL

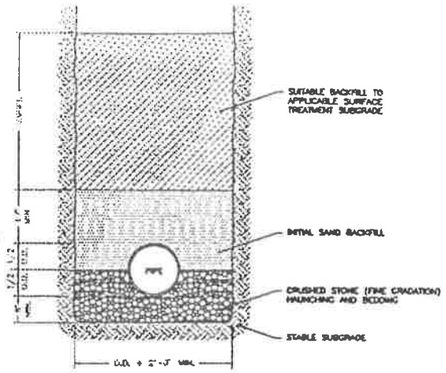
NO SCALE



CROSS-SECTION

TYPICAL UNDERDRAIN TRENCH CROSS-SECTION

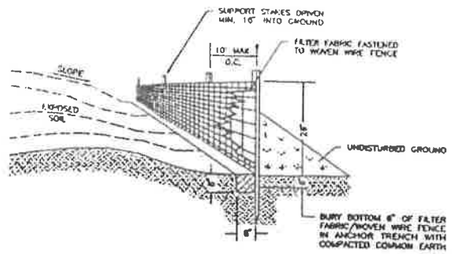
NO SCALE



CROSS-SECTION

TYPICAL STORM DRAIN TRENCH CROSS-SECTION

NO SCALE



PERSPECTIVE VIEW

MATERIALS SPECIFICATIONS:

1. SUPPORT STAKES: DURABLE HARDWOOD, 1" x 1" x 48" DIMENSION.
2. WOVEN WIRE FENCE: 14-1/2 GA. MIN., 6" MESH SPACING MAX.
3. FILTER FABRIC: HIGH STRENGTH NYLON, POLYESTER, PROPYLENE OR ETHYLENE YARN (50 lb/LIN. FT. MIN.) WITH A FLOW RATE OF AT LEAST 0.3 GAL/FT. MINUTE. FABRIC TO CONTAIN ULTRAVIOLET RAY INHIBITORS AND STABILIZERS.

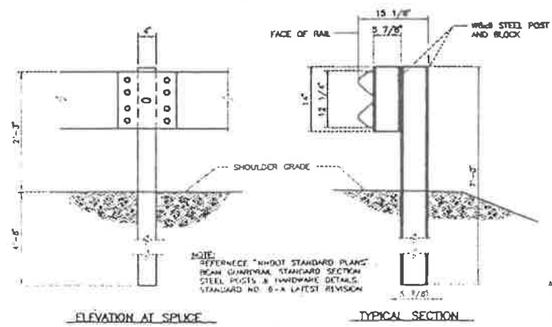
CONSTRUCTION SPECIFICATIONS:

1. INSTALL SEDIMENTATION FENCE WHERE INDICATED OR WARRANTED.
2. EXCAVATE ANCHOR TRENCH ON UPSLOPE SIDE OF THE PROPOSED FENCE LINE ALONG ENTIRE LENGTH.
3. DRIVE SUPPORT STAKES ON DOWNSLOPE SIDE OF PROPOSED FENCE.
4. FASTEN WOVEN WIRE FENCE TO THE UPSLOPE SIDE OF SUPPORT STAKES USING HEAVY DUTY WIRE STAPLES OR TIES.
5. FASTEN FILTER FABRIC TO FENCE WITH TIES SPACED EVERY 24 INCHES AT TOP AND MID-SECTION. OVERLAP ADJOINING SECTIONS OF FILTER FABRIC 6 INCHES AND FOLD AND STAPLE TOGETHER TO SUPPORT STAKE AT TOP, MID-SECTION AND BOTTOM.
6. BACKFILL ANCHOR TRENCH WITH COMMON EARTH AND COMPACT TO APPROXIMATE DENSITY OF SURROUNDING NATIVE SOIL.
7. MAINTAIN SILT FENCE AND REMOVE SEDIMENT WHEN "BULGES" DEVELOP.

SEDIMENT FENCE

NO SCALE

PLAN



ELEVATION AT SPLICE — TYPICAL SECTION

GUARD RAIL DETAILS

RECORD DRAWINGS

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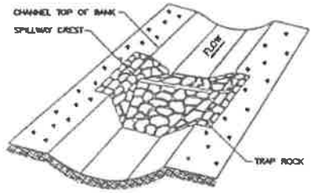
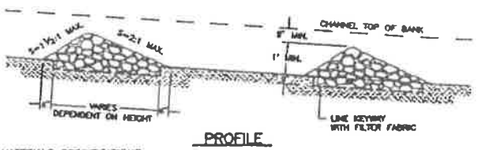
WMD LOG# 1996-00052
AND 1996-00185



PERSPECTIVE VIEW



PROFILE

MATERIALS SPECIFICATIONS:

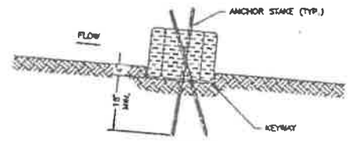
1. FILTER FABRIC: TERRATEX SD OR APPROVED EQUIVALENT.
2. TRAP ROCK: WELL GRADED MIXTURE OF DURABLE FRAGMENTS OF EITHER LEDGE ROCK, BOULDERS OR BOTH WITH d50 = 6". THE DIAMETER OF THE LARGEST STONE IN THE MIXTURE TO BE NO GREATER THAN 1-1/2 TIMES THE d50 SIZE WITH SMALLER SIZES GRADING DOWN TO 1".

CONSTRUCTION SPECIFICATIONS:

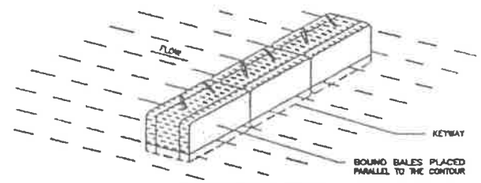
1. CONSTRUCT CHECK DAMS WHERE INDICATED OR WARRANTED.
2. EXCAVATE KEYWAY ACROSS CHANNEL TO TOP OF CHANNEL EMBANKMENTS. KEYWAY LENGTH TO BE PROPOSED DAM BOTTOM LENGTH, LESS 1'.
3. LINE KEYWAY WITH FILTER FABRIC EXTENDING 6" BEYOND TOP EDGES.
4. PLACE ROCK ACROSS CHANNEL BOTTOM AND ON CHANNEL EMBANKMENTS. CONSTRUCT DAM SUCH THAT HEIGHT AT CENTER OF CHANNEL (SPILLWAY CREST) IS A MINIMUM OF 8" BELOW ELEVATION OF LOWEST SIDE CHANNEL TOP OF BANK.
6. REMOVE CHECK DAMS ONCE PERMANENT CHANNEL LININGS HAVE BEEN ESTABLISHED AND STABILIZE RESULTING DISTURBED AREAS AGAINST EROSION WITH ADDITIONAL SURFACE TREATMENTS AS WARRANTED.

TRAP ROCK CHECK DAM

NO SCALE



SECTION



PERSPECTIVE VIEW

MATERIALS SPECIFICATIONS:

1. HAY BALES: TIGHTLY BOUND BALES OF HAY OR STRAW FREE FROM NOXIOUS WEED SEEDS OR WOODY MATERIALS.
2. ANCHOR STAKES: DURABLE HARDWOOD OF 1" x 1" x 48" DIMENSION.

CONSTRUCTION SPECIFICATIONS:

1. PLACE HAY BALE SEDIMENT BARRIERS WHERE INDICATED OR WARRANTED.
2. EXCAVATE A 4" DEEP, ONE BALE WIDE, KEYWAY ALONG ENTIRE PROPOSED BARRIER ALIGNMENT.
3. PLACE BALES IN KEYWAY, END TO END.
4. ANCHOR BALES SECURELY IN PLACE WITH TWO STAKES, EACH DRIVEN INTO THE GROUND 18". ANGLE FIRST STAKE THROUGH BALE TOWARD THE PREVIOUSLY ANCHORED BALE TO FORCE BALES TOGETHER. ANGLE THE SECOND STAKE THROUGH BALE TOWARD THE DIRECTION OF WATER FLOW.
5. FILL VOIDS BETWEEN KEYWAY AND BALES WITH COMMON EARTH TAMPED TO APPROXIMATE DENSITY OF SURROUNDING SOIL.
6. INSPECT BARRIER PERIODICALLY AND AFTER ALL PRECIPITATION EVENTS AND REPAIR OR REPLACE PROMPTLY AS NEEDED.
7. REMOVE BARRIER ONCE PERMANENT SURFACE TREATMENTS ARE ESTABLISHED.
8. WHERE INSTALLED IN COMBINATION WITH SEDIMENT FENCE, INSTALL HAY BALE SEDIMENT BARRIER ON DOWN GRADIENT SIDE.

HAY BALE SEDIMENT BARRIER

NO SCALE

RECORD PLAN

NO.	DATE	REVISION	ENG.	DWG.
1	1/16/96	REVISED CHECK DAM TO NHDOT STEEL POST FURNISHING	GW	DB

Provan & Lorber, Inc.
ENGINEERS AND PLANNERS

Home Office
53 Maple Street
Post Office Box 369
Contoocook, NH 03229
(603) 746-3220

Northern Regional Office
Post Office Box 167
Littleton, NH 03561
(603) 444-6301

TOWN OF NEW HAMPTON
NEW HAMPSHIRE
LANDFILL CLOSURE
BRISTOL, NH

EROSION & SEDIMENTATION CONTROL AND MISCELLANEOUS DETAILS

DATE	PROJ. NO.
11/17/95	792.04
ENG. BY	DRWN. BY
GSW	DEB
CHKD BY	DRWG. NO.
SML	1104

SHEET 8 OF 8

GEOMEMBRANE PERIMETER MONUMENT (TYP.)

APPROXIMATE WASTE BOUNDARY

RELOCATED STREAM CHANNEL

8" CPE UNDERDRAIN

PROBABLE MAX. FLOOD LINE

⊙ APPROX. WELL TILE LOCATION

WETLAND FLAG (TYP.)

ROCK EROSION LINING (TYP.)

PASSIVE GAS VENT (TYP.)

SETTLEMENT MONUMENT (TYP.)

EDGE OF GEOMEMBRANE COVER (TYP.)

GAS MONITORING PROBE (TYP.)

DRAINAGE COMPOSITE (TYP.)

SILT SOIL LINED DITCH (TYP.)

DRAIN OUTFALL (TYP.)

8" CPE COVER TOE DRAIN (TYP.)

BENCH MARK (TYP.)

MONITORING WELL (TYP.)

APPROX. LOCATION OF EXIST. SUBSURFACE DISPOSAL SYSTEM

NEW HOUSE

ROAD

RIVER

RELOCATED GRAVEL DRIVE

15" CGMP IN 510.13 OUT 504.50

TEXTURED MEMB.
SMOOTH MEMBRANE

TEXTURED MEMBRANE
SMOOTH MEMBRANE

EXIST. GATE

FIELD

APPROX.

GP1 GP2 GP3 GP4 GP5 GP6

DO1 DO2 DO3 DO4 DO5 DO6 DO7 DO8 DO9 DO10

SM1 SM2 SM3 SM4 SM5 SM6 SM7 SM8 SM9 SM10

GV1 GV2 GV3 GV4 GV5 GV6 GV7 GV8

PZ-1

MW #1 MW #2 MW #3 MW #4

WF #1 WF #2 WF #3 WF #4 WF #5 WF #7 WF #8 WF #10 WF #11 WF #12 WF #13 WF #14 WF #15 WF #16 WF #17 WF #18 WF #19 WF #20 WF #21 WF #22

C27

500 502 504 506 508 510 512

498 496 494 492 490 488 486

0 60' 120' 180'

SCALE IN FEET
1" = 60'

N

NOTE:
FINAL GRADING AND CLOSURE FEATURES ARE APPROXIMATE BASED IN DESIGN NOT AS-BUILT CONDITIONS

Provan & Lorber, Inc.
ENGINEERS AND PLANNERS

POST CLOSURE INSPECTION, MONITORING & REPORTING PLAN
FOR
TOWN OF NEW HAMPTON LANDFILL
NEW HAMPTON, NEW HAMPSHIRE

SITE PLAN

Emery & Garrett
GROUNDWATER INVESTIGATIONS
A Division of GZA

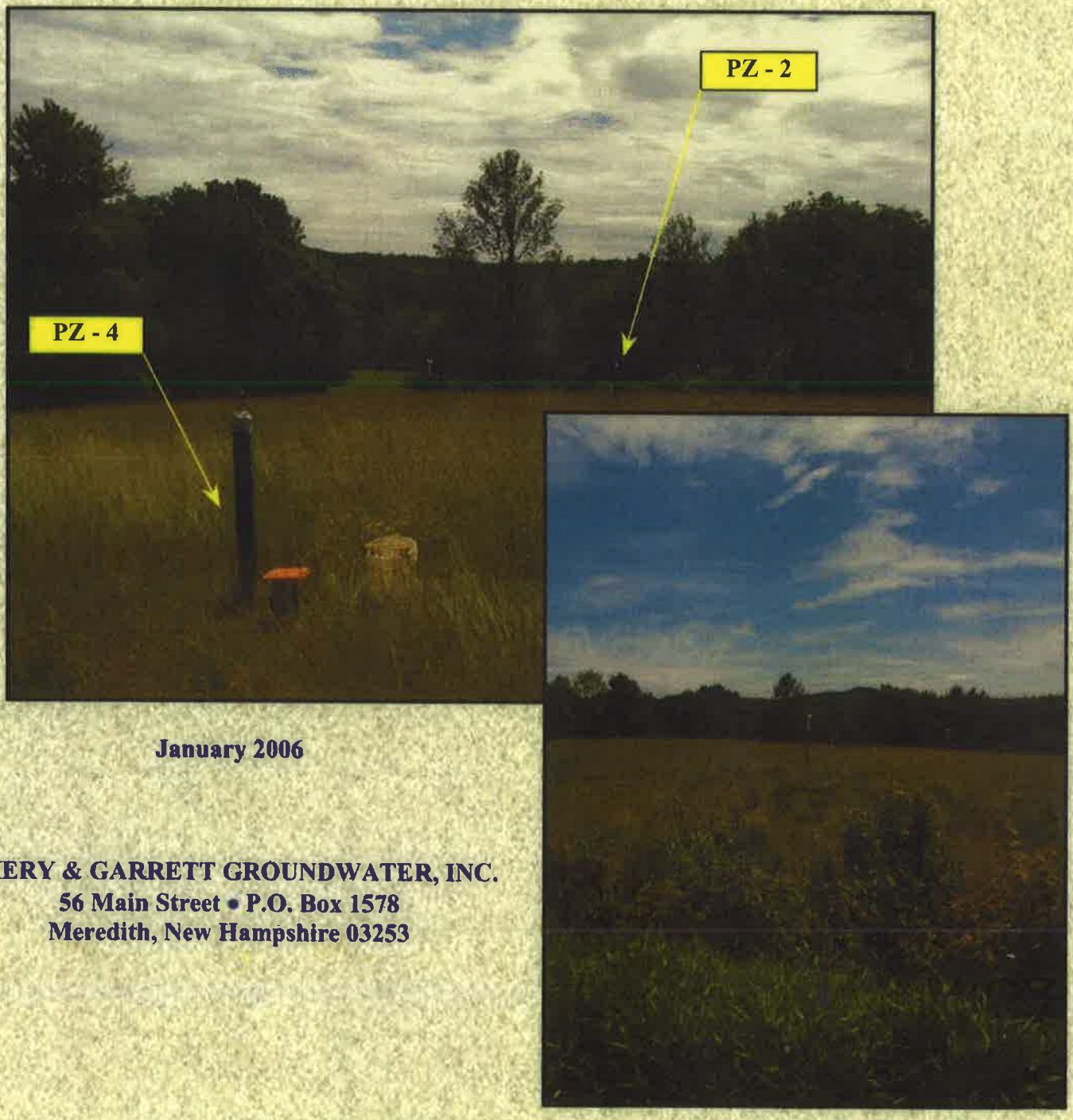
Appendix B – Updated Monitoring and Maintenance Plan – January 2006

UPDATED MONITORING AND MAINTENANCE PLAN

JANUARY 2006

NEW HAMPTON LANDFILL

BRISTOL, NEW HAMPSHIRE



January 2006

EMERY & GARRETT GROUNDWATER, INC.
56 Main Street • P.O. Box 1578
Meredith, New Hampshire 03253

New England Mid-Atlantic South Atlantic

Emery & Garrett Groundwater, Inc.
56 Main Street • P.O. Box 1578
Meredith, New Hampshire 03253
(603) 279-4425 ***Fax (603) 279-8717***

February 3, 2006

Ms. Barbara Lucas
Town of New Hampton
6 Pinnacle Hill Road
New Hampton, NH 03256

Dear Barbara,

Please find enclosed an updated landfill gas monitoring and gas venting maintenance plan for the New Hampton Landfill. I hope you find the information contained within this document responsive to your needs. If you have any questions regarding this material, please do not hesitate to contact me.

Best regards,

Jeff Marts, PG
Geologist/Project Manager

cc: Douglas Kemp, NHDES

Emery & Garrett Groundwater, Inc.
56 Main Street • P.O. Box 1578
Meredith, New Hampshire 03253
(603) 279-4425 *www.eggi.com* *Fax (603) 279-8717*

NEW HAMPTON LANDFILL
Updated Monitoring and Maintenance Plan
January 2006

This revised plan reflects recent changes in protocol for gas migration monitoring and mitigation at the New Hampton Landfill, as set forth by the NHDES. Replacement of the Gas Tech Safe T Net 100 methane gas alarm system with three GasAware residential methane alarms at the Rivest residence prompted the need for an up-dated plan.

Monitoring Frequency

All gas probes (Figure 1) will be monitored once a month in January, February, and March then quarterly for the rest of the year by town employees for concentrations of methane gas, oxygen, and hydrogen sulfide per the monitoring and calibration instructions in Appendix A and B. Readings will no longer be recorded from the gas meter installed at the Rivest residence. A completed data sheet (Appendix C) shall be faxed to Emery & Garrett Groundwater, Inc. (EGGI) (or other firm chosen by the Town of New Hampton) following each landfill gas monitoring event.

Report Frequency

EGGI will submit annual post-closure summary reports to NHDES including the description of the methane levels in the 11 gas probes. In the event that landfill gas levels exceed regulatory standards in GP-7, 8, 9, 10, or 11 (i.e., off-site probes), data will be reported immediately to the NHDES.

Methane Concentrations Exceeding Regulatory Standards

Offsite gas probe readings equal to or greater than 50% LEL (lower explosive level) constitute a violation of the New Hampshire Solid Waste Rules. Landfill gas concentrations equal to 25% LEL within an offsite building exceed regulatory standards and present a serious safety issue. The following paragraphs outline what actions are necessary to mitigate/prevent gas concentrations from reaching regulatory threshold levels.

To prevent gas levels from violating regulatory standards, active venting measures shall be taken in the event that gas levels reach 25% LEL in any of the off-site gas probes. (The procedure for actively venting the landfill is documented in Appendix D.) If methane gas equals or exceeds 25% LEL for any of the following wells: GP-9, GP-10 and GP-11, then the GP-2

venting system should be activated (Appendix D – page 2 – Emergency Operation). If methane equals or exceeds 25% LEL for gas monitoring probes GP-7 or GP-8, then the GP-5 venting system should be activated (Appendix D – page 2 – Emergency Operation).

EGGI installed three residential methane gas alarms at the Rivest Residence to replace the Gas Tech Safe T Net 100 alarm system. These alarms (CCI GasAware Model 7550) were installed on July 20, 2005 as follows: 1) one in the basement; 2) one on the first floor (living area); and 3) one on the second floor/attic area. These units use a standard 120 volt A/C outlet and have a built-in battery back up that can power the unit for up to 10 hours during interruption of electrical service. An 85-decibel alarm sounds at a concentration of methane of approximately 17% of the LEL. Calibration is not necessary for the GasAware alarms to properly function. EGGI recommends that these GasAware alarms be replaced at the end of the 5-year warranty period (July 2010). A guide to the use of the GasAware alarm was provided to Mr. Rivest and is included in Appendix E.

In the event of alarm activation, 911 should be immediately contacted. Both New Hampton and Bristol Fire departments will be dispatched to the Rivest home and the Emergency Action Plan For Methane Alarm (Appendix F) will be implemented. The New Hampton Police will follow SOP #98-1 (Appendix F), which includes notifying a Town official. The Town official will then notify the Town's engineer or Jeff Marts (of Emery & Garrett Groundwater, Inc. at 603-279-4425) to schedule a site inspection. Alarm activation with confirmed methane will also necessitate immediate active venting of landfill gas monitoring probe GP-5 once the Incident Commander (IC - Fire Officer in charge) terminates command or if the IC agrees to actively vent during the fire emergency.

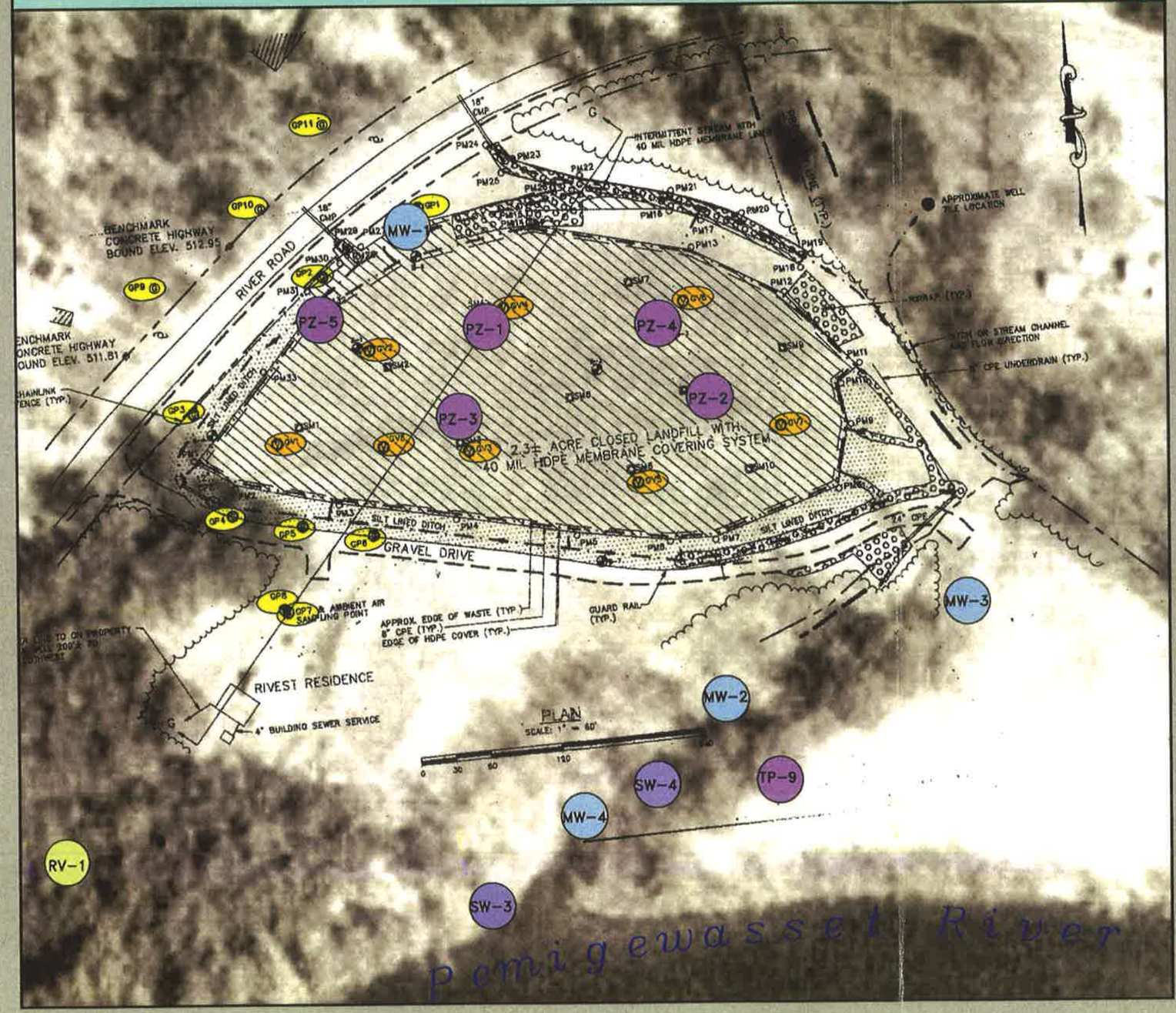
Inspection and Maintenance of Active Venting System

EGGI will inspect and test the active venting system twice annually, once in May and once in August, during routine landfill inspections. The test will involve operating the blower to see that suction is generated at both gas monitoring probes GP-2 and GP-5. The town employees shall immediately repair any leaks, blockages, loose fittings, or other problems.

FIGURE 1 -- Map of Landfill with Gas Vent Wells, Gas Monitoring Probes, Monitoring Wells, Piezometers, and Surface Water Points for the New Hampton Landfill, Bristol, New Hampshire

Location of Gas Vent Wells and Gas Monitoring Probes

Scale = 1:1200, 1" = 100'



Legend

- GV3 — Gas Vent Well With Horizontal Screens
- GP5 — Gas Monitoring Probe
- MW-3 — Monitoring Well
- SW-2 — Surface Water Monitoring Point
- PZ-2 — Piezometer
- RV-1 — Rivest Well
- SM8 — Settling Monument

Tax Map

Scale = 1:6000, 1" = 500'

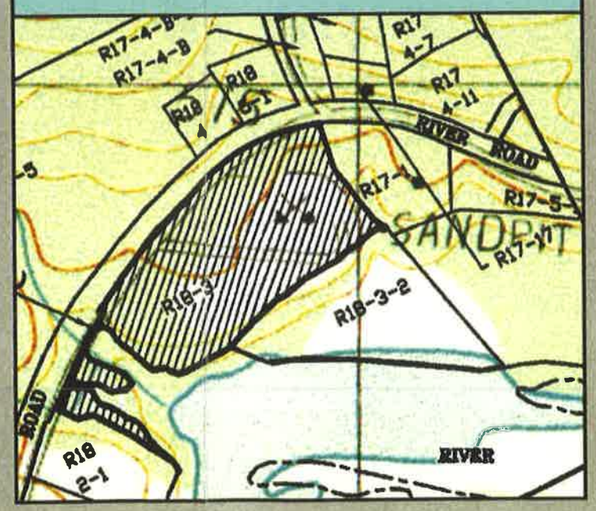


Figure 1

APPENDIX A

METHODOLOGY FOR MONITORING GAS PROBES WITH GASTECH GT LAND SURVEYOR AT NEW HAMPTON LANDFILL

Emery & Garrett Groundwater, Inc.
56 Main Street • P.O. Box 1578
Meredith, New Hampshire 03253
(603) 279-4425 *www.eggi.com* *Fax (603) 279-8717*

January 16, 2006

Subject: Monitoring Gas Probes with GASTECH GT Land Surveyor

1. Calibrate unit at the shop.
2. At landfill, turn on unit and press **Enter** when it reads *"Warm-up Complete."*
3. Set unit to Gas Mode by holding **Range** until it says *"%Gas."*
4. Connect the hose to the Gas Probe.
5. Open the valve on the Gas Probe.
6. Wait until the readings stop changing (this might take 5 minutes or longer).
7. Write down the readings on the datasheet.
8. If the oxygen reading is larger than *15%* and the % Gas is less than *5%,* then use the **Range** key to switch to %LEL. Record the %LEL on the datasheet.

- Measure the gas at all of the GP wells.
- Write down the Barometer Reading
- Fax datasheet to:

Jeff Marts
Emery & Garrett Groundwater, Inc.
Fax: 279-8717

APPENDIX B

METHODOLOGY TO CALIBRATE GASTECH GT LAND SURVEYOR

Emery & Garrett Groundwater, Inc.
56 Main Street • P.O. Box 1578
Meredith, New Hampshire 03253
(603) 279-4425 *www.eggi.com* *Fax (603) 279-8717*

January 16, 2006

Subject: Calibration of GASTECH GT Land Surveyor

1. Connect hose to unit (do not operate unit without filter assembly on the end of the hose).
2. Press **On\Off** to turn on unit; after warm-up is complete; press **Enter**.
3. Press **Reset** and **Backlight** together 3 times to enter calibration mode. Unit will display "*Version 2.54 Calibrate*".
4. Be sure hose is collecting fresh air, free of exhaust.
5. Press **Enter**.
6. The unit will display "*Zero Gas XXXX ppm COMB*" (XXXX will be a number displayed by the meter). If the reading is negative, use the **Func.\+** key to raise the reading to "*0000 ppm COMB*". If the reading is positive, use the **Backlight\-** key to get reading to "*0000 ppm COMB*".
7. Press **Enter**.
8. The unit will display "*Zero Gas XXX ppm H2S*". As in Step 6, adjust reading to "*000 ppm H2S*".
9. Press **Enter**.
10. The unit will display "*Zero Gas XXX %VOL OXY*". Do the following:
    A. Connect Regulator to "Nitrogen Zero" air cylinder.
    B. Connect bag assembly to regulator using clear tube.
    C. Connect unit to bag assembly (green tube) until all the air is drawn out of the bag.
    D. When the pump is about to stop, open the valve and allow bag to fill then close valve.
    E. When bag is half empty, adjust the reading to "*000 %VOL OXY*".
11. Press **Enter**.
12. The unit will display "*Span Gas XXX %LEL COMB*". Follow parts A – D in step 10 using the "Methane 2.5%" cylinder, making sure the bag is empty before filling with Methane.
13. When bag is half empty, adjust the reading to "*50 % LEL COMB*".
14. Press **Enter**.
15. The unit will display "*Span Gas XXX PPM H2S*". Follow parts A – D in step 10 using the "Hydrogen Sulfide 25 ppm" cylinder.
16. When bag is half empty, adjust the reading to "*25 PPM H2S*".
17. Press **Enter**.
18. The unit will display "*Span Gas XXX %VOL OXY*". With unit collecting fresh air (no bag), wait 90 seconds and then adjust to "*20.9 %VOL OXY*".
19. Press **Enter**.
20. Press any key to exit. You are now ready to take readings.

APPENDIX C

EXAMPLE REPORTING DATA SHEET FOR MEASURED LANDFILL GASES NEW HAMPTON LANDFILL

Gas Probe Monitoring Data Collection Sheet

New Hampton Landfill
New Hampton, New Hampshire

Date:	**Barometer Reading:**
Sampler's Name:	**Calibration Time:**

Well	Time	Methane		*or*	Methane	Oxygen	H_2S
		%LEL	ppm		% gas	(% volume)	(ppm)
GP-1							
GP-2							
GP-3							
GP-4							
GP-5							
GP-6							
GP-7							
GP-8							
GP-9							
GP-10							
GP-11							

Notes: _____

_____

1. Calibrate unit at the shop.
2. At landfill, turn on unit and press **Enter** when it reads *"Warm-up Complete."*
3. Set unit to Gas Mode by holding **Range** until it says *"%Gas."*
4. Connect the hose to the Gas Probe.
5. Open the valve on the Gas Probe.
6. Wait until the readings stop changing (this might take 5 minutes or longer).
7. Write down the readings on the datasheet.
8. If the oxygen reading is larger than *15%* and the % Gas is less than *5%*, then use the **Range** key to switch to %LEL. Record the %LEL on the datasheet.

APPENDIX D

METHODOLOGY FOR OPERATING THE ACTIVE VENTING SYSTEM AT THE NEW HAMPTON LANDFILL

Emery & Garrett Groundwater, Inc.
56 Main Street • P.O. Box 1578
Meredith, New Hampshire 03253
(603) 279-4425 *www.eggi.com* *Fax (603) 279-8717*

January 16, 2006

Re: Operation of the Active Venting (Vacuum) System at the Landfill in Bristol, NH

The Active Venting (Vacuum) System, now in place at the closed New Hampton Landfill on River Road in Bristol, mitigates off-site migration of explosive gas generated by decaying waste. Emergency operation of the system will now be performed by the Town of New Hampton and EGGI will test the system during post-closure inspections. This document is intended to give you sufficient background to the design and operation of the system, and to serve as a brief operations manual.

Background

Methane, the potentially explosive component of landfill gas, has been detected at monitoring points away from the closed landfill. This occurs especially in winter when the ground is frozen, thus preventing the free passage of air through soils around the landfill. The State has ordered the Town to institute remedial measures to prevent migration from the landfill toward the Rivest residence to the south, and across River Road to the west. The landfill was tested and a remedial system designed. It will utilize two gas monitoring probes located on the perimeter of the landfill to draw the gas back towards the landfill.

Description of the System

The system consists of the following parts:

Passive Gas Vents (GV-x) (see Figure 1 for locations) emerge through the cover of the landfill. There are 8 such vents. They have been modified with a 4-inch ball valve with a large red handle. The tops of the vents have been fitted with a tee having a flapper valve on one side and a cap on the other side. The flapper valve is passively operated by pressure of gas emerging from the landfill. There is a brass nipple with a petcock on the side of each vent for sampling landfill gas. However, no gas monitoring of the vents is called for under this active venting plan.

Gas Monitoring Points (GP-x) are located outside the landfill footprint. There are 11 points (see Figure 1 for locations). Their design has been simplified. They are all 1-inch diameter PVC wells set inside steel protective casings. They are now all capped with rubber stoppers with ¼-inch ID LDPE tubing extending down to within 1-foot of the bottom of each well, in the screened section of the well. At the top of each piece of tubing is a small piece of

silicone tubing with a petcock, and another piece of silicone tubing (to connect to the meter). The petcock is normally closed.

The **blower assembly** is located close to the electrical service box along the River Road fence. The blower is connected to GP-5 to the south and GP-2 to the northeast via 2-inch diameter insulated pipes that run around the perimeter fence. There is a quick-connect coupling to remove a section of this pipe at the gate to the landfill. Access onto the landfill should not be needed until the summer months when it is time to mow.

To operate the blower you will need a heavy gauge, 15-foot extension cord. Similar to the type used for air conditioners or refrigerators would be best. This should be connected between an outlet below the box and the cord hanging beneath the blower. You will also need to unlock the box (with an EGGI master key) to turn on the main breaker and circuit to power the outlet used (outlets and corresponding breakers are numbered 1, 2, 3…etc.). You only need to use one breaker. We suggest #1.

The **wellheads of GP-5 and GP-2** are set up in the same manner. There is a tee on top of the 1-inch PVC well pipe, with the suction pipe from the blower is connected to one side and a sampling nipple and valve on the other. Also, there is a gate valve on the suction side to close the well when the blower is not on.

Emergency Operation

In the event that methane levels reach 25% LEL in any of the following gas probes 7, 8, 9, 10, or 11 then the active venting system should be operated immediately. The system will be on for two hours, once every two weeks until the methane in the offsite probes stays below 25% LEL. If the high readings are in GP-7 or 8, then GP-5 will be actively vented. If the high readings occur in GP-9, 10, or 11, then GP-2 will be mechanically vented. Both GP-2 and 5 should be vented together if nearby wells for each have high readings. To operate the system, all you have to do is:

1. Measure gas concentrations at all GP wells to be monitored. (When GP-5 is being actively vented (vacuumed), GP-4, 5, 6, 7, and 8 will be monitored. When GP-2 is being vented, GP-1, 2, 3, 9, 10, and 11 will be monitored. When both GP-5 and GP-2 are being vacuumed, all GP wells will be monitored.)
2. Shut off valves at all GV vent stacks on the landfill.
3. Open the valves in the suction pipeline between the blower and the well that you want to vent, making sure the other valves are closed.
4. Plug the blower into the power at the site to turn it on.
5. Leave the site for 1.5 hours.
6. When you return, monitor gas concentrations at all GP wells being monitored. (Readings for the well(s) being vented can be obtained from the fitting on the vent stack behind the blower.)
7. Just prior to unplugging the blower, close the valve at the well(s) that is being vented, so that when the blower is shut off air won't rush back down in the well.
8. Unplug the blower.

9. Leave the site for 2-3 hours.
10. When you return, monitor gas concentrations at all GP wells being monitored (plus the well that was actively vented (vacuumed) at the wellhead).
11. Open the GV vent stack valves.
12. Leave the site.
13. Return once the next day to monitor gas concentrations in all GP wells monitored previously.
14. Send and fax all data sheets to EGGI (attention Jeff Marts, PO Box 1578, Meredith, NH 03252; Fax: 603-279-8717).
15. Repeat two weeks later if gas concentrations in the offsite wells are still above 25%.

Routine Operation

The active venting system should be tested two times per year by EGGI. The tests should occur during post-closure inspections: May and August. The following procedure should be used to check the system.

1. Shut off valves at all GV vent stacks on the landfill.
2. Open the valves in the suction pipeline between the two wells.
3. Turn on the blower.
4. At both GP-2 and 5, open the sampling valve and check for suction, then close sampling valves.
5. Just prior to unplugging the blower, close the valves at the wells, so that when the blower is shut off air won't rush back down in the well.
6. Shut down the blower.
7. Check for loose fittings and troubleshoot the system if there was no suction at either of the venting probes.
8. Open the GV vent stack valves.

If you have further questions, please contact any of the following people at EGGI:

Jeff Marts - work: 603-279-4425 cell: 703-297-7549
James Emery - work: 603-279-4425 home: 603-968-3232
Peter Garrett - work: 207-872-0613 home: 207-873-6443

APPENDIX E

GASAWARE MODEL 7550
BASIC OPERATION INFORMATION

Emery & Garrett Groundwater, Inc.
56 Main Street • P.O. Box 1578
Meredith, New Hampshire 03253
(603) 279-4425 *www.eggi.com* *Fax (603) 279-8717*

July 15, 2005

GasAware Model 7550 – Basic Operation Information

Normal Operating Conditions:

- Green "Power" light will stay on constantly when powered by AC electricity.
- Green "Power" light will flash when operating on battery back up. Batteries should last for 8 hours without power.
- Green "Power" light is out, yellow "Battery" light is flashing, alert beep sounding every 30 seconds indicates no AC power and low battery power – *Replace batteries immediately for continued operation of gas alarm. Re-install original rechargeable batteries when electrical service is restored.*
- Green "Power" light is on, yellow "Battery" light is flashing indicates that the batteries are being recharged.

Emergency – Methane Gas Detected:

- Red "Alarm" light flashing with constant alarm sounding – gas detected! *Evacuate the building and call 911 from a neighbor's phone or a cell phone away from the building.* Tell the 911 operator that you have *a **methane gas** alarm activation.*

Trouble Indications:

- Green "Power" light is off, yellow "Fault" light is flashing, alarm beeps every 30 seconds – unit is out of service! *Unplug unit and remove batteries, then call Jeff Marts at EGGI - 603-279-4425 and Barbara Lucas (New Hampton Town Office) 603-744-3559.*
- Green "Power" light is on, yellow "Battery" light is on constantly – batteries need replacement. *Call Jeff Marts at EGGI - 603-279-4425 and Barbara Lucas (New Hampton Town Office) 603-744-3559.* The alarm is in service as long as the unit is supplied with AC Power.

Please refer to the GasAware model 7550 instruction booklet for more detailed information.

APPENDIX F

EMERGENCY ACTION PLAN
METHANE GAS

METHANE GAS PROCEDURE

The New Hampton Police Department has a Statement of Procedure (S.O.P. #98-1) to follow in the event of a E-9-1-1 call that the methane alarm system is activated at Mr. Rivest's home located at 4285 River Road, Bristol, NH at the site of the New Hampton Landfill. The alarm is presently set at 4% LEL. If a Selectman or the Town Administrator is contacted by a New Hampton Police Officer in the event that there has been an alarm activation, they should contact immediately the New Hampton Fire Chief to request the status of the situation and then immediately notify the engineer or Jamie Emery 279-4425 to schedule an inspection of the site. An inside reading should be taken of the residence as well as a reading of the closest gas probes.

Listed below are the phone numbers and cell phone numbers that may also be necessary:

	Home #	Cellphone#
Theodore Rivest, Jr.	744-5077	
Barbara Lucas - Town Admin.	744-6152	455-7075
Thomas Smith - Selectman	968-9488	520-0348
Merritt "Doug" Salmon - Selectman	279-5611	
Paul Tierney - Selectman	968-9506	520-5023
Jim Boucher - Public Works Dir.	536-1005	455-9330
Police Chief Nathaniel Sawyer	744-9584	455-5382
Sgt. George Huckins	968-4430	707-7429
Fire Chief David Clement	744-3160	455-5752
Deputy Chief Bruce Harvey	744-9711	455-5753
Deputy Chief Steve Marsh	744-0147	344-8630

2/06 Updated

Town of New Hampton
Fire Department
P.O. Box 368, New Hampton, New Hampshire 03256 • 744-2735

Emergency Action Plan
For
Methane Alarm

Purpose

The purpose of this emergency action plan is to define roles and describe actions in the event that an alarm is received from the residence located adjacent to the remediated landfill in the town of Bristol, but owned by the town of New Hampton.

Background

The alarm was installed in the residence to provide early warning in the event that the naturally occurring Methane gas from the remediated landfill were to migrate through the various soil layers into the basement. The landfill is equipped with many vents and also is monitored weekly.

Methane is an extremely flammable gas. Any other hazard that may be associated with this gas is outweighed by its potential for fire. A Material Safety Data Sheet is attached and should be reviewed prior to taking any offensive action.

Action Plan

In the event that the alarm is activated, both Bristol and New Hampton Fire Departments would be toned as part of an already established automatic response agreement. Even though this property is maintained by the town of New Hampton, it is still within the town of Bristol and they would have overall command. Command should maintain a defensive posture until more information is gathered by properly trained and equipped personnel.

Alarm with no fire, Command would take the following actions:

1. Insure that responding personnel maintain a safe distance from the residence until it is deemed safe for entry.
2. Insure that all of the landfill area has been evacuated.
3. Remove all ignition sources.
4. Have the Central New Hampshire Hazmat Team respond for entry and monitoring.

5. Depending on the levels found and the conditions present, take the appropriate actions consistent with national standards to bring the residence and the area to a safe level prior to termination of command.

In the event that the residence is involved in a fire, either as a result of the accumulation of Methane gas or not, actions taken would be similar to any other structure fire with the following exceptions;

1. Keep all personnel involved in the fire attack in self-contained breathing apparatus at all times.
2. Insure that all unnecessary personnel are safely away from the residence until the area has been made safe.
3. Contact the Hazmat team for post-fire monitoring.

Prepared and approved by both New Hampton Fire Chief David Clement and Bristol Fire Chief Norman Skantze.

5/02

Emery & Garrett
GROUNDWATER INVESTIGATIONS
A Division of GZA

Appendix C – Facility Financial Assurance Plan

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

Cost Estimate Form for Post-Closure of a Landfill

(lined or unlined)

Submit to:
Waste Management Division, SWMB
PO Box 95, Concord, NH 03302-0095
(603) 271-2925 or solidwasteinfo@des.nh.gov
https://www.des.nh.gov

RSA 149-M/Env-Sw 1400

Facility Name: New Hampton Landfill	
Facility Address: 4825 River Road, Bristol, New Hampshire	
NHDES Permit #: 19870478	
Owner: Town of New Hampton	
Phase: Post-Closure	**Acreage: 2.3**

Task	Unit	Unit Cost	Quantity	Total Cost
I Water Monitoring				
Surface Water Sampling & Analysis				
Other (Permit Requirement) _____				
Ground Water Sampling & Analysis	*1*	$1,640.00	1	$1,640.00
Other (Permit Requirement) Groundwater Monitoring Report	*1*	$1,500.00	1	$1,500.00
Other				
II Gas Monitoring				
Landfill Gas Migration Monitoring	*1*	$230.00	4	$920.00
Replacing 20% of the Active Gas Collection System				
Other:				
III Settlement Monitoring				
Field Survey				
Data Tabulation				
Other				
IV Leachate Collection/Monitoring				
Sewer Charges				
Electricity				
Maintenance of Collection System				
Sampling & Analysis				
Other				
V Clean Air Act Requirements				
Monitoring & Analysis				
Emissions Fees				
VI Repair & Site Maintenance Costs				
Snow Removal				
Roadway Maintenance				
Mowing				
Soil Cover Maintenance and Planting				
Maintenance of Gas Venting System				
Subsidence Repair				
Stormwater Maintenance				
Other: **General Maintenance including Mowing**	*1*	$500.00	1	$500.00
VII Inspections				
Annual Report-Landfill Post Closure Report	*1*	$460.00	1	$460.00
Annual Site Inspections	*1*	$460.00	2	$920.00
Other: **Electricity for Active Gas Collection System**	*1*	$350.00	1	$350.00
VIII Other				
Qualified Professional Oversight of all Activities				
Sub-total				$6,290.00
Contingency (10 % minimum)				$629.00
Total Yearly Cost				$6,919.00
Total 30-Year Cost				$207,570.00

Signature of Preparer: _____ Date: 1/25/2021
(Must be a Professional Engineer)

This form provides a basis for estimating post-closure costs for a lined or unlined landfill. This form is not inclusive of all costs that may be associated with the landfill's post-closure monitoring and maintenance requirements. The cost estimate must include all expenses associated with compliance of all NHDES permits. Please use the spaces provided above noted as "Other" or attach additional sheets if necessary.