

Closed Landfills: Hazards & Best Management Practices

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What is NEWMOA?

- The Northeast Waste Management Officials' Association
- Formed by the New England Governors back in the 1980s
 - NJ & NY joined
 - Formally recognized by US EPA in 1986
- Non-partisan, non-profit association of the Solid Waste, Hazardous Waste, Waste Site Cleanup, and Pollution Prevention & Toxics programs in CT, ME, MA, NH, NJ, NY, RI, VT
- www.newmoa.org

Why Care About Closed Landfills?

- Liability!
 - Contamination of water resources
 - Generation of methane gas
 - Physical hazards
- Landfill owners – including municipalities – **are responsible for all costs** to clean up environmental contamination



Municipal officials need to be aware of the location & condition of ALL landfills

- Most towns have more than one old landfill:
 - One that closed more recently – often where the transfer station is
 - One (or more) that is even older
 - 4 in Laconia & Lebanon!
 - 3 in Atkinson, Auburn, & Pelham
 - 2 in Bartlett & Wilton





Contamination of Water Resources

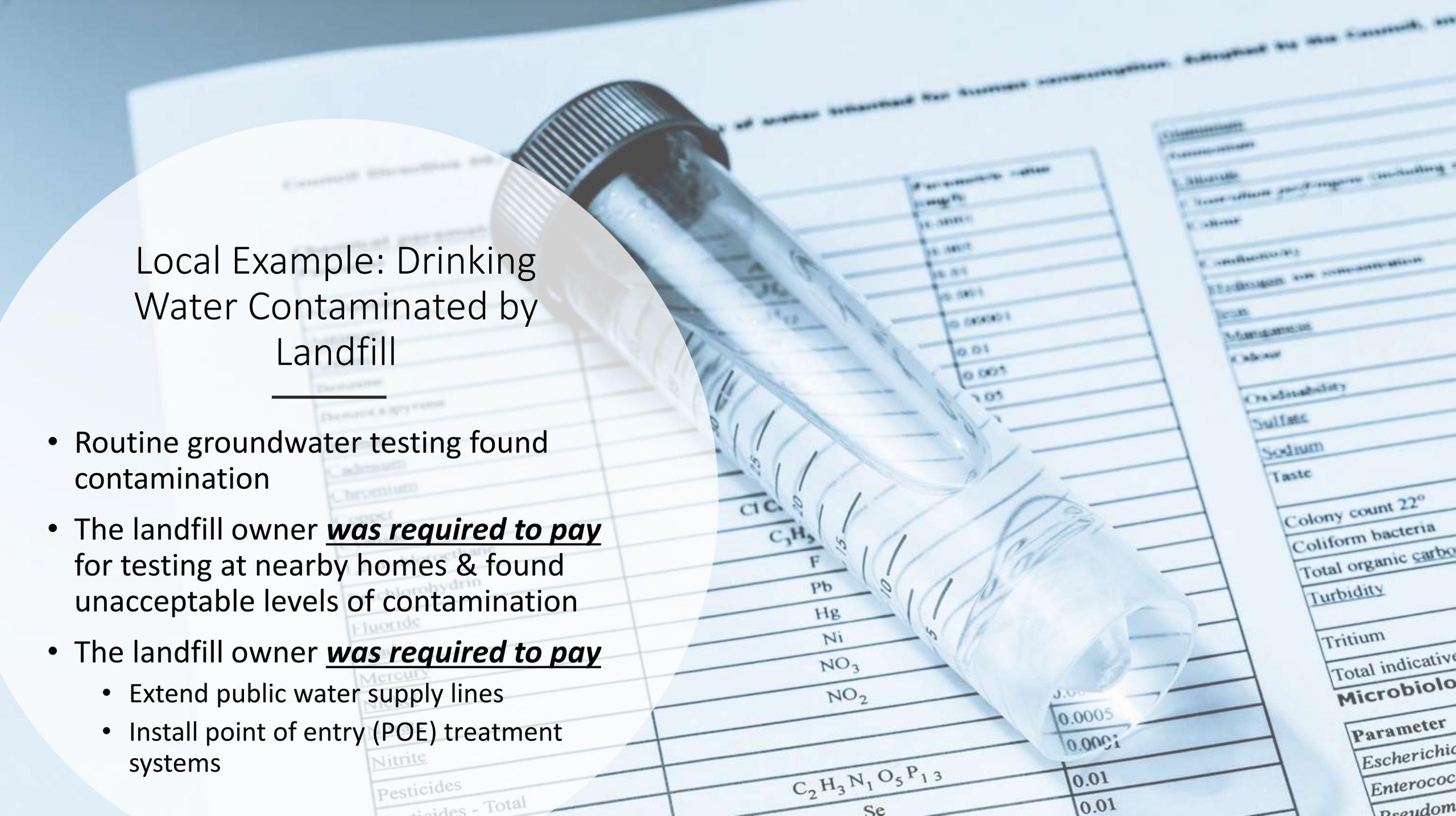
Water Contamination Can Affect Community Health

- Rain & snow enter the landfill becoming leachate
- The bottoms of old landfills were not lined
- Leachate pollutes surface & groundwaters
- **Effective risk reduction:** Properly maintain cover soil & vegetation systems to reduce water movement through waste



Local Example: Drinking Water Contaminated by Landfill

- Routine groundwater testing found contamination
- The landfill owner **was required to pay** for testing at nearby homes & found unacceptable levels of contamination
- The landfill owner **was required to pay**
 - Extend public water supply lines
 - Install point of entry (POE) treatment systems



Landfill Owners Should Make Sure That:

- No waste is exposed
- Good depth of soil covers all waste
- Cover soil is kept intact
- Healthy grass covers waste areas
- No trees or woody vegetation is growing in waste areas, including side slopes
- Cover soil reduces water infiltration and promotes run-off
- Run-off is managed by diverting it off & away from the landfill without causing erosion

A person wearing a white hard hat and a high-visibility yellow vest is standing on a grassy slope, looking towards the left. The background shows a line of trees and a clear sky. The overall scene is dimly lit, suggesting an overcast day or a shaded area.

Two Inspections Each Year!

A walkover inspection should be conducted at least twice a year by a knowledgeable municipal employee or a professional engineer

For regulated landfills, NHDES requires two inspections each year – preferably in April/May & October/November

Annual Mowing to Prevent Tree Growth

- Shallow landfill cover soil cannot support trees as they mature
- Blown over trees damage cover soils & expose waste
- **Effective risk reduction:** Mow closed landfills at least once annually or as needed to control woody growth
 - Plan to mow in late September to avoid killing nesting species and insects



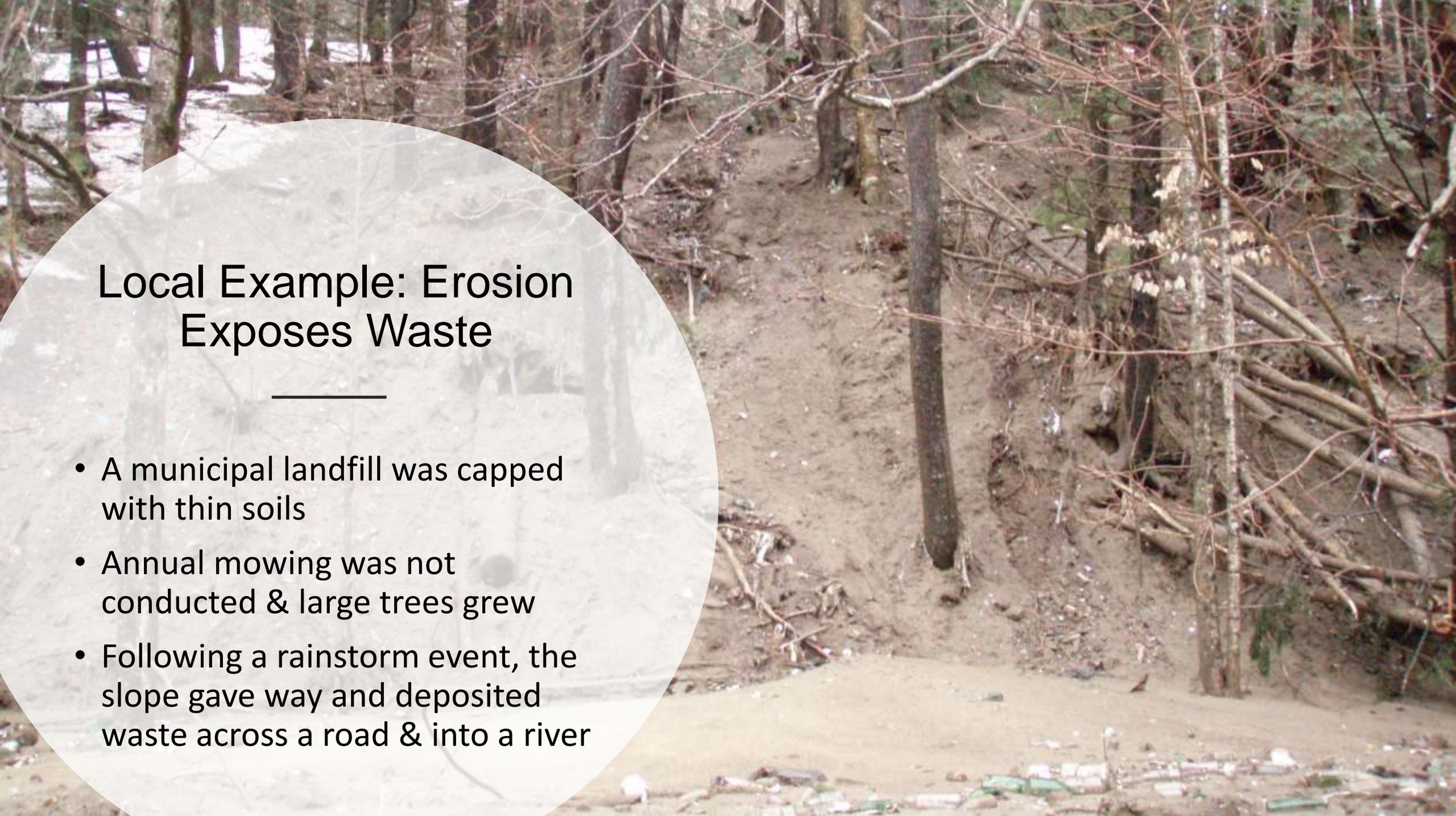


Maintain Good Grass Cover

Prevents soil erosion by
water or wind

Animal burrows provide
a direct pathway into the
waste





Local Example: Erosion Exposes Waste

- A municipal landfill was capped with thin soils
- Annual mowing was not conducted & large trees grew
- Following a rainstorm event, the slope gave way and deposited waste across a road & into a river

Waste Settlement & Drainage

- Waste settles over time, causing depressions that allow for ponding water
- **Effective risk reduction:** Fill depressions with soil, regrade to promote runoff, & restore grass coverage



Leachate Breakouts

- Leachate breakouts or “seeps” come out of a landfill side slope or at the base (or toe) of the landfill
- **A leachate seep creates a potential hazard & must be addressed immediately – contact NHDES and/or your engineer!**
- **Effective risk reduction:** maintain healthy grass coverage & ensure a good depth of cover soil that is graded to reduce infiltration





Generation of Methane Gas

Methane Gas Formation & Risks

- As organic wastes in a landfill age, they decompose & generate methane & other gases
- **Gas production can continue for decades after a landfill closes**
- Landfill gas can ***travel underground 1,000 feet or more*** from the landfill
- Methane gas, at certain concentrations, can explode or otherwise fuel a fire
 - *One visual sign of methane gas is stressed or dead vegetation*



Local Example: Landfill Gas Impacts Utility Work

- Utility workers measured gas levels before entering their roadside excavation
- Explosive levels were found & they had to wait an hour for the gas to dissipate
- Source was a nearby old landfill
 - It had been closed for more than 20 years
- The property owner was required to install a landfill gas interceptor system & **must keep paying** to conduct gas monitoring



Structures Near Landfills

- Structures should not be built on top of landfilled waste or near an old landfill
- **Effective Risk Reduction:** Measure gas levels in the soil at the property boundary & in any on-property buildings at least once a year
 - If the measured level increases, measure frequently to make sure a dangerous situation does not develop



Local Example: Landfill Gas Explosion

- A town maintenance garage located adjacent to a closed municipal landfill
- A particularly cold & snowless winter froze the ground deeper than normal, likely causing the landfill gas to migrate
- A welder's spark fell into a floor drain & set off an explosion
 - Fortunately, it did not injure anyone or cause significant damage





Encroachment of Development

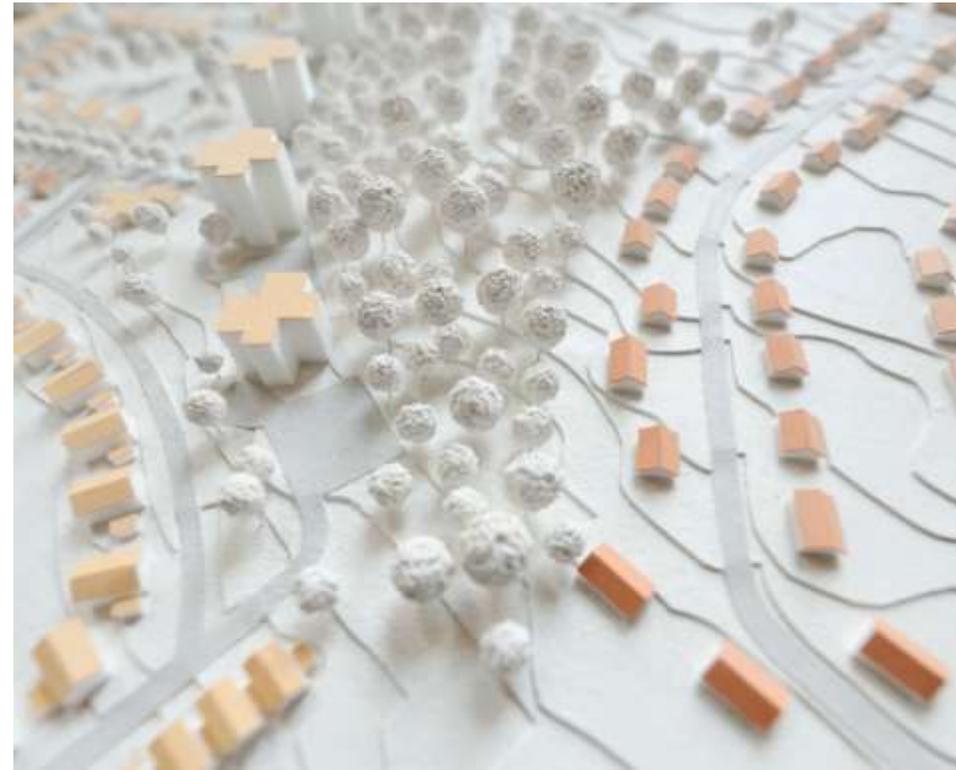
- **Liability!**

- If a groundwater well will be the water supply, the groundwater might already be contaminated, or ***the new pumping might cause contamination to spread & move into the well***
- Methane gas might migrate into structures



Effective Risk Reduction:

- Include a notice on the deed for the property that is recorded at the Registry of Deeds
- Increase awareness of the location of old landfills
 - Particularly among local officials that oversee real estate development
- Adjust zoning & planning ordinances & codes to limit development near old landfills





Physical Hazards

Source & Reduction of Physical Hazards

- Closed landfills are tempting locations for unauthorized uses
 - All-terrain vehicles (ATV) & illegal waste dumping
- Trespassing increases liability!
 - Disturbs the landfill cover (increases leachate)
 - Potential damage to infrastructure (e.g. wells, gas vents)
 - Creates injury hazards
- **Effective risk reduction:** Restrict access with gates & barriers, post signs identifying old landfill, remove illegal waste & **take preventative measures**



An Opportunity for Closed Landfills!

- Closed landfills are typically large open areas & should be evaluated for solar energy generation potential
- For a solar project to be economically feasible, there typically needs to be a three-phase power line available near the site
 - If three-phase power is located nearby, contact a solar developer to help identify next steps





Requirements for Landfills that Ceased Operations After July 9, 1981

Post-Closure Care Requirements



If a landfill ceased operations after July 9, 1981, it should have a:

- Solid Waste Permit
- Closure Plan:
 - Includes post-closure inspection, monitoring & maintenance requirements that are specific to your site
- Groundwater Permit (most landfills)

Post-Closure Care Requirements

- ***Inspect, monitor, and repair*** any damage
- Conduct two inspections per year, ***and file those reports*** with NHDES
- File an annual facility report ***by March 31st*** of each year

The Post-closure Care period extends until you can ***demonstrate to NHDES*** achievement of the “performance standards” in the NH Solid Waste Rules:

- Stop generating leachate,
- Stop generating decomposition gases like methane,
- Achieve maximum settlement,
- Remove harmful impacts to air and water, and
- Remove threat to human health and the environment.

“BRADY BILL” LANDFILLS *RSA 149-M:9(XIII)*



No permit issued by the department to a town with a population of 5,000 persons or fewer shall require the town to clean up an inactive, municipally-owned, unlined landfill (inactive facility) if the town:

- (1) **Monitors** the inactive facility in accordance with requirements established in RSA 485-C and RSA 149-M and rules adopted by the department.
- (2) **Continues to show**, through monitoring devices, that the inactive facility is having no adverse impact, as defined in rules adopted by the department, on the environment.
- (3) **Has obtained approval of a closure plan** from the department by January 30 of the calendar year in which the facility is scheduled to close by the department.



Assistance Resources

Signature _____

Date _____



Best Management Practices & Requirements Guide

https://www.newmoa.org/wp-content/uploads/2023/03/NH_Closed_Landfill_BMPs.pdf



Closed landfills are a long-term liability for municipalities because they can create environmental and other problems that negatively impact residents, visitors, and others. Landfill owners, including municipalities, are responsible for the costs to cleanup environmental contamination. Therefore, **it is important that municipal officials are aware of the location and condition of all the closed landfills in their community.** Many New Hampshire towns have *more than one* closed landfill – one that long-time residents remember using (often near the location of the current transfer station) and one or more that was used before that one opened. Municipal officials need to know about and maintain all of them.

This Closed Landfill Best Management Practices (BMP) Guide is designed to help municipal officials understand the actions they should take to reduce the potential environmental contamination from closed landfills and to protect the health and safety of their community. Note that landfills that ceased operations *after July 9, 1981*, have additional requirements that are outlined on page 7 of this document.

Closed landfills can cause:

- Contamination of water resources
- Generation of methane gas
- Physical hazards

NHDES IS HERE TO HELP!

The New Hampshire Department of Environmental Services (NHDES) can answer questions and provide advice and limited technical guidance to municipalities. NHDES is most interested in providing cooperative assistance to address problems as soon as they arise. Contact NHDES' Solid Waste Management Bureau: (603) 271-2925 or solidwasteinfo@des.nh.gov. Additional information is available from NHDES: <https://www.des.nh.gov/waste/solid-waste>.

TWO INSPECTIONS EACH YEAR

A walkover inspection should be conducted at least twice a year by a knowledgeable municipal employee or a professional engineer. Inspections should be conducted in the spring following snowmelt and after/during the annual mowing event in the fall. Inspectors should look for:

- **Soil cover:** tree growth, animal burrows, erosion, and exposed waste
- **Grass cover:** bare spots and dead grass/vegetation (could indicate a methane gas problem)
- **Cover grading:** settlement or areas where water can pond; and sloughing of side slopes
- **Stormwater management:** obstructions in ditches, culverts and other features, erosion, or excessive sediment accumulation
- **Access restrictions:** evidence of ATVs, dirt bikes, or other unauthorized access

A separate Closed Landfill Inspection Checklist is available at: https://www.newmoa.org/nh_inspection_checklist/.

Inspection Checklist

https://www.nwmoa.org/wp-content/uploads/2023/03/NH_Inspection_Checklist.pdf

CHECKLIST

Name: _____
 Organization and Position: _____

 Landfill Name: _____
 Town Where Landfill is Located: _____
 Landfill Street Location: _____
 Date of Inspection: _____

Circle the most applicable response for each question

VEGETATION				
	1	2	3	Notes/Action Items
Are trees or bushes growing on the landfill, including the side slopes?	None	Areas of brushy growth	Trees/bushes cover large areas	
Can you walk all the way around the landfill at the bottom of the side slope?	Yes	Some obstructed areas	Not at all	
Is grass growing over the entire landfill, including the side slopes?	Yes	Several small bare or mossy spots	Many large bare spots	
Are there animal burrows on the landfill, including the side slopes?	None	Several small	Many large or connected	

DRAINAGE				
	1	2	3	Notes/Action Items
Is the landfill graded so there are no depressions where water can pond? (if it hasn't recently rained, look for mossy growth or muddy looking bare spots)	Yes - no depressions	Several small depressions	Many large depressions	
Is there any evidence of erosion on the side slopes?	None	Several small concentrated channels a few inches deep	Many large channels with bare soil	
Are all drainage features that are located off the landfill (such as drainage swales/ditches, culverts, detention ponds) free of obstruction (including tree & shrub growth) & no evidence of sediment build up?	Yes - no obstructions & no sediment OR Not applicable - there are no off landfill drainage features	Some obstructions OR some sediment	Obstructions & sediment	

LEACHATE SEEPS			
	1	2	3
When walking around the landfill, is there any soil that is stained orange or an area where liquid is seeping from the slope?	No	A small dry area	A large wet area
Notes/Action Items			

LANDFILL GAS				
	1	2	3	Notes/Action Items
Are there any buildings located on the landfill itself?	No		Yes	
Are there any building or other structures located around the base of the landfill?	None	More than 100 feet away	Within 100 feet	
Are all gas vents in good condition?	Yes OR Not applicable - no gas vents	1 has cracks or missing screen	More than 1 is broken	

PROPERTY ACCESS				
	1	2	3	Notes/Action Items
Is access to the property restricted?	Yes - gate locked & no way around	Somewhat restricted - some boulders or tree logs	No barrier to entry	
Are there "no entry" signs warning the public that there is a landfill?	Yes		No	
Is there evidence of unauthorized access (such as ATV trails or illegal dumping)?	No		Yes	

GROUNDWATER MONITORING WELLS			
	1	2	3
Are all groundwater monitoring wells at the landfill accessible & easy to find & covered & locked?	Yes - all in good condition & locked OR Not applicable - no groundwater monitoring wells	Hard to find - covered but not locked	Cannot find any of them
Notes/Action Items			

The results of each inspection should be shared with one or more senior municipal officials, such as the Selectboard Chair, the Town Manager, the Director of Public Works, and/or the Town Clerk.

- Any answers other than “1” require follow-up to address deficiencies.
- **Any answers of “3” require immediate attention** – contact NHDES for advice and assistance. Also consult the “Closed Landfills in New Hampshire: Guide to Best Management Practices & Requirements” for more information.
(Available at https://www.newmoa.org/nh_closed_landfill_bmps/)
- Any answers of “2” indicate an issue that needs ongoing monitoring and/or attention before the situation worsens.

Yearly Tasks for Municipalities

- Delegate responsibility for maintaining the landfill(s)
- At least ONCE a year
 - Mow to prevent tree growth
 - Measure level of methane gas in soil
 - Measure level of methane gas inside nearby structures
- At least TWICE a year
 - Walkover inspection
 - Review results of each inspection **& address deficiencies!**
- For regulated landfills:
 - Follow requirements of the groundwater permit, including reporting to NHDES, as required*
 - Report from each semi-annual inspection sent to NHDES within 30 days
 - Annual Post-Closure Report sent to NHDES **by March 31st** of the following year

Municipal Checklist

https://www.newmoa.org/wp-content/uploads/2023/03/NH_Municipal_Checklist.pdf

CHECKLIST

Name: _____ Today's Date: _____

Position in Town: _____

Landfill Name: _____

Landfill Street Address: _____

Date began accepting waste: _____ Date ceased operation: _____

1: Is there a town position that includes responsibility for maintaining the landfill? YES NO

Position: _____

Name of person currently employed in that position: _____

2: Has the landfill been mowed at least once in the past year? YES NO

Date of mowing: _____

3: If applicable, has the level of methane gas in the soil been measured (in % Lower Explosive Limit (LEL)), at the property boundary on all sides of the landfill at least once in the past year? YES NO

What was the highest level in % LEL: _____ Date of measurement: _____

4: If there are structures located at the same property as the landfill, has the level of methane gas been measured inside each structure at least once in the past year? YES NO

What was the highest level in % LEL: _____ Date of measurement: _____

5: Have walkover inspections been conducted at least twice a year by a knowledgeable municipal employee and/or a professional engineer? YES NO

Date of SPRING inspection: _____ Date of FALL inspection: _____

6: Have you reviewed the results of each inspection? YES NO

7: Have all deficiencies noted in the inspections been properly addressed? YES NO

8: If the landfill ceased operation after July 9, 1981 – has the "Annual Post-Closure Report" been submitted to NHDES? YES NO

9: Does the landfill have a groundwater management permit? YES NO

What is the frequency of monitoring? _____ Was it completed when required? YES NO

What is the frequency of reporting to NHDES? _____ Was it sent when required? YES NO

10: Has a notice been added to the deed for the property noting that it contains a landfill? YES NO

You should be able to answer "YES" to EVERY question. If not, please implement the changes required so that "yes" is the answer to everything.

Resource: NHDES OneStop

- Permits, Data, Reports & Other Documents
- Searchable by town & type of activity, for example:
 - Solid waste facility
 - Hazardous waste generator
 - Air stationary source
 - Groundwater discharge site
- Home page: <https://www.des.nh.gov/onestop-navigation>
- Search page: <https://www4.des.state.nh.us/DESOnestop/BasicSearch.aspx>



Tuesday, Jun. 13, 2023

OneStop - Search

Any DES Interest Id:

NHDES is working to make all of our online documents fully accessible. If you have any problems accessing a particular file, please contact us and we will make the necessary accommodations. If you have any questions about using this site, please contact us. Click the OneStop Contact button in the menu bar above for contact information.

Areas of Interest

General Areas of Interest:

If you are unsure which Specific Areas of Interest you want, try selecting a General Area of Interest. This will select all the Specific Areas that apply.

Specific Areas of Interest

- Aboveground Storage Tank
- Air Stationary Source
- Alteration of Terrain Permit
- Asbestos Disposal Site (Inactive)
- Auto Salvage Yard
- Beaches
- Bottled Water Site
- Groundwater Discharge Site
- Hazardous Waste Generator
- Initial Response Spill
- Public Pools/Spas
- Public Water System
- Registered Water User
- Remediation Site
- Solid Waste Facility
- Underground Storage Tank
- Water Well

Before hitting the Enter key, if you have checked specific area(s) of interest, you may want to scroll down to check other Interest Specific Criteria you can search on.

- Include other interests found at location(s)
- Return only results that exist in ALL selected areas of interest

Location

Town/City:

Site Name:

Address:

County:

Interest Specific Criteria

ALL Owner fields listed below are automatically wildcard searched. For other fields noted by an "*", the wildcard character "%" can be used. Click here to learn more about using the Search wildcard character.

Solid Waste Facility

Permit Number:

Location  

Enter

Town/City: 

Site Name: 

Address: 

County: 

Interest Specific Criteria  

ALL Owner fields listed below are automatically wildcard searched. For other fields noted by an "*", the wildcard character "%" can be used. [Click here to learn more about using the Search wildcard character.](#)

Solid Waste Facility 

Enter

Permit Number:

Facility Type:

- Collection/Storage/Transfer
- Collection/Storage/Transfer-Materials Recovery
- Lined Landfill
- Processing/Treatment
- Processing/Treatment-Incinerator
- UnLined Landfill

- Collection/Storage/Transfer-Asbestos
- Collection/Storage/Transfer-Select Recyclables
- Other
- Processing/Treatment-Compost
- Processing/Treatment-Waste to Energy

Status: Operating Not Operating

Owner Type:

Service Type:

New Hampshire Department of Environmental Services | PO Box 95 | 29 Hazen Drive | Concord, NH 03302-0095
603.271.3503 | TDD Access: Relay NH 1.800.735.2964 | Hours: M-F, 8am-4pm



Tuesday, Jun. 13, 2023

OneStop - Search Results

Document Retrieval Problems? [Learn More](#)

[New Search](#)



Total rows Found: 4

Display results per page

Sort By:

Location	Name(s) at Location	Interest(s) at this location Click interest for details	Primary Id(s)	Secondary Id(s)
FRANK BEAN RD LACONIA Map It Master Id: 58485	FRANK BEAN ROAD SITE	Solid Waste Facility Old non-landfill open dump site	Facility Id: 0003098 Site No: 200308076	Master Id: 0058485 Project No: 0013055
JODI DR LACONIA Map It Master Id: 68826	GILBERT LANDFILL	Solid Waste Facility	Facility Id: 0002987	Master Id: 0068826
RTE 11BWINNISHORE RD LACONIA Map It Master Id: 16672	LACONIA DISPOSAL GARDENS	Solid Waste Facility Existing landfill or landfill closure	Facility Id: 0000023 Site No: 198709021	Master Id: 0016672 Project No: 0000381
MORIN RD LACONIA Map It Master Id: 71997	MORIN ROAD LANDFILL	Solid Waste Facility	Facility Id: 0003125	Master Id: 0071997
Location	Name(s) at Location	Interest(s) at this location Click interest details	Primary Id(s)	Secondary Id(s)

New Hampshire Department of Environmental Services | PO Box 95 | 29 Hazen Drive | Concord, NH 03302-0095
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 - Email: solidwasteinfo@des.nh.gov
 - Call: 603-271-2925
- <https://www.des.nh.gov/waste/solid-waste>

