NEW YORK STATE ASSOCIATION OF SOLID WASTE MANAGEMENT

Leachate Management

Presented by: Joshua Olbrys, Executive Director

Oneida-Herkimer Solid Waste Authority

March 2024

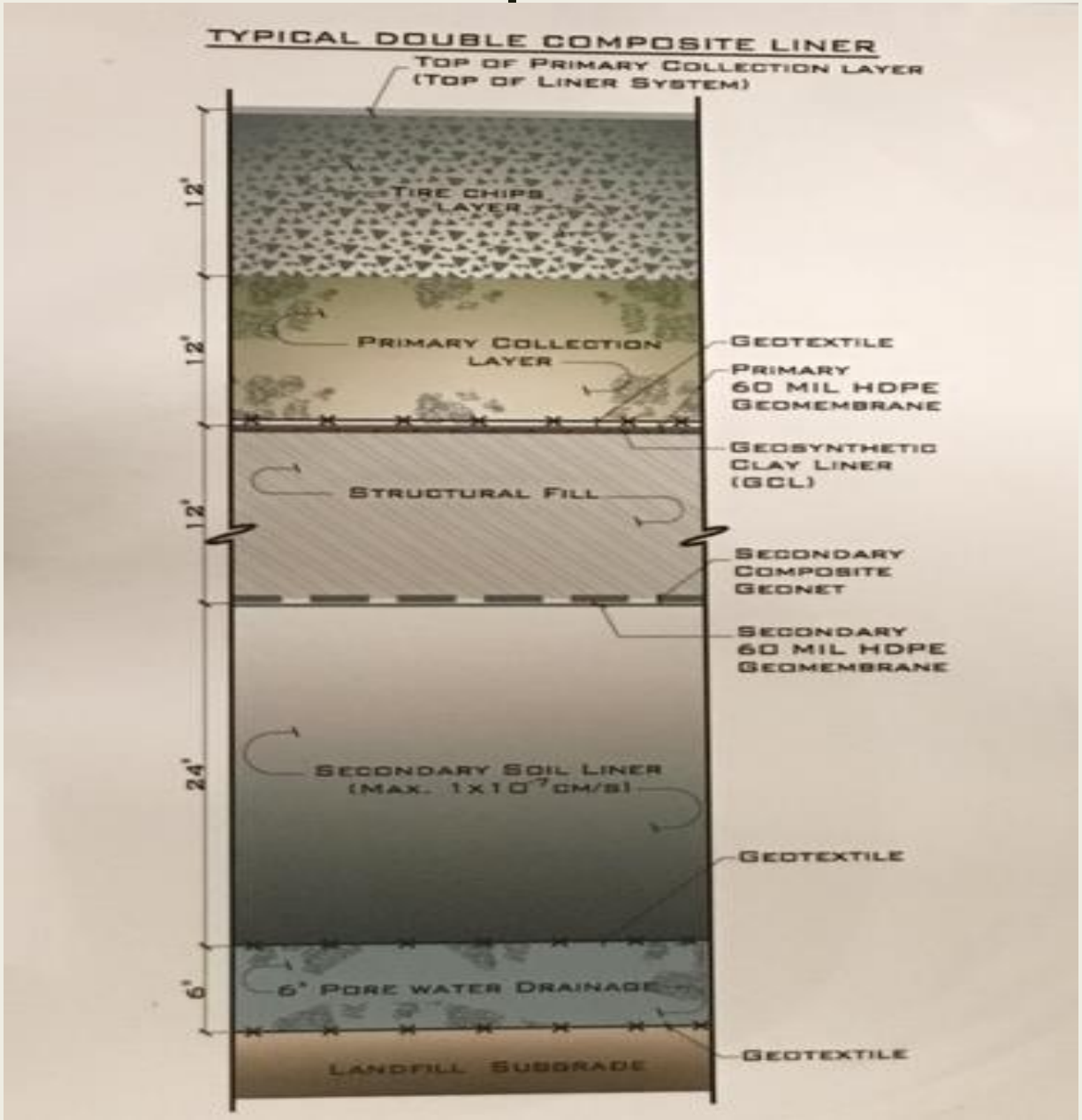
Dump vs. Part 360 Landfill

- Old Dumps were easy to operate.
- Leachate was conveyed either toward groundwater or surface water channels.
- Difference = Leachate accountability.

Modern Landfills

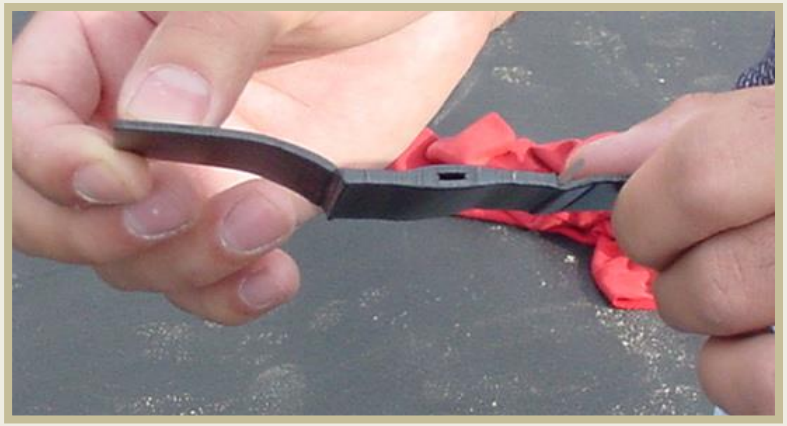
- Modern landfills are different than dumps.
- Sophisticated liner systems.
- Constructed in cost-effective manner.

Double Composite Liners



Hot Wedge Welding Machine

- Seam testing



Leak Detection Sensitivity Testing

- Electrical charge
- Quicker methods available for liner performance
- Pinhole leaks can be found

Select Refuse

- Once the contractor finishes these expensive liner systems it is up to operators to ensure they are not damaged.
- Part 360 Regulations require initial lift of refuse be placed above leachate collection systems.
- Minimum of 5 ft. thickness, no rigid objects.
- This layer typically called select refuse.

Leachate Generation

The factors that influence leachate generation include:

- Climate/Weather
- Topography
- Landfill Cover
- Vegetation
- Types of Refuse
- Operating Methodology
- Landfill Design
- Amount of Rainfall
- Moisture Content of Waste itself is also a Factor.

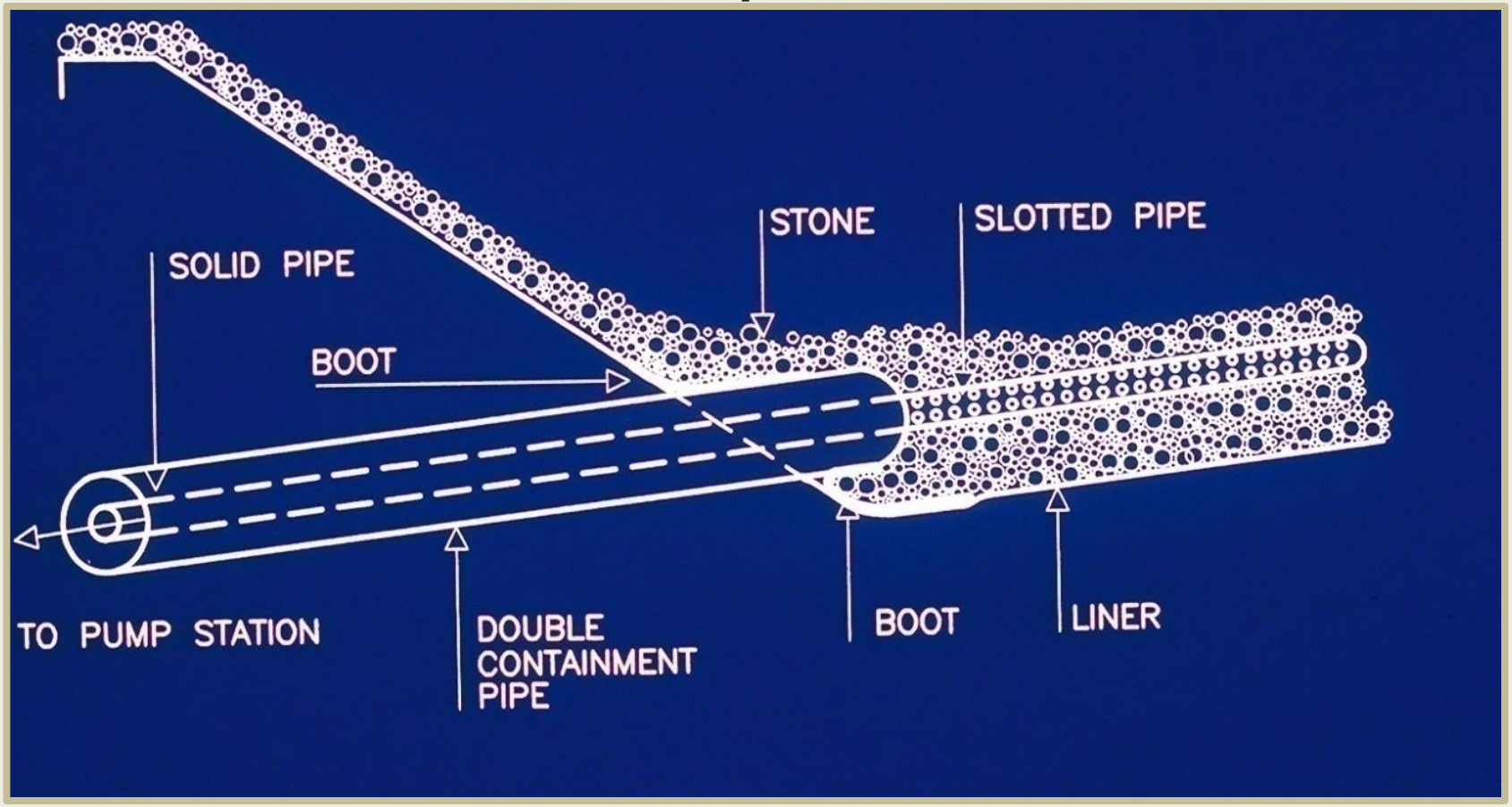
Minimize Leachate Generation

- Part 360-2.9 (j) Leachate Management Plan
  - (1) minimize the generation of leachate
- Divert Storm Water
  - Intermediate Cover
  - Build Berms
  - Use Synthetic Cover on Inactive Areas
- HOWEVER: Side slope breakouts must be directed to the interior of the landfill and the primary leachate collection system!

Collection Pipe Installed

- Pipe is installed in center of sawtooth design
- Filter fabric and drainage material
- Over time changes in design
- Larger piping 8”
- De-beading of welds

Several Design Types for Leachate Pipe Network

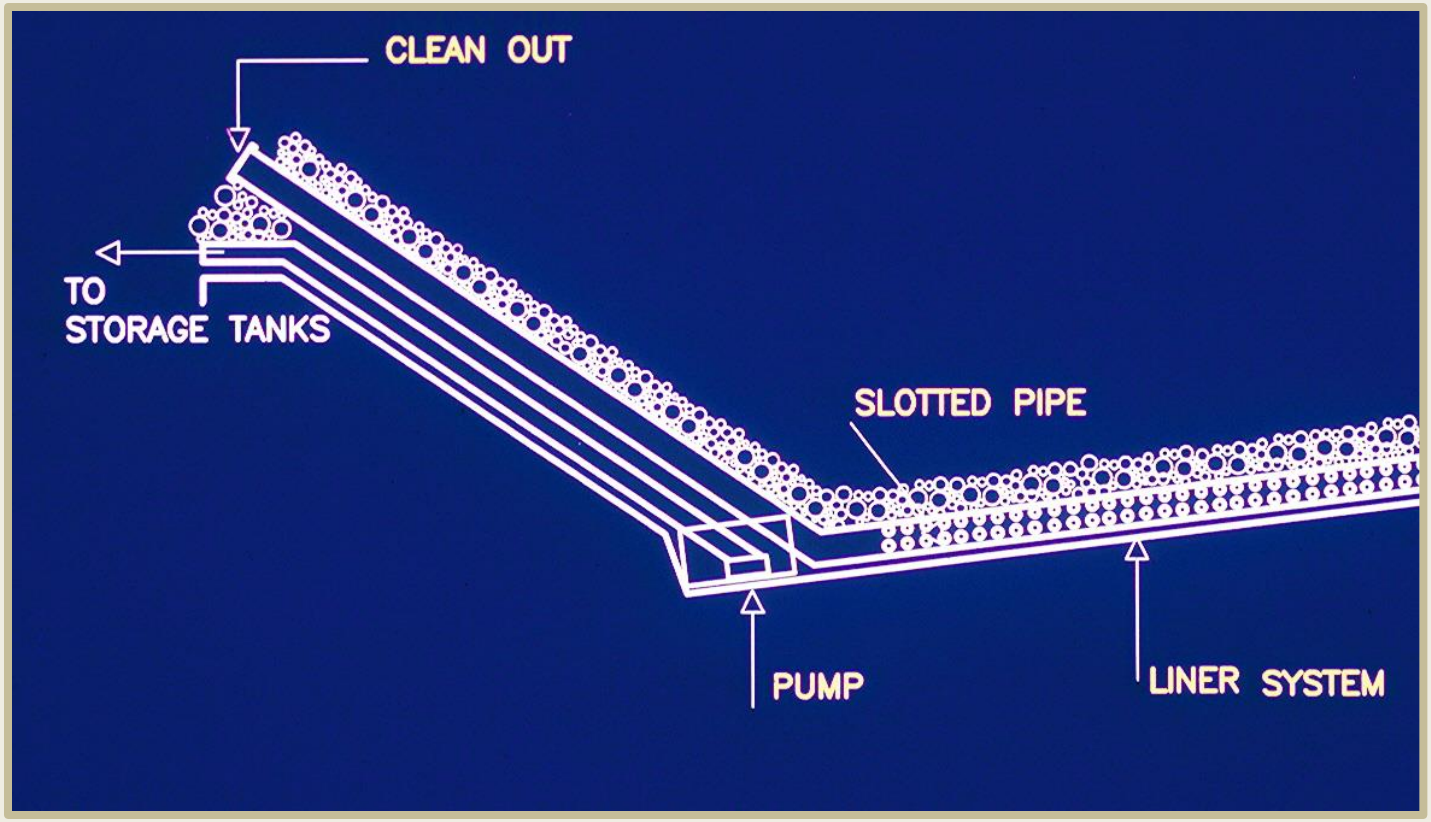


- Boot System - Slotted pipe sloped at 2% pitch toward pump station, penetrating side wall of the landfill through a boot system.

Constructing Boot System

Side Slope Riser System

- Has track system for lowering pump into lowest spot of landfill to remove leachate from liner system.
- Regardless of type of system at the low end of cell, leachate collection laterals must be maintained.

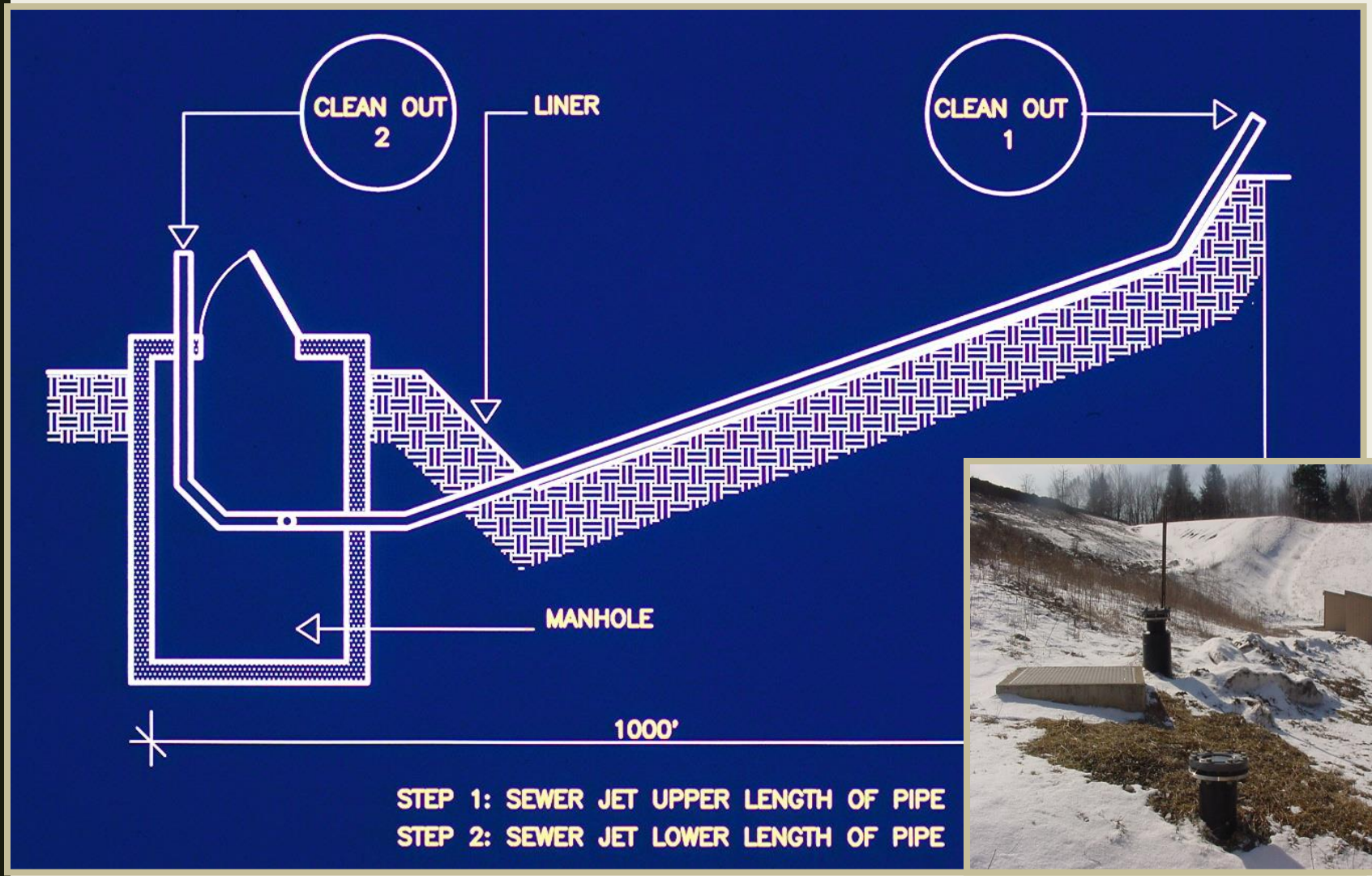


Annual Cleaning of Leachate Collection Pipes

- Collection laterals with few fittings
- Sewer jet 85 gals/min at 2,500 PSI
- 650’ length manageable (however, longer lengths possible)
- If problem, camera inspect

Clean-Outs Should Be Accessible

- To ensure cleaning occurs in safe and efficient manner, clean-outs should be made accessible.

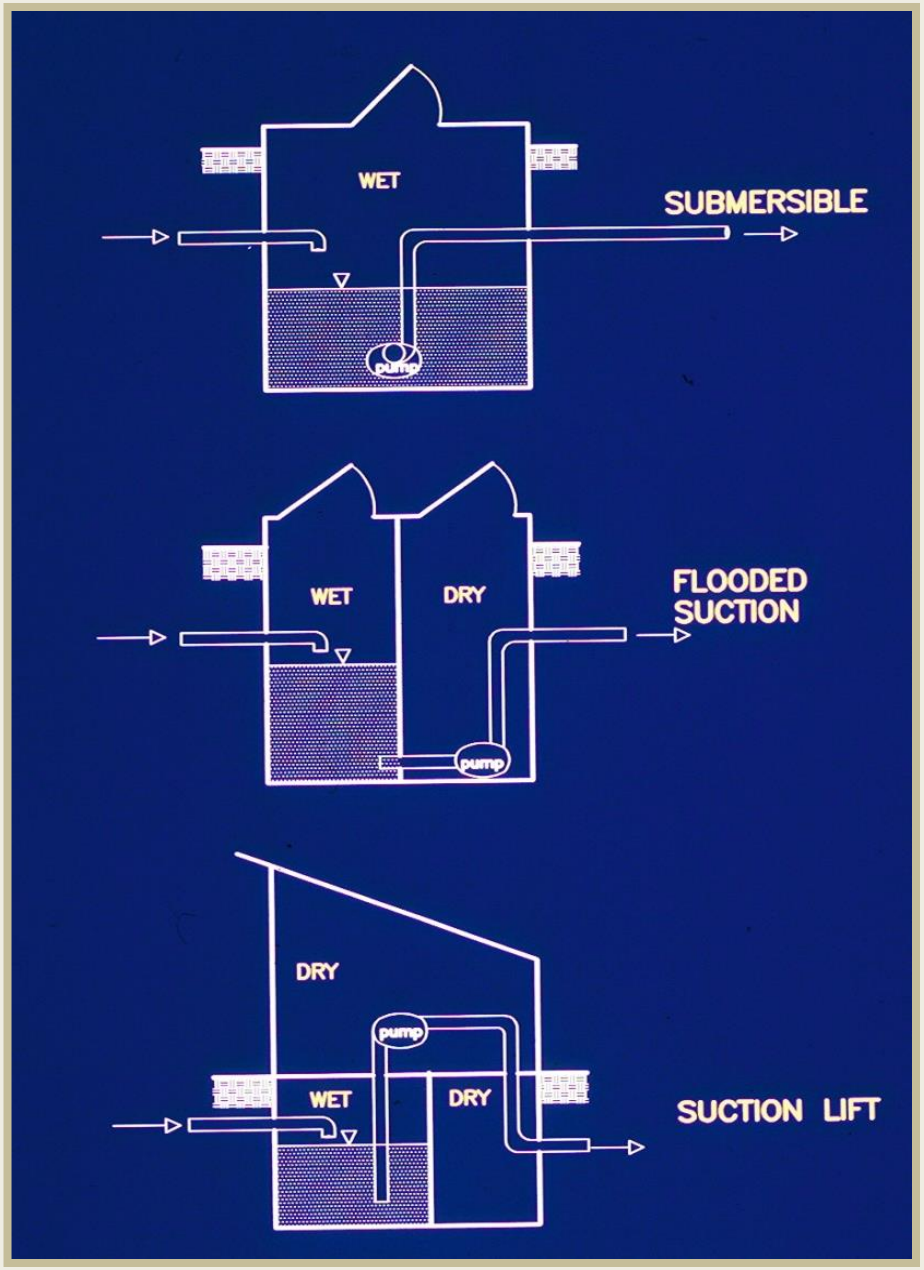


Video Inspection

Leachate lines must be inspected every other year

or if a blockage is present

Landfill Pump Stations Differ



- In landfill design, consultants utilized different methodologies to convey leachate.
- Common types:
  - Submersible pumps
  - Centrifugal pumps with flooded suctions
  - Centrifugal pumps with suction lift

Pump Station Problems

- Include: Double containment failures, electrical difficulties, improper pump wiring, corrosion and lack of preventative maintenance.

Pump Station With Submersible Pumps

Example of Submersible Pumps

Wet Well Cleaned On Annual Basis

- After flushing of laterals, wet well of any facility should be cleaned.
- Pump out all liquid and remove all sediment in base of wet well.
- Any valves should be checked to ensure proper operation (rebuild or replace if worn).
- Even a small amount of debris could render a valve useless.
- Keep pump stations operational to prevent leachate backing up and create head build-up on the liner!

Force Mains Should Be Maintained

- It is important that force main from pump station to leachate storage facility be maintained.

Development Of Biological Matter On Force Mains

- Biological matter clings to inside of pipe.
- Greatly increases friction of pipe which reduces flow capabilities of a force main.

Force Main Cleaning

- Force mains must be cleaned on an annual basis.
- Can be accomplished in most systems by inserting foam swabs into piping systems.
- Can insert several at a time (tracers available).

Launch Area

- Valves are opened and pumps turned off.
- Insert one or more swabs.
- Reinstall covers.
- Turn on pumps which send swabs through system cleaning side walls of pipe.

After Retrieval

- Swabs will be deformed after traveling the entire length.
- Typically they can be reused several times.

Debris Results

- Biological scum and grit will be pushed out by swab.
- Procedure can be repeated several times to complete cleaning.

Vacuum Truck

- The clean-up from the swabs can be accomplished by using a vac truck.
- This saves time and eliminates the need for confined space entry.

Part 360 Regulations

- Secondary collection leachate removal system allows 20 gallons per acre per day on 30-day average.
- State approval if below 20 gal/acre/day.

Part 360 Allowable Leakage Rate:

20 GAL/ACRE/DAY

SECONDARY FLOW RATE

- 0.35 Gallons Per Minute
- 10-Acre Cell
  - 0.35 GPM * 60 Minutes = 21 Gall/Hour
  - 21 GPH * 24 Hours = 504 Gall/Day
  - 504 GPD/10 Acres = **50.4** Gall/Acre/Day

SECONDARY FLOW RATE VIOLATION??

30-DAY AVERAGE MAY BE OK!

Flow Rate Calculation

- Automatic electronic metering equipment
- Manual Measurements of accumulated flow within wet wells
- Pumping of collected liquid through positive displacement metering equipment

Calibration & Flow Checks

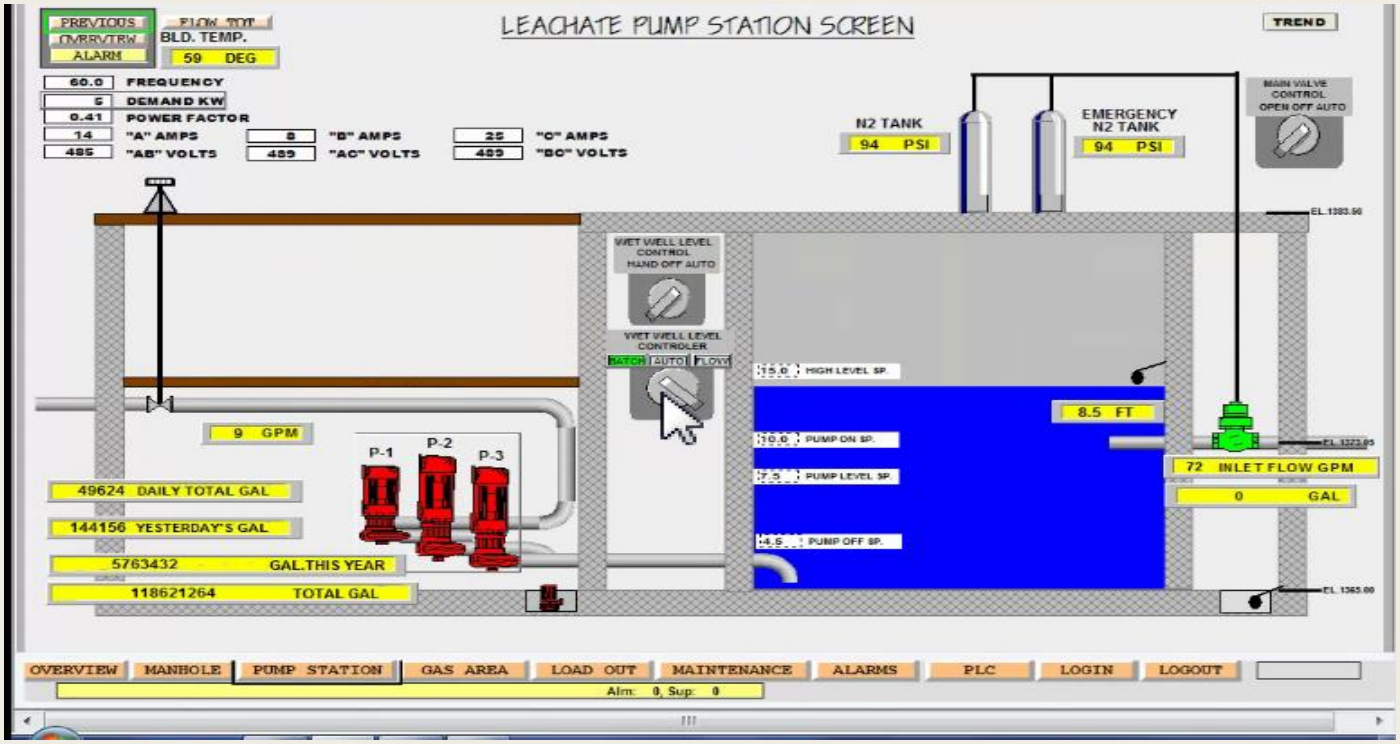
- Meters and flow devices should be checked by the operators quarterly, or if flow rate is suspect.
- Flow meters should always be factory calibrated or checked according to the manufacturer's recommendations.

Secondary Leachate Quantities

- Regardless of method used, you must accurately determine the quantity of leachate collected in the secondary removal system.
- This is proof your facility is operating per permit requirements and in accordance with design.

SCADA Technologies

- Supervisory Control And Data Acquisition
- Several methods can be utilized to document readings.



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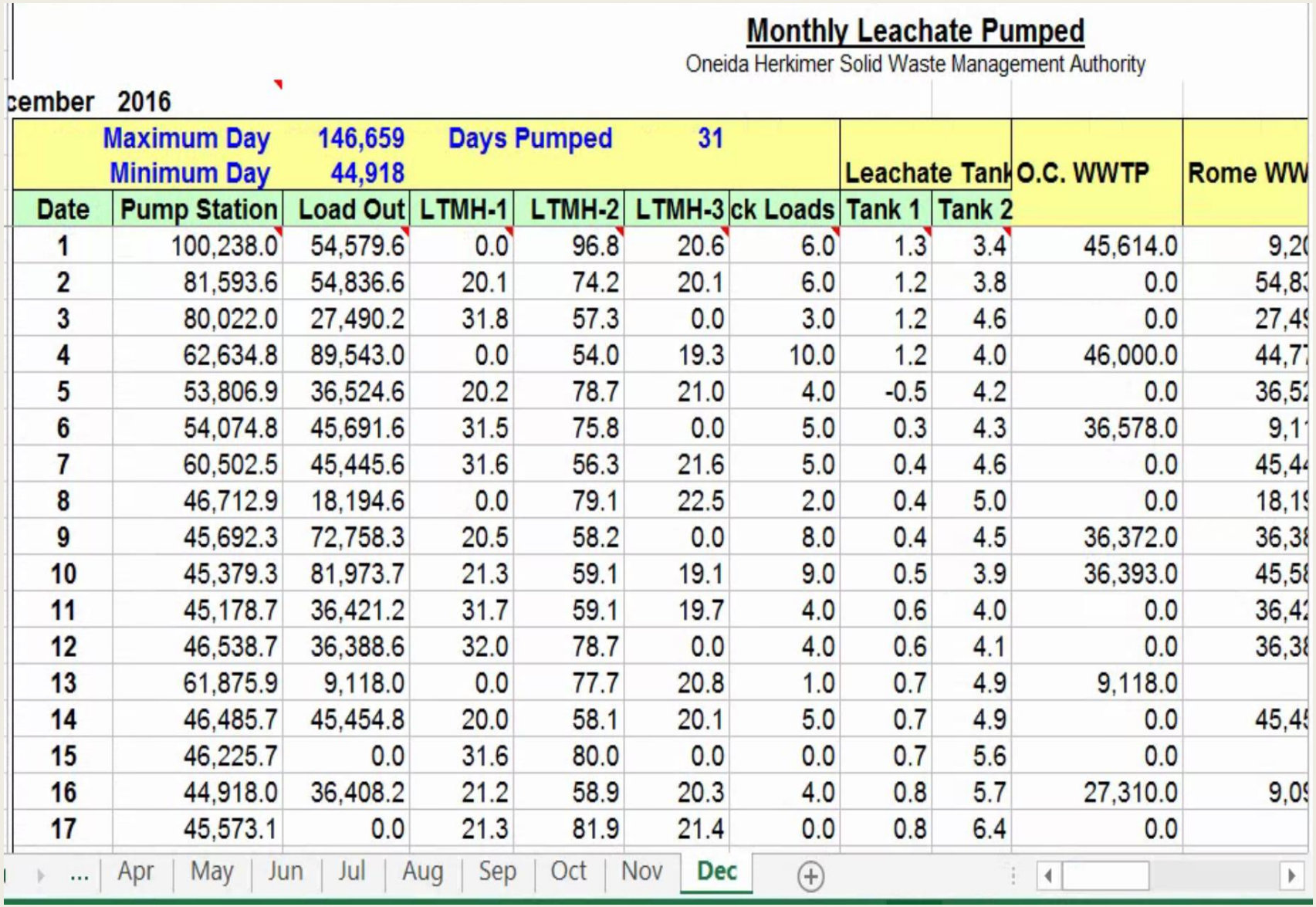

Monthly Leachate Pumped

Oneida Herkimer Solid Waste Management Authority

cember 2016

	Maximum Day	146,659	Days Pumped	31			Leachate Tank		O.C. WWTP	Rome WW
	Minimum Day	44,918								
Date	Pump Station	Load Out	LTMH-1	LTMH-2	LTMH-3	ck Loads	Tank 1	Tank 2		
1	100,238.0	54,579.6	0.0	96.8	20.6	6.0	1.3	3.4	45,614.0	9,20
2	81,593.6	54,836.6	20.1	74.2	20.1	6.0	1.2	3.8	0.0	54,83
3	80,022.0	27,490.2	31.8	57.3	0.0	3.0	1.2	4.6	0.0	27,49
4	62,634.8	89,543.0	0.0	54.0	19.3	10.0	1.2	4.0	46,000.0	44,77
5	53,806.9	36,524.6	20.2	78.7	21.0	4.0	-0.5	4.2	0.0	36,52
6	54,074.8	45,691.6	31.5	75.8	0.0	5.0	0.3	4.3	36,578.0	9,11
7	60,502.5	45,445.6	31.6	56.3	21.6	5.0	0.4	4.6	0.0	45,44
8	46,712.9	18,194.6	0.0	79.1	22.5	2.0	0.4	5.0	0.0	18,19
9	45,692.3	72,758.3	20.5	58.2	0.0	8.0	0.4	4.5	36,372.0	36,38
10	45,379.3	81,973.7	21.3	59.1	19.1	9.0	0.5	3.9	36,393.0	45,58
11	45,178.7	36,421.2	31.7	59.1	19.7	4.0	0.6	4.0	0.0	36,42
12	46,538.7	36,388.6	32.0	78.7	0.0	4.0	0.6	4.1	0.0	36,38
13	61,875.9	9,118.0	0.0	77.7	20.8	1.0	0.7	4.9	9,118.0	
14	46,485.7	45,454.8	20.0	58.1	20.1	5.0	0.7	4.9	0.0	45,45
15	46,225.7	0.0	31.6	80.0	0.0	0.0	0.7	5.6	0.0	
16	44,918.0	36,408.2	21.2	58.9	20.3	4.0	0.8	5.7	27,310.0	9,09
17	45,573.1	0.0	21.3	81.9	21.4	0.0	0.8	6.4	0.0	

... Apr May Jun Jul Aug Sep Oct Nov Dec

Leachate Storage Facilities

- 360 regulations state minimum of 3 months of storage capacity for leachate generated at peak times.
- OHSWA has 2.6 million gallons of leachate storage.

Anticipate Seasonal Impacts

- Operators must look at your leachate storage needs.
- Keep in mind temperature, high flood rate, and road conditions.
- 360 Regulations state you must maintain 2’ of free board.
  - Provides a margin of safety
  - Protects against ice damage

Results From Not Maintaining 2’

- Here the operator did not maintain the 2’ free board.
- Liquid was at the brim prior to pumping.
- New panels had to be installed.

Annual Tank Cleanings

- At a minimum, tanks must be cleaned on an annual basis.
- Use of high-pressure hose and squeegee make cleaning easy.
- Inspect tanks once, clean and to manufacturers recommendations.

Cold Weather Considerations

- Any piping above ground needs to be heat traced and insulated for winter operations.
- Blowers and blower lines should be inspected and tested before cold weather season.

Leachate Disposal Options

Build a pipeline to the treatment plant.

Leachate Disposal Options

- Build your own treatment plant

Leachate Disposal Options

- Haul leachate to a designated approved Waste Water Treatment Plant.

Loading Area Must Be Maintained

- Must be able to haul leachate in winter.
- Should be operator friendly.
- Should be safe.
- Contained loading area.

Collection System Maintenance In Summary

- The importance of the leachate collection system maintenance has been an ongoing experience.
- The need for force main, collection piping, and tank cleaning and equipment maintenance requires efficient and qualified individuals.
- All this work must be done regularly and safely.
- Keeps leachate flowing without backing up leachate on the primary liner.

The Authority
ONEIDA-HERKIMER SOLID WASTE AUTHORITY

Contact Information:

Joshua Olbrys, Executive Director
Oneida-Herkimer Solid Waste Authority
Landfill Address: 7044 State Route 294, Boonville, NY
Mailing Address: 1600 Genesee St., Utica, NY 13502
Ph. (315)358-4068
E-mail: **josh@ohswa.org**
Authority Website: **www.ohswa.org**