

CMP POLICY & IMPLEMENTATION COMMITTEE MEETING

This meeting was conducted both remotely and in-person
The public could view/comment through Pinelands Commission YouTube link:

<https://www.youtube.com/watch?v=P8RR6S8-ODI>

Meeting ID: 880 7744 3281

Richard J. Sullivan Center

15C Springfield Rd

New Lisbon, New Jersey 08064

February 24, 2023 - 9:30 a.m.

MINUTES

Members in Attendance – Alan W. Avery, Jr., Mark S. Lohbauer, Edward Lloyd, Chair Laura E. Matos

Members Absent – Jerome H. Irick, Theresa Lettman

Commission Staff in Attendance – Gina Berg, John Bunnell, Ernest Deman, April Field, Susan R. Grogan, Brad Lanute, Paul Leakan, Trent Maxwell, Stacey P. Roth, Steven Simone, and Ed Wengrowski. Also in attendance was Janice Venables from the Governor’s Authorities Unit.

1. Call to Order

Chair Matos called the meeting to order at 9:31 a.m.

2. Adoption of the Minutes from the January 27, 2023, CMP Policy and Implementation Committee Meeting

Commissioner Lloyd moved the adoption of the minutes for the January 27, 2023, Committee meeting. Commissioner Lohbauer seconded. All members voted in favor.

3. Presentation by Pemberton Township and the Pinelands Preservation Alliance on a proposed Memorandum of Agreement (MOA) with the Commission

Susan R. Grogan, Executive Director (ED), discussed the Commission’s history with Memoranda of Agreement (MOA), the process for consideration of an MOA, and the steps for establishing the agreement. (attached) The Pinelands Comprehensive Management Plan (CMP) allows the Commission to enter into MOAs with other public entities to establish streamlined permitting procedures or to authorize a deviation from CMP standards. The P&I Committee must make a recommendation to the full Commission as to whether the agency should consider entering into the proposed MOA. ED Grogan noted that offsets are a requirement of deviation MOAs, typically met through the preservation of land. She also indicated that the deviation in this proposal was for construction in wetlands buffers.

Chair Matos added that this is the first of several discussions of this proposed MOA in public

meetings and that the MOA process includes many opportunities for input. She encouraged Committee members to ask questions and learn more about the proposal.

Carleton Montgomery, Executive Director of the Pinelands Preservation Alliance (PPA), and Daniel Hornickel, Business Administrator at Pemberton Township, gave a joint presentation on the proposed trail construction near Pemberton Lake Wildlife Management Area (presentation attached) that would require a MOA.

Mr. Montgomery stated the PPA recognized that accessibility issues may preclude disabled persons from recreating on typical Pinelands trails. The Alliance launched its “Pinelands is for Everyone” program and reached out to the administration in Pemberton Township. The two entities identified Pemberton Lake as a good site on which to create an accessible trail.

Mr. Hornickel thanked the Commission for having a process that could make the accessible trail possible. He said the Township has a large population of disabled veterans and others with mobility issues. He further described municipal commitments to completing the project and maintaining the site. He added the trail upgrades would provide a public good for disabled persons and cause minimal disruption to the Pinelands.

Mr. Montgomery presented pictures and maps of the trail setting and features to show slope and trail surface issues that pose potential hazards to disabled persons using the trail. He also showed images of existing accessible trails elsewhere in the Pinelands to show what the proposed Pemberton Lake trail might look like. He also discussed walling off a denuded location with a wooden barrier to allow for restoration and revegetation. This is the proposed offset for the deviation MOA.

Commissioner Avery asked if the image of the steep slope in the presentation is part of the trail or leads to a ravine. Mr. Montgomery said it is part of the trail.

Mr. Montgomery said that boardwalk construction style trails are proposed only in locations that are habitually wet. The remainder of the trail would be graded and surfaced in compacted aggregate. He said that a boardwalk style for the entire trail would be cost prohibitive.

Commissioner Lloyd expressed support for the project and asked if wheelchairs need a certain wheel width to work on the current trails and if the proposed trail will accommodate all types of wheelchairs.

Charlotte Borgensen, a member of the PPA featured in the presentation, said her wheelchair is all-terrain and functions well in most off-road settings but struggles on the existing trail’s soft sands. A manual wheelchair would have even more trouble and could potentially tip over.

Mr. Hornickel said the goal is to allow people with all types of wheelchairs and visual impairments to use the trail.

Mr. Montgomery added that PPA has spent a lot of time on addressing accessibility for different wheelchair types.

Commissioner Lohbauer asked how long the project will take to complete.

Mr. Montgomery said they have not done a project like this before and are not entirely sure. Mr. Hornickel added that Pemberton has a capable public works staff that hopes to finish the project quickly.

Commissioner Lohbauer said the restoration of the offset area may be the biggest component of the project. Mr. Montgomery said PPA has ample experience with mitigating those issues but that restoration will take multiple years.

Commissioner Lohbauer asked if the Township envisions spreading the word about the trail upgrades and their improved accessibility for disabled persons.

Mr. Hornickel said yes, and that Pemberton publishes a quarterly newsletter. He said there was a lot of public excitement about the project when it was first announced in the fall of 2021. Mr. Hornickel said he hoped disability alliances would also spread the word that a new accessible trail is available in the Pinelands.

Mr. Montgomery said that when PPA launched its Pinelands is for Everyone project, it held several public outreach events to gain input from residents on the challenges for people with disabilities. He said there are limits to how they can recreate comfortably, safely, and reliably.

Chair Matos suggested involving the Division of Disability Services at the New Jersey Department of Human Services. Mr. Montgomery said they are already involved and supportive of the project. The Division launched its Inclusive Healthy Communities Grant Program in 2020 and PPA saw an opportunity for assistance in funding the accessible trails project.

ED Grogan added the Pemberton Township project may be a template for similar projects that are anticipated. A similar project in Stafford Township is being planned and may also need a MOA for trail construction in wetlands buffers.

Stacey Roth, Chief of Legal and Legislative Affairs, asked if any construction would occur inside the Wildlife Management Area (WMA). Mr. Montgomery said construction would occur both inside and outside the WMA.

Ms. Roth asked if the New Jersey Department of Environmental Protection (DEP) would be participating with the project. Mr. Montgomery said yes. ED Grogan added that a DEP representative was present in previous meetings with PPA and the Township.

Commissioner Avery asked if Pemberton Township, the State DEP, and the Commission would be the three signatories to the agreement. ED Grogan said that was correct.

Mr. Hornickel added that PPA has a license from the Township for the trail. They entered into a five-year licensing agreement to allow PPA to improve the trails.

Commissioner Lohbauer asked if the upgraded trail would include access to an electric vehicle charging station. Mr. Hornickel said that could be a future phase.

Commissioner Avery mentioned that the Barnegat Branch trail uses a similar construction technique but is 10 feet wide to accommodate bicycles. The standard wheelchair works well on that trail because it is compacted stone dust. Commissioner Avery suggested visiting county parks and that most of them have enhanced accessibility. Mr. Montgomery agreed and cited Double Trouble village as a good example.

Commissioner Avery asked if the crushed stone aggregate surface in the wetlands buffer is the primary reason for the MOA. ED Grogan said yes.

Commissioner Lloyd asked if there was any concern about motorbikes using the trail. Mr. Montgomery said yes, and that a barrier would be erected to discourage motorbikes from entering the trail. Mr. Hornickel added that the Township will work on preventative measures.

Ms. Roth asked if the trail is accessible from the former Burlington County College site. Mr. Hornickel said no.

Commissioner Lohbauer expressed support for the project.

Chair Matos asked for a vote to recommend that the full Commission authorize moving forward with the proposed MOA at its March meeting. Commissioner Lohbauer made the motion. Commissioner Lloyd seconded. All Commissioners voted in favor.

4. Discussion of the Commission's landfill closure assessment program

Ed Wengrowski, Environmental Technologies Coordinator, gave a presentation on the Commission's landfill closure assessment program (presentation attached). Mr. Wengrowski's presentation discussed the CMP prescriptions for capping solid waste landfills that predate the Commission, standard methods for managing and monitoring leachate and other hazardous byproducts of landfills, identification of significant ecological risks to wetlands from legacy landfills, and typical ecological screening criteria.

Commissioner Lohbauer thanked Mr. Wengrowski and asked if any of the 60 legacy landfills in the Pinelands Area are still operating.

Mr. Wengrowski said there is only one that is still operational: the Cape May Landfill. The other landfills were closed by the early- to mid-1980s, and some ceased operation prior to the adoption of the CMP. Some were closed with an impermeable cap, while most of them not been capped and have remained inactive for the past four decades.

Commissioner Lohbauer said the Commission should acquire the additional data on the 60 landfill sites regarding harmful contaminants, capping status, nearby Environmentally Sensitive Natural Resources (ESNR), and any monitoring wells. He asked if the Commission had that information or if it will acquire that data.

Mr. Wengrowski indicated that broad screening was done in-house in 2010 followed by a Rapid Landfill Assessment project by United States Geological Survey (USGS). Those projects looked at DEP monitoring reports, GIS layers for sensitive receptors, and contaminants of concern. At least one constituent was categorized as high risk at most landfills. A wide array of contaminants was identified as low risk.

Commissioner Lohbauer asked how the Commission's role in landfill regulation differs from the DEP and if the Commission's review is only triggered by an application for development. He also asked if the Commission staff has the capacity and regulatory authority to require treatment if contaminants are impacting environmentally sensitive receptors.

Mr. Wengrowski said that assessing ecological impacts is the Pinelands focus and the DEP focuses on public health.

ED Grogan said the Commission has different standards from DEP and the Commission review is limited to when an application comes in because a municipality has some incentive to move forward with capping a landfill, such as the installation of a solar field on the capped landfill.

ED Grogan added the Commission is looking to hire a new Environmental Technologies Coordinator to assist with landfill closures and associated development projects.

Commissioner Avery asked if the DEP's regulatory authority over landfills varies by the date the landfills stopped receiving waste. ED Grogan said they have different dates. Mr. Wengrowski added most of them closed in the 1980s prior to adoption of the CMP.

Commissioner Avery asked if most of the closed facilities were public. Mr. Wengrowski said yes.

5. Public Comment

Carleton Montgomery, Executive Director at PPA, asked if the Commission has evaluated or has data indicating that landfill capping has successfully prevented groundwater contamination at the Stafford Township, Big Hill, and Southern Ocean landfills. He also asked if evaluating success is a fundable project.

Mr. Wengrowski said no evaluation has been completed. He said leaving landfills uncapped leaves them vulnerable to atmospheric conditions and oxygenation, which can speed up the decomposition process. By placing an impermeable cap on the landfill, the materials inside remain preserved. The Environmental Protection Agency (EPA) continues to recommend capping of landfills in certain cases, even for landfills without a liner, as it does reduce the amount of infiltration that would occur.

Commissioner Avery commented that one of the benefits of capping the landfills is gas management.

Heidi Yeh, Policy Director at PPA, commended Mr. Wengrowski's presentation. She mentioned concerns about warehouse sprawl in the Pinelands Area raised by Commissioners at the November 2022 Climate Committee meeting. She said that the logistics industry is important in New Jersey, but that not all sites are suitable for warehouse development.

Ms. Yeh commented that the New Jersey State Planning Commission's Office of Planning Advocacy (OPA) has created a document with best management practices to help municipalities plan for warehouse development. Ms. Yeh added that there are bills pending in the State Legislature that would give these practices enforcement power and give more consideration to regional planning. She said the Commission is well-positioned to take a leadership role in the matter.

Ms. Roth stated the Commission is aware of the warehouse guidelines, which were previously distributed to Committee members. She noted the staff tracks legislation related to implementation of the guidelines.

Michelle Forman of Pemberton Township asked about other development that could occur on landfills. Chair Matos replied that other development constitutes any sort of structure or facility built on top of the landfill. ED Grogan added it would be any development the municipality proposes.

Commissioner Lohbauer said that recreational facilities like golf courses and soccer fields have been built on top of landfills.

Ms. Forman asked about the status of an Open Public Records Act (OPRA) request. Ms. Forman asked if she could receive a hard copy of response documents. ED Grogan said yes.

Ms. Forman asked about the status of her appeal. Ms. Roth said it was under her review and a response would be provided within a few days.

Ms. Forman asked if there was a timeline for completing review of appeals. Ms. Roth said no. Chair Matos added there is no established timeline or framework for these reviews and that the timeframe depends on the staff's workload.

Ms. Forman asked if she would receive her response in the mail. Ms. Roth said yes. ED Grogan added that the Commission will contact Ms. Forman when it is ready, and she can come in person to pick up the documents.

Esmé Devenny of the Fair Share Housing Center commented on the Fair Housing Act (N.J.S.A. 52:27d-329.9), which allows municipalities to require a reduced number of affordable housing units when necessary for economic feasibility reasons. She expressed concern that developers are justifying reduced affordable housing units due to the economic constraints imposed by Pinelands requirements for Pinelands Development Credits for residential development. She mentioned an example in Egg Harbor Township where the Township is allowing the developer to proceed with just eight affordable units. She added the Center is concerned that this issue will continue in the Pinelands Area.

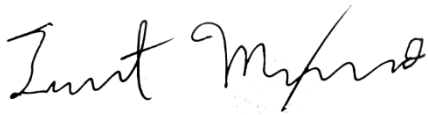
Chair Matos closed public comment at 11:29 a.m.

Commissioner Lohbauer thanked Ed Wengrowski for his career working at the Commission and wished him well in his retirement.

Commissioner Lloyd commended Mr. Wengrowski on his twenty-year service to the Pinelands and his ability to communicate with the Commissioners on technical issues.

Chair Matos asked for a motion to adjourn the meeting. Commissioner Lohbauer gave the motion. Commissioner Avery seconded. All members voted in favor. The meeting adjourned at 11:33 am.

Certified as true and correct:



Trent R. Maxwell, Planning Technical Assistant

Date: March 16, 2023



Process for an Intergovernmental Memorandum of Agreement

February 24, 2023

Memoranda of Agreement

The CMP authorizes the Commission to enter into MOAs with public entities for two purposes:

- To establish streamlined permitting procedures
- To authorize deviations from CMP standards, provided measures are included to ensure equivalent protection of Pinelands resources

History of MOAs

- The Commission has entered into 23 new or amended MOAs since 2002
 - 13 permit streamlining MOAs
 - 10 deviation MOAs
 - the majority dealt with the expansion of existing public facilities
 - Offsetting measures resulted in permanent protection of 9,740 acres in the Pinelands Area

Process for Consideration of an MOA

- Originally developed in 2008, an expanded 13-step process was established in 2016 by the Commission's MOA Policy Advisory Committee
- The process applies to all proposed MOAs that authorize deviations from CMP standards
- MOAs may only be executed between the Commission and other public agencies

Process for Consideration of an MOA: Recommended Changes

Step 1. Commission staff meets with the public agency to discuss a proposed development plan. If all CMP standards cannot be met, staff may identify appropriate options for the agency's consideration, including:

- modification or relocation of the project
- a waiver of strict compliance
- an MOA

Process for Consideration of an MOA: Recommended Changes

Step 2. The Executive Director and Commission Chair meet with the public agency to discuss the proposed development project and the process and potential for an MOA.

Step 3. The public agency submits a written proposal to the Executive Director

- Conceptual site plan, public purpose, project partners and financing, offsetting measures

Process for Consideration of an MOA: Recommended Changes

Step 4. The Executive Director advises the public agency of the need for any additional information

Step 5. The public agency briefs the P&I Committee on its proposal

Step 6. The P&I Committee makes a recommendation as to whether the Commission should consider entering into the proposed MOA

Process for Consideration of an MOA: Recommended Changes

Step 7.

- The Executive Director briefs the full Commission at its next meeting on the public agency's proposal and the P&I Committee's recommendation.
- The Commission determines whether to authorize the staff to move forward with the administrative process and draft an MOA. If yes, the Commission provides a schedule for development and consideration of the MOA.

Process for Consideration of an MOA: Recommended Changes

Step 8. The Executive Director assigns appropriate staff member(s) to work with the public agency and determines the need for any escrow payments. Staff prepares a draft MOA and shares/discusses it with the public agency.

Step 9. Staff consults with and briefs the P&I Committee on the draft MOA.

Process for Consideration of an MOA: Recommended Changes

Step 10. Staff conducts a public hearing on the MOA and prepares a report and recommendation.

Step 11. Staff reviews the MOA, report and recommendation with the P&I Committee.

Step 12. The P&I Committee makes a recommendation to the full Commission.

Step 13. The Commission considers the resolution at its next meeting.

Questions?





Pemberton Lake

Accessible Trail

PROPOSAL BY PEMBERTON TOWNSHIP AND
THE PINELANDS PRESERVATION ALLIANCE



Pemberton Bypass

Rancocas Conservancy

Pemberton Township

Magnolia Road

Division of Fish and Wildlife























Key Points

- There is a public need for more accessible trails
- This park is easy to reach for Pemberton residents
- The lake and trail are very scenic
- Uses existing trail with no need to widen or remove vegetation
- Stone will stabilize surface and not change soil chemistry or water quality
- PPA and Fish and Wildlife will restore damaged area

Pinelands Commission Landfill Closure Assessment Program

Policy and
Implementation
Committee
Meeting

February 24, 2023



N.J.A.C. 7:50-6.75 Landfills

(c) All landfills that ceased operation on or after September 23, 1980 if located in the Preservation Area or on or after January 14, 1981 if located in the Protection Area shall be capped with an ***impermeable material*** unless it can be clearly demonstrated that:

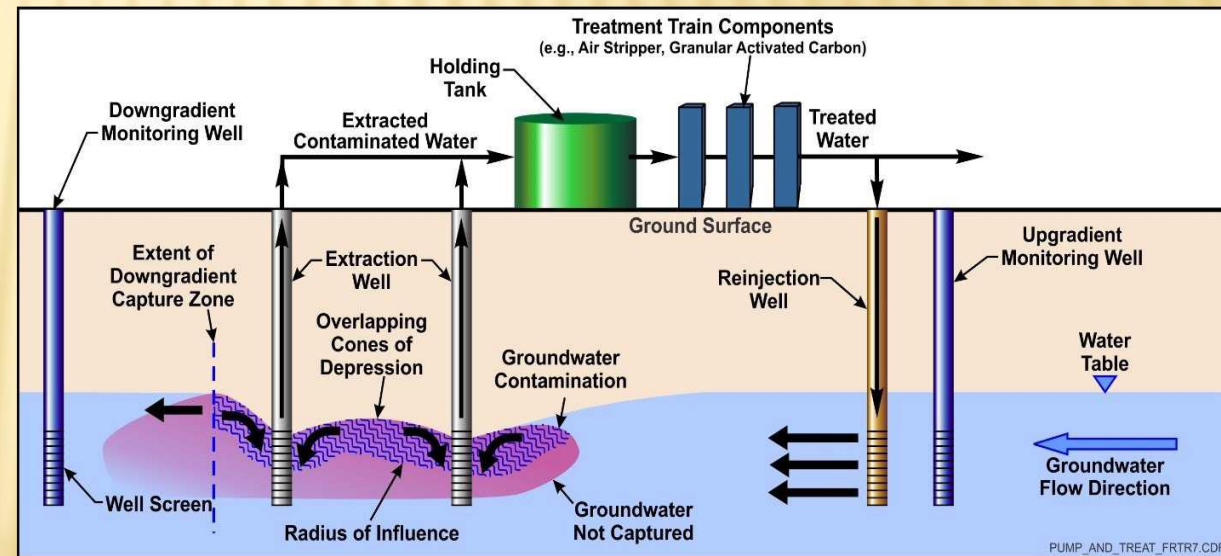
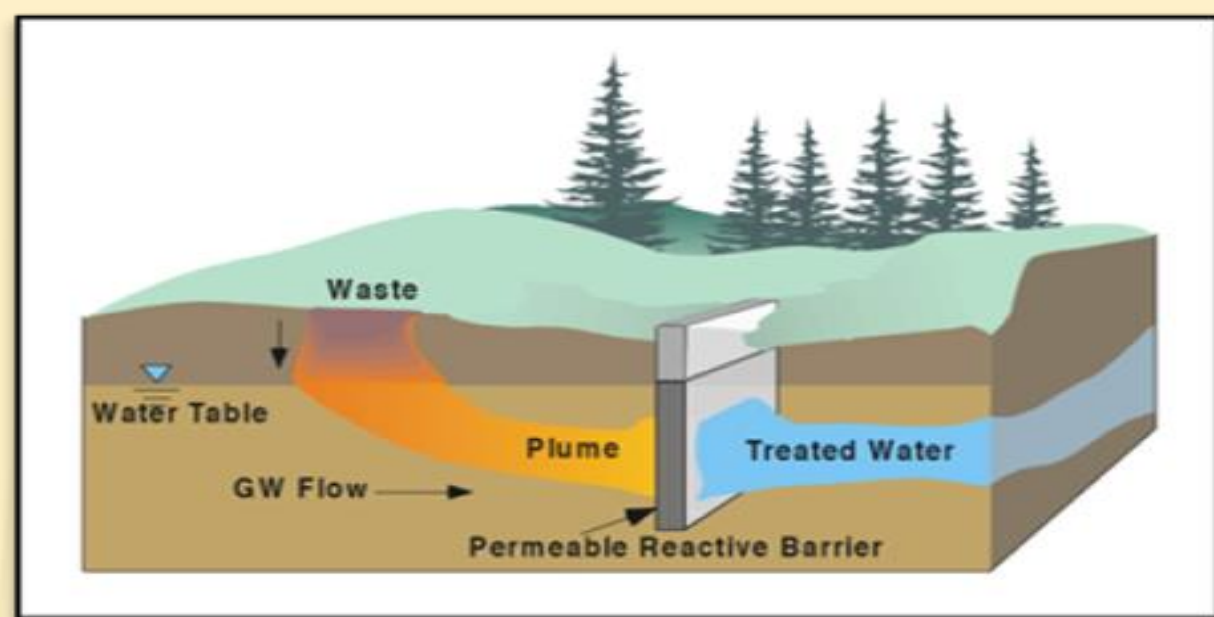
1. The landfill accepted only vegetative waste or construction debris for disposal;
2. An ***alternative means of addressing the public health and ecological risks*** associated with the landfill is available that will **afford an equivalent level of protection** of the resources of the Pinelands than would be provided if the landfill were capped with an impermeable material;
3. No leachate plume associated with the landfill exists and the landfill is not generating leachate; or
4. ***A leachate plume associated with the landfill exists but poses no significant ecological risk to wetlands.***



Impermeable material cap is the standard presumptive remedy ($K=1 \times 10^{-7}$ cm/sec) Typ. 40 mil HDPE heat or solvent welded seams

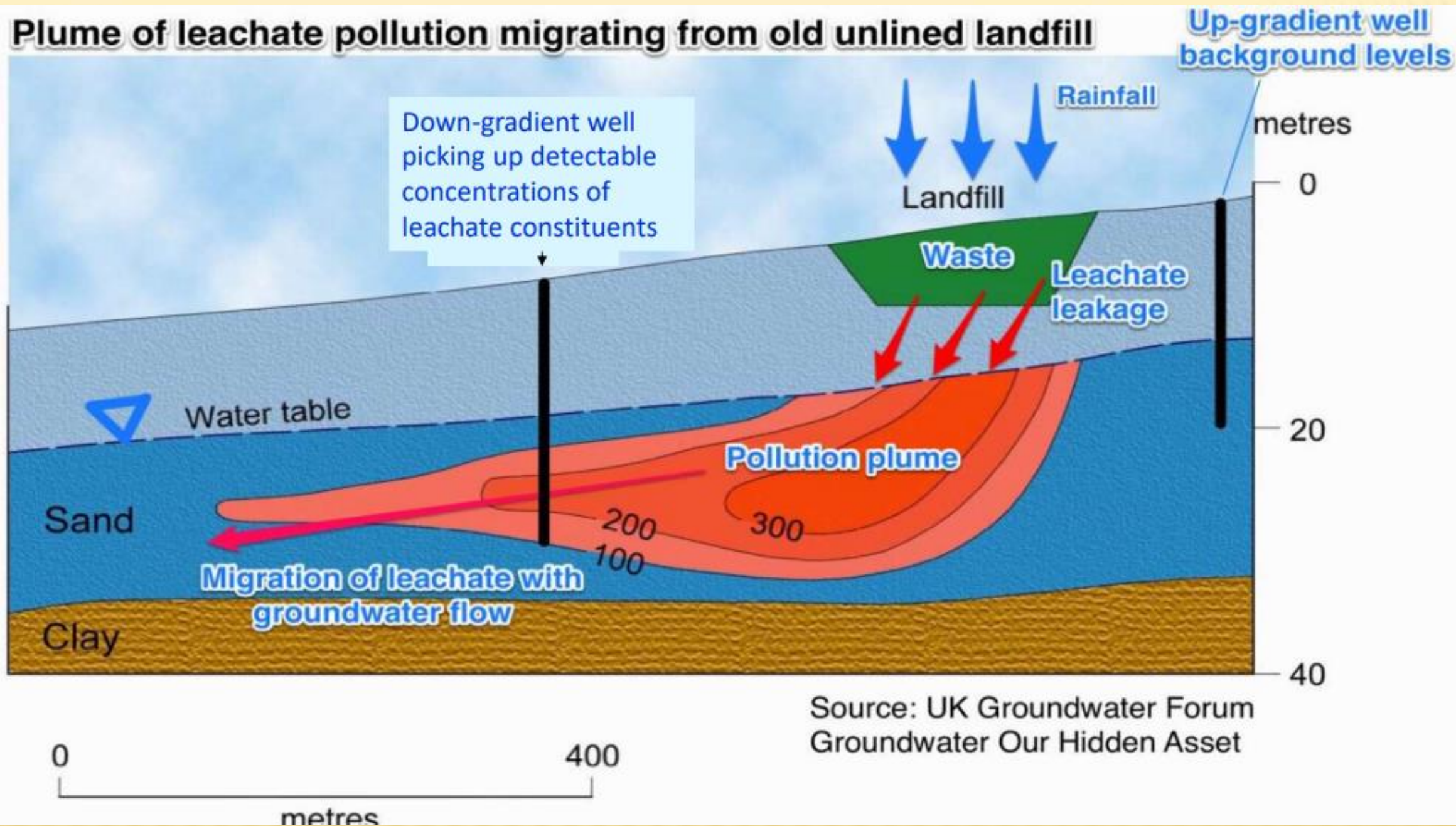


Permeable soil cover (Typ. 2' thick) is not an alternate means of addressing a public health or ecological risk – **used where no such risk exists**



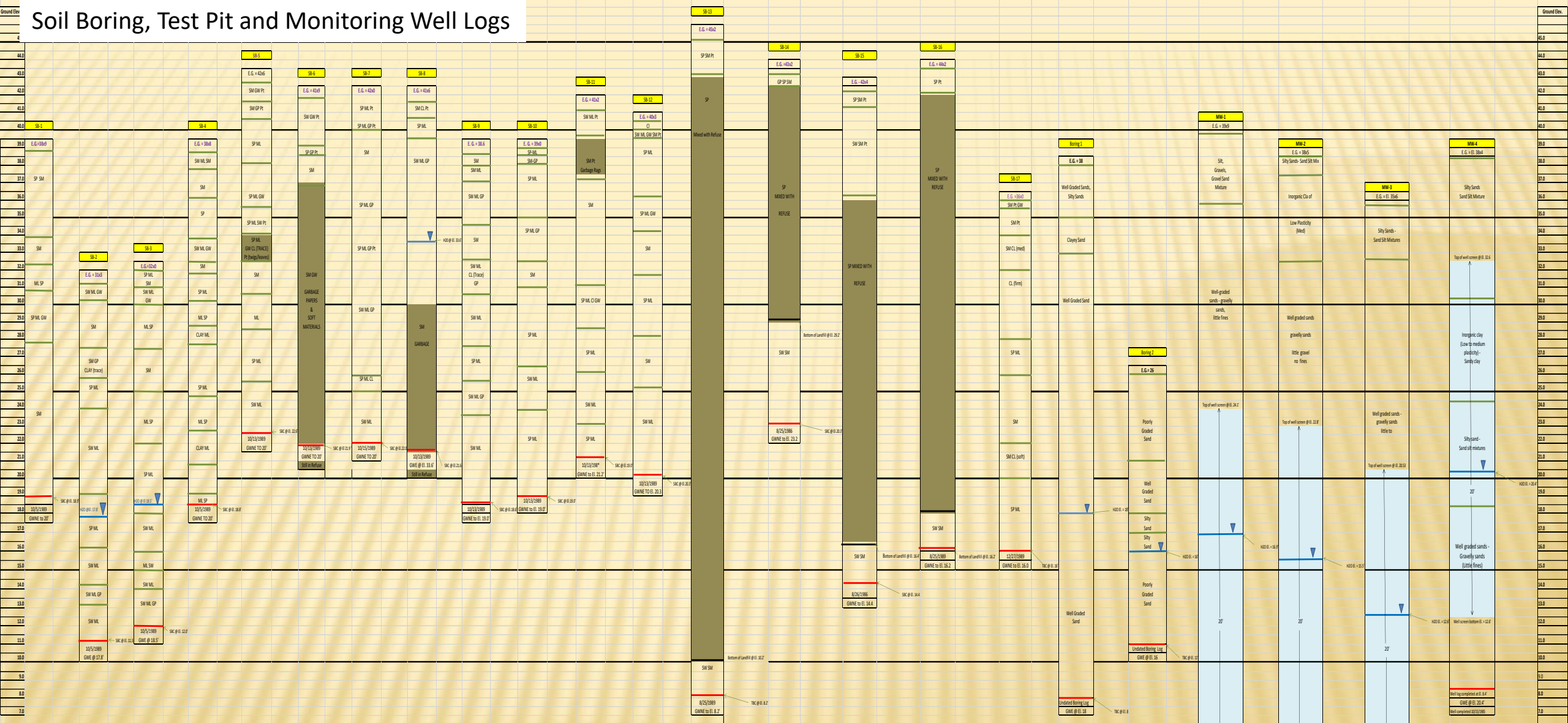
Permeable Reactive Barrier and Groundwater Pump and Treat Systems are examples of EPA approved *alternative means to addressing public health or ecological risks*

Plume of leachate pollution migrating from old unlined landfill



Source: UK Groundwater Forum
Groundwater Our Hidden Asset

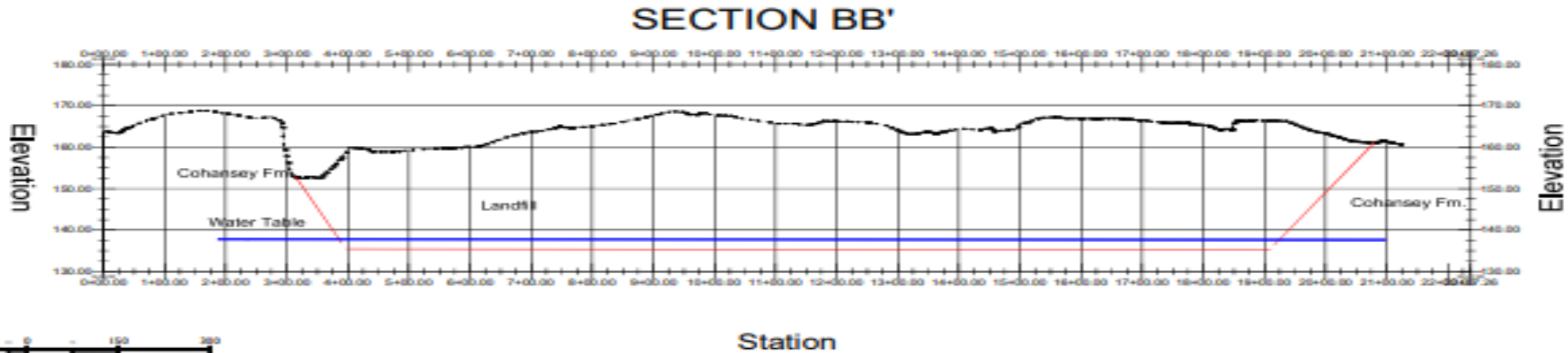
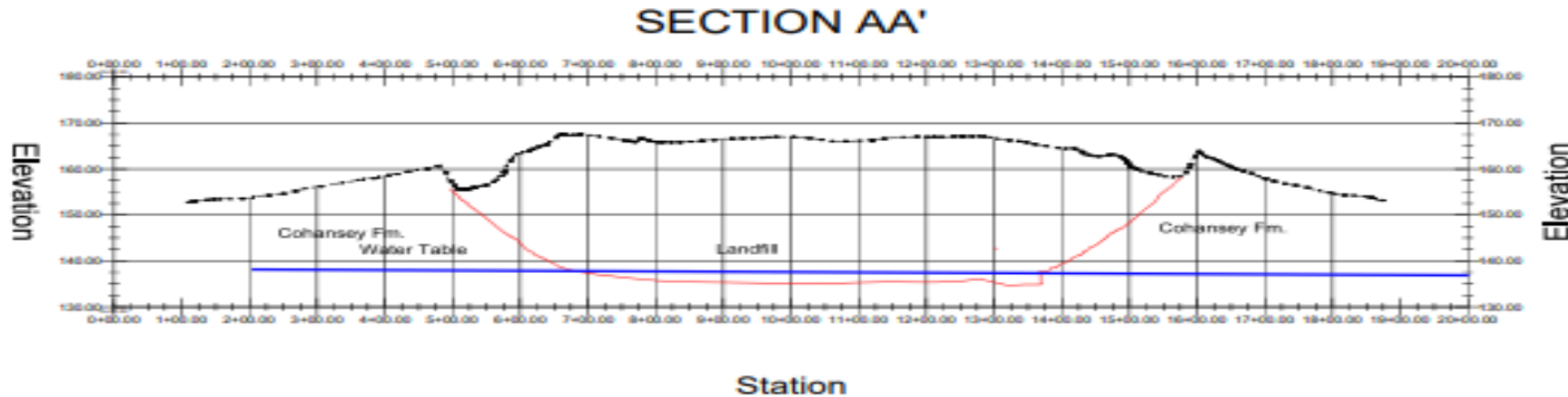
Soil Boring, Test Pit and Monitoring Well Logs



NOTE: SB-1 through SB-17 information was taken from a plan entitled: Bouough [sic] of South Toms River, Soil Borings, prepared by Mackie Associates (undated). Boring No. 1 and Boring No. 2 information taken from a plan entitled: Proposed Finished Grades, Existing Municipal Landfill, prepared by Mackie Associates, dated July 31, 1971

Provides cross sectional view of subsurface soil strata, refuse depth, monitoring well screened intervals, and depth of groundwater - all tied to a common benchmark elevation.

Longitudinal cross sections depict surface elevation depth (elevation) of refuse and elevation of the water table – components of the hydrogeologic site model



Estimating Groundwater Flow Direction

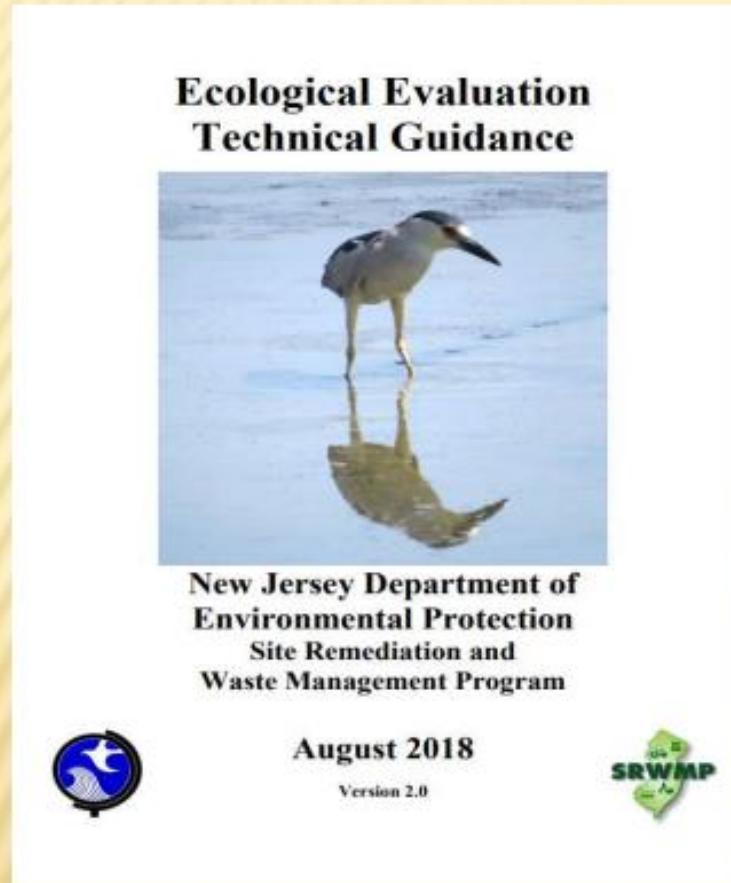
- Minimum of three water table surface (piezometric) elevations are required.

- Several water level readings taken during multiple seasons is best.



MW-5 and MW-3 are upgradient wells
MW-1 and MW-4 are side-gradient wells
MW-2 is the downgradient well

Determination of “No Significant Risk to Wetlands” (Ecological Receptors)



Technical guidance on how to conduct an Ecological Evaluation and Ecological Risk Assessment (per NJAC 7:26E-1.16 and 7:26E-4.8) for environmentally sensitive natural resources associated with contaminated sites.



Detailed technical training by senior staff from NJDEPs Site Remediation and Waste Management Program, Bureau of Environmental Evaluation and Risk Assessment, and private consultants

Determination of “No Significant Risk to Wetlands”

(Wetlands = Ecological Receptors = Environmentally Sensitive Natural Resources)



- Environmentally Sensitive Natural Resources (ESNR)
ESNRs are defined as environmentally sensitive areas pursuant to the, the Pinelands Protection Act, the Pinelands Comprehensive Management Plan
- Contaminants of Potential Ecological Concern (COPEC) -Present in groundwater monitoring wells –The list of these COPECs continues to evolve PFAS, Personal Care Products, Pharmaceuticals, EDCs, etc.
- Area of Concern (Landfilled area boundary)

Determination of “No Significant Risk to Wetlands”

- The Ecological Evaluation (EE) seeks to identify the presence or absence of contaminant migration pathways
- Concentration values from ground water monitoring wells are compared to ESC or Ecological Screening Criteria values
- ESC values are NJDEP values for individual contaminants that were usually derived by dosing experiments and that are mainly based on the no observed adverse effect level
- The ESC are generally conservative levels designed to protect the target organisms based on direct exposure.



Prescribing Leachate Constituent Testing Parameters

- NJPDES permits issued when the Pinelands Area landfills ceased operating prescribe groundwater monitoring requirement by frequency (quarterly/annually) and by parameter specificity.

Typical (old) Landfill NJPDES list

Aldrin/Dieldrin	Lindane
*Ammonia N	Manganese
Arsenic & compounds	Mercury & compounds
Barium	Methoxychlor
Benzidine	*Nitrate N
BOD	pH
Cadmium	Phenols
COD	PCBs
Chloride	Selenium
Chromium (hex & compounds)	Silver & compounds
Coliform bacteria	Sodium
Copper	Spec Cond.
Cyanide	Sulfate
DDT & metabolites	TDS
Endrin	Total organic halogen
Fecal coliform	Total VOC
Fluoride	Toxaphene
Hardness	Zinc and Compounds
Iron	2,4-D
Lead & compounds	2,4,5-TP (Fenoprop/Silvex)

* Often cited as "Landfill Signature" Chemicals

Updated testing requirements required by the PC

- Target Compound List + 30 (TCL+30) and Target Analyte List (TA) parameters including:
- Sixty-six (66) Semi-Volatile Organic Compounds – many are likely human carcinogens
- Twenty-two (22) TAL metals more extensive with some duplication
- Contaminants of Emerging Concern, including:
- PFAS compounds commonly referred to as "forever chemicals". (NETFOSAA, NMEFOSAA, PFBS, PFDA, PFDaA, PFHpA, PFHxA, PFNA, PFOS, PFOA, PFTeA, PFTriA, PFUnAPFNA, PFOS, PFOA). USGS research finds that these may be present in landfill leachate. May be limitations on sampling older monitoring wells that often contain Teflon (PFAS) tubing
- Endocrine Disrupting Chemicals (EDCs) – Bisphenol E, Bisphenol F, Bisphenol A, Bisphenol AF, Bisphenol B, Bisphenol S, 17 alpha-Dihydroequilin, Equilenin, Equilin, 17 beta-Estradiol, Estriol, Estrone, 17 alpha-Ethinyl-Estradiol
- General Chemistry Parameters

NJDEP Ecological Screening Criteria

Toxic Substance	CAS Number	Surface Water (ug/L)						Sediment (mg/kg)				Soil (mg/kg)						
		Fresh Water (FW2) Criteria			Saline Water (SE & SC) Criteria			Fresh Water Criteria		Saline Water Criteria		Wildlife PRGs (flora and fauna)	Terrestrial Plant Tox Benchmarks	EcoSSLs ²⁰				
		Aquatic		Human Health	Aquatic		Human Health	Lowest Effects Level (LEL) ¹	Severe Effects Level (SEL) ²	Effects Range Low (ER-L) ⁴	Effects Range Medium (ER-M) ⁵			Plants	Soil Invertebrates	Avian	Mammalian	
		Acute	Chronic		Acute	Chronic												
Acenaphthene	83-32-9		38 ⁸	670(h)			990(h)	See Saline Criteria ³ 0.0067 ¹³		0.016	0.500	20 ⁹						
Acenaphthylene	208-96-8		4840 ⁸					See Saline Criteria ³ 0.00587 ¹³		0.044	0.640	682 ⁹						
Acrolein	107-02-8		0.19 ⁸	6.1(h)			9.3(h)	0.00000152 ²				5.27 ⁹						
Acrylonitrile	107-13-1		66 ⁸	0.051(hc)			0.25(hc)	0.0012 ²				0.0239 ⁸						
Aldrin	309-00-2	3	0.017 ²	0.000049(hc)	1.3		0.000050(hc)	0.002	8	See Freshwater Criteria ⁶		0.00332 ²						
Aluminum	7429-90-5							2.55% ¹⁵			1.8% ¹⁵		50					
Ammonia, un-ionized	7664-41-7	See N.J.A.C. 7:9B-1.14(e)			See N.J.A.C. 7:9B-													
Anthracene	120-12-7		0.035 ⁸	8,300(h)			40,000(h)	0.22	0.0572 ²	370	0.085	1.1	1,480 ⁹					
Antimony	7440-36-0		80 ⁸	5.6(h)(T)			640(h)(T)		3 ¹⁵			9.3 ¹⁵	5 ⁹	5		78	0.27	
Arsenic	7440-38-2	340(d)(s)	150(d)(s)	0.017(hc)(T)	69(d)(s)	36(d)(s)	0.061(hc)(T)	6	9.9790 ²	33	8.2	70	9.9 ^{9,10}	10	18		43	46
Asbestos	1332-21-4			7x10 ⁷ fibers/L >10um(h)														
Barium	7440-39-3		220 ⁸	2,000(h)(T)								48 ¹⁵	283 ¹¹	500		330		2,000
Benz(a)anthracene	56-55-3		0.025 ⁸	0.038(hc)			0.18(hc)	0.320	0.108 ⁸	1,480	0.261	1.6	5.21 ⁹					
Benzene	71-43-2		114 ⁸	0.15(hc)			3.3(hc)	See Saline Criteria ³ 0.142 ²		0.34 ⁷		0.255 ⁸						
Benzidine	92-87-5		824 ¹⁰	0.000086(hc)			0.00020(hc)											
3,4-Benzofluoranthene (Benzo(b)fluoranthene)	205-99-2		9.07 ⁸	0.038(hc)			0.18(hc)	10.4 ⁸				1.800 ¹⁵	59.8 ⁸					
Benzo(k)fluoranthene	207-08-9			0.38(hc)			1.8(hc)	0.240	1,340	See Freshwater Criteria ⁶			148 ⁸					
Benzo(g,h,i)perylene	191-24-2		7.64 ⁸					0.170	320	See Freshwater Criteria ⁶			119 ⁸					
Benzo(a)pyrene (BaP)	50-32-8		0.014 ⁸	0.0038(hc)			0.018(hc)	0.37	1,440	0.430	1.6	1.52 ²						
Beryllium	7440-41-7		3.6 ⁸	6.0(h)(T)			42(h)(T)					10 ⁸	10		40			21
BHC (Benzohexachloride)								0.003	12	See Freshwater Criteria ⁶								
alpha-BHC (alpha-HCH)	319-84-6		12.4 ⁸	0.0026(hc)			0.0049(hc)	0.006	10				0.0994 ⁸					
beta-BHC (beta-HCH)	319-85-7		0.495 ⁸	0.0091(hc)			0.017(hc)	0.005	21				0.00398 ⁸					
gamma-BHC (gamma-HCH/Lindane)	58-89-9	0.95	0.026 ⁸	0.98(h)	0.16		1.8(h)	0.003	1				0.00500 ⁸					
Biphenyl	92-52-4												60 ⁹					
Bis(2-chloroethyl) ether	111-44-4		1900 ⁸	0.030(hc)			0.53(hc)	3.520 ²					23.7 ²					
Bis(2-chloroisopropyl) ether	108-60-1			1,400(h)			65,000(h)						19.9 ⁸					
Bis(2-ethylhexyl) phthalate	117-81-7		0.3 ⁸	1.2(hc)			2.2(hc)	0.182 ²	0.750 ¹⁵	0.18216 ¹⁵	2.64651 ¹⁵	0.925 ⁸						
Boron	7440-42-8											0.5 ⁹	0.5					
Bromine	7726-95-6											10 ⁸	10					
Bromodichloromethane (Dichlorobromomethane)	75-27-4			0.55(hc)			17(hc)						0.540 ⁸					
Bromoform	75-25-2		230 ⁸	4.3(hc)			140(hc)	0.492 ²				15.9 ²						

Identification of an appropriate landfill closure strategy is based on the presence or absence of contaminants of environmental concern and the presence or absence of a contaminant migration pathway.

- Concentrations of landfill leachate constituents, if detected in groundwater nearest the wetlands are compared to the published Ecological Screening Criteria (ESC) values.
- If detections are below the ESC values, or there is no migration pathway, we would conclude the landfill does not pose a significant ecological risk to the wetlands.
- If detections are above the ESC values, and a migration pathway exists, we would conclude that the landfill poses a significant ecological risk to the wetlands requiring an impermeable cap or an alternative means of addressing the ecological risk to the wetlands



Photo by Joel Mott

Questions and Discussion