

Connecticut Valley Environmental Services, Inc.

Town of Dalton Selectboard
& Conservation Commission
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via email: selectmen@townofdalton.com
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November 14, 2024

re: *Water Quality Monitoring Results, North Country Environmental Services, Inc. Landfill*
in Bethlehem, New Hampshire; implications for *Granite State Landfill* in Dalton and
Bethlehem, New Hampshire

Dear Dalton Selectboard and Conservation Commissioners Members,

On October 3, 2024, you requested that our firm, Connecticut Valley Environmental Services, Inc. (“CVES”), review the water quality monitoring results at the North Country Environmental Services, Inc. Landfill (“NCES Landfill”) in Bethlehem and comment on the implications of those results to the proposed Granite State Landfill LLC (“GS Landfill”) in Dalton. We are pleased to offer the following analysis and comments on those reports.

The proposed GS Landfill site in Dalton is less than seven miles away from the existing NCES Landfill in Bethlehem (see Landfill Locations attached), and the NCES Landfill is storing a significant volume of toxic compounds (e.g., polyfluoroalkyl substances (PFAS) and manganese) harmful to human health and the natural environment.¹ The reports below demonstrate that the NCES Landfill has inadvertently released some of these toxic compounds into groundwater and surface waters near the Ammonoosuc River. The GS Landfill is of similar design, will store similar solid waste, and will likely release the same toxic compounds. In our opinion, some of these toxic compounds can be expected to be released – whether because of human errors, geologic vulnerability, and/or climate events – resulting in contamination of the Ammonoosuc and Connecticut Rivers.

The proposed location of the GS Landfill, within the same reach of the Ammonoosuc River as the NCES Landfill, creates a disproportionate and unacceptable risk from the toxic waste that will be generated by several New England States, then transported to and stored within the watersheds of the Ammonoosuc and Connecticut Rivers. The probable cumulative release of toxic compounds from the NCES Landfill and the GS Landfill will cause irreparable harm to these watersheds. Consequently, siting the GS Landfill near the NCES Landfill cannot comport

¹ <https://img1.wsimg.com/blobby/go/3a99e672-2796-498c-8250-9aae47365deb/downloads/a9d59459-7c23-4edd-ac92->

with environmental justice objectives, meet the “public benefit” standard², nor represent the environmentally preferable alternative³ as required by the National Environmental Policy Act.

This conclusion is based on review of the following documents:

- *Sanco Landfill Hydrogeologic Analysis, Bethlehem, New Hampshire, October 26, 1984 (attached)*
- *Calex Environmental, LLC (Calex) March 22, 2024-letter pertaining to solid waste landfills in Bethlehem (attached)*
- *Sanborn Head & Associates, Inc. (SHA) July 2024 Tri-Annual 2024 Annual Water Quality Monitoring Results, North Country Environmental Services, Inc. (NCES), dated September 3, 2024⁴*
- *NCES September 6, 2024-incident report⁵ on the penetration of the landfill overliner by drilling for landfill gas wells*

I. SUMMARY AND COMMENTS ON REPORTS

Sanco Landfill October 26, 1984-Hydrogeologic Analysis

This analysis, prepared by Kimbal Chase Company, Inc. and Caswell, Eichler & Hill and submitted to the New Hampshire Bureau of Solid Waste Management, describes the geologic setting and presents 1984-water quality monitoring data at the Sanco Landfill in Bethlehem, a precursor of the NCES Landfill and a successor of a landfill operated there since September 2, 1976.

The underlying sediments are described as well-drained glacial outwash that are “extremely complex and laterally discontinuous.” The water table is deep. Depths to ground water range from approximately 16 feet to 44 feet below the surface. Groundwater flow is generally to the north-northeast (NNE) but is variable.

Analyses of water quality data indicate the landfill adversely impacts groundwater quality offsite of the Sanco property. Data from a well upgradient of the landfill and a seep on the Ammonoosuc River bank show excellent background water quality. Nevertheless, elevated concentrations of leachate indicators near the site boundary prove the landfill is generating leachate and creating reducing conditions under the landfill (evidenced by iron and manganese concentrations), which violate secondary drinking water standards. It also documents that volatile organic compounds (VOCs) are present in elevated quantities.

Our Comment: These data clearly show the NCES Landfill generates concentrations of organic and inorganic chemicals that are harmful to human health and violate drinking water standards. The organic compounds are biodegradable, whereas, per- and polyfluoroalkyl substances (PFAS), which were not monitored at the time, are not known to degrade. These “forever

² for approval according to NH RSA 149-M:11

³ <https://www.federalregister.gov/documents/2024/05/01/2024-08792/national-environmental-policy-act-implementing-regulations-revisions-phase-2>

⁴ [https://img1.wsimg.com/blobby/go/3a99e672-2796-498c-8250-9aae47365deb/downloads/a9d59459-7c23-4edd-ac92-](https://img1.wsimg.com/blobby/go/3a99e672-2796-498c-8250-9aae47365deb/downloads/a9d59459-7c23-4edd-ac92-3d0f4b825686/9%203%202024%20NCES%20SHA%20July%202024%20GW%20Report.pdf?ver=1727018295657)

[3d0f4b825686/9%203%202024%20NCES%20SHA%20July%202024%20GW%20Report.pdf?ver=1727018295657](https://img1.wsimg.com/blobby/go/3a99e672-2796-498c-8250-9aae47365deb/downloads/a9d59459-7c23-4edd-ac92-3d0f4b825686/9%203%202024%20NCES%20SHA%20July%202024%20GW%20Report.pdf?ver=1727018295657)

⁵ <https://www4.des.state.nh.us/DocViewer/?ContentId=5238441>

chemicals” dissolve in water, don't easily break down over time, and are linked to numerous health problems.⁶

To manage the Sanco leachate, the waste from the Sanco landfill was later transferred to a double-lined cell within the NCES Landfill next to the Sanco site. To protect water quality the New Hampshire Department of Environmental Services (NHDES) has required groundwater testing at the NCES Landfill for PFAS starting in 2017 and surface water testing starting in 2023.

Calex Environmental, LLC, (Calex) March 22, 2024-Letter (“Calex Letter”)

Calex was asked by the North Country Alliance for Balanced Change to determine whether the PFAS detected in July 2023 in groundwater wells and surface water seeps are from residual leachate releases from the decommissioned unlined Sanco landfill, were released when the Sanco waste was transferred to the lined NCES Landfill, or were more recently released from the active NCES Landfill. Based on review of the landfills’ history and July 2023-water quality monitoring data, Calex concluded the following in its March 22, 2024 letter to the Alliance:

- 1) the unlined Sanco landfill generated leachate indicators in ground water;
- 2) a spike in leachate indicators occurred when Sanco waste was transferred to the NCES Landfill;
- 3) elevated concentrations of both PFAS and bromide⁷ indicate leachate releases occurred after 1996;
- 4) a second spike of leachate indicators occurred from the mid 2000’s to about 2012 which was attributable to operational errors at the landfill (e.g., inadequate leachate storage and handling);
- 5) PFAS, as well as other regulated compounds, have migrated beyond the historical and current landfill footprints and are moving downgradient in groundwater;
- 6) contamination is “located less than 50 feet from the edge of the [Ammonoosuc] River;” and,
- 7) discharges of contaminated groundwater and surface water are likely entering the Ammonoosuc River.

Our Comment: The evidence cited in the Calex Letter support all of its conclusions above. The recent high concentrations of leachate indicators in groundwater and surface water correlate to, and are likely to be primarily caused by, accidental spills at the NCES landfill (documented in the 2009 NCES Corrective Action Plan; see pgs. 4-5 of Calex Letter).

In 1996, Sodium bromide, a “leachate tracer”, was added to waste deposited in Stages II and III of the NCES lined-landfill. Detections of PFAS coincident with bromide at monitoring locations indicate leachate has been released since 1996 and that it is from the NCES Landfill waste rather than from the residual Sanco waste. The “regulatory record shows that these landfill releases were clearly from current operations (e.g., leachate spills, sumps, tanks, force mains, caps, and liners) which impacted downgradient groundwater conditions” (Calex Letter, pgs. 1-2).

These observations and Calex’s projection “that the GSL will generate leachate contamination for the better part of 100 years”⁸ indicate the risks created by the landfills are ongoing and will

⁶ <https://www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas>

⁷ Bromide was added to NCES waste from 1996 to about 2006 to detect leachate releases.

⁸ Carex Environmental Consulting, February 12, 2024-letter, p. 1.

persist long after they are closed. Consequently, it is our opinion that its reasonably likely that the GS Landfill will have **adverse effects on human health and the natural environment⁹ which could persist for more than a century (the “foreseeable future”) and occur well beyond the footprint of the landfill.**

The current NCES Landfill – which did not appear to have any wetlands or surface waters within the project footprint – did not require wetland fills to meet required separation distances to groundwater and surface waters. Conversely, the proposed GS Landfill requires numerous wetland fills to meet the required separation distances to both groundwater and surface waters. Due to the proximity of groundwater and surface waters to the GS Landfill, leachate releases at the GS Landfill are more likely to contaminate waters of the State than those which have occurred at the NCES Landfill.

NCES Water Quality Monitoring Results July 2024

The most recent tri-annual water quality monitoring at the NCES Landfill took place between July 22 and 24, 2024. The report by Sanborn Head & Associates (SHA), Inc., is comprehensive and responsive to New Hampshire Department of Environmental Service’s (NHDES) requests for groundwater and surface water testing. The monitoring locations include 43 groundwater samples and/or water levels, five surface water spring/seep samples, and three Ammonoosuc River samples.

Consistent with Calex’s report, these results confirm toxic compounds (e.g., PFAS and manganese) continue to be present in groundwater and surface water in concentrations that exceed background values, violate ambient groundwater quality standards (AGQS), and show a trend of increasing concentrations at several locations.

Groundwater PFAS. Thirty groundwater locations were sampled in July 2024 for analysis of per- and polyfluoroalkyl substances (PFAS). Perfluorooctanoic acid (PFOA) was detected above background concentrations at 17 locations, exceeded the ambient groundwater quality standard at eight locations, and was present in record maximum concentrations at three locations.

Notably, the July 2024 PFOA concentration (44.6 ng/L) at release detection well B-926U is significantly above the background concentration (<1.5-<2.5 ng/L). This is “the first sampling event for PFAS at this location” and SHA surmises that *“[g]iven the general absence of other potential leachate indicators, the data are not consistent with a new release* [emphasis and italics added]” (SHA, pg. 4).

The July 2024-bromide concentration at B-926U was 0.12 mg/l, the only July 2024-sampling location where bromide concentration exceeded background concentration. In April 2024 bromide concentration at this location was below the reporting concentration limit (0.1 mg/l) whereas the July 2024 bromide exceedance was above the background concentration (0.1 mg/l).

⁹ The GSL will put at risk critical components of New Hampshire’s natural environment including the Ammonoosuc River, highest ranked habitats in New Hampshire, 11.5 acres of wetlands, five vernal pools, perennial and intermittent streams, cold water fisheries, and possibly exemplary natural communities and rare, threatened and endangered species. Connecticut Valley Environmental Services, Inc. (CVES) February 20, 2024-letter to Town of Dalton Selectboard & Conservation Commission

In addition to PFAS and bromide spikes at location B-926U, the July 2024-values, relative to background values, of specific conductance, pH, chloride, chemical oxygen demand and manganese at this same location are indicative of a leachate release.

Groundwater and Surface Water Manganese. In July 2024, manganese concentrations exceeded background concentrations (0.072 mg/l) and ambient groundwater quality standards (0.3 mg/l) at eight groundwater locations. The exceedances were recorded at wells near or downgradient from the former unlined Sanco landfill, but also occur at two locations (MW-701 and B-926U) west-northwest of the landfill, purportedly upgradient of the former unlined landfill.

Of the five surface-water seep sampling locations, total manganese concentrations exceeded the human health water and fish criteria (0.05 mg/l) at four locations, the human health fish only criterion (0.1 mg/l) at three locations, and the AGQS (0.3 mg/l) at one location.

Our Comment: It is our interpretation that the July 2024 exceedance of bromide (the leachate-tracer) coincident with a significant PFOA concentration and five other leachate indicators (listed above) at B-926U indicate leachate was released from the NCES Landfill waste. It may represent either a new release, between April 2024 and July 2024 (as evidenced by the spike in bromide concentration), or an ongoing release. (Data for PFAS prior to July 2024 were not taken at this location.) It is our opinion that the PFOA detected at B-926U may be from a leak in the leachate storage system and/or accidental spills during handling and transport.

It is evident that current leachate indicator exceedances at sampling locations in the vicinity of the NCES Landfill can be attributed to both residual releases from the Sanco waste and releases from the NCES Landfill waste, either due to accidental operational releases or to failure of the containment system. However, regardless of the source of the leachate and how it was released, **it is unequivocal that the NCES Landfill, even with diligent NHDES oversight of its design and operation, continues to be a source of toxic compounds that contaminate groundwater and surface water.**

NCES Solid Waste Facility Incident Report, September 6, 2024

This incident report, prepared by NCES Landfill employees and submitted to NHDES on September 6, 2024, documents that both liners of the overliner system, which are necessary to enhance leachate travel time, were inadvertently punctured. Eleven gas wells drilled to extract landfill gas, between September 9, 2014 and June 27, 2024, resulted in increased leachate flows in the base liner system that necessitated corrective actions. The report states “*NCES's on-site manager and its overseeing company engineer mistakenly concluded* [emphasis and italics added] ... the existing overliner could be treated as decommissioned.”

Our Comment: The punctures of the liner system, previous incidents in which landfill releases were reported in the *2009 NCES Corrective Action Plan* (see Callex Letter, pgs. 4-5), and two recent significant accidental discharges of landfill leachate (Bethlehem, New Hampshire¹⁰ and

¹⁰ <https://www.nhpr.org/climate-change/2021-05-20/leachate-spill-under-investigation-at-bethlehem-landfill-could-be-largest-in-n-h>

Coventry, Vermont¹¹) demonstrate the likelihood of human error in the oversight of landfill operations and failure to prevent accidental leachate releases.

II. DISCUSSION

The National Environmental Policy Act (NEPA) requires that all impacts on public interest factors are considered in a determination of “effects” before a decision is rendered to issue a permit.¹² The definition of “effects” includes “direct, indirect, and cumulative effects.”¹³

In our opinion, the **cumulative discharge of toxic substances into the watersheds of the Ammonoosuc and Connecticut Rivers by the GS Landfill and the NCES Landfill as a result of probable operational accidents, undersized storm water control structures (discussed below), and potential natural disasters must be assessed and given adequate weight in the decision-making process.** Specifically:

1. The cumulative effects of discharges of toxic substances into the watersheds of the Ammonoosuc and Connecticut Rivers from the GS Landfill and the NCES Landfill (e.g., PFASs, VOCs, discussed above), roadway runoff (e.g., salt, heavy metals) from widened roadways and increased traffic (particularly trucks hauling leachate) necessary to serve the GS Landfill, and other sources over the foreseeable future (i.e., the next 100 years) need to be addressed.

Toxic discharges can be expected to occur from increased impervious road surfaces and leachate transport within the protected shoreline of the Ammonoosuc River. Shoreline improvements to construct a truck turn lane will directly impact a perennial stream, an intermittent stream and wetlands (NHDES Wetland Application 6.1, pg. 5). Moreover, toxic runoff from accidental spills and use of the roadway will directly discharge to the Ammonoosuc River (which would feed into the Connecticut River).

2. Additionally, adverse effects on water quality will likely result from the undersized stormwater management system. The GS Landfill storm water control structures are currently designed for 50-year precipitation events. This design standard ignores precipitation events of more intense storms (i.e., those associated with 100-year events and greater). The current design is grossly inadequate as the frequency and intensity of storms have recently increased due to climate change and are predicted to increase even further in the future. The Connecticut River Valley has experienced multiple 100-year and 500-year storms within the last twenty years. Over the expected life of the landfill, the site will likely see numerous storms¹⁴ that the proposed constructed ponds will be

¹¹ <https://www.vermontpublic.org/local-news/2024-03-08/spill-of-landfill-leachate-into-stormwater-pond-leaves-coventry-locals-concerned>

¹² In this instance, it is particularly relevant to the pending wetland permit application before the U.S. Army Corps of Engineers

¹³ <https://www.ecfr.gov/current/title-40/chapter-V/subchapter-A/part-1508/section-1508.1>.

¹⁴ Intense storms have become more frequent and are projected to become even more common due to climate change. Precipitation in the Northeast has increased in all seasons, and extreme precipitation events (defined as events with the top 1% of daily precipitation accumulations) have increased by about 60% in the region—the largest

unable to detain and infiltrate. It is difficult to define the impact these more intense storms will have on the structural integrity of the landfill and downstream aquatic resources. Particularly since the data for the NCES Landfill show that even though there is greater separation between solid waste cells and groundwater and surface water at the NCES Landfill than at the GS Landfill, the distances are still inadequate to protect water quality.

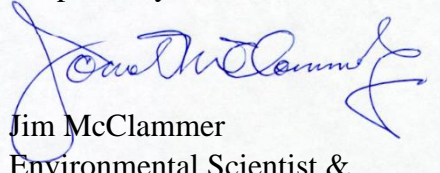
3. Natural disasters and human errors, such as embankment failures, landslides, flooding triggered by extreme precipitation events, earthquakes, operational mishaps and even the possibility of domestic terrorism can all result in the transport of toxic substances by groundwater and surface waters to the watersheds of the Ammonoosuc and Connecticut Rivers.

III. CONCLUSION

Based on the well-documented record at the NCES Landfill of ongoing leachate releases to groundwater and surface water, and the persistence of toxic leachate compounds in groundwater at levels exceeding background concentrations and ambient groundwater quality standards, as well as undersized stormwater control structures at the proposed GS Landfill and its close proximity to both groundwater and surface waters, it is our opinion that **the GS Landfill should not be located anywhere in the watersheds of the Ammonoosuc and Connecticut Rivers.**

The State of New Hampshire is compelled to protect our rivers, which are public trust resources. New Hampshire's Solid Waste Management Act¹⁵ clearly states that "[f]acilities must be **designed** and **operated** [emphasis added] in a manner which will protect the public health and the state's natural environment."

Respectfully Submitted,



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Attachments:

Landfill Locations

Sanco Landfill Hydrogeologic Analysis

Calex Environmental, LLC March 22, 2024-letter

increase in the US. USGCRP, 2023: Fifth National Climate Assessment. Crimmins, A.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, B.C. Stewart, and T.K. Maycock, Eds. U.S. Global Change Research Program, Washington, DC, USA. <https://doi.org/10.7930/NCA5.2023>. November 2023. Figure 2.8.

¹⁵ <https://gencourt.state.nh.us/rsa/html/X/149-M/149-M-11.htm>