

	<p><u>Drumlin Environmental, LLC</u> Hydrogeologic and Engineering Consultants</p> <p>Soil Metrics, LLC</p>	
---	--	---

REVIEW MEMORANDUM

To: Jim Chandler & Hampden Environmental Trust
From: Matt Reynolds
Date: May 27, 2019
Subject: Pine Tree Landfill –Initial Review of 2018 Annual Report

As you requested, I have done an initial review of water quality data from the Pine Tree Landfill (PTL) site from sampling events conducted in October 2018 and April 2019. Jeff Pelletier of New England Waste Services of Maine (NEWSME) also provided a copy of the 2018 Annual Monitoring Report for the PTL site and I have done an initial review of that report as well. An overview of recent site data based on these reports is provided below.

- In order to improve water quality around the landfill site, NEWSME extracts groundwater from 6 extraction wells and the perimeter underdrain. During 2018, NEWSME increased groundwater withdrawal from the 6 extraction wells by 29% compared to 2017, extracting 2.04 million gallons of groundwater. NEWSME also extracts landfill gas (LFG) from 4 gas extraction wells and in 2018 increased gas extraction compared to 2017.
- The majority of the data from monitoring wells around the landfill show that groundwater quality in 2018 was similar to groundwater quality in 2017. For most locations, this represents improved conditions compared to 2011, which was the first year that the landfill was closed. However groundwater quality at most locations remains significantly above the criteria established by the Maine Department of Environmental Protection for successful corrective action.
- During 2018 there were 3 of the 22 groundwater monitoring wells that were below the corrective action criteria for specific conductance of 500 umhos/cm during at least one of the sampling events. There are 4 additional monitoring wells that have been below this criteria in one or more sampling events in the last few years. However, 12 of the 22 wells continue to have specific conductance concentrations above 1000 umhos/cm.
- There were 4 of 22 wells that have a statistically significant 5-year trend of improving water quality as measured by specific conductance and 3 of 22 wells that have an improving 5-year trend as measured by dissolved methane. All of the wells with improving 5-year trends are located to the south of the landfill.
- During 2018 there were 7 of 22 monitoring wells where the data indicated a 5-year trend of increasing specific conductance concentration. Several of the wells with increasing specific conductance trends are to the north or west of the landfill in

locations that are not downgradient from the landfill and where non-landfill activities (e.g., Route 95) may also influence water quality.

- As noted in previous reviews, there are a several wells (MW-03-802B, MW03-803A, MW03-803B, MW03-804A) near the southwest side of the landfill that have exhibited a persistent trend of increasing concentrations over the past several years, and this trend continued in 2018. In June 2016, a seep was discovered originating from the landfill cover system near these wells. In July 2016, the cover was repaired and the impacted soil was excavated and removed. The 2016 Annual Monitoring Report suggested that this seepage may have been responsible in part for the increasing trend, which was expected to decline following the repairs and soil removal. However, the increasing trend persists in these wells. This suggests that the repair was incomplete or that there is a different condition that is responsible for the increasing trend in these wells.
- Following closure of PTL in 2010, on-site monitoring wells showed increasing concentrations of arsenic. At the request of the MEDEP, NEWSME conducted additional on- and off-site sampling for arsenic in 2014, 2015 and 2016. During 2018 (and 2017), water quality monitoring detected significantly lower arsenic concentrations comparison to the 2014 to 2016 period.
- During 2018, NEWSME recirculated approximately 371,000 gallons of leachate back into the landfill using leachate recirculation trenches 2 and 3. This was approximately 10% of the 3.4 million gallons proposed in the 2017 Annual Report. The decrease in recirculation was reportedly due to staffing limitations and a reduced need for fuel at the on-site gas-to-energy facility. The 2018 Annual Report proposes to recirculate up to 3.4 million gallons of leachate during 2019, as feasible considering staffing levels and fuel needs.

The PTL site was closed in 2010 and 2018 represents the 8th year of the 30-year post closure monitoring period. The overall trend of water quality monitored in association with the landfill represents slow improvement. The current corrective actions, including groundwater and gas extraction, are having a positive influence on water quality, but it is premature to conclude that these corrective actions will be sufficient to achieve the criteria established by the MEDEP within the 30-year post-closure period. The area to the southwest of the landfill monitored by the 802-, 803- and 804-series wells continued to exhibit an increasing trend during 2018. NEWSME and their engineers Sevee & Maher Engineers propose to continue monitoring to gather data to better understand the conditions that are causing this trend.

The items discussed above provide an overview based on our initial review of the 2018 data and Annual Report. As we have done in the past, we will prepare a more complete review memorandum and will provide that to you and the Environmental Trust. If you or the Trustees have any questions during or following your upcoming meeting, please feel free to call or email me at any time.