



INFORMATION REPORT

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| TO: | Mayor and Members Public Health Committee |
| COMMITTEE DATE: | April 29, 2024 |
| SUBJECT/REPORT NO: | Third-Party Air Monitoring for Green for Life Stoney Creek Landfill (BOH24008) (Wards 5 and 9) (Outstanding Business List Item) |
| WARD(S) AFFECTED: | Wards 5 and 9 |
| PREPARED BY: | Matthew Lawson (905) 545-2424 Ext. 5823 Manal Chaudhry (905) 546-2424 Ext. 7134 |
| SUBMITTED BY: | Kevin McDonald Director, Healthy Environments Division Public Health Services |
| SIGNATURE: | |

COUNCIL DIRECTION

At its meeting on September 27, 2024 Council approved the following motion:

“That staff be directed to explore the ways and means to provide independent third-party air monitoring for a minimum seven-day period at GFL Stoney Creek Landfill to be funded by the Stoney Creek Compensation Royalties (GFL Landfill) Reserve 117036 and report back to the Public Health Committee.”

This information report satisfies the requirement for Item 2023-I, respecting Independent Third Party Air Monitoring at GFL Stoney Creek Landfill, and can be removed from the Public Health Committee Outstanding Business List.

INFORMATION

The purpose of this report is a response to Board of Health’s direction to explore third-party air monitoring in close proximity to the Green For Life Stoney Creek Landfill located at 65 Green Mountain Road, Stoney Creek. AtkinsRéalisis was identified through the City’s Roster Program as a vendor that can support the development of a feasibility report with options for air monitoring at Green For Life Stoney Creek Landfill (the Site).

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Background

In response to residents' odour complaints and concerns regarding potential contaminants and impacts from odour, the Ontario Ministry of Environment, Conservation, and Parks (the Ministry) conducted two air monitoring assessments in August and September 2023.

The Ministry assessments included monitoring of the following compounds: benzene, trichloroethylene, toluene, tetrachloroethylene, chlorobenzene, ethylbenzene, styrene, 1,2,4 trimethylbenzene, naphthalene, nitrogen oxides (NO_x), including nitric oxide (NO) and nitrogen dioxide (NO₂), total reduced sulfur compounds (TRS) and sulfur dioxide (SO₂), as well as odour measurements through a nasal ranger. The Ministry assessments found several instances of elevated odours, and twenty-nine (29) 10-minute Total Reduced Sulphur O. Reg. 419/05 Standard exceedances at various locations around the Green For Life Site in September 2023. The Ministry has identified the Green For Life Site and leachate pond as the most likely source of odour and recorded Total Reduced Sulphur exceedances. The Ministry's air monitoring assessments assumed that Total Reduced Sulphur measured around the Green For Life Site is composed of hydrogen sulphide (H₂S).

As a result of the exceedances of Total Reduced Sulphur and the continued odour from the site, the Ministry issued a Provincial Officer's Order to Green For Life on October 17, 2023. Under the Order, Green For Life is mandated to retain the services of a qualified third-party to submit an air monitoring plan for the Stoney Creek Landfill to the Ministry for approval. This plan should monitor Total Reduced Sulphur, ammonia, and other contaminants that may contribute to odours at the Site.

Although hydrogen sulfide (H₂S) has not been known to cause cancer,¹ prolonged exposure to low concentrations of Total Reduced Sulphur compounds such as hydrogen sulfide (H₂S) may cause headaches, tiredness, and nausea.¹ This is consistent with community concerns raised regarding their lived experience with the

¹ Canadian Centre for Occupational Health and Safety (CCOHS), 2023. Hydrogen Sulfide. Available from:

https://www.ccohs.ca/oshanswers/chemicals/chem_profiles/hydrogen_sulfide.html

odour emanating from the Facility impacting their quality of life^{2, 3, 4, 5} which research confirms can trigger an individual's stress response.⁶

As a part of the City's efforts to address public concerns regarding air quality and odours, Hamilton City Council directed Public Health Services to explore options to provide independent third-party air monitoring in close proximity to the Green For Life Site for a minimum of seven days.

Sampling Plans Provided in Feasibility Report

AtkinsRéalis submitted a feasibility report to the City outlining three sampling plans for third-party air monitoring in close proximity to the Green For Life Stoney Creek Landfill (see Appendix "A" to Public Health Committee Report BOH24008). The sampling plans, a brief description, and the associated costs are provided in Table 1 below.

² Aatamila M., Verkasalo P. K., Korhonen M. J., Suominen A. L., Hirvonen M. R., Viluksela M. K., et al. 2011 Odour annoyance and physical symptoms among residents living near waste treatment centres *Environ Res* 111 1 164 -170 Available from: <https://pubmed.ncbi.nlm.nih.gov/21130986/>

³ Baldacci S., Maio S., Martini F., Silvi P., Sarno G., Cerrai S., et al. 2015 Odor annoyance perception and health effects in an Italian general population sample *Eur Respir J* PA1115 Available from: https://erj.ersjournals.com/content/46/suppl_59/PA1115

⁴ Blanes-Vidal V. 2015 Air pollution from biodegradable wastes and non-specific health symptoms among residents: Direct or annoyance-mediated associations? *Chemosphere* 120 371 -377 Available from: <https://pubmed.ncbi.nlm.nih.gov/25192839/>

⁵ Hooiveld M., van Dijk C. E., van der Sman-De Beer F., Smit L. A. M., Vogelaar M., Wouters I. M., et al. 2015 Odour annoyance in the neighbourhood of livestock farming – Perceived health and health care seeking behaviour *Ann Agric Environ Med* 22 1 55 -61 Available from: <https://pubmed.ncbi.nlm.nih.gov/25780829/>

⁶ Hirasawa Y., Shirasu M., Okamoto M., and Touhara K. 2019 Subjective unpleasantness of malodors induces a stress response *Psychoneuroendocrinology* 106 206 -215 Available from: <https://www.sciencedirect.com/science/article/abs/pii/S0306453018312125>

Table 1: Sampling Plans Proposed in AtkinsRéalis Feasibility Report

| Sampling Plan | Description | Contaminants Sampled | Number of Sampling Locations | Estimated Cost (including laboratory, equipment, staff) |
|---|---|--|--|--|
| Mobile Continuous Sampling | Mobile analysis vehicle or trailer that is deployed with continuous sampling equipment | Sulphur compounds and Volatile Organic Compounds | Not Applicable | >\$1 million |
| Long-term Fixed Location Passive Sampling | Non-continuous air monitoring through tube/cartridge analysis in fixed positions for a period of seven to fourteen days. | Hydrogen Sulphide and Volatile Organic Compounds | Ten fixed locations over seven to 14 days. | Roughly \$20,000 |
| Short-term Fixed Location Canister Sampling | Non-continuous air monitoring through canisters set in fixed locations, which can sample up to eight hours or 24-hours for a period of seven days. Supplemented by 10-minute sampling cannisters. | Sulphur compounds and Volatile Organic Compounds | Five fixed locations per day for 8-hour or 24-hour analysis. Four portable cannisters per day for 10-minute samples. | Roughly \$62,000 for a 7-day campaign |

The results of the seven-day monitoring would be shared with the Ministry for consideration and appropriate action, if any.

- **Mobile Continuous Sampling;**

The proposed mobile continuous sampling plan would require the construction and outfitting of a mobile-based laboratory with various continuous samplers, with a power source to support the sampling equipment. This would result in a mobile sampling unit similar to the one operated by and used by the Ministry for air monitoring assessments.

This option is cost-prohibitive as well as time consuming, as sourcing the

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equipment and building the unit will take upwards of six months. This would not allow for any sampling to occur in the warmer months of 2024 when odours may be exacerbated.

It should be noted that if Public Health Services were to invest in a mobile air monitoring unit, the unit should be procured directly and owned by the City of Hamilton as opposed to a third-party. A business case for a mobile air monitoring unit would have to be further explored to determine the value of the unit.

- **Long-term Fixed Location Passive Sampling;**

The proposed long-term passive sampling involves using air sampling equipment (a tube or cartridge with an open inlet) at a fixed location over the sampling period. The equipment proposed by AtkinsRéalis is capable of sampling for hydrogen sulphide (H₂S) and Volatile Organic Compounds. Samples are analysed by a laboratory at the end of the sampling period and the laboratory returns an average concentration. The sampling sites will be based on predominant wind directions and residential locations.

The concentrations of hydrogen sulphide (H₂S) and Volatile Organic Compounds returned through this sampling method are an average over the entire sampling period of seven to fourteen days. As such, this method does not capture any short-term peaks in contaminant concentrations. However, the Ministry air monitoring assessment conducted in September 2023 shows that exceedances of Total Reduced Sulphur around the Green For Life Site were short-term in nature. In addition, the passive sampling equipment is capable of measuring hydrogen sulphide, but not Total Reduced Sulphur. Therefore, this sampling method will not provide an indication of exceedances of Total Reduced Sulphur levels near the Green For Life Site.

This sampling plan may be better suited to determine long-term exposures to contaminants. However, the results from this sampling plan are not directly comparable to Ontario's health based Ambient Air Quality Criteria, as the averaging period in the criteria are 10-minutes, 8-hour, 24-hour, 30-day, and annual.

- **Short-term Fixed Location Canister Sampling;**

The proposed short-term fixed location canister sampling plan uses canisters that are set up at fixed locations for a short period during which the air is drawn into the sampler. The sampling plan proposes four locations for 8-hour sampling periods. AtkinsRéalis has indicated that this sampling period can be extended to 24-hours, and that the laboratory is also able to provide Total Reduced Sulphur concentrations from the sample which can then be compared to the 24-hour health-based Ambient Air Quality Criteria for Total Reduced Sulphur. Similar to

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the long-term sampling plan, the sampling equipment will be sited based on wind directions and the location of residential neighbourhoods.

This sampling plan also includes additional portable samples that can take 10-minute samples to compare to the odour based Ambient Air Quality Criteria for Total Reduced Sulphur. The locations of the 10-minute samplers can be determined based on odour observations by third-party staff or based on residential complaints. While results from this sampling plan can be compared to the 10-minute and 24-hour Ontario Ambient Air Quality Criteria, the sampling methodology is not approved by the Ministry.

Both the long-term and short-term monitoring plan require a minimum of two weeks for preparation, and results from the laboratory may take up to 10 days or more for turn-around time. This timeline may be further prolonged if sampling equipment is not available at the laboratory. In addition, unmanned stations can be tampered with.

- **Ministry Order to Green For Life for Independent Third-Party Air Monitoring**
The Ministry's September 2023 air monitoring assessment at Green For Life Stoney Creek Landfill found twenty-nine (29) exceedances of Total Reduced Sulphur in the community surrounding the Site. Following this assessment, the Ministry issued an order to Green For Life on October 17, 2023 (see Appendix "B" to Public Health Committee Report BOH24008). Part of this order includes Green For Life hiring an independent third-party to submit an air monitoring plan for Total Reduced Sulphur, ammonia, and any other odour causing contaminants on the Site. The order is included as an appendix to this report.

This monitoring plan will include daily fence-line monitoring for Total Reduced Sulphur and ammonia at the Green For Life site, with sufficient data to compare to the on-site 10-minute and 24-hour standards set out in O.Reg 419/05. The plan must also include odour monitoring in the surrounding community and a plan to communicate monitoring results to the public. Once the monitoring plan is approved by the Ministry and monitoring is underway at the Site, both short-term and long-term Total Reduced Sulphur concentrations will be monitored at the Site.

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APPENDICES AND SCHEDULES ATTACHED

Appendix "A" to Report BOH24008: Feasibility Assessment for Odour Monitoring at Green For Life Landfill for City of Hamilton

Appendix "B" to Report BOH24008: Provincial Officer's Order Issued to Green For Life Environmental Inc.