

SEPA monitoring assessment update for Tarbolton Landfill – October 2020



This report provides:

- A summary of the changes to on-site work at Tarbolton Landfill due to COVID-19 restrictions
- A summary of recent site conditions
- A review of environmental monitoring, including data collected from 16 December 2019 to 15 October 2020
- Information on any additional monitoring collected by SEPA to support the NHS-led Problem Assessment Group
- An update on work to establish potential options for management of the site

COVID-19 Pandemic

As Scotland is facing the biggest health emergency in living memory, SEPA will play its role in helping the nation manage this emergency in a way that protects and improves the environment. Prior to lockdown restrictions coming into place, SEPA continued to carry out environmental monitoring in line with the previous monitoring plan, with the last site visit prior to lockdown undertaken on 12 March 2020. Since then SEPA have been constrained in doing some of our normal key tasks such as routine site visits and monitoring, including at Tarbolton landfill site. As restrictions eased and following a review of our Health and Safety procedures, we have prioritised and reinstated site visits and monitoring at Tarbolton Landfill site and recommenced site activity at Tarbolton landfill in July 2020. We will review our approach in line with Scottish Government guidelines.

Recent site conditions

Over the 2019/2020 winter period, SEPA noted a continued deterioration in the general condition of Tarbolton landfill and in particular the eastern and southern side of the landfill site. Excess leachate observed in these areas appears to be affecting trees and other flora, which are beginning to die. During our most recent site visits, no significant visible deterioration since March 2020 was observed. However, a seasonal increase in invasive species giant hogweed and Japanese knotweed were noted on site.

Environmental Risk Assessment

Media	Risk type	Previous Risk Assessment	Current Risk Assessment
Landfill gas	Migration of landfill gas through sub-surface pathways	Low	Low/Moderate
Groundwater	Groundwater quality impact	Low/Moderate	Low/Moderate
Surface water	Surface water quality impact	High	High
	Impact on farm animals drinking contaminated surface water	Very Low	Very Low

SEPA have carried out intensive environmental monitoring around the Tarbolton site since May 2018 to assess the site impact on associated water bodies and wider effects. SEPA continues to review the monitoring data gathered on each sampling occasion and revise the environmental monitoring plan where necessary to inform our ongoing environmental risk assessments.

A significant review of our monitoring plan was undertaken in October 2019, following the identification of worsening conditions on-site. Monitoring was undertaken in line with that monitoring programme up until COVID-19 restrictions were put in place, with the last site visit pre-lockdown undertaken on 12 March 2020. Once restrictions were eased and SEPA health and safety procedures were updated, site visits and a limited monitoring programme were reinstated. The first site visit took place in July 2020. Three site visits have been undertaken since then: 29 July, 09 September and 15 October 2020. During this time, monitoring of landfill gas and groundwater levels have been completed. We are currently planning to reinstate the wider monitoring, including water quality, subject to Scottish Government restrictions and guidance.

Migration of landfill gas through sub-surface pathways

Landfill gas is a variable mixture of gases generated by decaying organic matter within a landfill site, although its principal components are methane and carbon dioxide. Prior to COVID-19 restrictions being put in place, SEPA monitored the gas within boreholes around the perimeter of the landfill on a monthly basis as part of an ongoing programme to assess the risk posed by landfill gases migrating off site through sub-surface pathways. SEPA has prioritised reinstating this monitoring as restrictions eased and has undertaken monitoring of landfill gas on 29 July, 09 September and 15 October 2020. Currently, plans are to continue this monitoring on a monthly basis.

This update considers the monitoring results recorded during the December 2019 to February 2020 period and from July 2020 to October 2020.

Levels of methane remained below permit trigger levels (1% v/v) at all perimeter boreholes, with the exception of GWD4, GWD5 and GWD7 which lie to the south, west and south-southwest of the landfill, respectively. The methane levels within GWD4 were found to be above 1% v/v over the winter period (December 2019 to February 2020) with concentrations ranging from 1.3 to 1.6% v/v, which is consistent with the previous year's measurements. Methane concentrations in GWD4 were below detection limits during the July to October 2020 monitoring period. Borehole GWD5 on the western perimeter of the site was found to contain concentrations of methane above the trigger level, at 3.9% v/v in July 2020, having only once previously breached the trigger value in 2018. The methane concentrations were however below detection limits on the three previous and two subsequent monitoring visits, thereby indicating that this is not an upward trend; more of an isolated occurrence.

Levels of carbon dioxide continued to be detected at or above permit trigger levels (1.5% v/v) in several perimeter boreholes on the southern and western perimeter of the site. However, levels are generally stable and consistent with concentrations detected during the corresponding period of the previous year.

Based on the monitoring observations discussed above, there is some evidence to indicate that there may be a low level of lateral landfill gas migration occurring to the south and west of the landfill, although this is not definitive as the levels of gas measured may be due to other sources such as gas formed within the marshland itself.

Borehole GWD7 has however exhibited a significant change in measured methane and carbon dioxide levels. This is due to the identification and repair of a damaged pipe connection within the borehole, which has resulted in an increase in the subsequently measured gas concentrations. Prior to repair, this borehole consistently exhibited carbon dioxide and methane concentrations below permit trigger levels. There is nothing to indicate that the situation in this area of the site has changed, rather now that the measurements are more accurate. The measured concentrations of methane in the months of December 2019 to October 2020 (i.e. after the repair) were well above the 1% v/v trigger level (ranging from 6.3 to 42.2% v/v). The levels of carbon dioxide were also well above the 1.5% v/v trigger level (at levels ranging from 6.1 - 16.4% v/v). The high concentrations indicate the presence of landfill gas within this borehole and therefore may indicate that, at least localised, landfill gas migration is occurring in this area. There are other possible explanations for these readings, including that this borehole may have been drilled in waste deposits or that leachate ingress into the borehole is causing elevated results.

In order to assess the risk to members of the public accessing areas to the south and west of the landfill a walkover inspection was undertaken to identify any potential public access routes, and to carry out methane monitoring in low lying trenches and streams and at chest height in accessible areas. SEPA assessed that access to the potentially affected area to the immediate west and south west of the landfill was severely restricted due to the marshy nature of the ground; the high, dense vegetation and due to the width of the perimeter ditches and streams. There were no signs that members of the public had accessed this area. There was however evidence of a recently used track running, approximately east to west, to the south of the landfill. Methane measurements were undertaken at potentially accessible locations within the river channel (beside the track), and at chest height along this track. Methane concentrations were the below detection limit (5 ppm) at all locations except at a single location to the immediate south of the landfill within the Biggary Burn's channel, which measured a peak concentration of 64 ppm methane which, although above background atmospheric levels, is not considered to be at a level of concern. Based on the walkover inspection, the risk to members of the public is considered to be low.

The overall risk from subsurface landfill gas migration is considered to remain low for all local housing and building receptors and for all land areas to the north and east of the landfill, including the closest receptor, the building owned by Ayrshire Waste Management. The risk to local housing to the south and southwest remains low due to the lack of viable

gas pathways between this location and the housing. The nearest houses are several hundreds of metres from the region of gas migration and the intervening marshy land is cross-cut by streams and ditches, which can act as ground gas venting trenches preventing near-surface transmission.

However, due to the high methane measurements within borehole GWD7, SEPA have assessed the risk level as low/moderate and will continue to monitor this borehole and areas to the south west of the landfill.

Groundwater quality

Prior to COVID-19 restrictions, SEPA reduced its monitoring frequency for groundwater quality and leachate quality and levels to every 6 months, with the last round of monitoring prior to lockdown undertaken in November 2019. All samples were analysed for a range of inorganic parameters and metals. Groundwater level monitoring had continued on a monthly frequency prior to lockdown.

The results from the leachate wells sampled in November 2019 were consistent with those from previous monitoring rounds and suggest that there had been little change in leachate quality in 2018-2019. Leachate levels generally displayed either a rising trend or were largely stable.

Groundwater quality in boreholes GWD5 and GWD7 adjacent to the unlined Zone 1 landfill area continued to be impacted by landfill leachate in November 2019. These boreholes displayed elevated chloride and ammoniacal nitrogen concentrations in GWD7 and GWD5. Total metal concentrations were elevated compared with drinking water standards but generally filtered metal concentrations were lower, indicating migration of metals through the subsurface was likely to be partially mitigated by natural attenuation mechanisms. Concentrations monitored in all other boreholes showed little or no change.

Since lockdown, Groundwater quality and leachate monitoring have been delayed. We are currently planning to reinstate this monitoring subject to Scottish Government restrictions and guidance.

Groundwater level monitoring was undertaken monthly prior to lockdown and reinstated on 09 September 2020 post lockdown. When considering the data collected between December 2019 and February 2020 and then again since September 2020, groundwater

levels were generally stable but with some seasonal influence demonstrated by a rise in levels in the majority of boreholes in winter 2019 and 2020 compared to those recorded in summer 2019.

The overall risk from the landfill to groundwater is considered to remain unchanged (i.e. moderate from Zone 1 and low/moderate from Zone 2), however there is uncertainty associated with this assessment given the lack of recent monitoring data.

Surface water quality

SEPA monitored a range of inorganic parameters and metals at six locations every second week on the Biggary Burn and Water of Fail. This frequency was reduced from weekly in October 2019. The data is compared to statutory water quality standards used to classify water quality under the requirements of the Water Framework Directive (WFD)¹.

No water quality has been carried out since the COVID-19 restrictions in March 2020. This monitoring will be reinstated as soon as is practicable and following Scottish Government restrictions and guidance. This update includes an assessment of the surface water monitoring undertaken between 16 December 2019 and 11 March 2020.

The evidence gathered during our intensive monitoring programme demonstrates the watercourses around Tarbolton Landfill are heavily influenced by local rainfall patterns and resulting flow, therefore chemical concentrations fluctuate depending on available dilution.

Following a period of mixed rainfall during Autumn 2019, local rainfall in January and February 2020 was consistently above the seasonal norm. In February, the monthly total was three times the seasonal norm. The rainfall in March was similar to the monthly average. The additional flow due to the higher rainfall increases the dilution available in the watercourses leading to slightly lower concentrations of ammoniacal nitrogen in the Biggary Burn and Water of Fail. The environmental impact remains significant, with measured concentrations in the range 1.1 to 9.1 mg/l in the Water of Fail downstream of the landfill in January, February and March 2020. These values would lead to a classification of bad under the relevant WFD standard for ammoniacal nitrogen.

¹ [The Scotland River Basin District \(Standards\) Directions 2014](#)
[The Scotland River Basin District \(Standards\) Amendment Directions 2015](#)

The increased concentrations in the Water of Fail detected at the monitoring point 50 m upstream of the Biggary Burn confluence continued to mirror the levels detected at the next downstream point between October 2019 and February 2020. The last sample collected on 11 March 2020 was closer to the average concentration at this site prior to August 2019 (i.e. 0.4 mg/l). This concentration was only slightly higher than the site 1 km further upstream. Further work is needed to confirm if the levels have continued to remain at this lower concentration.

The monitoring point on the Water of Fail at Failford, 5.5 km downstream of Tarbolton landfill, has continued to see increased concentrations of ammoniacal nitrogen. The peak of 9.8 mg/L at the end of November 2019 is the highest result yet detected for this site. The concentration has gradually reduced to approximately 2.5 mg/l in March 2020. The peaks and troughs observed over that period are inversely related to the predicted flow in the Water of Fail.

The overall risk assessment for surface water quality is considered to remain unchanged (i.e. high), however there is uncertainty associated with this assessment given the lack of recent monitoring data.

Farm animals

In the Biggary burn, in particular, there is significant contamination of the watercourse as discussed above. However, the burn is steep and fenced in this area and as such should be inaccessible to livestock. In addition, under the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended), General Binding Rule (GBR) 19 on the keeping of livestock states that poaching of any land within 5 m of any river, burn or ditch must be prevented². SEPA have had discussions over meeting the requirements of the GBR with farmers in the local area.

The current risk assessment is considered to remain at very low, despite the lack of recent data.

² [The Water Environment \(Controlled Activities\) \(Scotland\) Regulations 2011- A practical guide](#)

Odours and information to support public health risks

Since the beginning of 2020 SEPA has received regular odour complaints from residents living in close proximity to the boundary of the landfill. SEPA Officers routinely inspected the site prior to COVID-19 restrictions being put in place and reported moderate to strong leachate and landfill gas odours. Further site visits have taken place since lockdown restriction were eased with SEPA Officers continuing to note leachate odours along the north and eastern boundary of the landfill.

A cross agency Problem Assessment Group (PAG) was established by NHS Ayrshire & Arran to enable the NHS to assess risks to public health. In addition to the NHS, the members of this group are: South Ayrshire Council, SEPA, Health Protection Scotland, Health and Safety Executive and Scottish Water. SEPA updates the PAG on odour assessments and environmental monitoring.

The PAG meet as required to consider results of ongoing monitoring and sampling by SEPA and other agencies in order to assess the risk to public health. Previous SEPA monitoring has confirmed that potentially hazardous gases have been occasionally detected within the boundary of the unmanaged landfill site. In response to the detection of gases and the risk of deep water at the site, on behalf of all members of the problem assessment group, South Ayrshire Council has erected signage, warning members of the public to keep off the site.

South Ayrshire Council have undertaken gas monitoring at various off-site locations.

The risk to the general public outwith the site has been assessed as low and this will be kept under review by the Problem Assessment Group.

As per signage, which has been erected at the perimeter of the landfill by South Ayrshire Council, we would urge members of the public to keep off the unmanaged landfill site. Anyone experiencing symptoms that they think are related to the landfill should seek medical advice from their GP in the first instance.

Work to establish potential options for management of the site

SEPA has been in regular contact with Scottish Government in relation to Tarbolton landfill site. Early in 2019, Scottish Government asked SEPA to commission a report into options for the management of the site which would mitigate the impact on the environment.

As a result of the initial report, it became clear that, in order to arrive at accurate costed options for managing the site, further survey work was required. Scottish Government funded this additional work.

During January 2020 specialist contractors attended Tarbolton Landfill to assess the condition of the leachate discharge connection to the sewer and to undertake a topographical survey. Reports detailing a leachate management strategy and a site capping appraisal document have been received by SEPA and shared with local stakeholders.

The Scottish Government, SEPA and South Ayrshire Council are working to assess future options for management of the site. The above reports have been considered by Scottish Government, SEPA and South Ayrshire Council. Although no decisions have yet been reached, Scottish Government and partners are committed to continue working together to identify potential solutions.

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