TLCCG
Tullamarine Landfill
Community Consultation Group

MEETING NOTES

THURSDAY

4 March 2021

6.30pm – 8.30pm

Hume Global Learning Centre

75-95 Central Park Ave, Craigieburn

FACILITATOR: SUSAN MCNAIR, CURRIE

NOTE TAKER: RYAN ONG, CURRIE

MEETING PURPOSE

i. Share and discuss the audit report
ii. Confirm topics and community consultation in 2021-2022

ATTENDEES

Community

- Peter Barbetti
- Ovi Clements
- Graeme Hodgson
- Helen Patsikatheodorou
- Cherine Fielder
- Helen van den Berg
- Jos van den Berg

City Council

- Amanda Dodd, Hume City Council

Environmental auditor

- Suanna Harvey, Senversa

EPA Victoria

- Jeremy Settle, Field Team Leader, Metropolitan Region
- Sean Vintin – Senior Environment Protection Officer

Cleanaway

- Peter Fennelly, Post Closure Technical Lead
- Olga Ghiri, Stakeholder and Community Engagement Manager

Apologies

- Lolita Gunning
- Prue Hicks
- Rhett Jenkinson
- Dianne Lee
- Russell Nilsson
- Harry van Moor

ABOUT THESE NOTES

Currie Communications has produced these notes, which aim to provide detailed minutes that cover the key information that was provided in the meeting. However, these notes are not intended to be a transcript of the meeting, and discussions, comments and questions have been summarised to reduce the overall length of this document.

Presenters were given the opportunity to review the notes relating to their item to ensure the discussion was accurately summarised, and that it details best available knowledge at the time of the meeting. Attending community members were also given the opportunity to provide feedback, which was addressed by Currie. Additional comments or relevant information received after the meeting have been highlighted in red, and useful hyperlinks have been added to text as additional references.

These notes will be posted on the Tullamarine Community Information page on the Cleanaway website www.cleanaway.com.au/community/major-project/tullamarine-closed-landfill-vic/ and will be available to the public. All meeting participants were asked if they wanted their names to be removed from public version of the document.

The intent of these meeting notes is to promote open communication between Cleanaway, local government, community and EPA Victoria. They are not to be used in a manner that compromises this objective.

AGENDA

1. Welcome, introductions (S. McNair)
2. Meeting principles and purpose (S. McNair)
3. Post-closure audit report – key findings and highlights (S. Harvey, Environmental auditor)
4. Community response to audit
5. Cleanaway response to audit and questions (P. Fennelly)
6. EPA response to audit and questions (J. Settle)
7. Confirm timeline for next meeting, meeting close (S. McNair)

Meeting opened at 6.30pm.

Item 1: Welcome, introductions

S. McNair (Facilitator) welcomed everyone and all attendees introduced themselves.

Item 2: Meeting principles and purpose

S. McNair noted the following principles for conduct of the meeting:

- Respect each other
- Give everyone a fair go and a chance to speak
- Openly share information and be transparent
- No personal attacks
- Be clear and concise information – make the message clear
- Be truthful and honest

The purpose of the meeting as stated in the agenda was reviewed and no changes were requested.

Item 3: Post-closure audit report – key findings and highlights

S. Harvey, environmental auditor, provided an overview of the post-closure audit report, summarised below. Slides can be found in Appendix 2.

- The report aimed to identify environmental risks considering the period of 2018 to June 2019, though more recent data was considered in select cases.
- The auditing approach had a strong focus on trends to help fill gaps in monitoring data.
- The assessment found that environmental risks are limited in nature and extent, however gaps in data make a conclusive assessment difficult.
    - Groundwater levels have been dropping since 2011.
    - Leachate levels have reduced significantly.
    - LNAPL appears stable and is not moving laterally.
    - Salt levels (TDS) in groundwater to the north of the landfill appear to be reducing or stabilising.
    - Risk is assessed as medium for Moonee Pond Creek (MPC) ecosystems due to insufficient data, and low for all other groundwater uses

- One landfill gas risk was ranked as unacceptable, this related to excavating off-site towards the south-west due to the uncertainty of control. Cleanaway has since implemented a Dial Before You Dig system in that area. Further investigation into where the deeper geological units outcrop to the south and southwest will also fill this data gap.
- Salt impacts detected in the MPC upstream or alongside the landfill dissipated in downstream sample locations.
- The assessment recommended a new and improved monitoring program that includes updated numerical modelling.
    - There was difficulty in determining what scheduled monitoring had been performed, and monitoring was inconsistent when done.
    - The auditor considers the current post-closure management plan (PCMP) overly complex.
    - A more cohesive PCMP and monitoring program is a high priority.

Question: Are changes in surface water quality in the MPC due to storm water being fed into the creek?

> S. Harvey: It could be due to all manner of things, it could be a variable sampling method issue for example, but I think it's also possibly dilution from other outputs.

Question: To what depth is the unacceptable excavation risk?

> S. Harvey: Any excavations are potential unacceptable risks. However, the methane impacts to the south of the site are in the deeper geological units more than 10-15 metres deep.

Question: Do these recommendations cover what's was found not to be written in the PCMP – how Cleanaway would do inspections, check fences etc.?

> S. Harvey: This wasn't written down, but yes this is part of the broader recommendation to update the PCMP. The update of the PCMP also incorporates part of the EPA publication 1490.1 that sets out what Cleanaway needs to do to stay on track.

Community member comment: In the past, the EPA has failed to ensure the monitoring program protected the community, there needs to be a big improvement in the next era of the EPA.

> S. Harvey: One of the reasons for the fragmented monitoring is the program's complexity – it is very difficult to comply with. It is very hard to operate under those conditions.

Item 4: Community response to audit

S. Harvey responded to questions provided by the community in advance. All of these provided questions can be found with answers in Appendix 3. S. Harvey also responded to additional questions during the session.

Question: How come you noticed things that others did not?

> S. Harvey: I think it helped that we had a former employee that knew some of the history. We also had a lot of resources to work with, put in by Cleanaway.

Question: Does the sampling on the Moonee Ponds Creek extend further up and downstream?

> S. Harvey: The sampling goes up to about 1km up and downstream.

Question: How does Senversa maintain its 'Chinese walls' to avoid conflicts of interest?

S. Harvey: Usually we ensure that people working on projects that may have a conflict are physically separated. This was much easier due to COVID-19.

Question: Regarding current leachate extraction, is this still required?

S. Harvey: No leachate extraction is currently occurring or being recommended.

Question: Will the groundwater need to be closely monitored further afield?

S. Harvey: We are trying to find the toe of the plume to see if the groundwater quality is affected further from the site and to identify if this is a problem.

Question: Will the updated modelling help us find out how far contaminants could have gone?

S. Harvey: It might help us predict how far it could have gone.

Question: The audit does not cover the four settling ponds that are now empty, why aren't these covered?

S. Harvey: The ponds are capturing storm water runoff at the moment. Their purpose and management will come under the new PCMP as part of aftercare management of the landfill.

Item 5: Cleanaway response to audit and questions

P. Fennelly responded to questions provided by the community.

Question: Has the review of the geology and potential for outcropping of LFG to the south and west of the landfill been conducted? What implications does it have? If it's not completed when can we expect to get the results?

P. Fennelly: The review is about complete. About 99% of the wells are located, however some are associated with the airport and have been buried. Both the airport and VicRoads have a stake, so this is a complication that will take some time to work though.

Question: We know that in the early days a lot of things weren't recorded. What records did get handed from the first to second owner and then on to Cleanaway?

P. Fennelly: I will come back to you on that.

Action 0321_1: P. Fennelly to inform the community on what records they received from the owner.

Question: What is the volume of the gas being extracted?

P. Fennelly: The Tullamarine flare averaged a flow of 147.7 SCMH (standard cubic metres per hour) of landfill gas (LFG) for February 2021. The flow can change due to various outside factors (e.g. atmospheric pressure).

Question: Is there a risk of having no redundancy system in place?

P. Fennelly: Earlier this week the flare was getting an annual service due to issues restarting it at times. The contractor has advised me that the issue is due to the design of the flare, it doesn't have a purge setting. We are in the process of rectifying the issue, the contractor is providing a quote.

Action_0321_2: P. Fennelly to update the community on rectifying the flare at the next meeting.

Question: Are we monitoring growling grass frog populations, as this will be an indicator for ecosystem health? Is the landfill impacting these populations?

P. Fennelly: In terms of impact, a professional gave us the advice that there are many variables coming into play that make it near impossible to pinpoint whether the landfill is impacting the population. The population could be monitored.

A. Dodd: The Hume City Council has a fauna monitoring program which we can talk to Cleanaway about.

Action 0321_3: P. Fennelly to talk to A. Dodd about potential collaboration to monitor growling frog populations.

Question: Is there a plan to feed and water kangaroos?

P. Fennelly: We have been in touch with a kangaroo consultant to look into kangaroo management plans. At this point they are in the process of scoping up the works. I will be able to provide an update next time.

Action 0321_4: P. Fennelly to update the community on the kangaroo management plan at the next meeting.

Question: Have you got the new groundwater pipe design? Can you provide an update on this?

P. Fennelly: I don't have this but I have seen it. I can provide an update on this next time.

Action 0321_5: P. Fennelly to update the community on the groundwater pipe design at the next meeting.

H. van den Berg: We want a better interface between the stormwater and the way it gets into the creek, the proposed is ugly, we preferred the $1.3m plan. We want cleaner creeks that support instream flora and fauna, Cleanaway has a role in providing that.

P. Fennelly: I acknowledge that, just to comment, no stormwater from the capped area flows to the creek.

Item 6: EPA response to audit and questions

J. Settle responded to questions provided by the community in advance. All of these provided questions can be found with answers in Appendix 4.

Action 0321_6: EPA to respond to Graeme Hodgson's questions that were provided before the meeting.

Item 7: Close of meeting

The group agreed to set the time for the next meeting in mid-July.

Minutes will be shared as a draft, and if you have any questions or queries, please get in contact and we'll go through the transcripts to ensure that they're as accurate as they can be.

Meeting closed at 8.30pm.

Appendix 1: Rolling action list

UPDATED 26 March 2021

Reference	Action	Who	Status
0321_1	P. Fennelly to inform the community on what records they received from the owner.	Peter Fennelly	To complete at next meeting.
0321_2:	P. Fennelly to update the community on rectifying the flare at the next meeting.	Peter Fennelly	To complete at next meeting.
0321_3:	P. Fennelly to talk to A. Dodd about potential collaboration to monitor growling grass frog populations.	Peter Fennelly	To provide an update at next meeting.
0321_4	P. Fennelly to update the community on the kangaroo management plan at the next meeting.	Peter Fennelly	To complete at next meeting.
0321_5	P. Fennelly to update the community on the groundwater pipe design at the next meeting.	Peter Fennelly	To complete at next meeting.
0321_6	EPA to respond to Graeme Hodgson's questions that were provided before the meeting.	Jeremy Settle	*Complete (see Appendix 4).*
1020_1	P. Fennelly to supply a complete figure of the Groundwater Monitoring bores.	Peter Fennelly	*Complete.*
1020_2	P. Fennelly to supply updated maps of all bores	Peter Fennelly	*Complete.*

Appendix 2: Environmental auditor presentation

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Report to TLCCG

Tullamarine Closed Landfill Audit

4 March 2021

Suanna Harvey – EPA Appointed Auditor

Audit Objective and Scope

Independent auditor engaged to undertake the landfill aftercare management audit as per the EPA Post-Closure PAN and EPA Guidelines

The audit objective is to identify and, where possible, quantify the risk of harm to the environment caused by the aftercare management of the landfill.

Scope for Audit period – July 2018 to June 2019

- Re-verify the monitoring program
- Review progress of the 59 GHD audit recommendations
- Assess compliance with PCMP
- Stakeholder correspondence

Considered selected data from July 2019 to November 2020

  - when commenting on progress to 59 Audit recs
  - for assessing LFG risks
  - for review against target leachate levels
  - preparing GW contours

- Utilised historical data for trend assessment.
- Assessed potential risks to beneficial uses at the site and surrounding area

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Review of information

The documents supplied to the auditor are listed in Appendix E of the audit report.

- Reviewed monitoring data, previous studies, previous audit reports and risk assessments and undertook a site visit.
- Sought evidence of completion of the 59 audit recommendations (Appendix S and Section 12) and assessed PCMP implementation (Appendix D).
- Detailed assessment of monitoring data, trends in context of the surrounding environment and applicable beneficial uses (Section 5).
- Assessed risks related to leachate and LNAPL (Section 7), Groundwater (Section 8), Surface Water (Section 9) and Landfill gas (Section 10).
- Made recommendations to refocus the monitoring program to enable more conclusive assessment of the risk in future (Section 14).

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Risk Assessment approach

For each of land, surface water, groundwater and air – determined which beneficial uses apply based on the relevant State Environment Protection Policy (SEPP).

Determined if each beneficial use was likely to exist or be relevant at the site and surrounds.

Assessed and assigned risk level based on the likelihood of impact (pathway for impact and the beneficial use is existing and relevant), and the degree of impact as informed by monitoring data and other audit evidence.

Reviewed previous risk assessments and conceptual site models to see if risks and knowledge had changed, and what data gaps remained.

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Key findings

Considering the site history, it is likely that impacts to beneficial uses of the environment from the landfill are relatively limited in nature and extent.

The available data suggests risks are generally low and managed, but the fragmented data set over last 5 years (missed monitoring and the complex monitoring program), makes it hard to make conclusive assessment.

Recommendations aim to set the groundwork for a new monitoring program that -

- Reflects the current landfill status (capped, in long term care and maintenance)
- Responds to the priority areas of potential risk and uncertainty

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Risk Assessment - key findings – Groundwater, Leachate and LNAPL

- Capping appears to be having a positive impact -
  - Groundwater levels have dropped by 0.3 m to 1.5 m overall (since 2011), consistent with 2007 Secondary Risk Assessment predictions.
  - Leachate levels have reduced by 1 to 5 m (average 1.1 m) since pre-extraction in 2003 / or comparable data point. Greatest drop is in Mound 1.
  - LNAPL impact is stable – has not expanded laterally.
- TDS trends in key bores MB23 and MB6U near MPC reducing or stabilising. No triggers in the salinity monitoring network.
- Updated numerical modelling recommended.
- Risk assessed as medium for MPC ecosystems, as insufficient data to draw conclusions. All other beneficial uses for groundwater assessed as low risk.

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Legend

- Groundwater Monitoring Well - Upper Aquifer
- Groundwater Monitoring Well - Not Gauged
- Inferred Groundwater Elevation (mAHD)
- Inferred Groundwater Direction
- Watercourse - Tributary
- Watercourse - Main
- Property Boundary

Notes:
Cadastre and road data sourced from land.vic.gov.au (DELWP)
Aerial imagery sourced from Nearmap Pty Ltd

Designed:	N. Verga	Date:	19/11/2020
Drawn:	C. Smith	Revision:	0
Checked:	S. Harvey	Scale:	1:3,500 (A3)
File:	F007		

0 90 180 270 Metres

Datum GDA 1994, Projection MGA Zone 55

Figure No: 7

Title: **Indicative Groundwater Contours (Upper Aquifer), February 2020**

Project: Tullamarine Landfill Post Closure Audit 2018-2019

Location: 206-300 Western Avenue, Melbourne Airport, VIC 3045

Client: Cleanaway Solid Waste

Risk Assessment – key findings - Surface Water

Difficult to determine the degree of landfill impact to MPC.

Seasonal factors, variable sampling techniques

- Groundwater contributes to base flows in dry season.
- TDS / EC is key landfill trigger. Affected by seasonal conditions (wet/dry).
- Impacts in Moonee Ponds Creek (MPC) upstream and adjacent to the landfill are localised and dissipate downstream of the site.
- Need alternative / additional means of landfill impact monitoring for MPC, that takes into account other catchment sources and additional contaminants of interest.
- Comprehensive field observations needed for data interpretation.
- Risk to beneficial uses assessed as low, except for water dependent ecosystems – assessed as medium due to limitations in the data set.

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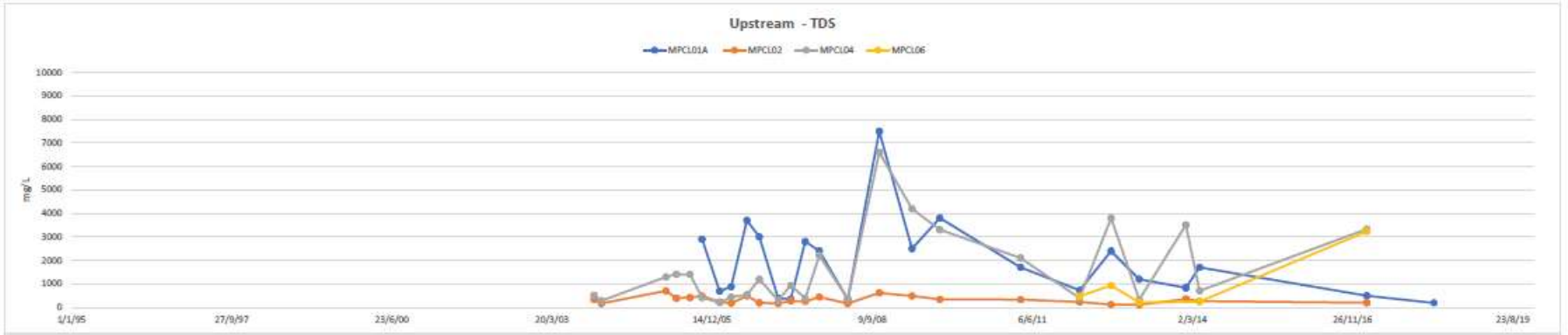
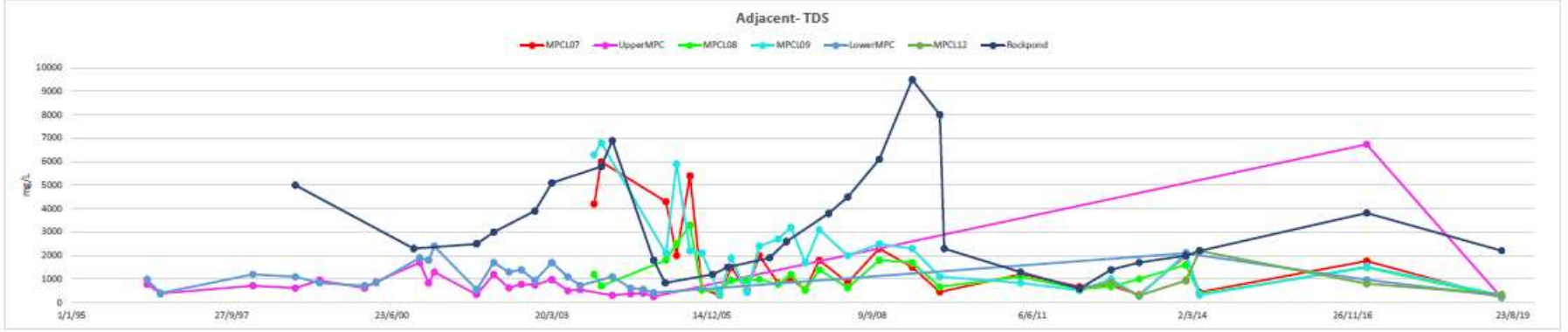
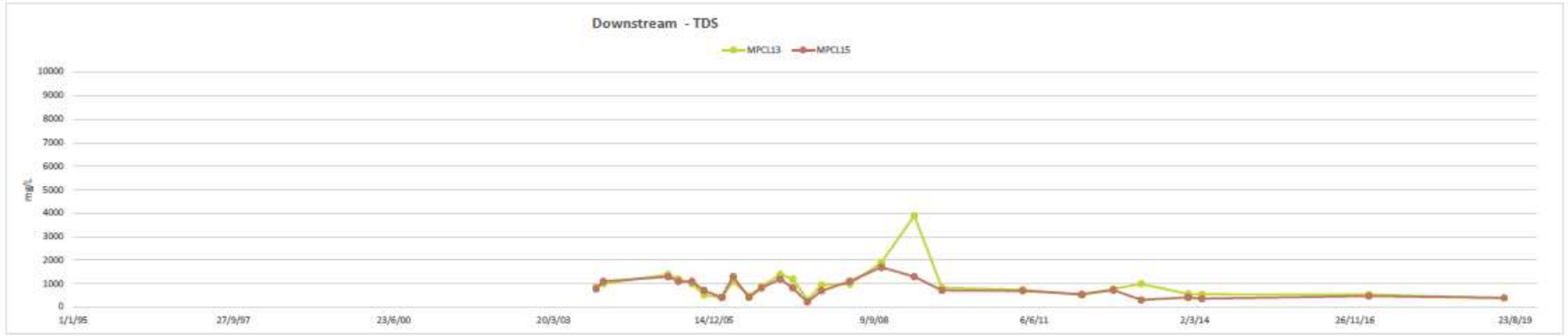
Moonee Ponds Creek Analyte Graphs







Risk Assessment – key findings – LFG

LFG EIP works – additional monitoring bores & extraction system optimisation

- New nested perimeter bores further from waste. Off-site methane in isolated bores at depth on southern boundary.
- LFG (methane) is contained within the site boundary to east and north.
- Sub-surface gas flows much reduced since 2014/ capping.
- Very little methane detected during building and service pit monitoring (max. 0.6 ppm in a sewer pit vs 10,000ppm action level).
- Limited surface emissions issues mostly related to leaks from infrastructure on the cap.
- LNAPL degradation is a source of gas at the site. Composition and behaviour is different to LFG from waste degradation.

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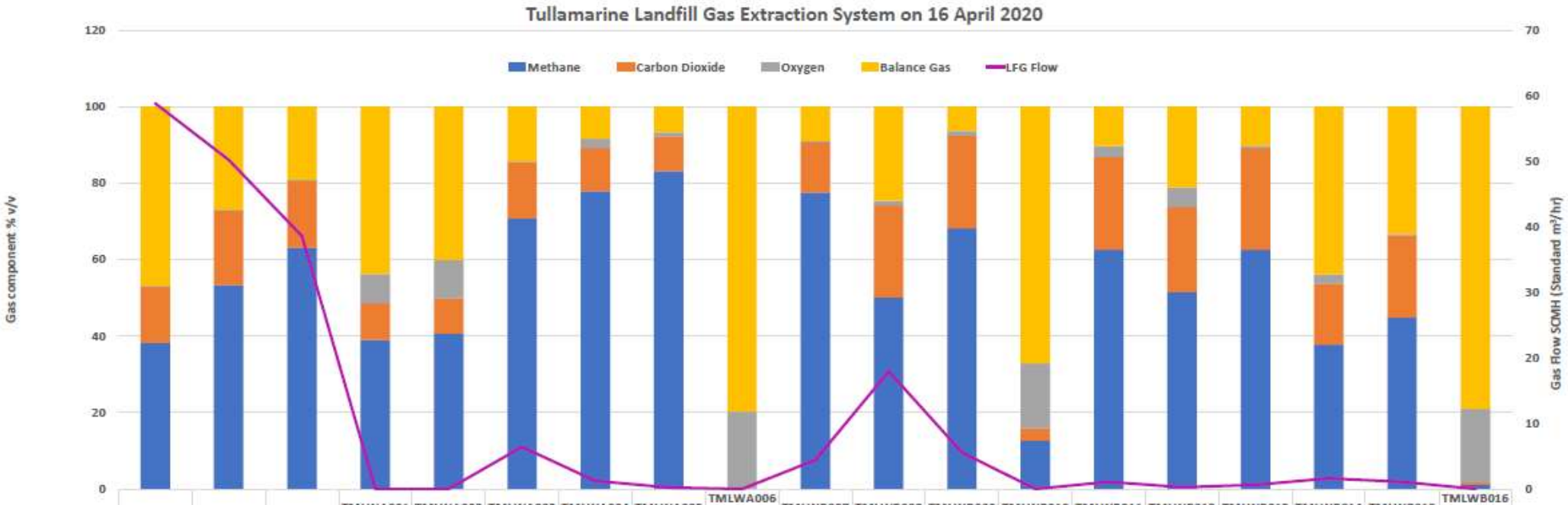
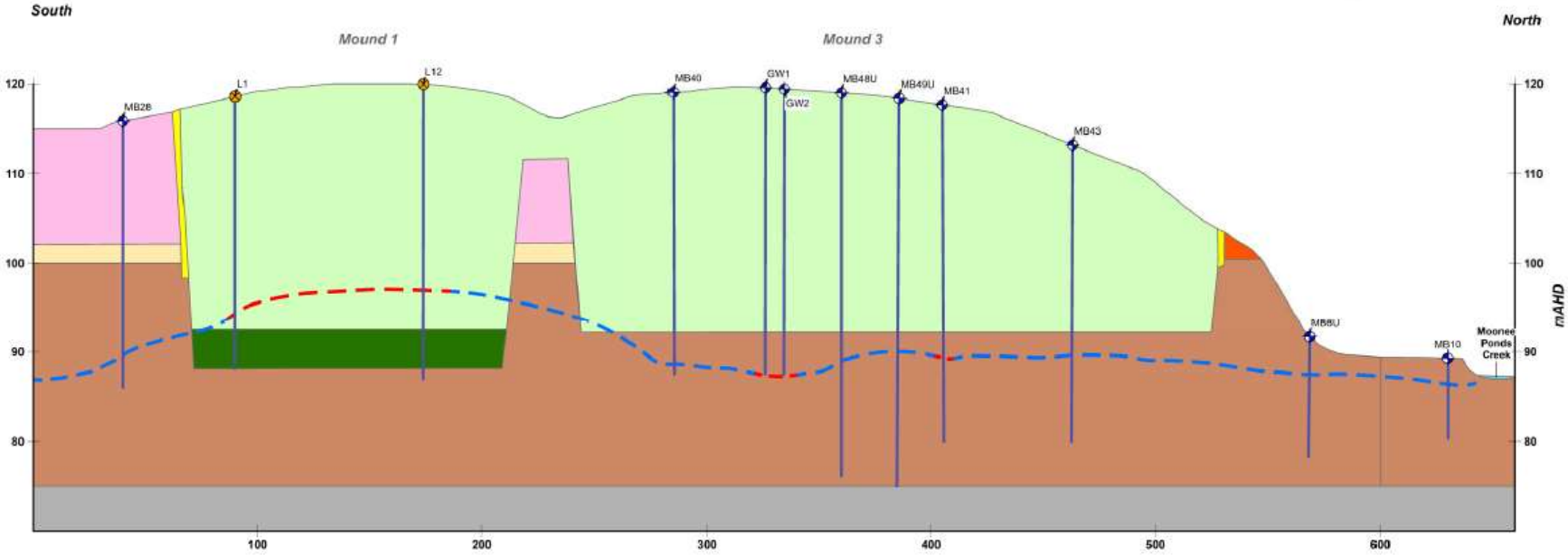


	TMGW0001 Gas Blanket	TMGW0002 Gas Blanket	TMGW0003 Gas Blanket	TMLWA001 Leachate Well L1	TMLWA002 Leachate Well L12	TMLWA003 Leachate Well L14	TMLWA004 Leachate Well L2	TMLWA005 Leachate Well L3	TMLWA006 Leachate Concrete Sump Well 15	TMLWB007 Leachate Well L13	TMLWB008 Leachate Well L6	TMLWB009 Leachate Well L4	TMLWB010 Leachate Well L5	TMLWB011 Leachate Well L11	TMLWB012 Leachate Well L9	TMLWB013 Leachate Well L8	TMLWB014 Leachate Well L10	TMLWB015 Leachate Well L7	TMLWB016 Leachate Concrete Sump Well 13
Balance Gas	46.8	26.9	19.1	43.8	40.1	14.3	8.4	6.7	79.8	9	24.7	6.3	67.2	10.3	21.1	10.2	43.9	33.3	79.1
Oxygen	0.2	0.2	0.4	7.6	10	0.2	2.4	1	20.1	0.3	1.1	1.3	16.9	2.8	5.1	0.6	2.4	0.3	19.2
Carbon Dioxide	14.8	19.6	17.4	9.6	9.3	14.7	11.3	9.1	0	13.1	24.1	24.2	3.3	24.3	22.3	26.6	16	21.5	0.6
Methane	38.2	53.3	63.1	39	40.6	70.8	77.9	83.2	0.1	77.6	50.1	68.2	12.6	62.6	51.5	62.6	37.7	44.9	1.1
LFG Flow	58.84	50.21	38.57	0	0	6.42	1.21	0.22	0	4.44	17.95	5.53	0	1.09	0.25	0.62	1.6	1.08	0

Gas Collection Asset Name



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Legend

- X and Y Axis
- GW Bore
- Leachate Bore
- Well Info
- Axis
- Inferred Groundwater/Leachate Elevation
- Intermittent LNAPL Elevation
- Brighton Group
- Compacted Clay Side Liner
- FILL
- LNAPL - Leachate - Groundwater
- Newer Volcanics
- Older Volcanics
- Silurian Bedrock
- Dry Unsaturated Waste
- Moonee Ponds Creek

Notes:
Groundwater/Leachate/LNAPL elevations taken in Feb 2020 (Resolve Environmental)
Cadastre and road data sourced from land.vic.gov.au (DELWP)
Aerial imagery sourced from Nearmap Pty Ltd

Designed:	N. Verga	Date:	19/11/2020
Drawn:	C. Smith	Revision:	0
Checked:	S. Harvey	Scale:	(A3)
File:	F006		

NOT TO SCALE

Datum GDA 1994, Projection MGA Zone 55

Figure No:	**6**
Title:	**South-North Landfill Cross-Section Through Mound 1 and Mound 3**
Project:	Tullamarine Landfill Post Closure Audit 2018-2019
Location:	206-300 Western Avenue, Melbourne Airport, VIC 3045
Client:	Cleanaway Solid Waste

Risk Assessment – key findings – LFG (continued)

- LFG extraction system, flare and monitoring are the key controls.
- One scenario assessed as "unacceptable risk" – excavation off–site due to uncertainty of control. Cleanaway has advised now on Dial Before You Dig system.
- Recommendation to check for outcropping of Older Volcanics and Brighton Group geological formations south and west of the site, as a way to close out the pathway at a distance.
- The following figure from the 2007 Numerical Groundwater Model prepared by Golder Associates suggests the deeper geological units where migrating landfill gas has been detected (Brighton Group and Older Volcanics) continue south west and outcrop directly above the Maribyrnong River (x-ref to Question 9).

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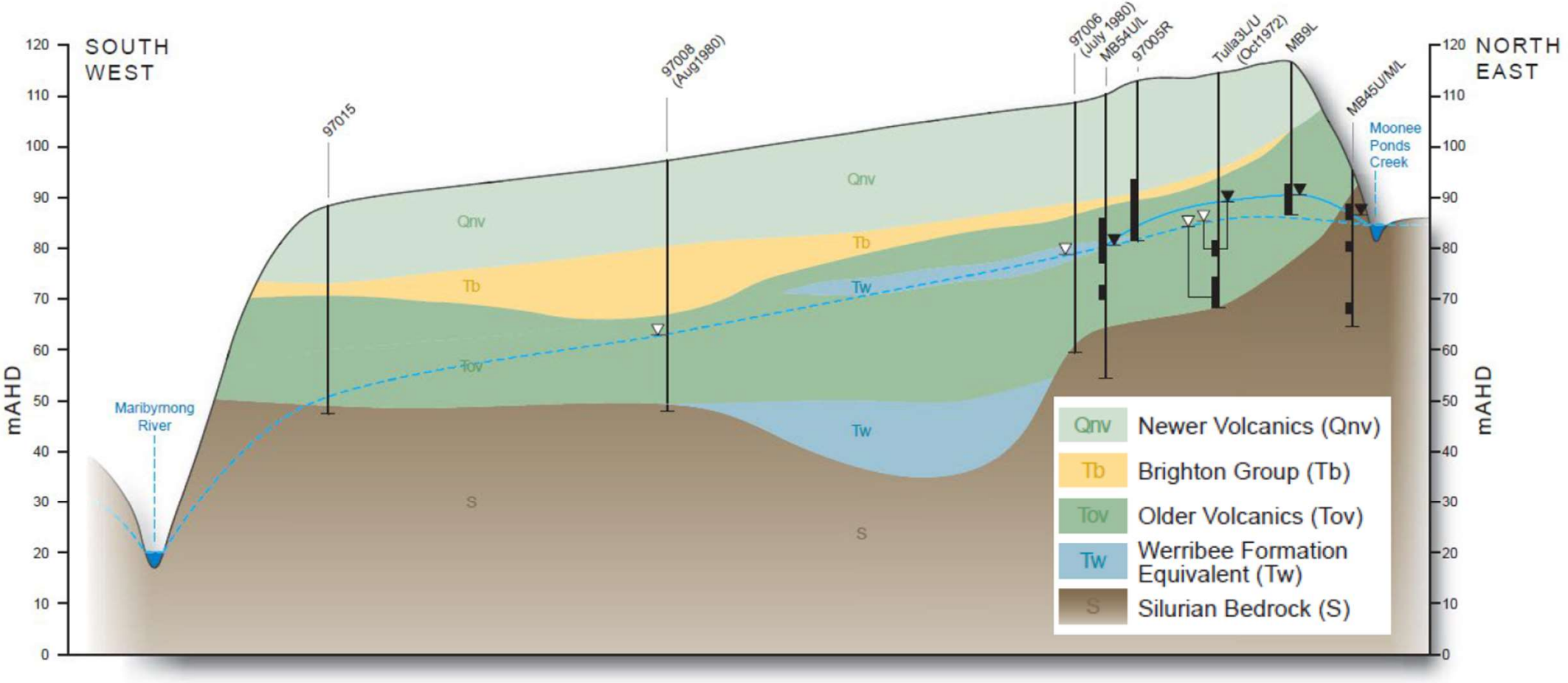

Source: Golder 2007c, Figure 4

Monitoring Program

- Some difficulty in determining what scheduled monitoring program had been performed.
- Sometimes missed locations, parameters or whole rounds (e.g. natural attenuation monitoring)
- Catch-up monitoring was arranged in February and May 2020, but still didn't directly align with particular programs.
- As noted, the auditor considers the current PCMP overly complex and to be missing some critical guidance. A high priority is to work towards a more cohesive program.
- Formalisation of landfill inspections, cap and surface water management and maintenance in the PCMP is needed.

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Recommendations

- Assessed progress of previous audit 59 recommendations. 22 complete, carried some over, closed or changed others to reflect current understanding of risk, priority areas and data gaps.
- Prepared new recommendations, with the aim to be able to relate all the monitoring to a source – pathway – receptor model, to provide additional clarity on the nature and extent of landfill impacts and inform the most effective way to monitor and manage the site going forward.
- Looking to increase quality and consistency of monitoring.

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Appendix 3: Environment auditor Q&As

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TLCCG Questions and Answers

Tullamarine Landfill Aftercare Environment Audit

1 July 2018 to 30 June 2019

EPA CARM's No. 62139-4

4 March 2021 Meeting

Question No. 1

Could the Auditor please elaborate on how she concluded that the set leachate level was unachievable? What is the new level set in the 28/2/21 PCMP? Can you offer any reason why this" impossible to achieve" level was not noticed before?

- The set leachate level of 86.95 m AHD is unachievable because:
  - The base of the waste in Mound 1 and Mound 2 sits at approx. 88 AHD (1.05 m above the set leachate target level).
  - Base of waste in Mound 3 is approx. 92 m AHD (5.05 m above the set leachate target level). Mound 3 received solid waste only, and is reported to be dry i.e. there is no "leachate" in Mound 3.
  - The historical (pre-landfilling) groundwater elevation within Mound 2 is approx. 89 mAHD (2.05 m above the set leachate target level). Continuous extraction of leachate and groundwater would be required within Mound 2, indefinitely, to draw the leachate down to 86.95 mAHD.
  - The historical (pre-landfilling) groundwater elevation within Mound 1 is approx. 87 mAHD.
  - Refer to the following slide.

Information sourced from the 2007 Hydrogeological Conceptual Model and Numerical Groundwater Model prepared by Golder Associates.

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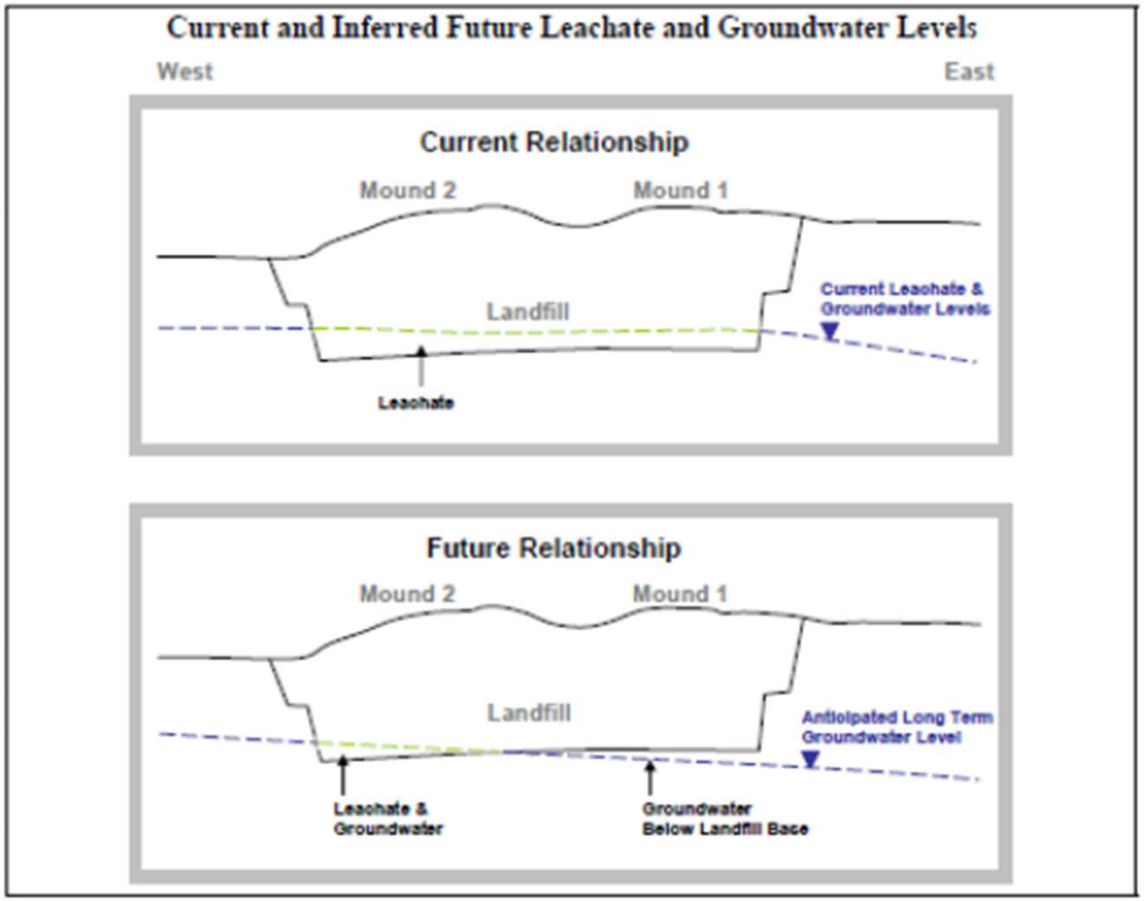
Question No. 1



Source: Golder 2007b, page 52

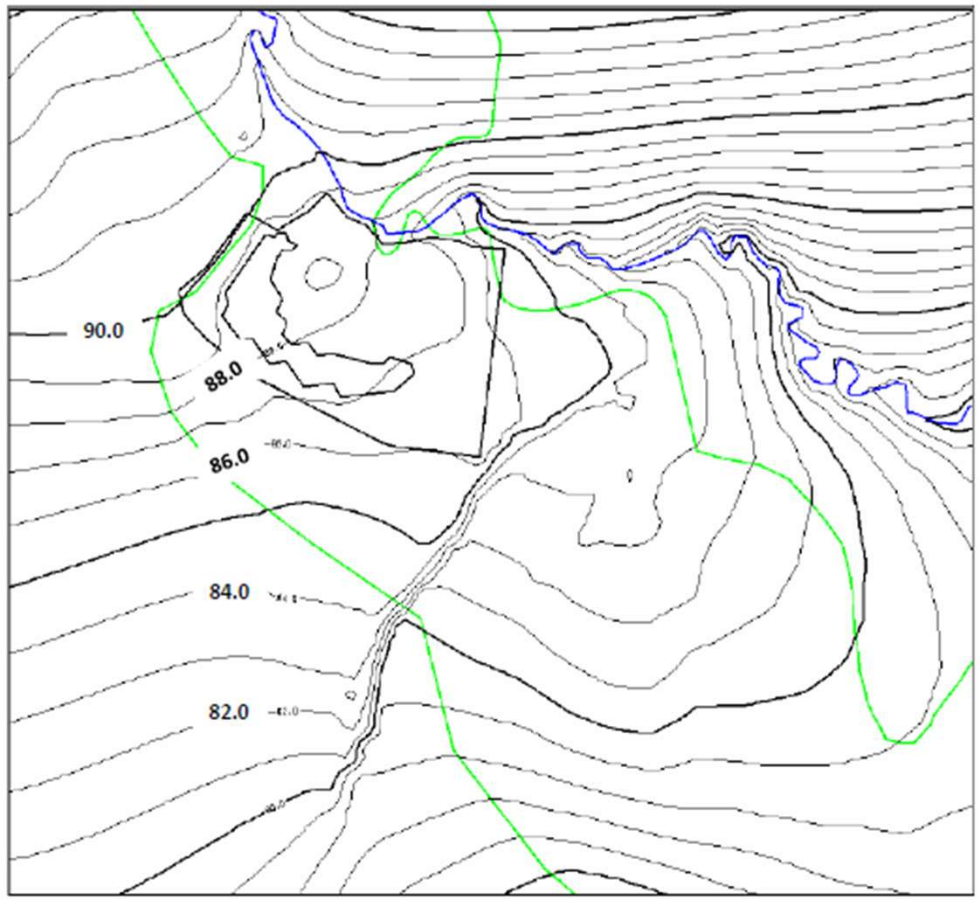


Figure 13: Pre-landfilling Groundwater Levels

Source: Golder 2007c

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Question No. 2

How many of the outstanding recommendations from the previous audit would it have been reasonable to expect to be completed in time for this audit? Of the 11 partially and the 26 not completed at the time of this audit, how many are still outstanding?

- 11 of the actions assessed as not complete were related to the PCMP not being updated, as well as 1 partial action.
- Four of the actions assessed as partially complete were near complete (11, 35, 36a, 45) and it was additional recommendations from this audit to improve the action taken that led to the decision to record them as partial.
- Good progress was made on investigating the landfill gas risks in detail, as these were the risks that were least understood at the completion of the previous GHD audit.
- The in-depth investigation and assessment of landfill gas risks during this audit indicates a low risk to beneficial uses with two outstanding actions to close knowledge gaps in potential pathways.
- To date, 27 recommendations competed and 16 partially completed.

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Question No. 3

Has the Environmental Risk Assessment to inform the PCMP objectives and priorities been completed? Who conducted it? How has its finding influenced the PCMP? Is the document available as a public document?

- The auditor understands Cleanaway has commissioned this process, including:
  - an initial tidy up of the PCMP to incorporate some of the smaller changes, and then
  - a major update incorporating the outcomes of the larger outstanding investigations.
  - The Environmental Risk Assessment would be attached to the next audit report.

senversa

Question No. 4

Does the amended PCMP of 28/2 now comply with BPEM standards of EPA publication 1490.1?

- The amended PCMP will reflect all requirements of landfill aftercare management as detailed within EPA publication 1490.1.

senversa

Question No. 5

Is the Auditor confident that the seven high priority tasks can be completed within the recommended time frame of either the next three months or the next relevant monitoring round? Which tasks fall into the latter category?

- The audit makes recommendations based on the risks and data gaps identified, and does not take into consideration the resources required to complete them.
- The completion of the seven high priority tasks within three months or next monitoring round was challenging but possible.
- Items in next 3 months were:
  - A1 – risk assessment to inform PCMP priorities
  - A2 – update the PCMP – to reflect EPA 1490.1, plus Audit report Table 6-1 items.
  - GW4 – update the HA target leachate levels
  - SW3 – MPC monitoring during low flow conditions
- Items before next monitoring round:
  - GW1 – detailed bore condition assessment
  - GW3 – low flow sampling / master field sheets
  - GW8 – quarterly gauging plus off-site bores

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Question No. 6

When can we expect a report on Monitored Natural Attenuation?

- The auditor does not expect a report to be available within the next 12 months:
  - Further leachate and LNAPL characterisation is required.
  - Groundwater recommendation 8 (quarterly gauging for a year) should be completed, including a search for usable state observation wells further out.
  - Most of groundwater recommendation 6 should be completed i.e. establishing the edge of the groundwater plume to assess whether it is shrinking, stable or otherwise.

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Question No. 7

Is the auditor confident that Cleanaway's current skill set can ensure GW 3 recommendation is implemented?

- Groundwater recommendation 3 is mandating a consistent sampling methodology i.e. all groundwater bores should be monitored using low flow sampling techniques, and from the same depth relative to bore screen level each time. This is normal industry practice and in line with EPA guidelines.

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Question No. 8

How long does the Auditor think it will take to complete a systematic assessment of the groundwater monitoring well network?

- The auditor expects an assessment of the groundwater monitoring network could take at least a month.
- Implementing corrective actions would follow from that.

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Question No. 9

Has the review of the geology and potential for outcropping of LFG to the south and west of the landfill been conducted? What implications does it have? If it's not completed when can we expect to get the results?

- The auditor understands this has not been completed yet.
- Landfill gas recommendation 3 was assigned a medium priority (complete within the next six months).
- The risk off-site is expected to be low, however this recommendation provides additional assurance and gap closure.

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Question No. 10

Given numerical modelling assist in understanding trends how long will it take to update the Numerical Modelling?

- Numerical model:
  - Set up and input data to be defined/selected as close to original model as possible. Note the model used before is specialised and not in common usage.
  - Run scenarios through the model.
  - Calibrate the model.
- Two scenarios:
  - 1st: Update now using groundwater levels and TDS concentrations from existing groundwater bores (~ 2 months).
  - 2nd: Update after a year of quarterly gauging including off-site bores, has been completed (GW 8).
- The second scenario may produce more credible predictions as calibration of the model using groundwater levels and TDS concentrations from off site bores will reduce model uncertainty.

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Question No. 11

With particular reference to Steele Creek and the Maribyrnong River and given that we still don't know the extent of the plume: what state ground water monitoring borders are available, at a suitable depth , from which a groundwater samples could be collected for analysis, so we can

a. compare their characteristics to the dump's leachate?

b. continue to use them as a sentinel bores to ensure that neither Maribyrnong river and Steele creek are not being polluted by this dump?

- Groundwater recommendation 8 requires a search of state observation bores be conducted. If they do not exist or are not suitable, and usable off-site bores in the landfill monitoring network do not provide enough coverage, then new wells will need to be installed. The search was assigned a High (1) priority i.e. within the next three months.
- The overall objective is to identify the extent of the groundwater plume attributable to the landfill, as noted in the question.

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Question No. 12

Given that all waterways in Victorian Volcanic Plains are groundwater dependent, and our deep pools are critically needed habitat refuge pools especially in dry times, the Auditor was not able to assess the risk to water dependent eco systems because of missing data; when will be given an accurate assessment of the risk?

- Prior to assessing the risk to water dependent ecosystems:
  - The Chemicals of Interest (Cols) to be analysed in groundwater and the Moonee Ponds Creek need to be reviewed.
  - The Moonee Ponds Creek should be sampled during low flow conditions, possibly in March 2021.
- Some assessment of the risk may be possible within the next audit, but may not be conclusive.
- It should be noted that the risk profile of the landfill has not suddenly changed, just the specific nature of the data gap has changed.

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Question No. 13

Reference - Para 2.4 - page 8 – (p 24 of 176) G1: A database of all historical and current monitoring data for the Tullamarine landfill should be developed and maintained by Cleanaway, to ensure that data is preserved in a usable format and enable future auditors and assessors to have confidence in the assessments being made.

Given that this Toxic Waste Dump has been passed through several owners/operators since it opened what guarantee does anyone have the records dating from 1972 are accurate or even complete? (1)

- There has been considerable focus on improving record keeping for the site.
- Historic records would be extracted from laboratory certificates in previous reports where available.
- Data trends are assessed over a period of time. It's quite likely that some monitoring data will be missing, however with data spanning a 10-20 year period a suitable picture can be established for assessment purposes.
- Laboratories can issue data in a requested format for import into customised database systems such as ESDAT. This is the preference for recent and ongoing water quality monitoring data (groundwater, leachate, LNAPL, surface water).

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Question No. 14

Reference - Para 2.5 – Potential Conflict of Interest – page 8 – (p 24 of 176) Further details of audit team member past involvement and Senversa involvement at neighbouring sites is provided in the letter to Cleanaway attached in Appendix F. The letter was also provided to EPA Audit Unit by email on 28 February 2020, with no response received.

It is to be expected there will be movement of people within waste and waste related industries. Being familiar with the concept of "fire walls" the electronic lock out is noted but how does Senversa ensure physical separation such that there is not an exchange of information on an informal basis? (2)

- The risk of conflict for MAB and APAM related to confidentiality of those entities information, as they are not subject to a public audit process. Meetings and other discussions of a confidential nature are held in meeting rooms. COVID -19 restrictions also helped.

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Question No. 15

Reference - 3.7.4 - Site Hydrogeology- page 22 – (p 38 of 176) Since the completion of initial capping works in 1990s, groundwater levels have been decreasing due to a reduction in rainfall infiltration and therefore recharge (Golder 2007). The groundwater mounding has produced localised reversals in flow, mainly to the north east and south east, as shown in Figure 7. This is superimposed on a regional, northerly groundwater flow direction, towards MPC. There is also a lesser, southerly flow component towards Maribyrnong River (Golder 2007).

- Comment 1: The index in the main report has no reference to figure 7, only figure 16. However, upon examination the index referencing figures 16-1 to 16-8 are in fact figures 1 to 8 contained at the end of the report and in the front of the Appendices document.

Incorrect

Figures

Figure 16-1: Site Location and Audit Boundary

Figure 16-2: On and Off-Site Groundwater, Leachate, Landfill Gas and Surface Water Monitoring Locations (Site Close Up)

Figure 16-3: On and Off-Site Groundwater, Leachate, Landfill Gas and Surface Water Monitoring Locations (Site and Surrounding Properties)

Figure 16-4: Registered Groundwater Bores within a 3km Radius

Figure 16-5: Extent of Onsite LNAPL, June 2020

Figure 16-6: South-North Landfill Cross-Section Through Mound 1 and Mound 3

Figure 16-7: Indicative Groundwater Contours (Upper Aquifer), February 2020

Figure 16-8: Indicative Groundwater Contours (Lower Aquifer), February 2020

Correct

Figures¶

Figure·1:·Site·Location·and·Audit·Boundary¶

Figure·2:·On·and·Off-Site·Groundwater,·Leachate,·Landfill·Gas·and·Surface·Water·Monitoring·Locations·(Site·Close·Up)¶

Figure·3:·On·and·Off-Site·Groundwater,·Leachate,·Landfill·Gas·and·Surface·Water·Monitoring·Locations·(Site·and·Surrounding·Properties)¶

Figure·4:·Registered·Groundwater·Bores·within·a·3km·Radius¶

Figure·5:·Extent·of·Onsite·LNAPL,·June·2020¶

Figure·6:·South-North·Landfill·Cross-Section·Through·Mound·1·and·Mound·3¶

Figure·7:·Indicative·Groundwater·Contours·(Upper·Aquifer),·February·2020¶

Figure·8:·Indicative·Groundwater·Contours·(Lower·Aquifer),·February·2020¶

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Question No. 16

Reference - 4.3.3 - Consultation with Hume City Council – page 28 – (p 44 of 176) No contact was made with Council. Cleanaway's Stakeholder and Community Engagement Manager advised on 23 July 2020 that Cleanaway no longer had a contact at Hume Council. It was noted that Council had not sent a representative to the previous October 2018 and October 2019 community meetings.

- ***It would have been a simple matter for the Auditor to contact Hume City Council using the freely available email address: contactus@hume.vic.gov.au. A phone call to 03 9205 2200 would have directed the Auditor to the relevant area. Why is it the auditor did not make the attempt to contact or consult with Hume? (3)***

- The auditor consulted with the EPA and Southern Rural Water in relation to some of the risks identified in the audit.
- No issues were identified during the audit that required further information from Council.
- The auditor did not pursue consultation with the City of Hume as she was of the opinion that Council's input would not have changed the audit outcomes.

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Question No. 17

Reference - Maintenance of a monitoring database – page 41 (p 57 of 176) A monitoring database is currently not being maintained by Cleanaway. Previous databases maintained by Golder Associates, Hydroterra and Kleinfeder no longer exist.

- ***In the case of a toxic waste dump the records need to be kept for as long as the site is being actively managed and beyond. Some would argue the records need to be kept in perpetuity given the longevity of the toxic chemicals dumped. Is there no requirement within EPA that records are to be retained for a number of years after the event? What systems exist for private companies to archive data such that it is not lost through buyouts, mergers, sale of business or anything else that could lead to loss of corporate memory? Note that the same applies to public bodies. (4)***

- The Post Closure Pollution Abatement Notice requires records to be maintained for seven years.
- It is in Cleanaway's interest to retain records longer than seven years, while a Financial Assurance is still held for the site by EPA.

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Question No. 18

Reference - Table 5-2 - Beneficial Uses Considered for the Audit – page 31 – (P 47 of 176)

- ***This table appears to refer to the offsite bores within a 3 km radius – see Figure 4. Has any attempt been made to test the groundwater from any of these bores in the path of the plume? If not, why not? At the very least it may assist in determining the extent of the plume. (5)***

- Groundwater recommendation 8 requires a search of state observation bores be conducted. If they are not suitable and additional off-site data is needed, then new wells will need to be installed. The search was assigned a High (1) priority i.e. within the next three months.
- Existing bores identified in Figure 4 which are privately owned cannot be monitored by Cleanaway.

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Question No. 19

Reference - 7.1.2 - Leachate Characterisation – page 47 (p 63 of 176) It is noted that monitored natural attenuation (MNA) is normally used as a management strategy for stable or shrinking dissolved plumes, while natural source zone depletion (NSZD) is more appropriately used for LNAPL.

- ***LNAPL is a general term applying to non-water soluble less dense than water liquids floating on water. It appears that the NSZD concept arises from a relative non fatal perspective. However, where the LNAPL contains known carcinogens natural depletion is unacceptable especially to a nearby community and where the LNAPL can find its way into the groundwater flow. Given that community requests for the LNAPL to be removed and treated when it was freely mobile were not agreed what processes and procedures are in place for the next 100 – 200+ (refer Anthony Lane Preliminary Risk Assessment 2004) years to ensure the LNAPL will not pose a risk the nearby communities while it, hopefully, depletes naturally? How can the community be assured that somewhere in the next 100 - 200 + years the corporate (and public) memory will not be lost and the Dump becomes a disaster in waiting? (6)***

- The LNAPL footprint under and around the landfill has not changed.
- The LNAPL continues to be detected in the ***same*** groundwater bores under Mound 3 and to the east of Mound 3 and Mound 1.
- The LNAPL has not moved off site since it was deposited at the site (pre 1990), even when leachate hydraulic gradients within the landfill were much higher i.e. when greater leachate mounding in the landfill could have mobilised it.
- The LNAPL present on leachate in Mounds 1 and 2 and on groundwater under Mound 3 has been sitting below the extent of the clay side liner for some time and off site movement has not been detected.
- Natural source zone depletion of the LNAPL is occurring approximately 20 m below ground level, hence the risk of exposure to the LNAPL or its degradation by-products is low.
- The site will remain on EPA's priority sites register.
- The Financial Assurance for the site will be in place until the site no longer poses a risk to the environment.
- Refer to the following slides.

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Legend

- Site Boundary
- DTM Boundary
- Major Contours
- Minor Contours
- LNAPL Present
- Groundwater Monitoring Well
- Leachate Extraction Well

Notes:
Cadastre and road data sourced from land.vic.gov.au (DELWP)
Aerial imagery sourced from Nearmap Pty Ltd
Contours: Tullamarine Site Survey 02-12-19

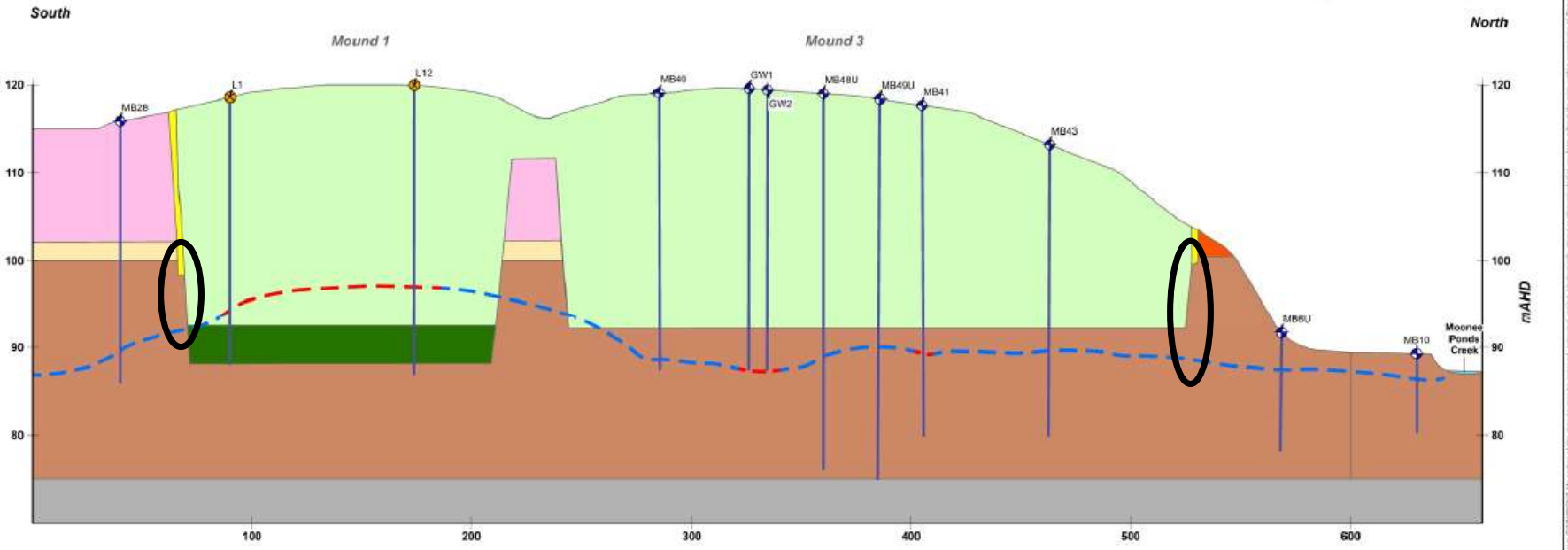
Designed:	V. Rigoli	Date:	20/11/2020
Drawn:	C. Smith	Revision:	0
Checked:	N. Verga	Scale:	1:3,100 (A3)
File:	M17865_Post Closure Audit		

0 25 50 100 150 200 Metres
Datum/Projection:GDA 1994 MGA Zone 55

Figure No: 5

Title: Extent of Onsite LNAPL

Project: Tullamarine Landfill Post Closure Audit 2018-2019
Location: 206-300 Western Avenue, Melbourne Airport, VIC 3045
Client: Cleanaway Solid Waste



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Legend

- X and Y Axis
- GW Bore
- Leachate Bore
- Well Info
- Axis
- Inferred Groundwater/Leachate Elevation
- Intermittent LNAPL Elevation
- Brighton Group
- Compacted Clay Side Liner
- FILL
- LNAPL - Leachate - Groundwater
- Newer Volcanics
- Older Volcanics
- Silurian Bedrock
- Dry Unsaturated Waste
- Moonee Ponds Creek

Notes:
Groundwater/Leachate/LNAPL elevations taken in Feb 2020 (Resolve Environmental)
Cadastre and road data sourced from land.vic.gov.au (DELWP)
Aerial imagery sourced from Nearmap Pty Ltd

Designed:	N. Verga	Date:	19/11/2020
Drawn:	C. Smith	Revision:	0
Checked:	S. Harvey	Scale:	(A3)
File:	F006		

NOT TO SCALE

Datum GDA 1994, Projection MGA Zone 55

Figure No: 6

Title: South-North Landfill Cross-Section Through Mound 1 and Mound 3

Project: Tullamarine Landfill Post Closure Audit 2018-2019

Location: 206-300 Western Avenue, Melbourne Airport, VIC 3045

Client: Cleanaway Solid Waste

Question No. 20

Reference - LL1: The 2018 PCMP does not include any specific leachate quality monitoring, and no LNAPL monitoring for Mounds 1 and 2. The Auditor identifies this as a significant gap, and therefore has recommended a program to assist with determining the efficacy of monitored natural attenuation (refer to Section 8.4.4), and to provide up to date information on impacts from LNAPL contaminants of interest

- **Comment 2: The Auditor confirms what the community has been expressing for several years, namely that the monitoring of the leachate is inadequate.**

- The comment is acknowledged.

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Question No. 21

Reference - 7.4 Gauging Results. Throughout the report the auditor refers to "gauging" of the wells. Gauging means a number of things to different people in different industries.

- ***Can you provide a definition and explanation of what is meant by "gauging" in the sense used in the report? (7)***

- Gauging in the context of the audit report means measuring a liquid level in a well or bore, either being leachate, groundwater or LNAPL.
- The depth to the liquid is measured, usually as metres below top of casing. If the top of casing elevation is surveyed, the liquid level or depth to liquid can be converted to a reduced level in metres, referenced to the Australian Height Datum (m AHD).

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Question No. 22

Reference - 8.2 - Site Observations – Page 70 – (p 86 of 167) The order for sampling wells for the last few rounds has been based on geographic location (generally starting upgradient and working across), rather than aiming to sample known 'clean' wells first.

- ***The auditor appears to be promoting a "clean wells" approach over a geographical approach. Is there a reason for the auditor's preference and may we have that reason? Should the reason form part of the report? (8)***

- The inference to sample clean wells first is a precautionary measure.
- Sampling cleaner wells first reduces the risk of cross-contamination between wells during sampling, and is usually done as an additional control measure. Decontamination of sampling equipment between wells and/or using disposable equipment for each well is the primary means to prevent cross-contamination.

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Question No. 23

Reference 8.3 - Monitoring Network – page 70 – (p 86 of 176)

- ***23a. The auditor noted difficulty in locating some of the wells. Did the auditor locate Well MB89U/L in Wright Street? The last time I looked I could not locate the concrete marker/cap. It seems to have been covered by soil. (9)***

- ***23b. The auditor notes there are number of wells where the monitoring event was not scheduled within the current audit period. Would it be reasonable to include when the last monitoring event occurred, when the monitoring should have occurred and/or the next monitoring event due? (10)***

- 23a – the auditor was unable to locate bore MB89U/L, however, Cleanaway has advised it was found during the bore condition survey conducted recently.

- 23b – the audit report documents monitoring rounds that were missed. It was not within the audit scope to record the last monitoring event and next due date for every monitoring well.
- The audit report has addressed this by requiring the review of Chemicals of Interest in all monitoring bores and their consistent monitoring over twelve months (groundwater recommendation 5) so that ongoing monitoring trends and risks can be better understood.

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Question No. 24

8.4.1 - Groundwater Elevations – page 75 (p 91 of 176) Groundwater level contours have been prepared by the Auditor and are attached as Figures 7 and 8. They have been prepared using elevations measured by Resolve in February 2020.

- **Comment 3. Refer Comment 1.**

- Figure 16-7 is Figure 7 and Figure 16-8 is Figure 8 in the audit report.

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Question No. 25

Can you confirm the Landfill Gas Perimeter Monitoring Bores are connected to the gas collection system? (11)

- Extraction does not occur from the perimeter landfill gas monitoring bores.
- Landfill gas extraction should generally occur from within landfill waste, not outside it.
- Landfill gas extraction from outside of the source could promote outward movement of gas i.e. subsurface gas migration outside the landfill perimeter.
- Refer to the following slide.

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Legend

- Groundwater Monitoring Well
- Landfill Gas Bore
- Leachate Well
- Surface Water Sample - Moonee Ponds Creek
- Surface Water Sample - Rockpond
- Watercourse - Tributary
- Watercourse - Main
- Property Boundary

Notes:
Cadastre and road data sourced from land.vic.gov.au (DELWP)
Aerial imagery sourced from Nearmap Pty Ltd

Designed:	N. Verga	Date:	23/11/2020
Drawn:	C. Smith	Revision:	0
Checked:	S. Harvey	Scale:	1:3,000 (A3)
File:	F002		

0 75 150 225 Metres

Datum GDA 1994, Projection MGA Zone 56

Figure No: 2

Title: Groundwater, Leachate, Landfill Gas and Surface Water Monitoring Locations (a)

Project: Tullamarine Landfill Post Closure Audit 2018-2019

Location: 206-300 Western Avenue, Melbourne Airport, VIC 3045

Client: Cleanaway Solid Waste

Question No. 26

The base of all three mounds sits above the final target leachate level of 86.95 m AHD. How is it that previous audits did not detect that the final target leachate level was set below the base of the site? (12)

- The target leachate level was set within the Hydrogeological Assessment (HA) prepared by Kleinfelder in 2015.
- There has only been one audit since then, completed by GHD in 2019.
- The GHD audit report noted the HA set the leachate level to protect groundwater and the Moonee Ponds Creek. It does not comment on the impracticalities achieving it. A recommendation was made to update the HA.
- We cannot comment on what other auditors may or may not have considered in their assessment, or why.

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Question No. 27

Reference - 10.5.1 - Gas Sources – page 112 (p 128 of 176) The degradation of hydrocarbons from an LNAPL source will usually generate gas volumes consistently, year after year, for decades.

- ***Are you able to advise the estimated number of years the degrading LNAPL will continue to produce methane and other gases please? This community needs to be aware of the risks to the environment and human health. (13)***

- LNAPL degradation will continue to occur and could exceed 100 years.
- The LNAPL at the site is a mixture of oils and fuels disposed from multiple sources and not all of its components can be identified.
- Without understanding all the components that make up the LNAPL, it is difficult to predict its ongoing degradation rate.
- Characterisation of all components of the LNAPL will be difficult.

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Question No. 28

Reference - 10.5.2 - Gas Exposure Pathways - page 113 – (p 129 of 176) Installation of the best practice cap over Mound 3 in 2006 and Mounds 1 and 2 in 2011 is also likely to have accelerated lateral migration through potential cracks in the clay side liner.

- Comment 4. Referring to the cap as a best practice cap is disputed by the community.

- According to the March 2011 Report, INDEPENDENT EXPERT GROUP REVIEW OF THE TULLAMARINE LANDFILL MANAGEMENT AND CAP DESIGN by Edward Kavazanjian Jr, PHD. PE, Consulting Engineer and Richard Theil, PE, President, Theil Engineering:

- Refer to the following slide.

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Question No. 28 (cont.)

Review of the proposed final cover designs for the Tullamarine Landfill indicates that the caps as constructed for Mound 3 and as designed for Mounds 1 and 2 meet international best practice standards for hazardous waste final cover (cap) design, construction, and management with four exceptions: absence of a biotic barrier, absence of a free-draining drainage layer, absence of a blanket gas collection layer beneath the entire area covered by the caps, and lack of a comprehensive post-closure Operations, Maintenance, and Monitoring Plan for the site. Absence of a biotic barrier in the Tullamarine cap mandates that appropriate institutional controls be put in place to mitigate the potential for inadvertent intrusion through the cap. These controls should include restricting access to the site and restricting and controlling activities on top of the cap. These controls should be memorialized in a Post-Closure Operations, Maintenance, and Monitoring plan and in deed restrictions.

The community notes the cap is less than that required for a putrescible landfill and given the toxic nature of the chemicals in this landfill and the extremely lengthy time (100 – 200+ years) for the chemicals and other nasties to breakdown into relatively harmless products the faith of the community in cap longevity and performance remains very low. The community would like to see cap integrity and performance included under a separate heading in future audits.

- Cap integrity and performance is addressed in the PC PAN, see condition LC11 which requires the incorporation of landfill cap maintenance in the PCMP.
- Aftercare management recommendation A2 requires ongoing inspection and maintenance of the landfill cap be included in an updated PCMP.
- The international best practice design that the Thiel study compared the Tullamarine cap to was for low-level radioactive waste or hazardous waste.
- The Thiel study report was dated March 2011. The Construction Audit report for Mounds 1 and 2 cap was issued in February 2013, and concluded the cap complied with BPEM 788.1. Construction Audit report for Mound 3 cap was issued in May 2010 and concluded the works met the EPA approved design and works approval.

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Question No. 29

Reference - Table - 10-1: Landfill Gas Perimeter Bore Groups (original wells) - page 105 - (p 121 of 176)

- ***It is presumed the heading FILL in the table refers to soil placed between the finished cap and the surrounding undisturbed ground. Is this correct? (14)***

Fill comprises imported material placed over natural soil or rock.
It is not specifically related to the cap.
Some shallow perimeter landfill gas monitoring bores are located in the fill that is present outside the landfill cap extent.

Refer to the following slide.

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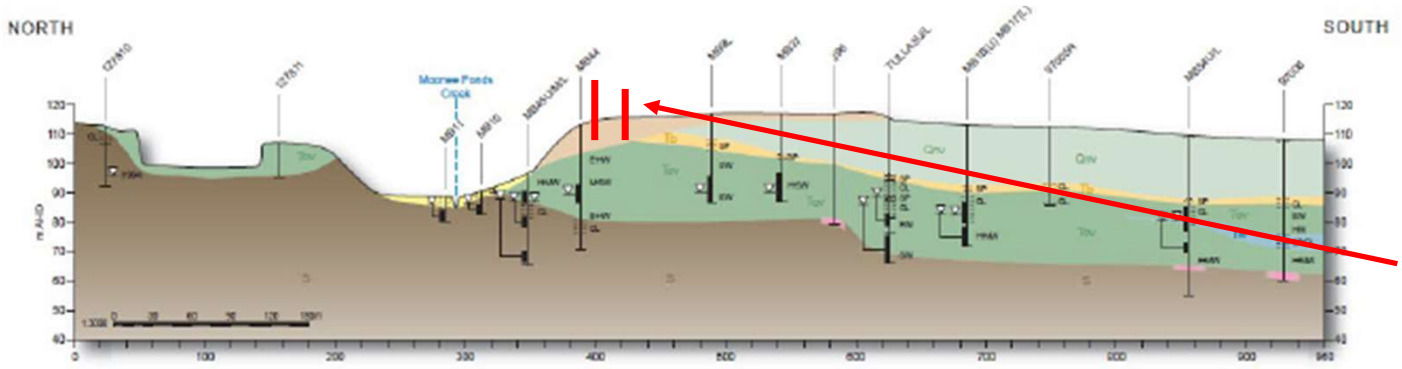
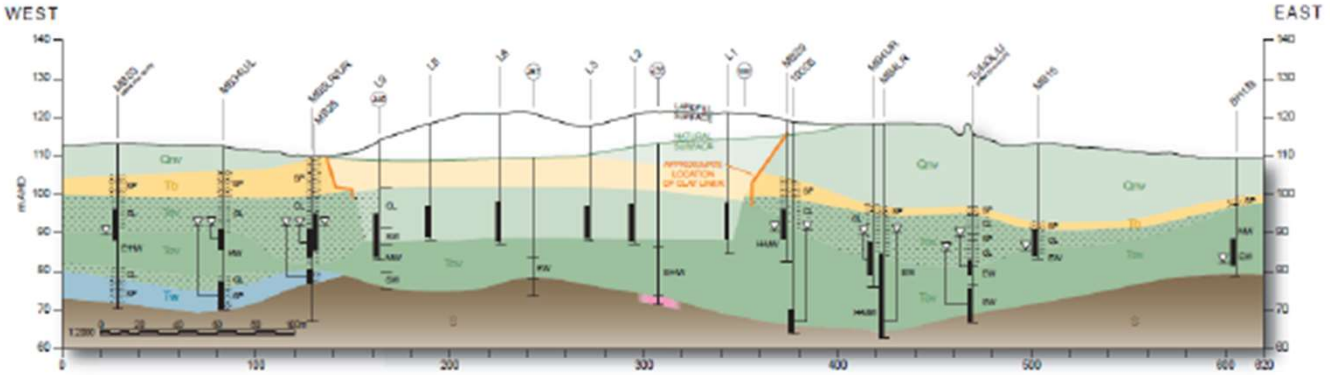
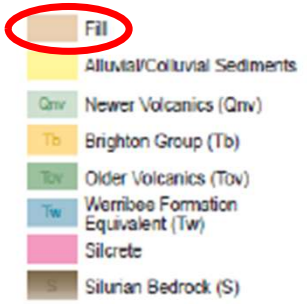


Landfill gas monitoring bores in "Fill".

Source: Golder 2007c, Figure 14



Source: Golder 2007c, Figure 13



Question No. 30

Reference - Table 10-2: Landfill Gas Perimeter Bore Groups – New Gas Bores 2020 - page 111 – (p 127 of 176)

- ***It is noted the Table 10.1 uses the prefix TU before each bore identifier whereas Table 2 except for one occasion does not yet the TU prefix is used in the following text. It this because "sometimes the sampling programs are aligned with other programs, resulting in different naming conventions" as explained by P. Fennelly of Cleanaway at the TLCCG meeting of 15 October 2020? (15)***

- Cleanaway uses the "TU" prefix in front of the bore names so they are not confused with other bores at other Cleanaway sites.
- When discussing the landfill gas results, the audit team tended to leave the "TU" prefix out as the discussions relate to the one Cleanaway site i.e. Tullamarine. On occasion, the audit report used SG, rather than TUSG.

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Question No. 31

Reference - 10.5.3 - Gas Receptors – page 113 – (p 129 of 176) Off-site receptors to the south and south-west of the landfill, including the childcare centre and other buildings on Airport land, beyond the freeway.

a. The auditor references off site gas receptors which include a childcare centre and Airport buildings. Why are the residents in Wright Street not considered as receptors? What about people working and living on the buffer land should there be building on the buffer, surely they would be off site gas receptors especially as the prevailing winds are from the west and the north? (16)

b. Why has no consideration been given to off-site flora and fauna? (17)

- Section 10.5.2 of the audit report describes gas exposure pathways, all of which are below the ground i.e. subsurface migration of landfill gas.
- Landfill gas will not travel above the ground through ambient air as once it reaches the ground surface, it disperses immediately.
- The heavier components of landfill gas like carbon dioxide can accumulate in underground service pits or structures, just below the ground surface (note this is not occurring in pits /site buildings).
- The landfill migration risk (below the ground) towards the east of the landfill was assessed as low because landfill gas migration was not detected in the outer eastern bores (along Victoria Street boundary).
- Landfill gas subsurface migration is greatest to the south west, at depth, within the Brighton Group and Older Volcanics geological formations, between 10 m and 15 m below ground level.
- Depth to gas off-site is deeper than plant root zones or burrowing depths.

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Question No. 32

Reference - Table 10-5 - Severity Likelihood Matrix (Source - LFTGN 03) – page 115 – (p 131 of 176)

- ***Whilst the use of the UK document LFTGN 03 as a Risk Evaluation authority is acknowledged, classifying the consequence of a Catastrophic event however unlikely as Insignificant (refer Table 10.5) is unacceptable to this community. In other industries any event which has a Severity assessment of Catastrophic and that risk cannot be eliminated must be addressed in the Risk Management Plan. Will Cleanaway ensure that, as a minimum, any Risk of Severity Rating of Significant and above regardless of Likelihood in addressed in their Risk Management Plan? (18)***

- Risk = Consequence x Likelihood
- The risk of a "consequence" cannot and should not be assessed without consideration of its "likelihood".
- For example, it may be considered unjustified for any site owner to plan for a "catastrophic" event in any detail, if its likelihood of occurring is "extremely unlikely". Risk mitigation measures should be commensurate with the level of risk posed.
- Risk management at the site includes regular monitoring of landfill gas and maintenance of the gas extraction system.

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Question No. 33

Reference - Table 10-7 - Risk Evaluation – page 117 - (p 133 of 175)

- ***Both on-site workers and on-site vegetation (flora) are considered as Receptors. Why has on-site fauna been ignored? Native animals are known to frequent the covered portion of the site. Consideration should be given to people living in Wright Street and potentially living and working to the east of the site on the buffer land. (19)***

- The landfill gas risk to onsite fauna is not considered due to the following:
  - Landfill gas risk to workers onsite generally exists when people work within buildings and landfill gas can potentially accumulate within the buildings. Risk to outdoor workers may be present if they attempted to enter subsurface services or conduct works that could ignite flammable landfill gas, like drilling of a leachate well or gas extraction well.
  - Landfill gas risk to onsite fauna is considered negligible as animals generally remain outdoors, and any landfill gas emissions through the cap will dissipate immediately.
  - Landfill gas risk to flora is considered with respect to potential root zone impacts.
- Landfill gas risk to residents living in Wright Street – refer to Question 31 response.

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Question No. 34

Reference - LFG7 (P) – page 121 - (p 137 of 176) The following recommendations are made for the conduct and reporting of LFG monitoring. This is to be detailed in the PCMP: Target all LFG monitoring to coincide with periods of decreasing pressure. As a minimum, avoid monitoring during days of increasing pressure.

- ***This recommendation is not understood. Why decreasing pressure and which pressure is being referenced, atmospheric or landfill gas? (20)***

- Atmospheric pressure is referred to in this section of the audit report.
- Subsurface landfill gas in the ground will most likely rise up out of the ground when atmospheric pressure is low or decreasing. This is a common trend noted in landfill gas monitoring at and around most landfill sites.

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Appendix 4: EPA Q&As

Q1. In the case of a toxic waste dump the records need to be kept for as long as the site is being actively managed and beyond. Some would argue the records need to be kept for a period of time after the site has proven benign for a number of years. If there no requirement within EPA that requires all records to be kept until such time as the site in benign for a number of years after the event will EPA institute such a requirement immediately?

> **Context:** Maintenance of a monitoring database – page 41 (p 57 of 176)
>
> A monitoring database is currently not being maintained by Cleanaway. Previous databases maintained by Golder Associates, Hydroterra and Kleinfeder no longer exist.
>
> **EPA response:** All documents are required to be stored for 7 years as outlined in the PCPAN. However, EPA acknowledges, as does the Auditor, that it would be prudent for Cleanaway to implement and maintain a document and data management system that mitigates against the potential loss of data.

Q2. The Auditor details a number of areas in which the PCMP does not meet EPA BPEM requirements. How is it that EPA approved the PCMP when it did not meet EPA's own best practice documents?

> **Context:** 6.2 - Environmental Monitoring Plan (EMP) Assessment – page 41 – (p 57 of 176)
>
> 6.2.1 - Areas for Improvement The PCMP does not incorporate all elements of aftercare from the BPEM or respond to the detailed guidance in Appendix 3 of EPA Publication 1490.1.
>
> **EPA response:**
>
> BPEM is a mixture of a guideline and policy. The sections titled 'Required Outcomes' empowered by the Waste Management Policy while the rest is guidance.
>
> Where a landfill or closed landfill operator believes that, for a particular objective of the BPEM guidelines, alternative means can achieve the objectives and required outcomes, a risk-based assessment can be used to support the proposed alternative measure and deviation from the BPEM guidelines
>
> The appointed Auditor then provides verification that the PCMP, the approach outlined and data contained therein is accurate and suitable for its intended use.

Q3. Why is it that EPA did not notice that the final target leachate level was set below the base of the site? In approving documents such as the PCMP, EPA is attesting to the accuracy, correctness and completion of the document. The community faith in the EPA is undermined when such errors are undetected for so long. This community is now concerned as to what other undetected errors are within the PCMP. In other words what assurance is there the PCMP is fit for purpose?

> **Context:** 8.4.1 - Groundwater Elevations – page 75 (p 91 of 176)
>
> Groundwater level contours have been prepared by the Auditor and are attached as Figures 7 and 8. They have been prepared using elevations measured by Resolve in February 2020.
>
> The base of all three mounds sits above the final target leachate level of 86.95 m AHD.
>
> **EPA response:** The values generated where based on the information and sampling that had been undertaken at time. The sumps have now been resurveyed which changed both the well head and base of well values.

Q4. In view of the comprehensive wide ranging recommendations and reported non-compliance with the BEPM, Best Practice Environmental Management: Siting, Design, Operation and Rehabilitation of Landfills, EPA Publication 788.3, contained in this audit will EPA require Cleanaway to conduct additional and more frequent, Post Closure / After Care Audits such as was instituted after the 2019 GHD audit?

> **EPA response:** Cleanaway are currently required to complete annual Post Closure / After Care Audits. More frequent reporting would be unlikely to capture seasonal variation and trends required by the auditor for consideration of risk and would therefore be unlikely to provide and additional benefits or insights than the current reporting frequency.
>
> This audit frequency is set by the auditor and it would be inappropriate for the EPA to interfere with an auditor determined frequency.

Q5. Given the scale of the monitoring task, how will EPA manage the supervision and the incorporation of the recommendations from the 2019 and 2020 Audit Reports? Clearly, Cleanaway does not have adequate resources to schedule and monitor all the testing and monitoring regimes.

> **EPA response:** EPA intends to formalise the high priority actions identified by the Auditor in the 2020 Audit Report by way of remedial notice. EPA understands that the recommendations contained within the 2019 Audit Report have either been implemented, partially implemented or captured by the high priority actions identified by the Auditor in the 2020 Audit Report.

Q6. Will EPA require copies of the monitoring program and will EPA pro-actively monitor the schedule for compliance? Where compliance is not achieved will EPA act to ensure Cleanaway fulfils its obligations?

> **EPA response:** Yes, EPA will require a copy of the PCMP which will then be adopted into the PCPAN as the management document regulated against.
>
> EPA intends to formalise, by way of remedial notice, the recommendation to provided an auditor-verified updated / revised PCMP during the 2020 / 2021 audit period and enforce any breaches. The EPA will also continue to enforce breaches of the PCPAN.

Q7. When will EPA be in a position to advise the community as to how they will supervise all monitoring programs to ensure the next Audit Report has no missing data? Can EPA assure this community that all the work required by both Auditors (GHD and Senversa) will be completed in time for the 2021 Audit Report?

> **EPA response:** If non-compliance with the PCPAN, PCMP or any remedial notice is identified, EPA will initiate sanctions in accordance with the EPA Compliance and Enforcement Policy.

Q8. This auditor has made a number of recommendations where the auditor requests aspects to be discussed and finalised with the auditor's input. Will EPA ensure that the Auditor's term of engagement is such that the requests made are all finalised? Will EPA ensure the Auditor's input is acted upon?

> **EPA response:** EPA intends to formalise the high priority actions identified by the Auditor in the 2020 Audit Report by way of remedial notice.

Q9: We've now had two years of incomplete reporting [monitoring] by Cleanaway, this audit details which bores haven't been monitored for a number of years, what new steps is EPA introducing, to ensure that the next monitoring round is completed on time and all Chemical Of Concern are checked.

> **EPA response:** EPA will continue to sanction Cleanaway for failure to comply with the monitoring requirements contained within the PCMP.
>
> The frequency of the 53V landfill aftercare audit reports is the mechanism for assessing compliance with the monitoring required by the PCMP. The auditor has recommended an update of this document to realign requirements and expectations.

Q10. Can the EPA ensure that Cleanaway provides the TLCCG with a) a flow chart of the on-going monitoring cycle for leachate GW, SW and LFG, b) a testing schedule, that would help us keep track of monitoring and reporting, c) graphs showing the trends for COI in GW SW and LFG?

> **EPA response:** The Post Closure Monitoring Plan (PCMP), which is publicly available, contains monitoring frequencies, in situ and analytical testing schedules and reporting requirements. The presentation of the data collected is at the discretion of those involved with the production of that data i.e Cleanaway, the assessing consultant and the Auditor.

Q11. Can the EPA mandate that Cleanaway holds more regular TLCCG meetings at which we are provided with the above requested information?

> **EPA response:** There is a regular meeting for community/Cleanaway and EPA. EPA is not aware of any request for further meaningful meetings that have been refused. Further to this EPA does not have legislation to force such a request.

Q12: Does the amended PCMP of 28/2 now comply with BPEM standards of EPA publication 1490.1?

> **EPA response:** The updated PCMP, as requested by the Auditor in the Senversa 2020 53V Audit has not, as of the time of writing, been received by EPA or the Auditor.
>
> We are unaware of where the past PCMP did not meet the standard of BPEM.

Q13. Why didn't EPA's audit team not recognise that the leachate level was impossible to achieve?

> **EPA response:** The EPA audit team undertake a procedural review of the Audits submitted. It is not the role of the EPA audit team to provide a technical appraisal or detailed review of the audits submitted. It is the responsibility of the appointed environmental consultant / assessor and appointed environmental auditor to verify that the data submitted is correct and targets achievable.

Q14. Is EPA confident that the Auditor's seven high priority tasks can be completed within the recommended time frame of either the next three months or the next relevant monitoring round? Which tasks fall into the latter category? We have been asking for consistency of reporting of trends for a long time because we have always understand the impact of this dump will be intergenerational for the local community and our precious groundwater and our waterways. When can we expect to see EPA ensuring it happens?

> **EPA response:** EPA intend to formalise the 7 high priority action contained within the Senversa 2020 53V audit report into a remedial notice and will consider sanctions in accordance with the EPA Compliance and Enforcement Policy if compliance with the remedial notice is not achieved.

Q15. What methods did EPA use to track if Cleanaway was complying with the previous audit? We note you thought compliance was "improving" but to us it doesn't seem good enough yet. How long are you going to let them continue with this unsatisfactory performance?

> **EPA response:** EPA have seen improvements with compliance relating to the installation of perimeter LFG bores at distances recommended in the BPEM (via PAN 90010885 issued in February 2020). The improvement is relevant to past performance and does not imply that they are meeting our expectations.
>
> Tracking of the requirements of the PCPAN is achieved by conditions contained within the PCPAN, namely LC12 (Landfill Aftercare Audit Reports) and LC13 (Annual Reports).

Q16. When was EPA notified by Cleanaway that they were, yet again, not compliant with their monitoring responsibilities? What are the consequences of non-compliance with reasonable time frames?

> **EPA response:** EPA were not notified by Cleanaway of any non-compliance with the PCMP. Cleanaway were issued with an infringement notice in December 2019 contrary to s.31A(7) of the EP Act 1970 for failing to implement the PCMP.