

Adaptive Management Plan – Progress Report 3

8 September 2020

Summary of first three months

Overview

Christchurch City Council owns two resource recovery facilities in Bromley – the Organics Processing Plant (OPP), operated by Living Earth, and the EcoDrop transfer station, operated by EcoCentral.

In March 2020, Environment Canterbury (ECan) completed a pilot study to determine the sources of odour in the Bromley area following Smelt-It app notifications made by the community. ECan determined that around 70 per cent of odour incidents in the area came from the EcoDrop transfer station and Organics Processing Plant.

Council staff worked with Living Earth, EcoCentral and ECan to develop and agree on an Adaptive Management Plant (AMP), which was signed-off on 22 June 2020.

Over the past months, since the Pilot study results were provided to the Council and its contractors, we've worked to implement the operational changes outlined in the AMP. The changes made at the EcoDrop transfer station have seen a decrease in odour detected by electronic monitors and ECan field officers. Living Earth has made numerous changes to the compost recipe with the aim of identifying a recipe that has a positive impact on the odour profile of the compost. A new compost 'recipe', was confirmed on 27 July 2020. It takes about 12 weeks for all of the compost from the old blend to completely cycle through the composting process and move off-site. This means that as of 6 September 2020, only about 7 per cent of compost on site was made up of the new blend. A complete understanding of the impact the new 'recipe' will have on the odour profile in Bromley will be known towards the end of October 2020.

Transfer station

The EcoDrop transfer station has been operating at its site in Metro Place, Bromley since 1984. The facility operates as a permitted activity under existing use rights in the Canterbury Air Regional Plan.

Operational changes

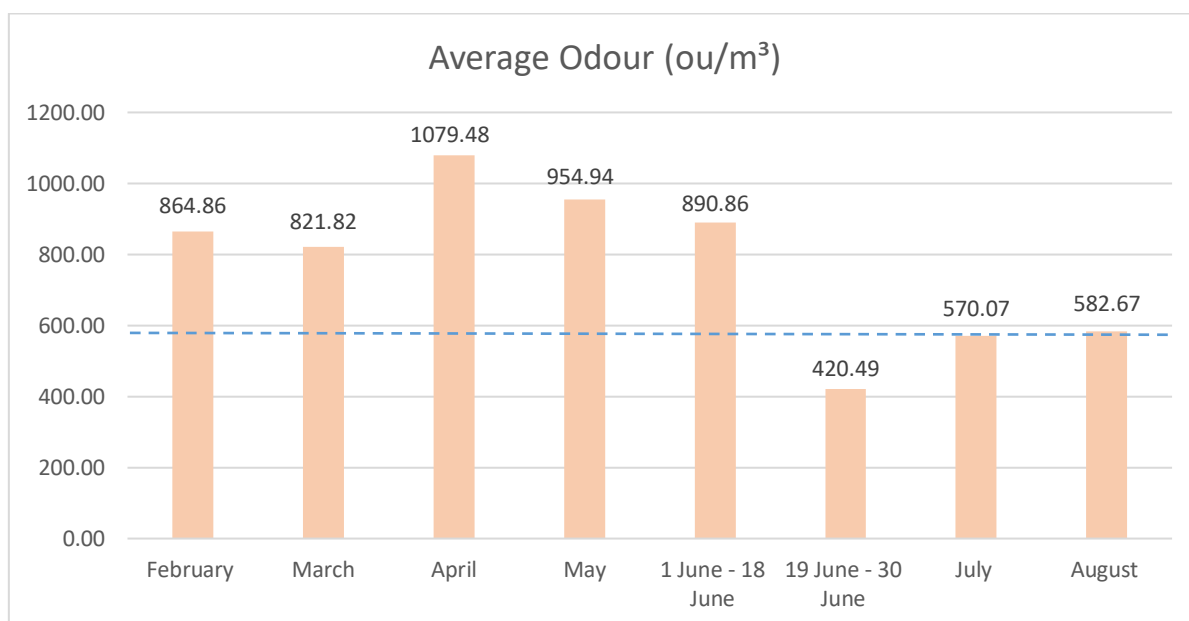
EcoCentral identified key operational changes it could make in the AMP. These were drawn from successful odour management practices at the Styx Mill transfer station, which also has residential properties within close proximity.

The changes focused on good 'housekeeping' processes such as prioritising odorous waste for immediate compaction and ensuring all waste is cleared from the hall floor each evening.

These changes were implemented from 19 June 2020.

Results

An electronic nose has been installed in the roof area of the tipping hall at the transfer station. The graph below shows the average odour units for the months preceding the operational changes and since. The average units dropped by about 40 per cent following the changes made in June.



The facility also saw a decrease in substantiated odour events reported by ECan officers following the operational changes.

Substantiated Odour Events	
1 May - 18 June	19 June - 31 Aug
3	0

There was one 'detected' odour event in July (AMP Notification #08131). This is a new designation introduced by ECan that is used when a full odour assessment is not possible. EcoCentral have provided a photograph of the pit at the time of the 'detected' notice which shows an essentially empty pit floor.

Independent review

Pattle Delmore Partners Ltd (PDP) completed an independent review of the transfer station's odour management processes. This included a site visit as well as reviewing operational plans. PDP's review found that, with the operational changes made as part of the Adaptive Management Plan, the site is demonstrating good operational practices.

Conclusion

The reduction in average odour units, in conjunction with no substantiated odour events by ECan officers, demonstrates the operational changes made in June were successful at mitigating odour at the transfer station.

Organics processing plant

The Organics Processing Plant (OPP) is operated under contract by Living Earth. The plant processes food and green waste from the Council's kerbside green bin collection as well as material from private collections and neighbouring councils.

The OPP diverts nearly 70,000 tonnes of material from landfill every year. Kerbside material is received in the processing hall where it is blended with other material to make the right 'recipe' and shredded. The first stage of composting is completed in sealed tunnels with air treated through a biofilter. The compost is then moved to outside windrows for maturation. The entire process takes about 12 weeks.

Following the Bromley Odour Project pilot study, ECan determined the OPP produced odour that was considered offensive and objectionable beyond the boundary. ECan advised the odour was not linked to any particular on-site activity, but present continuously. This was a step change from the previously accepted view that the odour issues from the OPP were isolated to occasional acute events.

Short-term changes

Based on the data provided by ECan, the most likely source of odour from the facility was the maturing compost on-site. As part of the AMP, Living Earth initiated a significant programme of work to change the compost 'recipe', with the goal of reducing the odour coming from the maturing compost.

Composting at the scale of the OPP is complex and requires considerable technical expertise. There are a number of variables within the process that impact the odour profile of the compost as well as its quality.

The technical team at Living Earth completed more than twenty small scale trials to determine what could be changed in the short-term to reduce odour. This was then scaled up to larger trials.

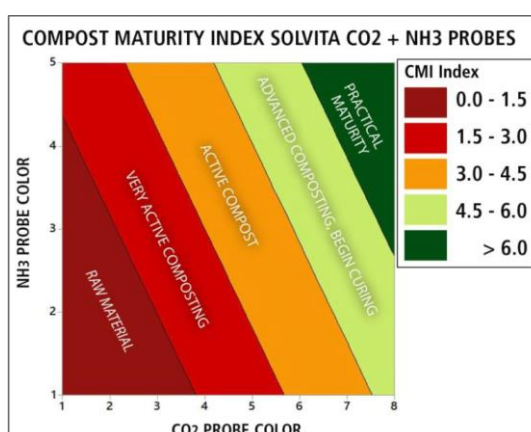
A preferred new recipe blend was selected on 27 July 2020. A total of ten changes were made to achieve the new blend. The changes included:

- Slowing down the rate of temperature rise in the early stages of the tunnel process. This increases the pH level of the compost during this phase. Allowing for more of the odorous compounds to be released in the controlled environment of the tunnel.
- Increasing the amount of air that can be pushed through the compost, as well as the moisture content of the product in the tunnels. Changes like these mean the compost has the ideal conditions in the tunnel and can degrade more quickly. The result is compost that is more mature and stable when it exits the tunnel.

Operational changes, such as the turning frequency of maturing compost, were also made to complement the 'recipe' changes.

Results

Compost maturity is a good indicator of potential for odour, with more mature compost being less active and releasing fewer odorous gases. An internationally recognised test of compost maturity is the Solvita® Compost Maturity Index. The index measures the amount of carbon dioxide (CO₂) and ammonia (NH₃) being released. The numbers are then put into the chart shown below with a scale from 'raw material' to 'practical maturity'. The old blend fell mostly into the 'very active' to 'active' range when it was taken out of the tunnels and placed into outside windrows. The new 'recipe', once taken out of the tunnel, has been found to have increased compost maturity measured to the upper end of 'active composting' to 'advanced composting'. This progression provides some confidence that the new 'recipe' will produce fewer odorous compounds when in outside windrows and therefore less likely to result in problematic odour in the wider environment.



Some of the key compounds that may lead to odour are ammonia, dimethyl sulfide and trimethylamine. In general people describe ammonia as pungent/irritating, dimethyl sulfide as disagreeable/asparagus/putrid and trimethylamine as fishy/pungent. Each of the compounds have thresholds for detection of odour, although there is some variance in how each of these are measured.

The table below shows the range of detection thresholds for each compound (this is in parts per billion) and the change from the old recipe to the new recipe, as well as a sample from the biofilter which treats the air from the composting tunnels. The samples were taken from within the compost windrows and directly on top of the biofilter.

The levels of compounds detected as outlined below would be subject to significant dilution by the time they reach the wider environment. The closest residential property is 600 meters from the windrows and one kilometre from the biofilter.

As the figures in the table demonstrate, there is a significant decrease in all compounds tested. The results of the new 'recipe', and decreases in compounds tested, will need to be analysed at the end of October to fully understand the effect on the odour profile within the Bromley community.

Compound	Odour detection threshold (ppb)	Old recipe (ppb)	New recipe (ppb)	Biofilter (ppb)
Ammonia	43 – 60,300	54,172	2,664	239
Dimethyl sulfide	0.12 – 8,110	401	75	6
Trimethylamine	0.02 – 1,820	404	0	26

Long-term options

We have taken a proactive approach to investigating long-term options with potential site redevelopment solutions being considered in parallel to the operational changes being made at the facilities.

Redevelopment options for the OPP were initially considered by Beca in 2015. We have requested the costings for this report be updated for inflation and the current environment, which is expected by the end of September.

We have also commissioned a feasibility study to determine whether increasing the aeration of the composting tunnels would improve how the plant operates, allowing more material to be processed inside the facility. This study is still on track to be completed by the end of September.

Conclusion

The operational changes made by Living Earth composting facility have had a significant impact on the maturity and level of odorous compounds being released from the compost when placed in the windrows.

The new compost 'recipe', developed by Living Earth, was confirmed on 27 July. By 17 August the new recipe blend in the tunnels began to be emptied into the windrows. It will take at least 10 weeks from 17 August for all of the old 'recipe blend' to finish processing and be replaced with the new 'recipe' blend. The impacts of the new 'recipe' blend on the odour profile in Bromley will be known towards the end October this year.

We're reviewing long-term options for site redevelopment and commissioning a feasibility study for increased compost maturation in the tunnels. We're working in collaboration with the community and ECan to review the progress of the first stage of the AMP and whether the operational changes have, or will have, the impact required to mitigate odour. If it is concluded that progress has not been sufficient, redevelopment options for the facility will be considered and presented to the Council by the end of November 2020 as per the AMP.

Communications

The communications team has developed a short video explaining what the organics plant does and the mitigation measures that have been put in place. This is due to be released with the communications going out when this report is released. The team had also organised tours of the EcoDrop and Organics Processing Plant for residents as well as Councillors and the local Community Board. Unfortunately these tours had to be postponed due to Covid-19 restrictions. We will consider rescheduling these tours if appropriate under alert level one.

Next steps

Living Earth

- Continue to cycle the new compost recipe blend through the facility; and
- If required, consider further redevelopment options for the facility.

EcoCentral

- Continue to practice good 'housekeeping' changes; and
- Confirm with Environment Canterbury whether site can continue to operate as a permitted activity.

Communications

- Release this report and the third ECan report along with relevant communications (including the video);
- Keep the community updated with the next steps as they are agreed; and
- Consider rescheduling tours of Living Earth and EcoDrop if appropriate under alert level one.