



memorandum

TO Christchurch City Council FROM [REDACTED]
DATE 2 August 2024
RE Living Earth Odour Monitoring: 1st July 2024 to 31st July 2024 Summary

1.0 Background

Living Earth Limited (Living Earth) operates an organics processing plant and composting facility located at 40 Metro Place, Bromley, Christchurch (the LE Site). Living Earth's air discharges are subject to the conditions attached to air discharge consent CRC080301.1 ("the consent") from Canterbury Regional Council (CRC) to discharge contaminants (odour and dust) to air.

Specifically, Condition 27 of the consent states that:

"The discharges to air shall not cause odour or dust which is offensive or objectionable beyond the boundary of the site on which this consent is exercised."

While Living Earth operates the composting facility, Christchurch City Council (CCC) holds the consent.

Pattle Delamore Partners Limited (PDP) has been providing assistance to CCC and Living Earth regarding the assessment and management of odour effects from the site. This has included regular odour scouting. The objectives of the odour scouting are to:

- ∴ Correlate the intensity and characters of observed odour (where possible) to:
 - Odour sources in the Bromley area.
 - Specific activities and/or sources on the LE Site.
 - Meteorological conditions.
 - Time of day.
- ∴ Undertake FIDOL assessments to determine if offensive or objectionable odours are present beyond the site boundary.
- ∴ Corroborate the content of community (i.e., Smelt-It) complaints.

This letter provides a summary of PDP's observations of off-site odour scouting for the period between the 1st July 2024 and 31st July 2024. The stockpiles of the outdoor material, namely the unscreened compost, oversized stockpiles and screened fines have been cleared from the site since the 12th of January 2024.

2.0 Summary of Methodology

Odour observations are made by PDP odour scouts. To ensure consistency between scouts, PDP ensures the following:

1. Scouts periodically undertake parallel odour assessments with each other in the field.
2. Scouts periodically visit the LE Site and familiarise themselves with the character of the odour from the various onsite sources.
3. Scouts undergo nose calibration via direct dilution olfactometry according to the requirements of AS/NZS 4323.3:2001 Section 9.7.2.

During an assessment, scouts walk at a comfortable pace through the area downwind of the LE Site, making note of odours detected. PDP has defined a series of observation points in the area where the scout makes more detailed observations, shown in **Figure 1**. The exact route and observation points visited in an assessment depend on the meteorological conditions (wind speed and direction) and the odour (if any) detected by the scout on the route.

Sites H and M are immediately downwind of the site, located along Dyers Road with sites G and F. Sites I, J, K, and N are located in the heavy industrial zone. Sites A, C, B, D, P, and R are located in the residential zone around Bayswater Reserve. Sites E, L, O, and Q are located roughly along the residential-industrial boundary. In assessments, Sites E, O, D and Q are in the residential zone, while Site L is in the general industrial zone.



Figure 1: Odour Observation Locations

In key areas where odour is detected, or at known sensitive areas, a full 10-minute odour observation is taken. Where 10-minute observations are taken at a site, a FIDOL assessment is completed by the scout and a determination made as to whether the odour is offensive or objectionable.

Determinations made are necessarily the opinion of the odour scout at that time to the conditions they encounter. They are based upon observations in the field but may also include consideration of wider factors such as meteorological conditions and patterns of site activity when considering the potential for offensive or objectionable odour over longer time periods.

Each scout makes their determination with reference to other determinations made, both within PDP, and more widely amongst the air quality profession.

Summaries for each odour scout are included in Section 3.0. Detailed analysis of specific observations is included, where necessary. Results of all 10-minute odour observations, summarised by observation location, are appended to this memorandum.

This memorandum presents the results of the odour scouting undertaken. This report does not analyse odour trends across time.

2.1 FIDOL Analysis

As per Ministry for the Environment's Good Practice Guide for Assessing and Managing Odour (MfE GPG), odours were assessed against the FIDOL factors to determine if they were offensive or objectionable. The FIDOL factors are:

- ∴ Frequency;
- ∴ Intensity;
- ∴ Duration;
- ∴ Offensiveness/Character¹; and
- ∴ Location.

Odour intensity is reported on a scale of (0-6) as per the MfE's GPG Odour. PDP applies the following descriptions to each odour intensity to ensure consistency between scouts:

0. No Odour: No odour.
1. Very Weak: Odour detectable but character not recognisable.
2. Weak: Odour detectable and barely recognisable.
3. Distinct: Odour readily recognisable.
4. Strong: Odour is strong but not causing discomfort to assessor.
5. Very Strong: The odour causes some discomfort; assessor can remain in area but will consider leaving/altering breathing patterns.
6. Extremely Strong: The odour causes assessor to feel nauseous or compelled to leave the area.

¹ "It is preferable to refer to the character of an odour, rather than its 'offensiveness' to avoid confusion between the inherent characteristics of an odour (i.e., whether it is pleasant or unpleasant) and whether there is an 'objectionable or offensive' effect occurring as a result of exposure to odour." (MfE GPG Odour)

When determining whether odour is having an offensive or objectionable effect, odour scouts make their determination with respect to the FIDOL factors. No regulatory standard exists for the specific combination of FIDOL factors that do or do not constitute an offensive or objectionable odour. However, as a broad litmus test when making determinations at the Living Earth site, PDP scouts consider intermittently distinct (3) or continuous weak (2) odours of a negative hedonic tone (such as compost) to be offensive or objectionable in a residential zone.

Within a heavy industrial zone, there is a lower expectation of amenity as it pertains to odour.

Based on PDP's understanding, this approach is generally consistent with that used by other air quality professionals.

3.0 Results Summary

Result summaries for each odour scout are reported below. Results of all 10-minute odour observations, summarised by observation location, are appended to this memorandum.

Scouts were present in the Bromley area on the:

- ∴ 12th July 2024;
- ∴ 18th July 2024;
- ∴ 19th July 2024;
- ∴ 24th July 2024; and
- ∴ 29th July 2024.

3.1 12th July 2024

██████████ was the PDP odour scout. The scout was present for approximately 40 minutes. The weather was overcast, with an average temperature of 7 °C, and east-northeasterly to south-southwesterly winds ranging from 0.7 to 1.5 m/s as a 10-minute average. The scout started near Site C, walked through the residential area and then along the boundary of the industrial area towards Site M, before returning to Site C. The objective was to undertake odour monitoring in the area downwind of the LE Site. The odour scout route (yellow dots) and key scouting locations are shown in **Figure 2**.



Figure 2: 12th July 2024 - Odour Scout Route

Results from the odour scout are shown below. Entries within **Table 1** that are highlighted blue denote locations within a residential zone and purple denotes locations within an industrial zone.

Table 1: 12 th July 2024 - Odour Scouting Summary		
Site	Time	Observations
C	12:41	No odour (0) detected.
B	12:44	No odour (0) detected.
D	12:46	No odour (0) detected.
E	12:49	No odour (0) detected.
F	12:52	Very weak (1) odours of an indeterminate character detected.
G	12:54	No odour (0) detected.

Table 1: 12th July 2024 - Odour Scouting Summary

Site	Time	Observations
H	12:56	No odour (0) detected.
M	13:00	No odour (0) detected.
H	13:03	No odour (0) detected.
G	13:05	No odour (0) detected.
F	13:08	No odour (0) detected.
E	13:11	Very weak (1) odours of an indeterminate character to weak (2) cut grass and solvent odours detected.
D	13:14	No odour (0) detected.
O	13:16	Weak (2) cooked food odour detected.

No compost odour was detected in the residential or industrial areas. Although north-easterly winds were forecast, when the scout arrived in the area the winds measured were mainly southeasterly, and thus the scout was not downwind of the LE site.

3.2 18th July 2024

██████████ was the PDP odour scout. The scout was present for approximately 40 minutes. The weather was overcast, with an average temperature of 9 °C, and northeasterly to east-north-easterly winds ranging from 2.7 to 3.0 m/s as a 10-minute average. The scout started near Site O and walked along the boundary of the industrial area towards Site M, before returning to Site O. The objective was to undertake odour monitoring in the area downwind of the LE Site. The odour scout route (yellow dots) and key scouting locations are shown in **Figure 3**.



Figure 3: 18th July 2024 - Odour Scout Route

Results from the odour scout are shown below. Entries within **Table 2** that are highlighted blue denote locations within a residential zone and purple denotes locations within an industrial zone.

Table 2: 18 th July 2024 - Odour Scouting Summary		
Site	Time	Observations
O	14:31	No odour (0) detected.
D	14:33	No odour (0) detected.
E	14:36	Weak (2) solvent odour detected.
F	14:39	No odour (0) detected.
G	14:42	No odour (0) detected.

Table 2: 18th July 2024 - Odour Scouting Summary

Site	Time	Observations
H	14:44	Very weak (1) odours of an indeterminate character to weak (2) solvent odour detected.
M	14:47	Very weak (1) odours of an indeterminate character detected.
H	14:51	No odour (0) detected.
G	14:51	No odour (0) detected.
F	14:54	No odour (0) detected.
E	14:58	<p>FIDOL assessment completed.</p> <p>No odour (0) was detected 85% of the time. Very weak (1) odours of an indeterminate character detected 15% of the time.</p> <p>The odour was assessed to be neither offensive nor objectionable.</p>
D	15:12	No odour (0) detected.
O	15:14	No odour (0) detected.

No compost odour was detected in the residential or industrial areas.

3.3 19th July 2024

██████████ was the PDP odour scout. The scout was present for approximately 30 minutes. The weather was overcast, with an average temperature of 12 °C, and easterly to east-south-easterly winds ranging from 5.3 to 6.2 m/s as a 10-minute average. The scout started near Site O, walked through the residential area and then along the boundary of the industrial area towards Site M, before returning to Site O. The objective was to undertake odour monitoring in the area downwind of the LE Site. The odour scout route (yellow dots) and key scouting locations are shown in **Figure 4**.



Figure 4: 19th July 2024 - Odour Scout Route

Results from the odour scout are shown below. Entries within **Table 3** that are highlighted blue denote locations within a residential zone and purple denotes locations within an industrial zone.

Table 3: 19 th July 2024 - Odour Scouting Summary		
Site	Time	Observations
O	15:25	Very weak (1) odours of an indeterminate character detected.
D	15:27	No odour (0) detected.
E	15:30	No odour (0) detected.
F	15:33	Very weak (1) odours of an indeterminate odour detected.
G	15:36	No odour (0) detected.
H	15:37	No odour (0) detected.

Table 3: 19th July 2024 - Odour Scouting Summary

Site	Time	Observations
H to M		Weak (2) to distinct (3) foul odour detected near Mr Boats. Intermittent weak (2) green waste odour detected near Site M.
M	15:42	No odour (0) to intermittent weak (2) green waste odour detected.
H	15:46	No odour (0) detected.
G	15:47	No odour (0) detected.
F	15:49	No odour (0) detected.
E	15:49	No odour (0) detected.
D	15:56	No odour (0) detected.

No compost odour was detected in the residential or industrial areas. The two odours (foul and green waste) were identified at separate times while the scout was between Sites H and M and were likely from separate odour sources.

The character of the foul odour detected between Sites H and M likely originated from the refuse station, as it was identified while directly downwind of the refuse station during a strong easterly. The green waste odour likely originated from the fresh green waste pile at the LE site as it was consistent with previously observed green waste odours from the LE site.

Neither of the odours were consistent with PDP's previous identification of compost odours originating from the LE site. The odour was assessed to be neither offensive nor objectionable.

3.4 24th July 2024

██████████ was the PDP odour scout. The scout was present for approximately 1 hour. The weather was fine, with an average temperature of 13 °C, and north-northeasterly to easterly winds ranging from 1.0 to 2.4 m/s as a 10-minute average. The scout started near Site O and walked along the boundary of the industrial area towards Site M, before returning to Site O. The objective was to undertake odour monitoring in the area downwind of the LE Site. The odour scout route (yellow dots) and key scouting locations are shown in **Figure 5**.



Figure 5: 24th July 2024 - Odour Scout Route

Results from the odour scout are shown below. Entries within **Table 4** that are highlighted blue denote locations within a residential zone and purple denotes locations within an industrial zone.

Table 4: 24 th July 2024 - Odour Scouting Summary		
Site	Time	Observations
O	15:59	Very weak (1) odours of an indeterminate character detected.
D	16:01	No odour (0) detected.
E	16:04	Very weak (1) odours of an indeterminate character detected.
F	16:07	No odour (0) detected.
G	16:10	No odour (0) detected.
H	16:11	No odour (0) detected.

Table 4: 24th July 2024 - Odour Scouting Summary

Site	Time	Observations
H to M		No odour (0) detected.
M	16:15	No odour (0) detected
M to H		No odour (0) detected.
H	16:19	No odour (0) detected.
G	16:20	No odour (0) detected.
F	16:22	Very weak (1) odours of an indeterminate character detected.
E	16:26	No odour (0) to intermittent weak (2) solvent odour detected.
D	16:29	No odour (0) detected.
O	16:31	No odour (0) detected.

No compost odour was detected in the residential or industrial areas.

3.5 29th July 2024

██████████ was the PDP odour scout. The scout was present for approximately 40 minutes. The weather was slightly cloudy, with an average temperature of 12°C, and easterly to south-southeasterly winds ranging from 1.3 to 3.4 m/s as a 10-minute average. The scout started near Site D, then walked along the boundary of the industrial area towards Site M, before returning to Site D. The objective was to undertake odour monitoring in the area downwind of the LE Site. The odour scout route (yellow dots) and key scouting locations are shown in **Figure 6**.



Figure 6: 29th July 2024 - Odour Scout Route

Results from the odour scout are shown below. Entries within **Table 5** that are highlighted blue denote locations within a residential zone and purple denotes locations within an industrial zone.

Table 5: 29 th July 2024 - Odour Scouting Summary		
Site	Time	Observations
D	15:20	No odour (0) detected.
E	15:24	No odour (0) detected.
F	15:26	No odour (0) detected.
G	15:28	No odour (0) detected.
H	15:30	Very weak (1) odours of an indeterminate character detected.

Table 5: 29th July 2024 - Odour Scouting Summary

Site	Time	Observations
H to M		Intermittent weak (2) compost odour detected near Site H, no odour (0) detected towards Site M.
M	15:35	No odour (0) detected.
M to H		Intermittent weak (2) compost odour detected near Site H, no odour (0) detected towards Site M.
H	15:39	<p>FIDOL assessment completed.</p> <p>No odour (0) was detected 78% of the time. Very weak (1) odours of an indeterminate character were detected 22% of the time.</p> <p>The odour was assessed to be neither offensive nor objectionable.</p>
G	15:54	No odour (0) detected.
F	15:56	No odour (0) detected.
E	16:00	No odour (0) detected.
D	16:04	No odour (0) detected.

Intermittent, weak (2) compost odour was detected in the industrial area near the LE site. The scout observed vehicle movements at the LE site when compost odour was identified, and as such the offsite compost odour may have been related to the loading and unloading of compost material at the site. Compost odours were not subsequently detected during a 10-minute FIDOL assessment. No compost odour was detected in the residential area. The compost odour detected in the industrial area was assessed to be neither offensive nor objectionable.

4.0 Summary

PDP undertook odour scouting on five occasions between the 12th of July 2024 and the 31st of July 2024.

Typically, PDP considers that intermittent distinct (3) or continuous weak (2) odours of a negative hedonic tone (such as compost) are offensive or objectionable in a residential zone.

Based on PDP's observations:

12th July 2024

- ∴ No compost odour was detected in the residential or industrial areas.

18th July 2024

- ∴ No compost odour was detected in the residential or industrial areas.

19th July 2024

- ∴ No compost odour was detected in the residential or industrial areas.
- ∴ The foul odour detected between Sites H and M was likely associated with activities at the refuse station and was separate to the green waste odour associated with the LE site.
- ∴ The green waste odour detected between Sites H and M was likely associated with the fresh green waste pile on the LE site.

24th July 2024

- ∴ No compost odour was detected in the residential or industrial areas.

29th July 2024

- ∴ Intermittent weak (2) compost odour was detected in the industrial area, downwind of the LE site.
- ∴ No compost odour was detected in the residential areas.

None of the offsite odour associated with the LE site was assessed to be offensive or objectionable.

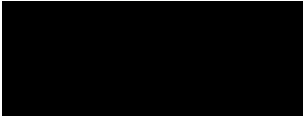
5.0 Limitations

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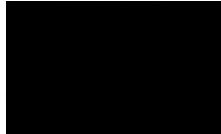
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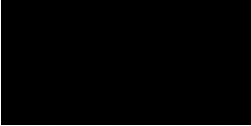
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Air Quality Engineer

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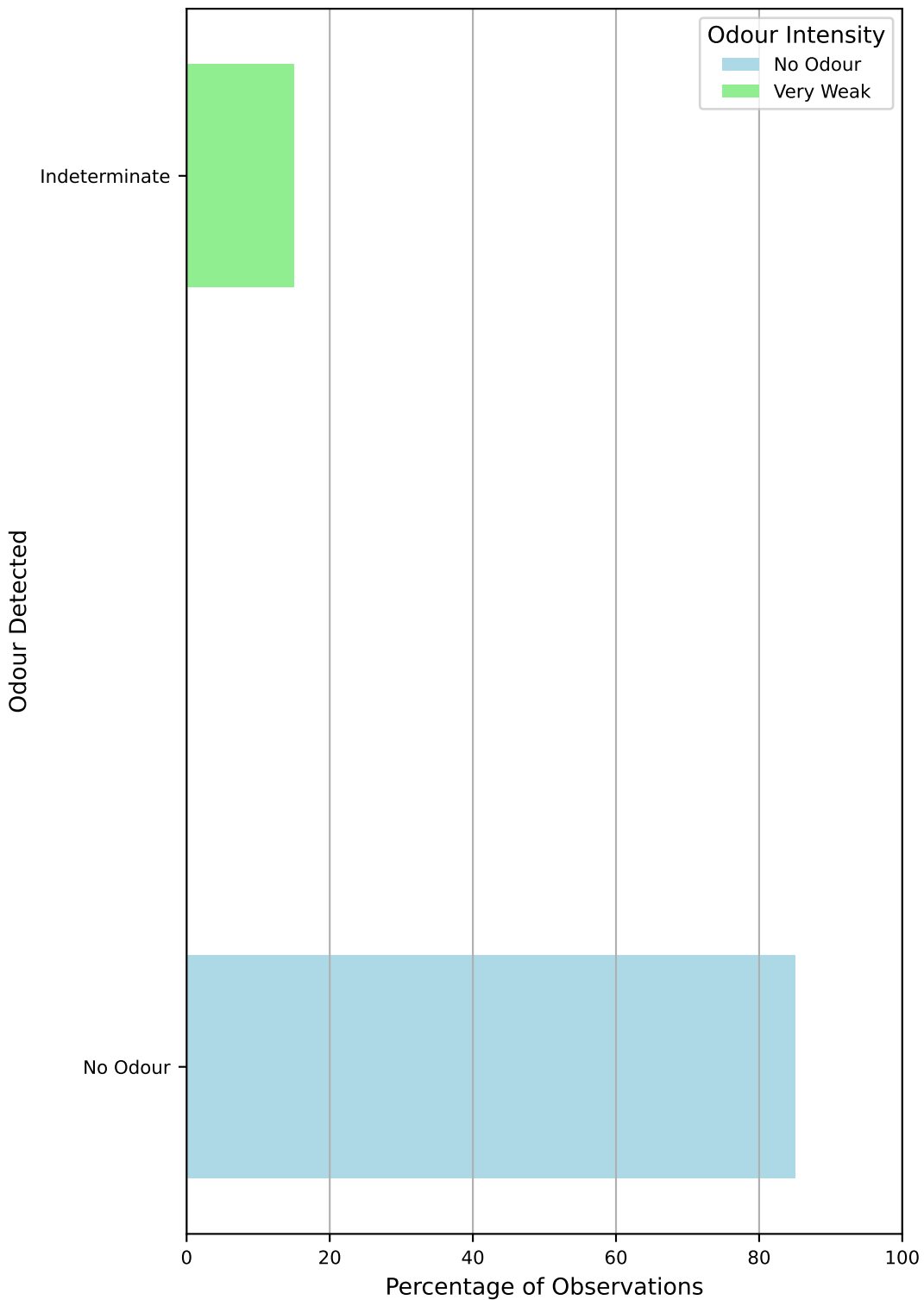
Service Leader - Air Quality

Approved by



Group Director

Site E



Site H

