



memorandum

TO Christchurch City Council FROM [REDACTED]
DATE 6 January 2025
RE Living Earth Odour Monitoring: 1st November to 20th December 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 November 2024 and 20th December 2024. The stockpiles of the outdoor material, namely the unscreened compost, oversize 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 together 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 undertaken. 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.

Due to a change in meteorological data availability since the last monitoring period, wind speed, wind direction and temperature data from the Bromley AWS is not as readily available post-scouting. Retrospective windspeed and wind direction data will not be reported for this monitoring window.

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:

- ∴ 8th November 2024;
- ∴ 13th November 2024;
- ∴ 29th November 2024;
- ∴ 5th December 2024;
- ∴ 10th December 2024; and
- ∴ 12th December 2024.

3.1 8th November 2024

[REDACTED] was the PDP odour scout. The scout was present for approximately 1 hour. The scout started near Site D and walked along the boundary of the industrial area to Site M, then returned to Site D via the industrial area. Conditions were forecast for north-easterly winds, and north-easterly winds were observed during the odour scouting. 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: 8th November 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: 8th November 2024 - Odour Scouting Summary

Site	Time	Observations
D	11:28	No odour (0) detected.
E	11:33	No odour (0) detected.
F	11:37	No odour (0) detected.
G	11:29	No odour (0) detected.
H	11:41	No odour (0) detected.
H to M		Intermittent very weak (1) odours of an indeterminate character detected.
M	11:45	Intermittent very weak (1) odours of an indeterminate character detected.
M to H		Intermittent very weak (1) odours of an indeterminate character detected.
H	11:48	Very weak (1) odours of an indeterminate character detected.
I	11:51	Very weak (1) odours of an indeterminate character detected.
J	11:54	No odour (0) detected.
K	11:58	No odour (0) detected.
L	12:03	No odour (0) detected.
D	12:05	<p>FIDOL assessment completed.</p> <p>No odour (0) was detected 80% of the time. Very weak (1) odours of an indeterminate character were detected 20% of the time.</p> <p>Odour was assessed to be neither offensive nor objectionable.</p>

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

3.2 13th November 2024

[REDACTED] was the PDP odour scout. The scout was present for approximately 1 hour. The scout started near Site D and walked along the boundary of the industrial area to Site M, then returned to Site D via the industrial area. Conditions were forecast for north-easterly winds, and north-easterly winds were observed during the odour scouting. 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: 13th November 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: 13th November 2024 - Odour Scouting Summary

Site	Time	Observations
D	12:04	No odour (0) to intermittent weak (2) solvent odour detected.
E	12:09	No odour (0) detected.
F	12:14	No odour (0) detected.
G	12:17	No odour (0) detected.
H	12:18	Weak (2) continuous compost odour detected.
H to M		Weak (2) continuous compost odour detected, decreasing to no odour (0) near Site M.
M	12:23	No odour (0) to intermittent very weak (1) odours of an indeterminate character detected.
M to H	12:24	FIDOL assessment completed. No odour (0) was detected 28% of the time. Very weak (1) odours of an indeterminate character were detected 28% of the time. Weak (2) compost odour was detected 38% of the time. Distinct (3) compost odour was detected 5% of the time. Odour was assessed to be neither offensive nor objectionable.
H	12:37	Very weak (1) odours of an indeterminate character to intermittent weak (2) compost detected.
G	12:29	No odour (0) detected.
F	12:42	No odour (0) detected.
E	12:45	Weak (2) intermittent cut grass and solvent odour detected.
D	12:49	Very weak (1) odours of an indeterminate character detected.

Weak (2) to distinct (3) compost odour was detected in the industrial area, between Sites H and M. No compost odour was detected in the residential area. The compost odour in the industrial area was detected directly opposite the site during the loading and unloading of compost material from the site.

3.3 29th November 2024

[REDACTED] was the PDP odour scout. The scout was present for approximately 30 minutes. The scout started near Site O and walked through the residential area, then walking the boundary of the industrial area to Site G, before walking to Site O via the industrial area. Conditions were forecast for north-easterly winds, and north-easterly winds were observed during the odour scouting. 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: 29th November 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: 29th November 2024 - Odour Scouting Summary

Site	Time	Observations
O	16:37	No odour (0) detected.
D	16:40	No odour (0) detected.
P	16:42	No odour (0) detected.
P to E		Weak (2) to distinct (3) compost/green waste odour detected near one house.
E	16:45	No odour (0) detected.
F	16:50	Intermittent weak (2) compost odour.
F to G		Intermittent weak (2) rubbish odour detected.
G	16:55	No odour (0) detected.
F	16:57	<p>FIDOL assessment completed.</p> <p>No odour (0) was detected 85% of the time. Very weak (1) odours of an indeterminate character were detected 5% of the time. Weak (2) compost odour was detected 5% of the time. Weak (2) rubbish odour was detected 5% of the time.</p> <p>Odour was assessed to be neither offensive nor objectionable.</p>
E	17:07	No odour (0) detected.
D	17:12	No odour (0) detected.
D to O		Very weak (1) odours of an indeterminate character detected.

Weak (2) compost odour was detected in the industrial area, between Sites F and G. The odour was a mix of compost and rubbish characters, likely corresponding to the EcoDrop and Living Earth sources.

The compost odour that was detected in the residential area was continuous, but only detectable while in front of the property in question. It is suspected the source was located on said property.

3.4 5th December 2024

██████████ was the PDP odour scout. The scout was present for approximately 1 hour. The scout started near Site O and walked along the boundary of the industrial area to Site H, then returned to Site O via the industrial area. Conditions were forecast for north-easterly winds, and north-easterly winds were observed during the odour scouting. Wind speeds of 2 to 4 m/s were measured using a handheld anemometer at the start of the odour scouting. 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: 5th December 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: 5th December 2024 - Odour Scouting Summary

Site	Time	Observations
O	15:44	A brief very weak (1) to weak (2) compost odour was initially detected upon exiting the vehicle.
O to D		Weak (2) solvent odour detected.
D	15:48	Weak (2) compost odour detected briefly upon arrival to Site D. FIDOL assessment completed. No odour (0) was detected 90% of the time. Very weak (1) odours of an indeterminate character were detected 10% of the time. Odour was assessed to be neither offensive nor objectionable.
D to E		Distinct (3) solvent odour detected from Ferry Panel & Paint. Observed spray painting occurring with the door open.
E	16:05	No odour (0) detected.
F	16:08	No odour (0) detected.
F to G		Intermittent weak (2) to distinct (3) compost odour detected.
G	16:12	Weak (2) to distinct (3) compost odour detected.
H	16:14	Intermittent weak (2) to distinct (3) compost odour detected.
H to I		Weak (2) compost odour detected.
I	16:18	No odour (0) detected.
J	16:21	No odour (0) detected.
K	16:24	Intermittent weak (2) compost odour detected.
L	16:29	No odour (0) detected.
O	16:32	No odour (0) detected.

Weak (2) compost odour was initially detected briefly at Site O but disappeared shortly after. A second, short observation of the odour was made at Site D, but this had cleared by the time the scout had started their 10-minute observation, and did not return during that 10-minutes. It was also not detected during the scout's return through the residential area. This is the first observation of compost odour by the scouts in the residential area in approximately 12 months. As the odour was weak (2), and very intermittent, it was assessed to be neither offensive nor objectionable.

Weak (2) to distinct (3) compost odour was detected in the industrial area, between Sites F and I, and at Site K. This odour ranged between intermittent and near continuous. The odour was assessed to be neither offensive nor objectionable, due to the location (industrial zone).

3.5 10th December 2024

[REDACTED] was the PDP odour scout. The scout was present for approximately 1 hour. The scout started near Site D and walked along the boundary of the industrial area to Site M, then returned to Site D via the industrial area. Conditions were forecast for north-easterly winds, and north-easterly winds were observed during the odour scouting. 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: 10th December 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: 10th December 2024 - Odour Scouting Summary

Site	Time	Observations
D	15:55	Very weak (1) odours of an indeterminate character detected.
E	15:59	No odour (0) detected.
F	16:02	Very weak (1) odours of an indeterminate character detected.
G	16:05	No odour (0) detected.
H	16:07	No odour (0) detected.
H to M		Distinct (3) to weak (2) compost odour detected.
M	16:10	No odour (0) detected.
M to H		Weak (2) to distinct (3) compost odour detected.
H	16:14	No odour (0) detected.
I	16:17	Very weak (1) odours of an indeterminate character detected.
J	16:21	No odour (0) detected.
K	16:24	No odour (0) detected.
L	16:28	No odour (0) detected
D	16:30	No odour (0) detected.

Weak (2) to distinct (3) compost odour was detected in the industrial area, between Sites H and M, immediately adjacent to the Living Earth site. No compost odour was detected in the residential area.

3.6 12th December 2024

██████████ was the PDP odour scout. The scout was present for approximately 1 hour. The scout started near Site D and walked along the boundary of the industrial area to Site M, then returned to Site D via the industrial area. Conditions were forecast for north-easterly winds, and north-easterly winds were observed during the odour scouting. 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 7.



Figure 7: 12th December 2024 - Odour Scout Route

Results from the odour scout are shown below. Entries within **Table 6** that are highlighted blue denote locations within a residential zone and purple denotes locations within an industrial zone.

Table 6: 12th December 2024 - Odour Scouting Summary

Site	Time	Observations
C	13:52	No odour (0) detected.
B	13:54	No odour (0) detected.
D	13:57	Very weak (1) odours of an indeterminate character detected.
D to E		Intermittent very weak (1) odours of an indeterminate character detected.
E	14:03	No odour (0) detected.
F	14:07	No odour (0) detected.
G	14:10	No odour (0) detected.
H	14:12	No odour (0) detected.
H to M		Weak (2) rubbish and compost odour detected.
M	14:18	Very weak (1) odours of an indeterminate character to weak (2) compost odours detected.
M to H		Weak (2) rubbish and compost odour detected.
H	14:25	No odour (0) to very weak (1) odours of an indeterminate character detected.
N	14:31	No odour (0) to weak (2) solvent odour detected.
N to J		Intermittent weak (2) compost odour detected.
J	14:38	Very weak (1) odours of an indeterminate character to intermittent weak (2) compost odour detected.
K	14:45	Very weak (1) odours of an indeterminate character detected.
L	14:50	Very weak (1) odours of an indeterminate character detected.
D		<p>FIDOL assessment completed.</p> <p>No odour (0) was detected 82% of the time. Very weak (1) odours of an indeterminate character were detected 18% of the time.</p> <p>Odour was assessed to be neither offensive nor objectionable.</p>
O	15:13	No odour (0) detected.

Weak (2) compost odour was detected in the industrial area, between Sites H and M, immediately adjacent to the Living Earth site, as well as in the industrial area as far as Site J. No compost odour was detected in the residential area.

4.0 Summary

PDP undertook odour scouting on 6 occasions between the 1st of November 2024 and the 20th of December 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:

8th November 2024

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

13th November 2024

- ∴ Weak (2) to distinct (3) compost odour was detected in the industrial area, between Sites H and M. No compost odour was detected in the residential area.

29th November 2024

- ∴ Weak (2) compost odour was detected in the industrial area, between Sites F and G. Compost odour was detected in the residential area but was not believed to originate from the Living Earth site.

5th December 2024

- ∴ Weak (2) compost odour was detected briefly at Sites O and D within the residential area but was assessed to be neither offensive nor objectionable. Weak (2) to distinct (3) compost odour was detected in the industrial area, between Sites F and I, and at Site K.

10th December 2024

- ∴ Weak (2) to distinct (3) compost odour was detected in the industrial area, between Sites H and M, immediately adjacent to the Living Earth site. No compost odour was detected in the residential area.

12th December 2024

- ∴ Weak (2) compost odour was detected in the industrial area, between Sites H and M, immediately adjacent to the Living Earth site, as well as in the industrial area as far as Site J. No compost odour was detected in the residential area.

Compost odour was detected in the industrial area (outside the site boundary) on five occasions. Compost odour, potentially attributable to the LE Site, was briefly observed in the residential area on 5th December.

5.0 Limitations

This memorandum has been prepared by Pattle Delamore Partners Limited (PDP) on the basis of information provided by Christchurch City Council and Living Earth. PDP has not independently verified the provided information and has relied upon it being accurate and sufficient for use by PDP in preparing the memorandum. PDP accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the provided information.

This memorandum has been prepared by PDP on the specific instructions of Christchurch City Council for the limited purposes described in the memorandum. PDP accepts no liability if the memorandum is used for a different purpose or if it is used or relied on by any other person. Any such use or reliance will be solely at their own risk.

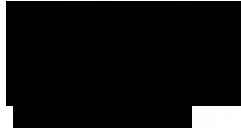
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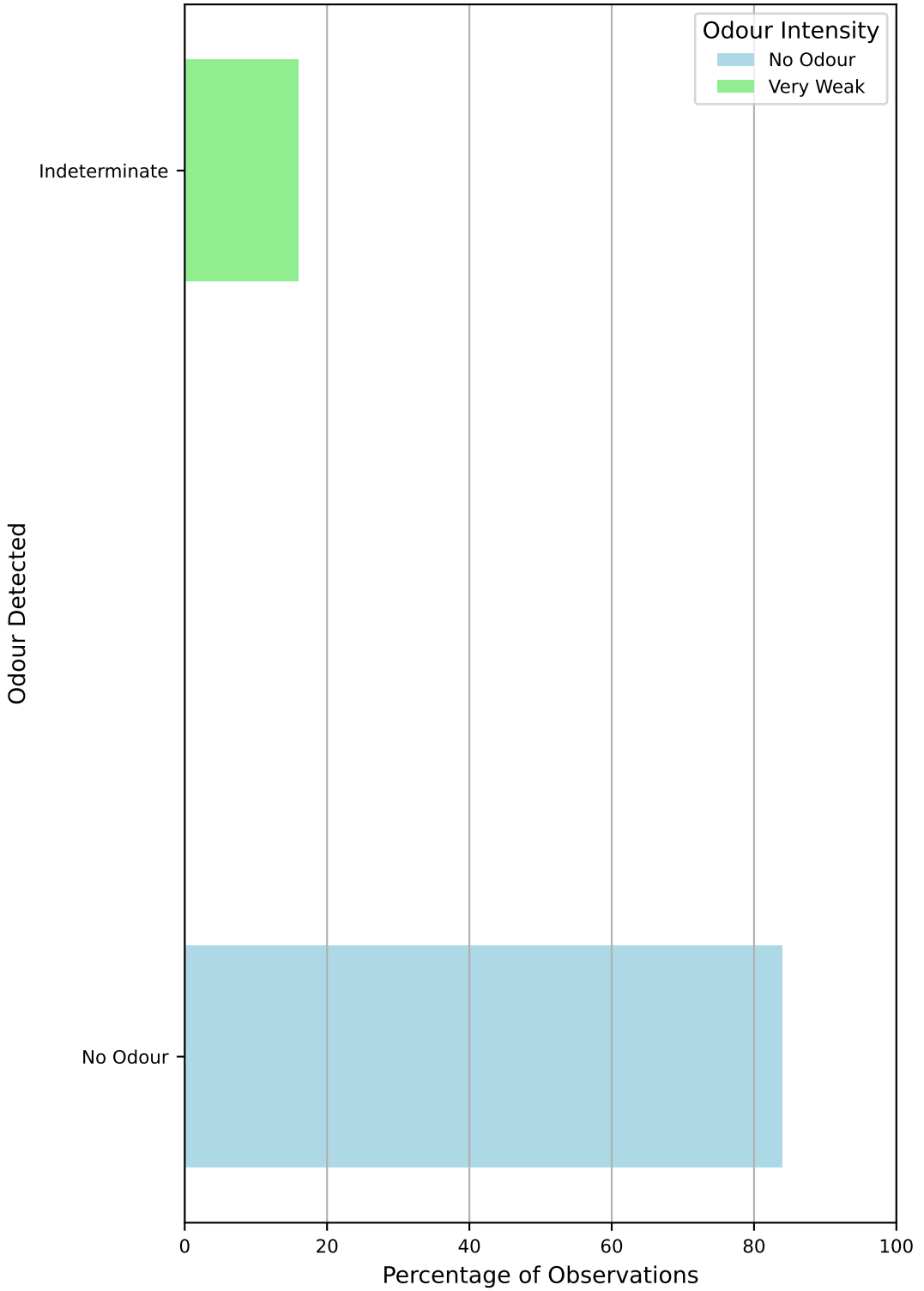
Service Leader - Air Quality

Approved by

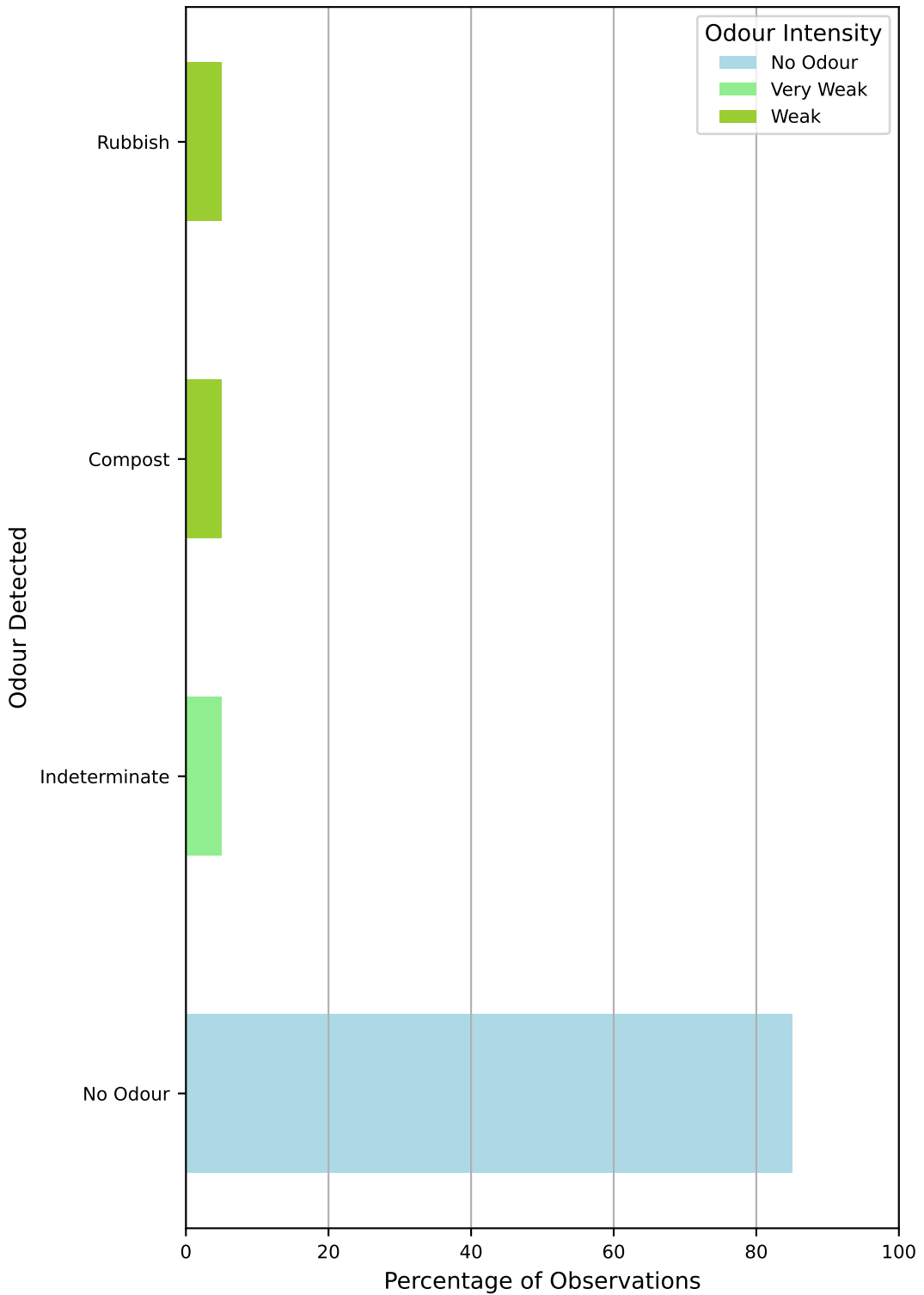


Technical Director – Air Quality

Site D



Site F



Site M/H

