Remediation NZ Limited
28-Jun-2019
Doc No. R001

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Assessment of Odour Effects

Revital Group - Uruti Composting Operations

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Client: Remediation NZ Limited

ABN: N/A

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28-Jun-2019

Job No.: 60606952

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Quality Information

Document	Assessment of Odour Effects
Ref	60606952
Date	28-Jun-2019
Prepared by	Jonathan Harland
Reviewed by	Andrew Curtis

Revision History

Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
A	26-June-2019	Draft	Andrew Curtis Technical Director	Andrew Curtis
B	28-Jun-2019	Final	Andrew Curtis Technical Director	

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1.0 Introduction

Remediation (NZ) Limited (Revital Group) operates a composting and vermiculture facility at 1460 Mokau Road, Uruti. Revital Group would like to continue its current operations, and also have the ability to compost food waste at its Uruti site, therefore they have applied for a new air discharge consent.

Following submission of the Application, the Taranaki Regional Council requested under Section 92 of the Resource Management Act, that an odour assessment be prepared to support the application. AECOM New Zealand Limited (AECOM) has been engaged to assess the odour discharges from the existing operations and the potential odour as a result of the proposed food waste composting operations. AECOM has undertaken odour observations of the current operations and prepared a FIDOL assessment for the proposed new operations based on those observations and experience at other similar sites. The findings of this assessment are presented in the following sections of this report.

1.1 Site Description

Revital Group's composting and vermiculture facility is located on State Highway 3 (1460 Mokau Road) approximately 2 kilometres south of the Uruti Village. The composting and vermiculture operations take place on river flats that run alongside the Haehanga Valley. The surrounding hill contours are steep, with a mixture of grass cover, scrub and native bush. The site slopes down towards State Highway 3 with the operations occurring approximately 1,300 metres from the site boundary, to the south of State Highway 3. The site is zoned rural, and is surrounded by native bush to the east, south and west. To the north of State Highway 3 is predominantly agricultural land.

The location of the Project Site is highlighted in orange in Figure 1.

Figure 1 Site Location

2.0 Current and Proposed Activities

2.1 Current Operations

The current site consists of an organic waste and paunch grass composting pads, a drill mud/composting mixing pad and a series of remediation ponds used for collection of leachate. Figure 2 presents the location of these operational areas. The first composting pad is approximately 5,000 m³ in size, which is used for composting chicken mortalities, fish waste, hatchery waste, which is blended with shredded greenwaste to achieve the required carbon to nitrogen ratio. The material is wedge piled and left for up to four weeks before being turned. The compost is turned up to 5 times as it moves towards the back of the pad where it is left to mature.

The second pad, which is 10,000 m³ in size is only used for paunch grass, which is composted over a period of six months before it is removed and fed to worm beds at the Uruti and Brixton sites. The third pad is 5,000 m³ in size, and it is used to process drilling waste. The drilling waste is blended with shredded greenwaste, sawdust and other organic material, and is then placed in windrow for composting.

The vermiculture operation is a very different process to composting, and involves the worms eating the composted paunch grass, leaving behind the worm cast which is essentially odourless.

2.2 Proposed Food Waste Composting Operations

The proposal is to truck up to 10 tonnes of food waste from Revital's Brixton site, where it would be mixed with greenwaste and saw dust, to obtain the most appropriate carbon to nitrogen ratio, before it is placed in a windrow, with the material progressively broken down by bacterial action to form compost. The windrow will be regularly turned to improve porosity and oxygen content, add/or remove moisture, and redistribute temperature in the pile. This whole process takes approximately 32 weeks, and once the material is composted and cooled, the screened compost is stored before being transported off-site.

2.3 Sources of Compost Odour

The amount of odour that is associated with a compost operation is dependant to a large degree on the raw materials that are used, and probably more importantly the control of the process. The Uruti site composts a variety of waste streams, which include; greenwaste, chicken mortalities, fish waste, hatchery waste and drilling mud. Animal waste is more likely to produce odorous emissions, compared to materials such as greenwaste.

Composting is essentially a natural process, one that occurs for example within the bush, as leaf litter is broken down by micro-organisms. Because it is a decay process there will also be some odour associated with it. The degree of odour generated relates to the level of aeration that occurs. In aerated composting processes aerobic bacteria break down the material, and generally generate what are considered "typical" mild compost odours, i.e. the "earthy" smell that you might associated with the leaf litter in the bush. If the compost is not adequately aerated, then anaerobic bacteria break down the plant material and generate relatively offensive odours.

2.3.1 Control of Odour Compost

A working group was formed to develop a New Zealand Standard for composts, mulches and soil conditioners. The intention in developing the standard was to provide for best practice and improve quality assurance within the sector.

Part of this guidance is on how to maintain aerobic conditions within the windrows, and appropriate temperatures to ensure that pathogenic micro-organisms within the compost are minimised.

As previously mentioned, animal waste material has the potential to be odorous, and therefore good management of these sources is required in order to minimise odour. To reduce odour emissions from these waste streams, Revital Group cover this material with either saw dust, greenwaste or mature compost immediately after receiving this material, to help supress odour.

Composting will produce some odour, but the odour associated with aerobic composting is considered not to be offensive, and therefore it is important that the conditions within the windrows are kept aerobic. The most common way of doing this with is by regular turning of the windrows and careful monitoring of temperature. Unfortunately this does mean that odours generated by aerobic decomposition are released, but these are not considered offensive, and are significantly better than the odours that might be released if the windrows became anaerobic.

Therefore in terms of odour generation from composting, there is a need to make a trade-off between turning the windrows to maintain aerobic conditions, and the fact that each turning event has the potential, albeit for a short period of time, to generate some odour that might be detectable off-site.

2.4 Irrigation to Land of Leachate

Situated north of the compost and vermiculture operations is a series of leachate ponds that collects run-off from these activities. In addition to the collection of leachate and stormwater that falls in the composting area, wash down water from the truck wash is also collected in this pond; which further dilutes the compost leachate.

Figure 2 highlights the area in purple, where water from these ponds are irrigated to land. Typically irrigation is undertaken weekly, but due to the number of different areas available for irrigation, each area is only irrigated approximately every month depending on rainfall, however this can be extended during period of warm drier weather. During the drier periods, the water from the pond is recycled back onto the compost pile to keep the moisture level in the optimal range for composting. Leachate is either applied using a travelling gun spray system or by a tanker pulled by a tractor, however the northern leachate paddock is only irrigated by tanker. In winter due to the soft ground conditions the tractor is not used, therefore the northern area (highlighted in pink) is not irrigated during this time.

Figure 2 Uruti Site

2.5 Sources of Odour from Vermiculture

Based on AECOM's experience vermiculture only becomes odorous if large amounts of fresh material are given to the worms and the piles are not aerated regularly. The worms at Uruti are feed with well aged paunch grass which is raked in to the beds.

2.6 Sources of Odour from Leachate

The two most significant factors that effect the odour of leachate is how dilute the leachate is, and how long it is stored for before being applied to land. Having raw leachate, that sits for extended periods of time can increase the biochemical oxygen demand (BOD). High levels of BOD in the water will result in lower dissolved oxygen, which can create anaerobic conditions, and as with compost, anaerobic conditions will produce more odorous compounds.

Additionally, how the leachate is applied will influence how leachate odour will be observed off-site. Releasing leachate high above ground, during windy conditions as a fine droplet will potentially disperse odour over a larger area.

2.6.1 Control of Odour from Leachate Application

The effects of odour from the spraying of leachate can be controlled in a number of ways. Firstly, regular spraying will result in fresh leachate being applied, and therefore it is unlikely the leachate will be anaerobic and therefore odorous. Additionally, the final leachate pond is aerated for two hours per day, to help promote aerobic conditions.

Secondly how the leachate is applied will have an impact on how far the odour could be dispersed. Having a low release height, with large droplet size is ideal. Revital Group uses either a travelling gun spray system or by tanker. The travelling gun spray system is designed to apply the leachate over a large area, therefore the release height is relatively high and can produce finer droplets. However, the northern irrigation area, which are closest to the receptors is irrigated using the tanker, which has a release height of approximately 1 meter and produces larger droplets which fall close the point of irrigation.

Additionally, Revital Group has control on when it irrigates the leachate to the northern areas, so it can choose to apply the leachate during period of low wind speeds (less than 3 m/s) and when the wind is not blowing from the south southeast and southeast i.e. down the valley towards the nearby sensitive receptors.

AECOM considers that the equipment used to apply the leachate is suitable for the location, and recommends that during the application of leachate, Revital Group staff continually monitor the meteorological condition to ensure they stay optimal, and that they monitor the ground for any ponding of leachate.

3.0 Assessment Criteria for Odour

Rule 35 to Rule 39 of the Regional Air Quality Plan for Taranaki relate to the implementation methods for discharges to air from waste management processes. However the only rule that specifically mentions composting is for residential purposes, therefore these rules were not applicable. Consequently a consent is required under the catch all Discretionary Activity Rule 55.

Rule 55: Discharges to air that cannot comply with Rules 1 to 54 – Discretionary

Any discharges to the air from any industrial or trade premises not listed in any other rule or where the activity is listed in a rule but the conditions for that rule cannot be met ***OR***

Any discharge from production land, waste management processes, site development, earthworks, the application of soil conditioners, aquaculture or intensive farming processes where the activity is listed in a rule but the conditions for that rule cannot be met.

4.0 Assessment Methodology

4.1 Qualitative Assessment Methodology (FIDOL)

Complaints are likely to occur when odours become detectable and recognisable. However, there are many situations when the release of a potentially odorous compound does not result in an odour nuisance effect. It is the subjective judgement of an odour's hedonic tone that enables the decision to be made as to whether it is a nuisance or not. The factors that contribute to an odour nuisance effect include the frequency (F) of odour impact, the intensity (I), the duration of exposure (D), the offensiveness (O) and the location (L). This type of assessment is similar to the guideline for assessing odour in the RAQP.

The FIDOL factors are explained in greater detail below:

- Frequency; relates to how often an individual is exposed to odour. Factors determining this include the frequency that the source releases odour (including its source type, characteristics and the rate of emission of the compound or compounds); prevailing meteorological conditions; and topography.
- Intensity: is the perceived strength of the odour or the odour detection capacity of individuals to the various compound(s). An increase in intensity of odour will increase the potential for odour complaints. Subjective measurements are made on a scale of 1 to 6 and qualitative measurements are in odour units (OU or OU/m^3).
- Duration: is the amount of time that an individual is exposed to odour. Combined with frequency, this indicates the exposure to odour. The duration of an odour, like its frequency, is related to the source type and discharge characteristics, meteorology and location. The longer the odour detection persists in an individual location, the greater the level of complaints that may be expected, particularly if the odours are unpleasant or obnoxious.
- Offensiveness: is a subjective rating of an odour's pleasantness and relates closely to hedonic tone. Offensiveness is related to the sensitivity of the 'receptors' to the odour emission, i.e. whether the odorous compound is more likely to cause nuisance, such as the sick or elderly, who may be more sensitive.
- Location: is the type of land use and the nature of human activities in the vicinity of an odour source. The same process in a different location may produce more or less odour depending on local topography and meteorological conditions. It is also important to note that in some locations certain odours may be more acceptable than in others (e.g. the expectation that rural smells will occur as part of the rural environment and industrial smells will occur in industrial areas).

AECOM has assessed each of these factors to determine if off-site odours are likely to be offensive or objectionable.

4.2 Sensitive Receptors

In the context of this odour assessment, the term 'sensitive receptor' includes any persons, locations or systems that may be susceptible to changes in abiotic factors as a consequence of the discharges to air (namely odour) from the Project Site. Typical locations for sensitive receptors include:

- Residential properties;
- Retirement villages;
- Hospitals or medical centres;
- Schools;
- Libraries; and,
- Public outdoor locations (e.g. parks, reserves, sports fields, beaches).

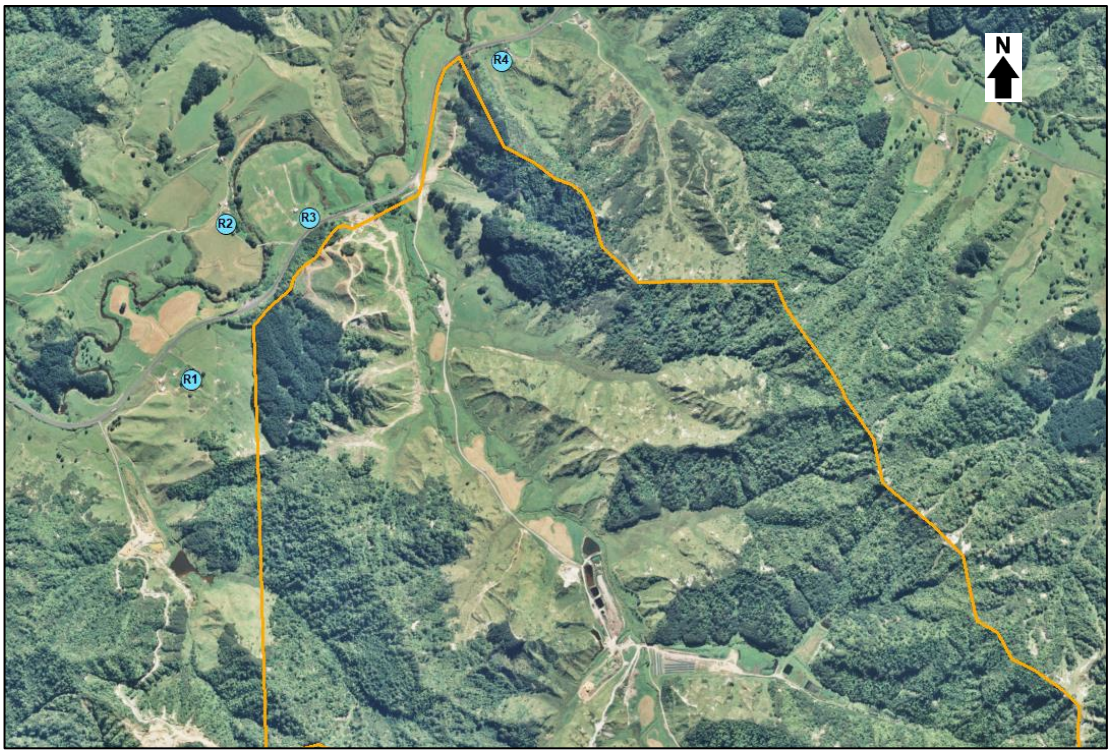
A desk-study as well as field observations were undertaken to identify discrete receptors deemed sensitive to odour as a result of discharges to air from the proposed.

The nearest potentially affected sensitive receptors are summarised in Table 1. Figure 3 shows the location of the potentially affected sensitive receptors identified (R1 – R4) in this assessment.

Table 1 Location of Receptors located close to the Project Site

Receptor Name	Address	Receptor Type	Distance from the Composting Operations (m)	Direction Relative to the Site
R1	1358 Mokau Road	Residential	1,600	Northwest
R2	1415 Mokau Road	Residential	1,900	Northwest
R3	1429 Mokau Road	Residential	1,700	Northwest
R4	1530 Mokau Road	Residential	1,900	North

Figure 3 Sensitive Receptor Locations



4.3 Field Odour Investigation

Subjective field odour investigation (or odour survey) was carried out at the Project Site on 10 June 2019, by an odour assessor using the FIDOL factors to determine an odour impact rating for several different locations across the site and beyond the site boundary. The odour survey was undertaken during normal operations. The investigations were carried out in accordance with the guidance contained in Ministry for the Environment (MfE) Good Practice Guide for Assessing and Managing Odour[1] (MfE GPG Odour). The primary purpose of undertaking this survey was to understand the level of odour generated from operations at Revital Groups Uruti site. The findings of this odour survey are presented in Section 5.3.

4.4 Wind Speed and Wind Direction

The Revital Group has its own Automated Weather Station (AWS) installed at its Uruti site. This weather station is located next to the weighbridge, which is approximately 400 metres south of State Highway 3, and is approximately 5 metres high.

Analysis of hourly wind data for the sites AWS for the two-year period 1 May 2017 and 1 May 2019 indicates that winds from all directions are experienced at the AWS site, however, the predominant winds are from the southeast and the northwest, which would indicate that the winds follow the valley in which the site is located in.

The wind rose for the sites AWS for the period 1 May 2017 and 1 May 2019 is presented in Figure 4, and seasonal wind roses are presented in Figure 5.

The seasonal wind roses indicate that:

- In summer, the prevailing winds are from the southeast.
- In autumn, the prevailing wind directions are from the southeast, with a significant component of winds from the northeast.
- In winter, the prevailing wind directions are from the southeast, with a significant component of winds from the northeast.
- In spring, the prevailing winds are from the southeast.

Table 2 presents the distribution frequency of wind speed. The predominant lower speed winds (less than 3 m/s) originate from the southeast, with calms (winds less than 0.5 m/s) occurring 34.8 percent of the time. Based on AECOM's experience, it is these light wind conditions which have the greatest potential to cause odour nuisance effects due to reduction in the dispersion and dilution of the odour emissions.

[1] MfE Good Practice Guide for Assessing and Managing Odour, November 2016

Table 2 Wind Speed Frequency Distribution

Direction	Wind Speed (m/s)		Total (%)
	0 - 3	>3	
North	1.0	0.0	1.0
North northeast	0.3	0.0	0.3
Northeast	0.4	0.0	0.4
East northeast	2.2	0.1	2.3
East	4.8	1.4	6.2
East southeast	7.5	2.0	9.5
Southeast	9.4	6.8	16.2
South southeast	2.7	1.0	3.7
South	0.6	0.0	0.6
South southwest	0.3	0.0	0.3
South west	0.5	0.0	0.5
West southwest	1.1	0.1	1.2
West	1.6	0.2	1.8
West northwest	4.5	0.5	5.0
Northwest	9.1	0.8	9.9
North northwest	6.1	0.1	6.2

Figure 4 Uruti Site Windrose – May 2017 to May 2019

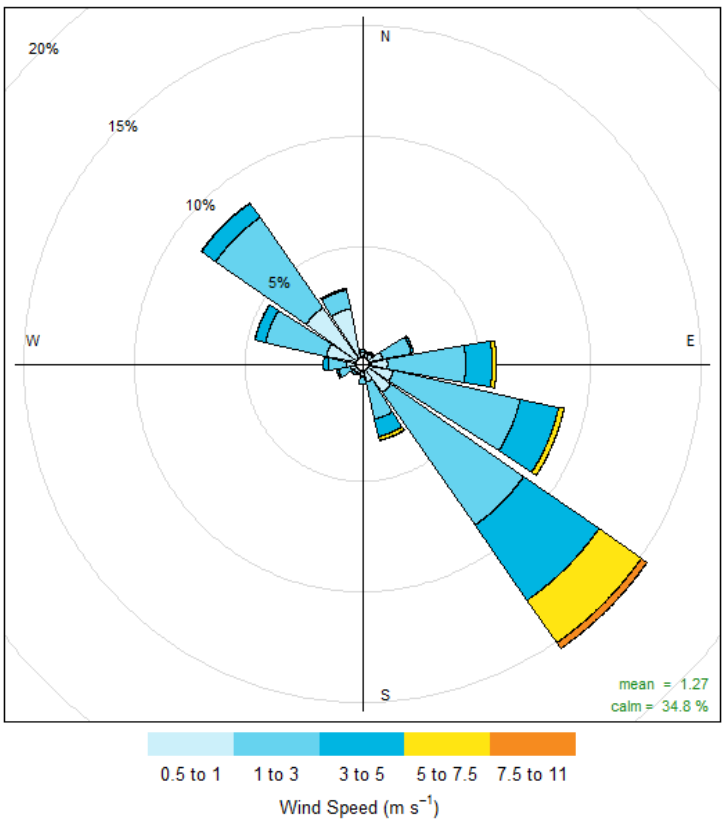
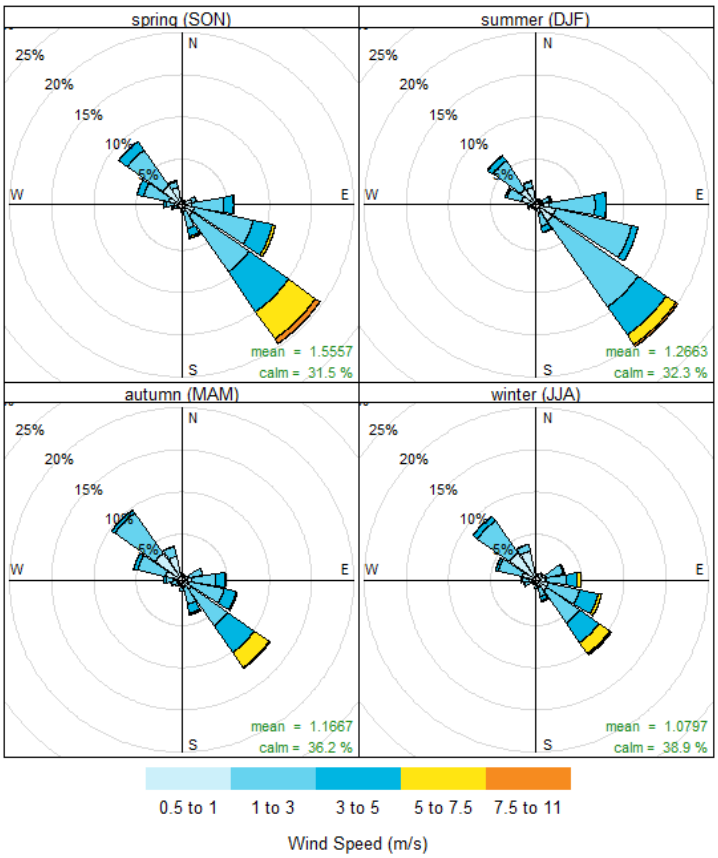


Figure 5 Uruti Site Seasonal Windroses – May 2017 to May 2019



4.4.1 Katabatic Air Flows

Katabatic air flows in this case is a result of the cold air draining down the valley that the site is located in, and typically results in low wind speeds, which provide the worst case dispersive conditions. Based on our review of the sites meteorological data, cold winds less than 1 m/s and below 10°C, coming down the valley (south southeast and southeast) occurred approximately 4.5% of the time. Under these conditions, it is possible for odour to be dispersed over longer distances, as there is little turbulence and therefore little opportunity for dilution to occur.

5.0 Odour Assessment

5.1 Methodology

The ambient odour monitoring methodology utilised in this study is a variation of the method described in the German Standard Verein Deutscher Ingenieure (VDI) 3940 “Determination of Odorants in Ambient Air by Field Inspections” (VDI Method). This is the method recommended in the Ministry for the Environment (MFE) Good Practice Guide for Assessing and Managing Odour in New Zealand and is commonly used in Australia and Europe for odour assessment.

5.2 Sampling

The modified method used by AECOM involved using a single ‘field odour scout’ to visit a selection of sites and sample the ambient air every 10 seconds for 10 minutes giving a total of 60 samples per location. The field odour scout recorded the intensity of the odour (according to a set intensity scale), the odour character (from a list of 40 various odour descriptors), the wind direction, the wind speed, any rainfall, and the time and date for every sample. The wind direction was determined and recorded by the field odour scout using a compass. Wind speed was recorded using a Kestrel handheld weather meter.

5.3 Field Odour Investigation

A site investigation was carried out by AECOM staff on 10 June 2019 to understand the level of odour associated with the composting operations. AECOM staff arrived onsite at approximately 8 am. The weather conditions during the site visit were overcast with calm winds moving down the valley from the southeast to south southeast. The wind speeds at the sites were between 0.3 and 0.7 m/s. AECOM considers that these conditions, especially wind speeds, were good in terms of undertaking odour observations.

During the visit, a subjective field odour investigation was undertaken by AECOM staff at various locations around and beyond the site boundary, in accordance with the guidance for field odour investigations contained in MfE GPG Odour. AECOM undertook an odour survey at Locations 1 to 10 (see following section) between 08:25 am and 11:40 am.

5.3.1.1 Field odour Investigation Locations

The field odour investigation was carried out at various upwind and downwind locations on or beyond the site boundary:

- Location 1: Site entrance;
- Location 2: Site dwelling;
- Location 3: Site office;
- Location 4: Downwind of site (800 metres);
- Location 5: Downwind of site (500 metres);
- Location 6: Leachate Pond and Drilling Mud Compost;
- Location 7: Waste drop-off area;
- Location 8: Downwind of active composting;
- Location 9: Vermiculture beds, and;
- Location 10: Aging paunch grass.

The locations of the odour survey points are shown in Figure 6.

Figure 6 Odour Survey Locations

5.3.2 Field Odour Investigation Findings

Where odour associated with the operations was detectable the odour was classified as “very weak” to “strong” and having a compost and waste odour character (neutral to unpleasant). Odour associated with the operations was only ever detected downwind of the site and the strongest odours were directly adjacent to the leachate ponds, material drop-off area, and active composting piles (Locations 6 and 7). However once away from the operation areas the odour was weaker in intensity. As experienced with other similar odour sources, the odour became weaker and transient in nature the further the distance from the source, and the site odours were not detected more than 300 metres from the activities.

No objectionable or offensive odours were detected at the off-site locations. Overall, the odour from the operations on the day of observations was low and consistent with the level of odour expected from this type of operations. There was no indication that there was any anaerobic decomposition occurring, with all the compost and vermiculture having a typical ‘earthy” type odour. The around the material drop-off and leachate ponds had a stronger ‘waste’ type odour.

Description of Odours Experienced

The odour described by the assessor at locations 1 – 10 was as follows:

- Location 1: Site entrance: Very Weak to Weak Agriculture Odour (not associated with the site activities).
- Location 2: Site dwelling: Very Weak Vegetation Odour (not associated with the site activities).
- Location 3: Site office: Very Weak to Weak Vegetation Odour (not associated with the site activities).
- Location 4: Downwind of site (800 metres): Very Weak to Weak Earthy Odour (not associated with the site activities).

- Location 5: Downwind of site (500 metres): Very Weak to Weak Earthy Odour (not associated with the site activities).
- Location 6: Leachate Pond and Drilling Mud Compost: Weak to Distinct Waste Odour.
- Location 7: Waste drop-off area: Very Weak to Strong Waste.
- Location 8: Downwind of active composting: Very Weak to Distinct Compost Odour.
- Location 9: Vermiculture beds: Very Weak to Weak Earthy Odour.
- Location 10: Aging paunch grass: Very Weak to Distinct Grass Odour.

5.4 Odour Assessment

It is generally accepted that odours associated with composting, and leachate irrigation could be considered unpleasant by the general population if the source becomes anaerobic or odorous material is left uncovered, and therefore odour from these activities needs to be appropriately managed.

However it is AECOM's experience that even with all appropriate mitigation measures in place there is the potential that from time to time odours may be detectable off-site. Consequently, AECOM considers that it is appropriate to use the FIDOL assessment tool to determine whether the odours have the potential to be offensive and objectionable.

5.4.1 Changes in Odour Emissions

The addition of food waste composting will increase the overall amount of composted material on site by approximately 20 percent. Even though there will be an increase in the volume of waste processed, AECOM does not consider that this will necessarily mean that there will be the same change in odour generated by this site. This is mainly due to food scraps primarily consisting of plant based material, which is less odorous than the other animal based waste products currently processed onsite.

The addition of food waste composting should not result in an increase in odour concentration of the leachate, however it will increase the overall volume of leachate. Having more leachate will increase either the frequency or the duration of irrigation, however it should not result in an increase in intensity of odour.

5.4.2 Frequency

Frequency relates to how often odours will be experienced at an off-site receptor. In terms of odour from the site operations, odour emissions are higher during periods when the composting and material is disturbed, such as turning or sieving. The composting process itself generates odour however, the concentration is much lower, than the other processes. Therefore the frequency at which odour could be detected at the neighbouring property will be a combination of the odour emission rate from the site and certain meteorological conditions, such as those which produce poor dispersion conditions. In the case of the Uruti site, the worst case meteorological conditions would occur during cold air drainage down the valley, which produces very low wind speeds and therefore little dilution of an odour.

All compost windrows on site are processed in a similar way, with new material added at the start of the windrow and as the material is turned the material is moved towards the back, with mature compost being located at the rear of the windrow. The main difference between the different windrows is the time it takes for all the material to be processed, with the organic piles taking around 32 weeks to mature, whereas drilling mud can take up to three years.

For odours to be experienced off-site these peak odour events have to occur during periods of poor dispersion, typically when wind speeds are below 3 m/s. Based on the meteorological data presented in Section 4, wind speeds are less than 3 m/s less that came down the valley occur 19.6 percent of the time, however the nearest dwelling is not directly downwind of the valley, and therefore would most likely only be affected during period of katabatic flows which drain down the valley and pool at the bottom of the valley. Based on the meteorological data this could occur approximately 4.5 percent of the time, AECOM would consider this frequency to be low. Considering the variability of odour emissions from the composting facility, the hours in which the odour generating activities occur and

the likelihood of poor dispersion conditions in the direction of the receptors occurring at the same time are low.

In terms of the irrigating leachate to land, this activity occurs approximately every week, however this is extended during drier periods. Based on the control measures described in Section 2.6.1, irrigation will be managed so leachate is applied during calm wind speeds, coupled with the fact that the land closest to the receptors are irrigated with a tanker that produces larger droplets, it is unlikely odour from leachate will be experienced at the nearby receptors.

5.4.3 Intensity

Odour associated with composting can have a strong intensity and can be considered offensive and objectionable by some people if the composting material turns anaerobic. However based on AECOM's experience odours associated with anaerobic conditions were not detected at the site, and odours associated with aerobic conditions are not usually detected more than 300 metres from the site, and the intensity of odours at this distance would not be described as offensive or objectionable.

The intensity is also related to the wind conditions and the resulting level of dilution that occurs between the source and the receptor. In essence, the stronger the wind, the more dilution of odour will occur. Considering the distance of the site to the receptors, odour from the compost operations should be well diluted before it reaches any receptor, especially considering that the majority of receptors are over 1,600 metres from the site.

It is also important to note that the human perception of odour intensity in relation to odour concentration is not a linear relationship, but logarithmic. This means that a ten fold increase in odour concentration does not result in a perceived increase in odour intensity of the same amount[2], with the perceived increase in odour intensity being much less than the numerical increase in odour concentration. It is generally considered that odour concentrations need to double before the perceived intensity change is recognisable. In terms of the proposed new operations, the site would only compost an additional 20 percent of material, the odour concentration would not double, and therefore the nearby receptors should not notice any perceived increase in odour intensity.

For the majority of the time any odours that are generated are expected to be indiscernible or very weak at or beyond the site boundary.

In term of intensity of odour from the leachate from the addition food waste composting, there should not be any increase intensity as the concentration of the leachate will be the same, but there should be an increase in volume of leachate collected.

5.4.4 Duration

As discussed previously, there will likely be some odour associated with the composting operations, however these, generally have very low intensity and are only detectable close to the windrows. When the windrows are being turned or the compost is being screened, there is an increased likelihood that odour could be detected further from the operational area.

As with frequency, the duration that anyone would be exposed to odour depends on the time the wind blows in a specific direction along with the duration that the activities occur. Typically the duration odour experienced off-site under normal day to day running of the composting operations will be short and intermittent.

During other parts of the process such as turnover and screening, which can take a number of hours to complete the duration of the odour event could be for extended periods. Screening will only be undertaken on the composted food waste before it is taken off-site. This will only occur when required as the site does not have a permanent screen onsite. However the screening process is of mature compost and the odour will be of a lower intensity, and earthy in nature.

When leachate is irrigated to land it is usually complete in a few hours to day. With the increased volume of leachate produced by the food scraps, the duration of leachate irrigation could increase by a couple of hours per application.

[2] MfE Good Practise Guide for Assessing and Managing Odour in New Zealand (2003)

5.4.5 Offensiveness

If strong undiluted odours, especially anaerobic type odours sometimes associated with composting or the raw animal waste were experienced off-site, they could be considered offensive by a member of the public. As the site is surrounded by steep bush covered hills, and the closest receptors are over 1,600 metres away, typically any odours should be well diluted by the time they could reach any receptor, and therefore are unlikely to be considered offensive.

However, considering the type of compost that Revital Group undertake and its management of the composting operations, it is unlikely that the more offensive anaerobic type odours will be produced in the first place. Additionally, odorous load such as chicken mortalities and the proposed food waste will be covered when they are delivered on-site and either blended with greenwaste or cover shortly after arriving onsite.

5.4.6 Location

To a large extent the location of the source in proximity to sensitive receptors is possibly the most important of the FIDOL factors. In this instance due to the fact that even if odours are generated there is little potential for adverse effect if there are few receptors located downwind of the source.

In this case, AECOM considers that the location of the site is very well placed in terms of the distance to nearest receptors being greater than 1,600 metres away.

In the neighbouring area are rural activities, and it is not unusual to experience a degree of rural type odour such as silage or even compost in the surrounding area which is considered acceptable. The MfE GPG for odour recommends that there is a greater tolerance of odour effects in a rural setting, particularly when the source of the odour is from a rural activity.

The leachate irrigation area closest to the nearest residential dwellings is only irrigated using the tanker, however this area is not irrigated in winter. This method produces larger water droplets that fall closer to the ground and therefore is unlikely to disperse odour over an area which could affect the nearby dwellings. The other leachate irrigation areas use the travelling spray gun system, which could disperse odours over a larger distance, however these irrigation areas are located further from the dwellings, and this application method should not affect these receptors. Further to the different application techniques, Revital Group staff monitor wind speed and direction, and can chose to apply leachate to different irrigation area that is best suited for the conditions.

6.0 Conclusion

Having assessed the addition of food waste composting against the FIDOL factors, AECOM considers that there is a low likelihood of off-site odour from Revital Group's Uruti operations being categorised as objectionable and offensive at nearby receptor locations. This is based on the following factors:

- The addition of food waste composting is only an additional 20 percent of material that will be processed on site, and the food waste should not be as odorous as the animal waste that is currently onsite. Based on the way the human nose perceives odour, this amount of increase wold not result in any noticeable change in intensity of odour from the site.
- The compost is turned frequently in the early stages, which prevents anaerobic conditions, which give rise to offensive odours.
- Any odorous waste is either covered with greenwaste, saw dust or mature compost shortly after it is received on-site.
- Based on the meteorological data for the area and the site topography, the nearby receptors would most likely only be effected by odours during periods of Katabatic flows, and based on the metalogical data, these events occur approximately 4.5 percent of the time. Based on the varied emission rate from the site operations, there is a low probability of higher odour emission rates occurring at the same time as poor dispersive conditions in the direction of these receptors.
- There is a large separation distance (greater than 1,600 metres) between the composting operations, and the sensitive receptors. There is also a good separation between the areas of irrigation (greater than 550 metres) and the receptors. These separation distances will help dilute any odour that might be generated by the composting operations.
- The surrounding land zoned rural, therefore it is not unusual to experience rural type odours such as silage or even compost.

However for the majority of the time the composting and vermiculture material will not be disturbed and therefore odour emission will generally be low. It is generally only during times of mechanical disturbance that could arise to higher odour emissions and these are limited to between the hours of 7:30am and 5:00pm Monday to Friday, and have to coincide with poor dispersive conditions.

In terms of odour as a result from irrigating leachate to land, unlike compost where there are fugitive odours, the activity of irrigation can be managed. Considering the control measures in place, the irrigation of leachate to land can be done in a way that will result no residential dwellings being downwind of any potential odour, also the way in which the leachate is applied (1 metre above ground and little mist) the potential for odour to travel in optimal wind speeds is low.

7.0 Limitations

AECOM New Zealand (AECOM) has prepared this Assessment of Effects report on discharges to air in accordance with the usual care and thoroughness of the consulting profession for Remediation NZ Limited for use in a statutory process from the Taranaki Regional Council under the Resource Management Act 1991 to support an application for discharge of air at their site at the 1460 Mokau Road, Uruti.

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