

Appendix L Air Quality Memo

Memorandum

Subject: ARL Project - Air quality and odour memorandum

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1 Introduction

WM New Zealand (WMNZ) has engaged Tonkin & Taylor Ltd (T+T) to prepare technical memoranda for the proposed new solid waste management and disposal facility in the Wayby Valley, north of Auckland ('**ARL**' or '**Project**').

The Project will involve constructing, operating, closing and providing aftercare for a new 24 Mm³ landfill facility and associated infrastructure at Wayby Valley, Wellsford. Ngāti Manuhiri are Project partners and will work with WMNZ on the proposed management and mitigation measures. Once landfilling ceases, the land will be returned to Ngāti Manuhiri as tāngata whenua.

The new landfill will be a Class 1 landfill, as defined in the Technical Guidelines for Disposal to Land (WasteMINZ Technical Guidelines)¹, accepting municipal solid waste. This includes residential and commercial waste, construction and demolition waste, some industrial wastes that meet acceptance criteria, and contaminated soils. Following waste settlement, the landfill cap surface will have a maximum height of 205 m RL.

WMNZ landholdings in the Wayby Valley area comprise a total area of 1020 ha, with the landfill footprint being approximately 60 ha. The WMNZ landholdings have been divided into five general areas; the Eastern Block, the Western Block, the Southern Block, the Waiwhiu Tributary Block and the Waiteraire Tributary Block. The proposed works will involve the following:

- **Site access and operation:** Construction of site access roads, weighbridges, and a vehicle wheel wash.
- **Landfill development:** Major earthworks and the installation of environmental management systems, including a landfill lining system and collection networks for leachate, stormwater, and landfill gas (LFG).
- **Leachate and landfill gas management:** A dedicated leachate management system and a LFG treatment facility, including a LFG flare and a LFG waste-to-energy plant.
- **Support infrastructure:** Facilities for site staff, plant maintenance, and water supply.
- **Terrestrial, freshwater and wetland biodiversity measures:** This includes native revegetation, and a weed and animal pest management programme to offset or compensate for residual adverse effects on terrestrial, freshwater and wetland ecology.

This memorandum provides an outline of the initial findings of the Air Quality Assessment and has been prepared for inclusion in an application for Ministerial referral of the Project under the Fast-track Approvals Act 2024 ('**FTAA**'). Specifically, this memorandum responds to the requirements under section 3.4 of the Fast-track Approvals Referral Application Form and section 13(4)(h) of the

¹ Technical Guidelines for Disposal to Land, WasteMINZ, September 2023, Revision 3.1.

FTAA. A full description of the draft proposal is included in the accompanying information attached to the application form for the referral.

2 Summary of findings

The discharges to air from landfilling activities principally comprise:

- Combustion products generated by the burning of collected landfill gas in flare(s) and generators;
- Fugitive emissions of landfill gas;
- Odour from the waste itself; and
- Dust emissions from construction activities or dusty wastes.

The proposed landfill will incorporate controls to effectively capture and destroy landfill gas (by combustion) and to minimise fugitive emissions of odour and dust. The landfill will be located within a large landholding. This means there is a large internal buffer (within the landholding) and separation distances of at least 1 km (the closest dwelling is approximately 1050 m from the edge of the landfill footprint) can be maintained between the landfill footprint and houses in the wider area. This large separation distance will further mitigate the effects of emissions to air.

The effects of emissions of combustion products from the flare(s) and generators have been assessed using dispersion modelling. The predicted off-site concentrations are well below the relevant ambient air quality standards and guidelines. On this basis, the effects of emissions to air of combustion products are assessed as less than minor.

Odour emissions can occur from fugitive emissions of landfill gas and odorous waste. The effects of the Project's potential emissions of odour have been assessed in accordance with recommended good practice. This includes dispersion modelling of "routine" odour emissions, evaluation of the proposed odour management measures against best practice, experience at other similar sites and an overall evaluation using the "FIDOL" factors. The effects of emissions to air of odour are assessed as less than minor.

Standard dust control measures, such as the use of water, will be used to control dust emissions during construction activities. Some localised dust may be generated from placement of cover materials, however experience at other landfills shows that these effects are not discernible within a short distance (typically of the order of 100 m). Due to the use of dust controls and significant separation distance created by the large site, operational activities are not expected to cause noticeable dust at nearby dwellings. The effects of emissions to air of dust are assessed as negligible.

Overall, subject to the implementation of the proposed design, management and operational measures to control emissions and mitigate their impacts, the effects of discharges to air from the proposed ARL are assessed as being less than minor.

3 Assessment methodology

The air quality assessment combined quantitative modelling and qualitative evaluation methods in accordance with the Ministry for the Environment's Good Practice Guide for Assessing Discharges to Air from Industry and Good Practice Guide for Assessing and Managing Odour. The CALMET and CALPUFF modelling system has been used, which is commonly used in New Zealand and internationally to simulate the transport and dispersion of air pollutants in complex terrain. Two meteorological years (2015 and 2017) are used to represent the range of atmospheric conditions likely at the site, reflecting El Niño and La Niña cycles respectively.

For emissions of combustion products from the proposed generators and flares, emission rates are derived from stack testing on similar generators installed at WMNZ's Redvale Landfill and published US EPA emission factors.

The findings of the dispersion modelling were compared with relevant air quality criteria including the ambient air quality standards in the National Environmental Standards for Air Quality (NESAQ), the New Zealand ambient air quality guideline and the Auckland Ambient Air Quality Targets (collectively referred to as the relevant air quality standards and guidelines), and the Ministry for the Environment's odour modelling assessment guidelines.

For odour, qualitative analyses were also used to interpret model outputs in the context of local topography, meteorology, and the distribution of sensitive receptors. The assessment draws on empirical data about odour effects from comparable operations at Redvale Landfill. Odour and dust assessments were informed by the FIDOL framework (frequency, intensity, duration, offensiveness, and location) consistent with good practice guidance.

4 Site and project context

A general description of the site and surrounding locality is included in the accompanying information as part of the referral application.

The landfill is proposed to be located in a valley that is oriented approximately southeast to northwest. Meteorological analysis from the nearby Mahurangi Forest station showed a dominance of southerly and southwesterly winds with frequent calm or low-wind conditions (< 2 m/s). Background air contaminant levels around the site are expected to be low, reflecting the rural nature of the surrounding environment and absence of industrial sources. Contributors to background air quality include vehicle emissions from State Highway 1 and occasional forestry or agricultural burning.

The closest dwellings to the landfill footprint are on Wilson Road and State Highway 1. The landfill will operate within a large landholding, enabling separation distances greater than 1 km to all dwellings. This buffer significantly reduces the potential for off-site impacts of air emissions. Effects on recreational users of the proposed walking tracks along the Waiwhiu Stream were also considered. Recreational users will generally only be present infrequently and for short durations.

The Energy Centre, containing flares and generators, will be situated approximately 150 m northwest of the landfill footprint, providing further setback from sensitive areas (the separation distance from the Energy Centre to the nearest dwelling is approximately 1.6 km).

5 Assessment of potential effects

The principal air emissions from the landfill will be combustion products from burning landfill gas in generators and/or flares and fugitive emissions of landfill gas and odour. There will also be minor emission of dust from construction activities and placement of waste and cover material.

Dispersion modelling has been used to predict off-site concentrations of combustion products (nitrogen dioxide, particulate matter (PM₁₀ and PM_{2.5}), sulphur dioxide, and carbon monoxide) emitted from flaring and energy generation. Even with conservative assumptions, such as modelling the future year with maximum landfill gas generation rates, predicted concentrations are well below the relevant air quality standards and guidelines beyond the site boundary. On this basis, the effects of emissions to air of combustion products are assessed as less than minor.

To prevent odour generation at source, multiple control measures will be in place. These include tight waste acceptance procedures, immediate burial of malodorous loads, daily covering of the working face, use of odour neutralising sprays, and leachate handling within sealed systems. Staff will be trained to identify and manage odorous materials promptly. Walkovers and surface gas

monitoring will be used to detect any fugitive emissions so they can be remedied as soon as practicable. Collectively, these practices represent the best practicable measures to control landfill odour.

The odour dispersion modelling uses odour emission rate measurements from WMNZ's Redvale Landfill that are representative of normal conditions. Even under worst-case meteorological conditions, the predicted hourly odour concentrations at receptors were an order of magnitude below the odour modelling assessment criterion for rural environments. Unplanned odour emissions will be minimised to the greatest extent practicable, including through weekly landfill surface walkovers and surface emission monitoring to identify and manage the integrity of the landfill cap. The effects of emissions to air of odour are assessed as less than minor.

Dust effects were also assessed, focusing on both the initial construction phase and ongoing operational activities. Most dust particles generated by vehicle movements and earthworks are expected to settle to the ground within 100 metres of their source. Water-based dust suppression and reduced vehicle speeds will minimise emission on unpaved haul roads. A wheel wash and regular cleaning of the main access road will be used to minimise emissions. The minimum 1-kilometre separation between the landfill footprint and receptors means there is negligible potential for dust from waste or cover placement to reach residential receptors. Potential impacts of dust on nearby vegetation were assessed as temporary and reversible. There will be short periods of time when construction activities will be closer to neighbours compared to operational landfill activities (for example road works and forming of the site access). Standard dust control measures for earthworks activities, such as use of water, will be used during these works. Overall, dust effects are expected to be negligible.

6 Conclusions

The landfill will incorporate a robust landfill gas management system that maximises recovery and combustion of odour and methane, and best practice controls to minimise odour emissions.

Dispersion modelling indicates that pollutant concentrations at off-site locations will remain below the relevant air quality standards and guidelines.

The combination of engineering controls, operational procedures, and large buffer distances result in a very low likelihood of off-site odour effects.

Given the large separation distance to sensitive receivers and the proposed mitigation measures, dust effects are expected to be negligible.

Overall, subject to the implementation of the proposed design, management and operational measures to control emissions and mitigate their impacts, the effects of discharges to air from the proposed ARL are assessed as being less than minor.

7 Applicability

This technical memorandum has been prepared for the exclusive use of our client WMNZ, with respect to the particular brief given to us, and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that WMNZ will submit this technical memorandum to the Environmental Protection Authority in support of a referral application under the Fast-track Approvals Act 2024 for the works described herein, and that the Environmental Protection Authority will rely on this technical memorandum for the purpose of assessing that application.

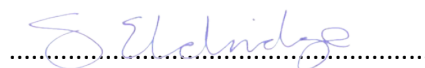
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