

Appendix N Noise

Technical Memorandum

Subject: ARL Transition Project Referral Application – Noise Assessment
Reference No: Mm 001 20241151
Author: Mathew Cottle
Date: 14 November 2025

1 Introduction

WM New Zealand (WMNZ) has engaged Marshall Day Acoustics to provide an Assessment of Noise Effects (ANE) to understand the acoustical effects from a proposal to reconsent Redvale Landfill, north of Auckland.

Redvale Landfill is one of only two landfill sites that can receive >350,000 tonnes of waste annually to service the approximately 1.5 million tonnes of waste that the Auckland Region produces each year. Redvale Landfill is currently scheduled to cease accepting waste in December 2028 and due to a delay in obtaining the resource consents required for the establishment and operation of the replacement Auckland Regional Landfill (ARL), WMNZ considers a transition plan is required. To address this potential gap in critical landfill infrastructure for residual waste disposal in the Auckland region, WMNZ is proposing to extend the operation of Redvale Landfill to the end of 2036 and develop 4.56 Mm³ of additional airspace at the existing facility. This includes approximately 3.13 Mm³ in additional Class 1 Landfill expansion on top of the existing Class 1 refuse placement area and 1.43 Mm³ of Class 2 Landfill extension.

To accommodate the on-going placement of waste at Redvale Landfill beyond 2028, the proposed works will involve the following:

- **Revised final surface profile of the existing landfill:** The current final design landfill ground profile varies, but is less than 1V:3H across the footprint. That ground profile will be steepened, up to a maximum grade of 1V:3H, to allow placement of additional waste within the existing landfill footprint. Bunds, varying in height between 2 and 6 m, will be constructed along the eastern and southern boundaries to accommodate the required additional waste volumes.
- **Class 2 extension:** The landfill is proposed to be extended to the south-west of the current landfill boundary, within the area currently occupied by the now decommissioned Managed Fill and Pond 6. The extension will comprise the excavation and lining of a new landfill cell, allowing the acceptance of waste that meets the proposed Class 2 waste acceptance criteria. It will be constructed in a manner similar to the already constructed cells within the current landfill.
- **Relocation of ancillary activities:** the relocation of ancillary activities to allow for the placement of waste.
- **Sediment Retention Ponds:** the removal and filling of Sediment Retention Pond 6 and the Office Pond while enlarging Pond 1 to capture and treat the stormwater from these catchments.

Together, these works are known as the ARL-TP Redvale Landfill project (the project).

This memo provides an outline of the initial findings of the ANE and has been prepared for inclusion in an application for Ministerial referral of the project under the Fast-track Approvals Act 2024. Specifically, this memorandum responds to the requirements under section 3.4 of the Fast-track Approvals Referral Application Form. A full description of the draft proposal is included in the accompanying information attached to the application form for the referral.

A glossary of technical acoustic terminology is included in Appendix A.

2 Summary of findings

Our assessment confirms that noise from the project can comply with the AUP:OP permitted activity standards at all assessed receivers. For the expanded landfill to remain compliant at all times the noise control elements of the Redvale Landfill Management Plan must be effectively implemented (as they have been in the noise model) to ensure that refuse and earth bunding is in place at appropriate positions relative to the cells being filled to effectively screen noise.

Based on:

- Landfilling noise of up to 49 dB L_{Aeq} (daytime), and
- Energy Park noise of up to 40 dB L_{Aeq} (15-mins) at night-time

The landfilling and energy park activities at Redvale Landfill will be audible to receivers when outside albeit, the level and character of activity noise will remain largely the same as currently occurs. On this basis, no change in the level of effect already authorised by the existing consent will occur from the proposed extension of operation of the landfill. Where the landfill continues to operate compliantly and in accordance with the noise control elements in the Redvale Landfill Management Plan, we conclude that **operational noise will be reasonable** with respect to s16 of the Resource Management Act 1991.

Construction noise will comply with the relevant limits.

3 Assessment methodology

The methodology to inform the assessment to date has been a combination of desktop and field-based work.

We performed the following desktop-based modelling tasks and assessment to inform the ANE:

- We modelled project noise emissions for four scenarios:
 - **Scenario 1 Existing and continued operations to 2028:** Models currently consented landfill activities based on the 2024 surveyed landform using LiDAR¹, with the landfill at approximately 85% capacity by volume as of June 2025. Includes the operation of 13 landfill gas generators and ancillary sources as shown on the application drawings;
 - **Scenario 2 Post-2028 operations if consent not granted:** If WMNZ is not granted consent to extend landfill operations past 2028 it will no longer receive new waste albeit, the Energy Park will still be operating with up to 13 landfill gas generators running. A new consent would be needed to authorise post-2028 effects as the landfill transitions into closure.
 - **Scenario 3 2036 operations:** Models landfill activities in the western half of the site (the proposed expansion area) on the basis that an extension of time is granted. Class 1 and Class 2 refuse is placed in separate areas. Includes the operation of 14 landfill gas generators and ancillary sources; and

¹ LiDAR: Light Detection and Ranging is a remote sensing method that uses pulsed laser light to measure time (and thus distance) and create highly accurate 3D maps of the terrain.

- **Scenario 4 Post-2036 aftercare period:** Models the remaining site activities with the proposed 2036 final cap contours in place. The landfill will be filled to its new capacity and capped albeit, still producing landfill gas. Therefore, eight landfill gas generators and ancillary sources will be operational;
- Noise modelling was undertaken in SoundPLAN_{noise} environmental modelling software v9.1;
- Noise emissions were calculated in accordance with International Standard ISO 9613-2:1996;
- For Scenario 1 (existing and continued operations up to 2028), we have assessed compliance against the limits in Condition 48 of Redvale Landfill's current land use consent, namely:

Time period	Time period Noise limit
0600 to 0700 hours Monday to Saturday	43 dB L _{Aeq}
0700 to 2000 hours Monday to Saturday	50 dB L _{Aeq}
At all other times	40 dB L _{Aeq}
At all other times	75 dB L _{AFmax}

- As WMNZ is applying for a new resource consent we have assessed Scenarios 2-4 against the permitted activity limits in AUP:OP Standard E25.6.15 for noise received within Mixed Rural Zone sites, namely:

Receiver Zones	Daytime	All other times
Mixed Rural Zone	55 dB L _{Aeq}	45 dB L _{Aeq}
Future Urban Zone		75 dB L _{AFmax}

Field work to inform the assessment undertaken to date has included:

- Two noise logger deployments – one at the northern end of the site and one toward the southern end, gathered noise data to quantify the existing noise environment (refer to Appendix B);
- An attended night-time noise survey at three positions on Richards Road (refer to Appendix B). These measurements were used to confirm noise emissions from the Energy Park and to calibrate the acoustic model; and
- Noise levels have been measured and assessed in accordance with New Zealand Standards NZS 6801:2008 and NZS 6802:2008.

4 Site and project context

A detailed description of the site and surrounding locality is included in the accompanying information as part of the referral application. The following elements of the site and project are key to this ANE.

Redvale Landfill accepts waste between 6am and 6pm Monday to Saturday. Plant operating during this period includes:

- Landfill compactors, wheeled loaders, excavators and bulldozers;
- Grader, tractor, water cart, articulated dump trucks, and refuse trucks.

The Energy Park operates 24/7. It typically forms a part of the background noise environment (L_{A90}) given it's steady-state noise emission characteristic. It is less audible during the daytime than at night. Plant operating includes:

- up to 14 Jenbacher J320 biogas generators rated at approximately 1MWe each plus associated cooling systems;
- biogas blowers which extract the biogas from landfill cells; and
- three landfill gas flares that operate intermittently.

As part of the project, landfilling activities will predominantly extend in a south-westerly direction for the Class 2 footprint extension, and will subsume the to-be-decommissioned Managed Fill Site and Sedimentation Pond 6. To accommodate more Class 1 waste the post settlement cap grades will be steepened from 1V:4H to 1V3H – the Class 1 landfill footprint will not change. These changes are factored into the noise model.

Redvale Landfill is located next to Dairy Flat Highway (DFH). DFH has a weekday (two-way) average daily volume of about 8,109 vehicles per day (vpd), with a seven-day average of 7,388 vpd with at least 9% heavy vehicles² moving past the site. As such, traffic noise forms a part of the existing noise environment.

The existing noise environment predominantly consists of traffic noise (as noted above), wildlife (birds, insects and farm animals), and site noise in the form of landfilling and Energy Park noise during the daytime, and Energy Park noise during the night-time. Together, these form the 'existing environment' against which noise from the expanded landfill has been assessed.

5 Assessment of potential effects

We have performed an assessment of noise effects based on the predicted sound levels for the scenarios described in Section 3. The assessment compares predicted levels to the existing noise environment (relevant to Scenarios 2 to 4 only).

The receivers we have assessed are shown in the figure and table in Appendix C.

The following sub-sections summarise our conclusions.

5.1 Scenario 1: Existing and continued operations to 2028

For this scenario we predict sound level ranges of:

- 25—43 dB L_{Aeq} (6-7am);
- 34—49 dB L_{Aeq} (Daytime); and
- 21—40 dB L_{Aeq} (15-mins) at night-time,

which comply with the consented noise limits (refer to ANE Section 4.1) at all assessed receiver locations in all periods.

We understand that WMNZ has received 32 noise-related complaints within the last five years (2020 to 2025). All complaints are investigated by WM staff, who take noise measurements at the complainants property.

For all noise complaint investigations to date the measured noise level was within consented limits.

² July 2012 to September 2025 traffic count data available at "Traffic Counts" Auckland Transport www.at.govt.nz.

5.2 Scenario 2: Post-2028 operations if consent not granted

For this scenario we predict sound level ranges of 21—40 dB L_{Aeq} (15 mins) anytime of the day.

The predicted levels comply with the AUP:OP permitted activity noise limits in Standard E25.6.15 (refer to ANE Section 4.2) at all assessed receiver locations in all periods.

We predict that Scenario 2 noise levels will be at or below the daytime ambient and background noise environment. At night, Energy Park noise will be within the range of existing ambient and background noise. Site noise during the daytime will be perceptibly lower than what currently occurs for all assessed receivers and equal to or more than half as loud for many receivers.

5.3 Scenario 3: End of extended resource consent (2036)

For this scenario we predict sound level ranges of:

- 23—41 dB L_{Aeq} (6-7am);
- 28—48 dB L_{Aeq} (Daytime); and
- 22—40 dB L_{Aeq} (15-mins) at night-time,

which comply with the AUP:OP permitted activity noise limits in Standard E25.6.15 (refer to ANE Section 4.2) at all assessed receiver locations in all periods.

For Richards Road receivers', noise from landfill activities is predicted to be generally similar to the levels predicted in Scenario 1. For receivers on Horseshoe Bush Road there will be a perceptible reduction in noise, in some cases a more than halving of loudness (as landfilling would predominantly occur at greater setback distances to the south-west). No change in the level of effect already authorised by the existing consent will occur from the proposed extension of operation of the landfill.

5.4 Scenario 4: Post-2036 aftercare period

For this scenario we predict sound level ranges of:

- 20—39 dB L_{Aeq} (6-7am);
- 20—39 dB L_{Aeq} (Daytime); and
- 20—39 dB L_{Aeq} (15-mins) at night-time,

which comply with the AUP:OP permitted activity noise limits in Standard E25.6.15 (refer to ANE Section 4.2) at all assessed receiver locations in all periods.

Site noise during the daytime will be perceptibly lower than what currently occurs for all assessed receivers and equal to or more than half as loud for many receivers.

For most receivers on Richards Road and DFH, Energy Park noise at night will be perceived as being similar to what presently occurs. For all remaining receivers there will be a perceptible reduction in noise, in some cases a halving of loudness for some Horseshoe Bush Road receivers. No change in the level of effect already authorised by the existing consent will occur from the proposed extension of operation of the landfill.

6 Applicability

This report 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.

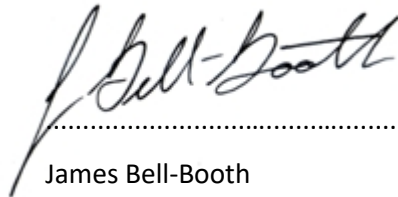
We understand and agree that WMNZ will submit this report to the Environmental Protection Authority in support of a referral application under the Fast-track Approvals Act 2024 for the works described herein, and that the Environmental Protection Authority will rely on this report for the purpose of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

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Document control

Title: Technical Memorandum Noise					
Date	Version	Description	Prepared by:	Reviewed by:	Authorised by:
15.10.25	1	Draft issued for review	M. Cottle	J. Bell-Booth	
07.11.25	2	2 nd round review draft	M. Cottle	Project Team	
12.11.25	3	3 rd round review draft	M. Cottle	Project Team	
13.11.25	4	4 th round review draft	M. Cottle	Project Team	
14.11.25	5	Final version	M. Cottle	Project Team	

Appendix A Glossary of Terminology

A-weighting	A set of frequency-dependent sound level adjustments that are used to better represent how humans hear sounds. Humans are less sensitive to low and very high frequency sounds. Sound levels using an “A” frequency weighting are expressed as dB A. Alternative ways of expressing A-weighted decibels are dBA or dB(A).
Background sound	The sound that is continuously present in a room or outdoor location. Often expressed as the A-weighted sound level exceeded for 90 % of a given time period i.e., L_{A90}.
Construction work	Means any work in connection with the construction, erection, installation, carrying out, repair, maintenance, cleaning, painting, renewal, removal, alteration, dismantling, or demolition of a structure (Source: Section 3 “Definitions” NZS 6803: 1999). Includes any work in connection with any excavation, site preparation, or preparatory work, carried out for the purpose of any construction work.
dB	Decibel. The unit of sound level.
ISO 9613-2:1996	International Standard ISO 9613-2:1996 <i>Acoustics - Attenuation of sound during propagation outdoors – Part 2: General method of calculation</i>
L_{Aeq}	The equivalent continuous A-weighted sound level. Commonly referred to as the average sound level and is measured in dB.
L_{A90}	See “background sound.”
L_{AFmax}	The A-weighted maximum sound level. The highest sound level which occurs during the measurement period. Usually measured with a fast time-weighting i.e. L_{AFmax}
L_w	Sound Power Level. The calculated level of total sound power radiated by a sound source. Usually A-weighted i.e. L_{WA}.
Notional boundary	A line 20 metres from any side of a dwelling, or the legal boundary where this is closer to the dwelling.
NZS 6801:2008	New Zealand Standard NZS 6801:2008 <i>“Acoustics – Measurement of environmental sound.”</i>
NZS 6802:2008	New Zealand Standard NZS 6802:2008 <i>“Acoustics - Environmental Noise.”</i>

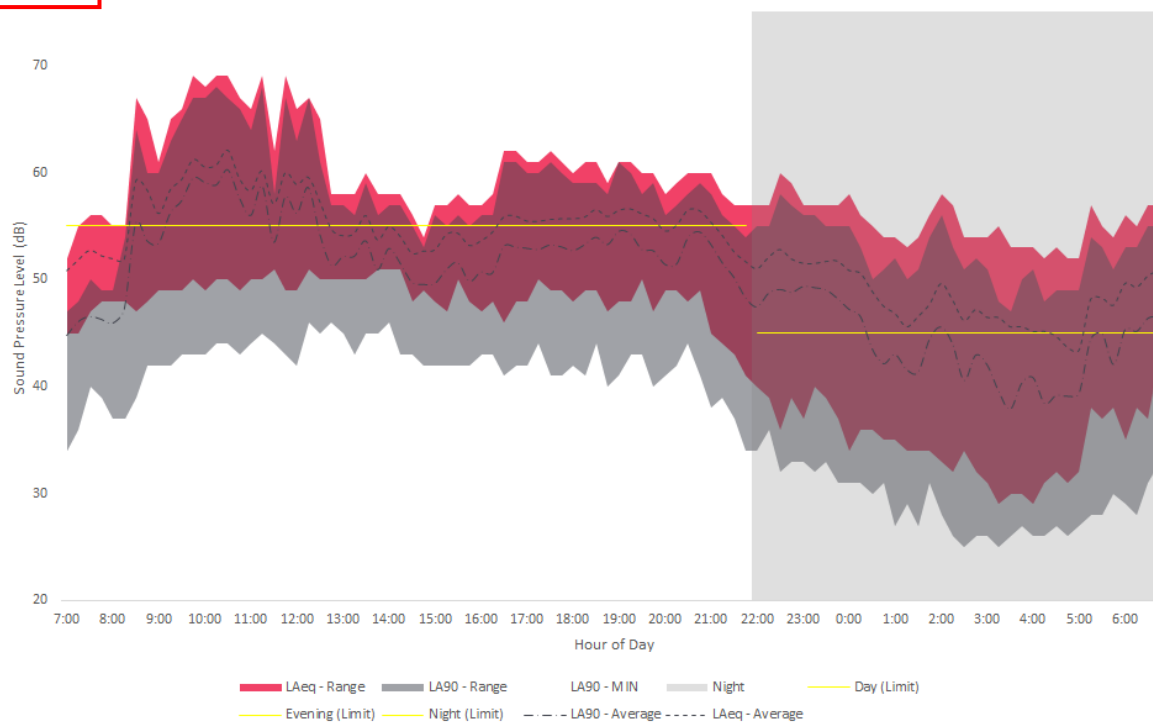
Appendix B Noise Logger Locations and Results



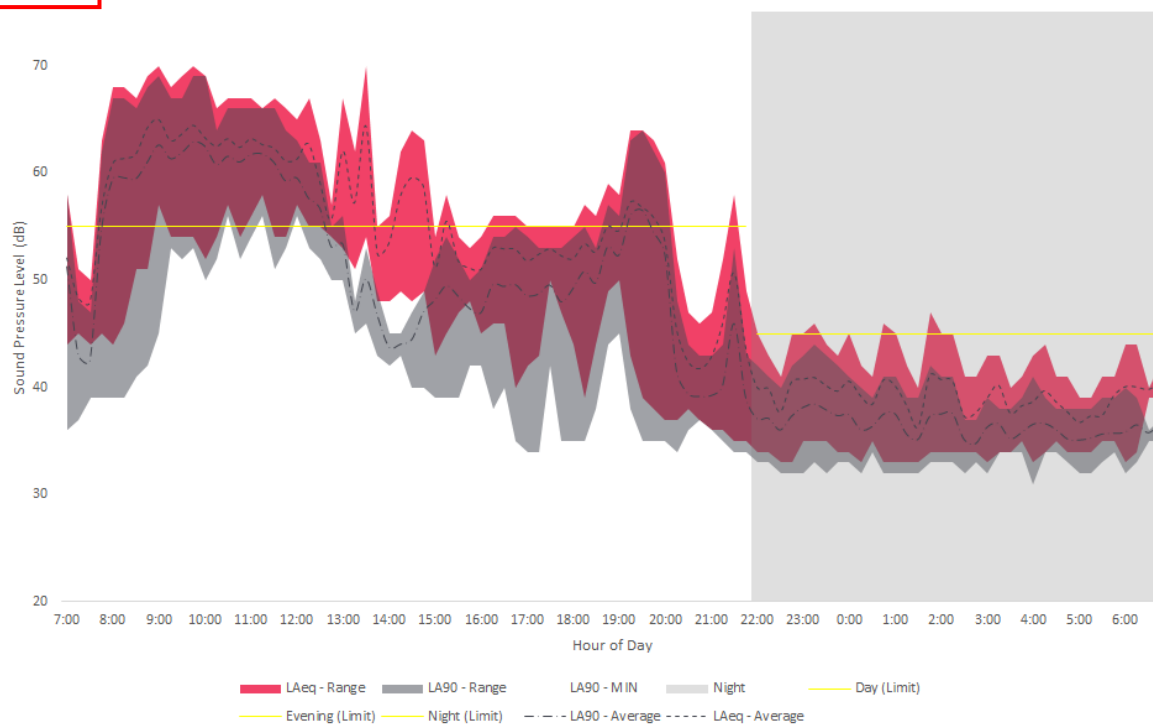
Time	Ambient range (dB LAeq)	Ambient average (dB LAeq)	Background range (dB LA90)	Background average (dB LA90)
NL1 (North)				
7am – 10pm	41 – 69	57	34 – 68	55
10pm – 7am	29 – 60	49	25 – 58	45
NL2 (South)				
7am – 10pm	35 – 70	59	34 – 69	57
10pm – 7am	33 – 47	39	31 – 44	37

NL1

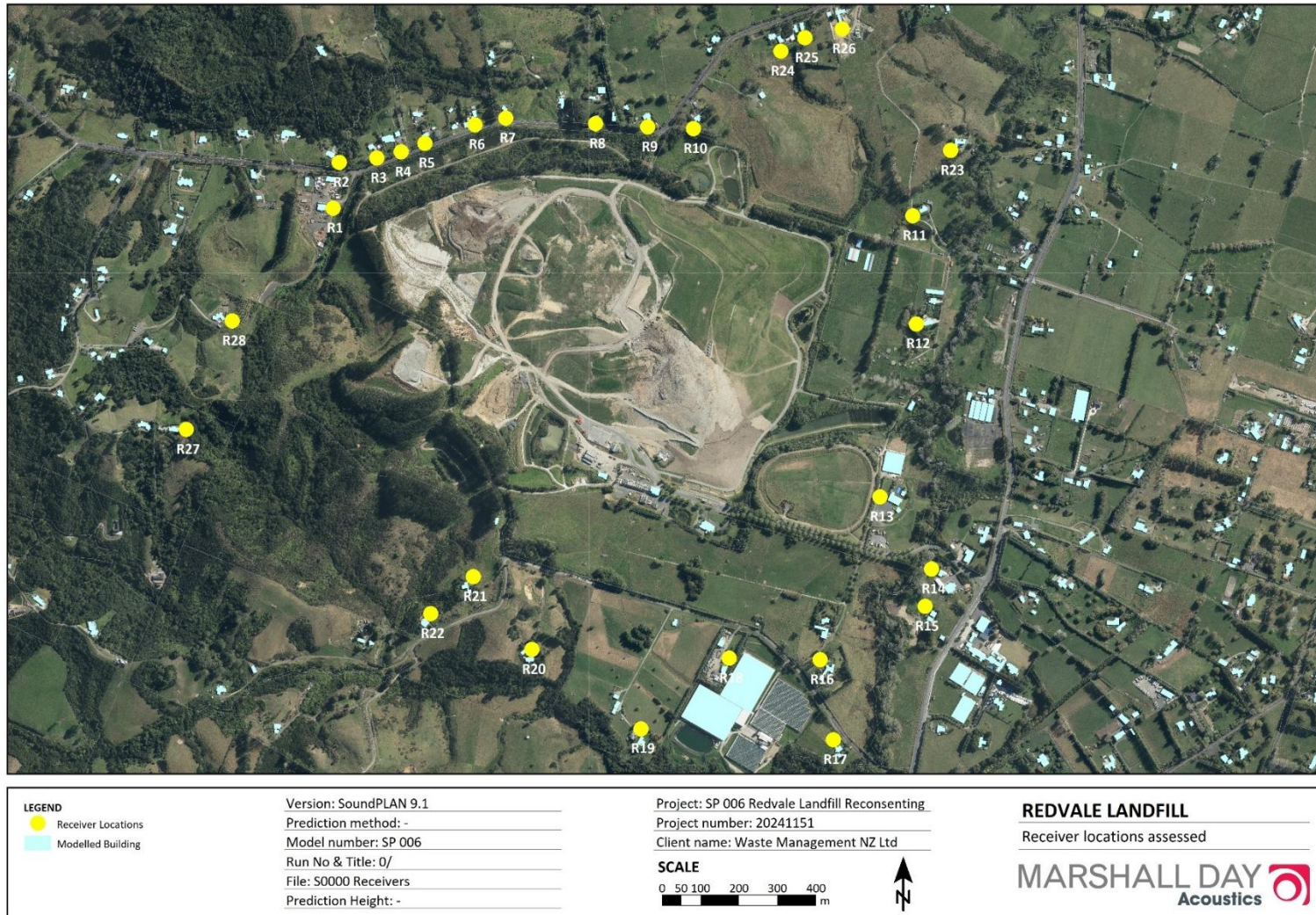
Ambient Sound Level - Diurnal Summary (LAeq vs LA90) 28 February 2025 to 14 March 2025

**NL2**

Ambient Sound Level - Diurnal Summary (LAeq vs LA90) 28 February 2025 to 06 March 2025



Appendix C Assessment Receiver Positions



ID	Address	AUP Zone / Usage	Min. distance to: (m)	
			Landfill envelope	Energy Park
R1	223 Horseshoe Bush Road	Rural / Dwelling	199	1,013
R2	212 Horseshoe Bush Road	Rural / Dwelling	199	1,086
R3	200 Horseshoe Bush Road	Rural / Dwelling	157	1,031
R4	194A Horseshoe Bush Road	Rural / Dwelling	152	1,006
R5	188 Horseshoe Bush Road	Rural / Dwelling	154	991
R6	176 Horseshoe Bush Road	Rural / Dwelling	151	975
R7	154 Horseshoe Bush Road	Rural / Dwelling	152	962
R8	146 Horseshoe Bush Road	Rural / Dwelling	150	900
R9	132 Horseshoe Bush Road	Rural / Dwelling	162	890
R10	115 Horseshoe Bush Road	Rural / Dwelling	190	901
R11	1319 Dairy Flat Highway	Rural / Dwelling	235	988
R12	1317 Dairy Flat Highway	Rural / Dwelling	270	817
R13	36 Landfill Access Road	Rural / Country Club	344	601
R14	1215A Dairy Flat Highway	Rural / Dwelling	558	763
R15	1215 Dairy Flat Highway	Rural / Dwelling	588	778
R16	34 Richards Road	Rural / Dwelling	506	618
R17	19 Richards Road	Rural / Dwelling	708	795
R18	63 Richards Road	Rural / Dwelling	446	469
R19	87 Richards Road	Rural / Dwelling	660	598
R20	115 Richards Road	Rural / Dwelling	436	485
R21	126 Richards Road	Rural / Dwelling	260	461
R22	158 Richards Road	Rural / Dwelling	391	606
R23	1351 Dairy Flat Highway	Rural / Dwelling	421	1,178
R24	85 Horseshoe Bush Road	Rural / Dwelling	449	1,156
R25	71 Horseshoe Bush Road	Rural / Dwelling	500	1,212
R26	67 Horseshoe Bush Road	Rural / Vacant	547	1,272
R27	73 Tender Road	Rural / Dwelling	656	1,137
R28	1247 Dairy Flat Highway	Rural / Dwelling	439	1,085