



**HEGLEY ACOUSTIC
CONSULTANTS**

BURRELL LANDFILL

LANDFILL ROAD, OWHIRO BAY

ASSESSMENT OF NOISE EFFECTS

Report No: 9315

Date: March 2012

Prepared for:

Wayne Miller Ltd
P O Box 82
Okaihau, 0475
Northland

Prepared by:

Rhys Hegley

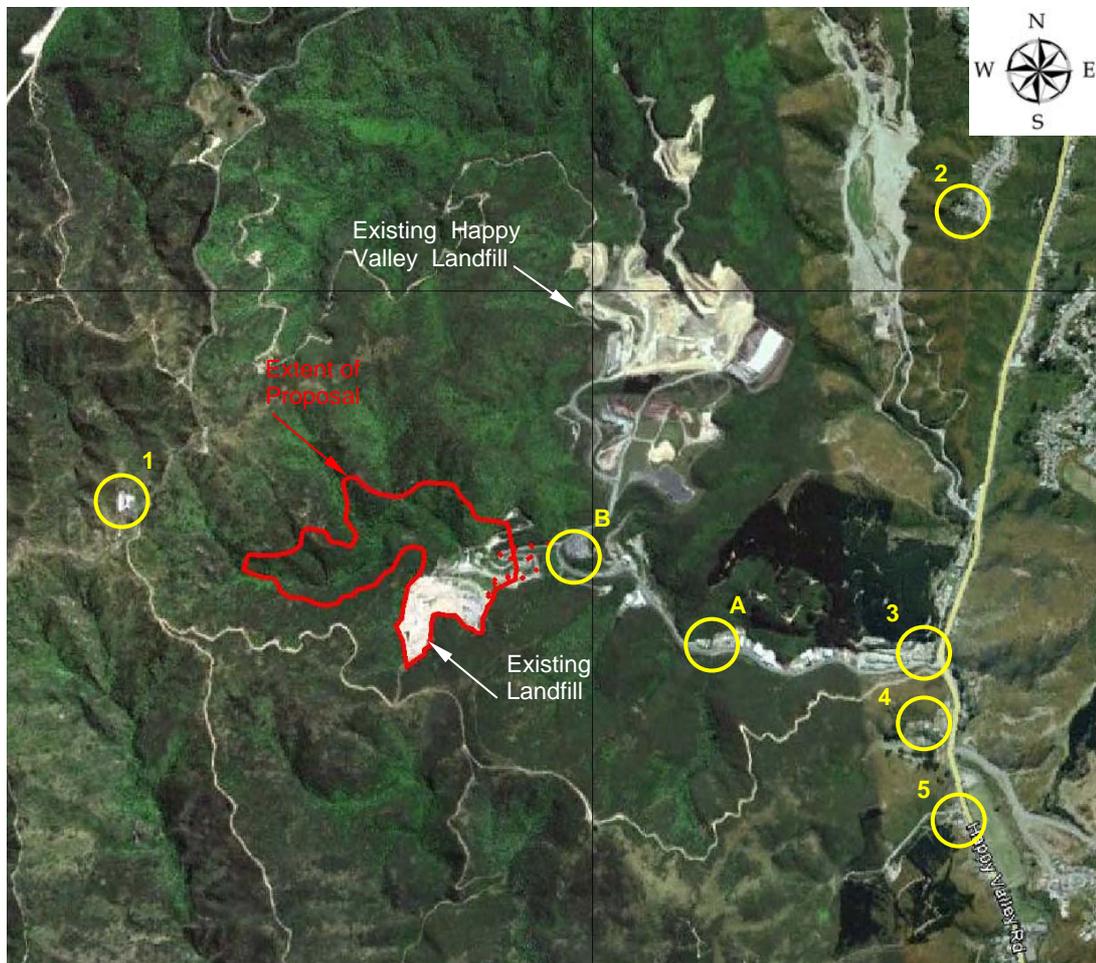
BE CPEng MIPENZ, IntPE(NZ)

Contents

1. INTRODUCTION	3
2. THE PROPOSAL.....	4
3. NOISE CRITERIA.....	5
4. NOISE ASSESSMENT	8
4.1. Surrounding Properties	8
4.2. Modelled Scenarios	8
4.3. Averaging	9
4.4. Special Audible Characteristics	9
4.5. Cumulative Effects	10
4.6. Noise Levels.....	10
5. CONCLUSIONS	12

1. INTRODUCTION

Burrell Landfill is currently operating on Landfill Road in Owhiro Bay, Wellington and is located close to the existing Happy Valley landfill. It is proposed to increase the size of the existing landfill. This report predicts the noise from the proposal to the surrounding sites and provides an assessment of the effects of that noise against the noise rules of the District Plan. Figure 1 below shows the site and the surrounding area.



A Assessment Site

Figure 1. Aerial Photograph of Site and Surrounding Area

2. THE PROPOSAL

The proposal is to maintain the current activities on site but simply to expand the area on which the activities occur. Figure 1 shows the site and the surrounding area. The existing landfill is apparent and the extent of the proposal is shown. Figure 1 also shows the nearby Happy Valley Landfill and the surrounding sites where assessment has been undertaken.

The site will operate from 6.00am to 6.00pm Monday to Saturday but will have the capacity to operate outside of these times if necessary. The site will be developed in stages and the first step will be to clear vegetation and top soil, the latter of which may be stockpiled for later rehabilitation. There are 3 x 30T front end loaders and 1 x 30T excavator on site that will be used for this stripping.

The fill material will be imported on road trucks with up to 60 trucks per day predicted (120 movements). The fill will then be placed and compacted with the excavator and three front end loaders.

As each stage is filled to capacity the area will be rehabilitated, which will involve capping with topsoil, broken rock or concrete or clay and planting.

3. NOISE CRITERIA

The Wellington City District Plan provides noise rules based on site zoning. Figure 2 below is an amalgam of zoning maps 2, 4 and 6. The site is zoned as Open Space and is surrounded by houses in Outer Residential zones, a house in the Rural zone and sites within the Suburban Centre zone.

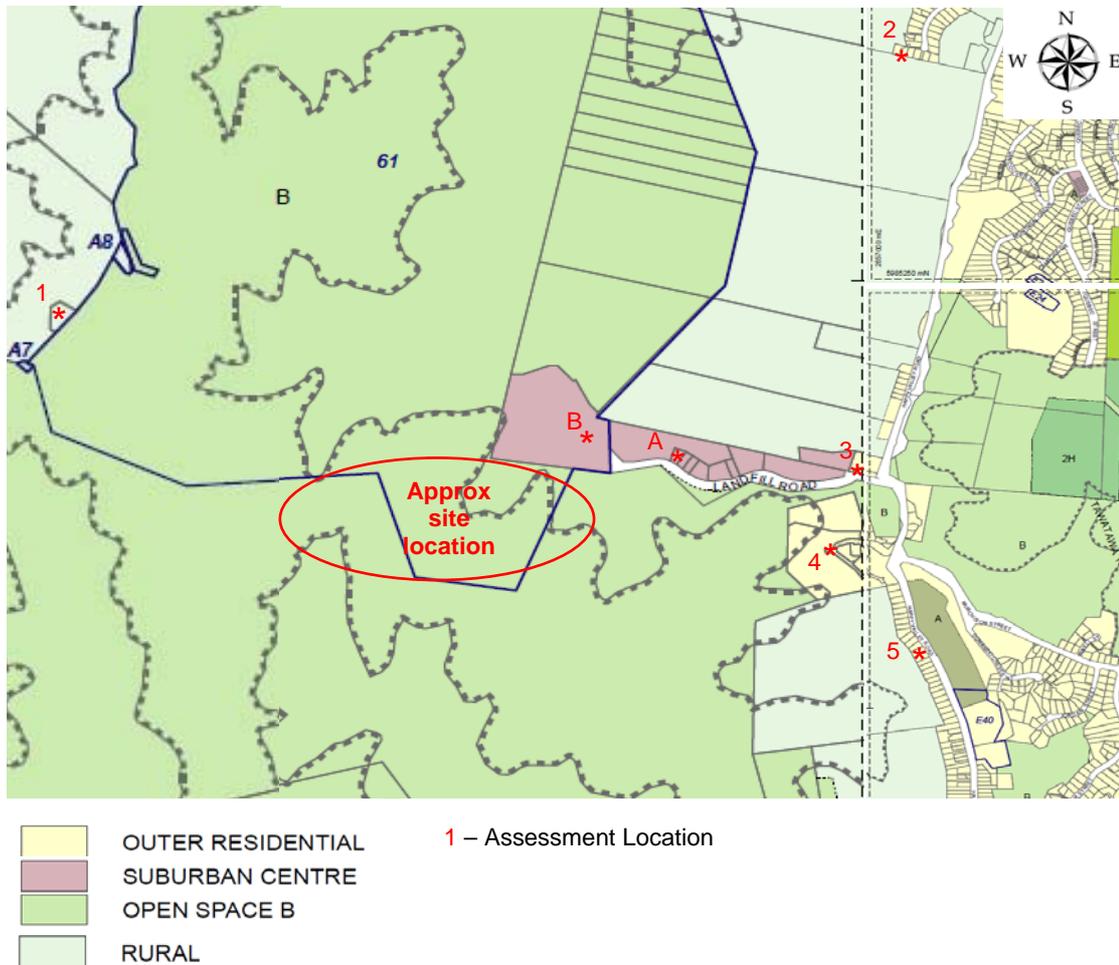


Figure 2. District Plan Zoning Maps

The removal of vegetation and topsoil is a construction activity and could be assessed against the criteria of the construction noise rule. However, as the construction activities will use the same plant as the operational activities, the noise levels will be similar. For this reason, all activities have been conservatively assessed against the noise rules for the Open Space zone.

Appendix 1 of Chapter 17 (Open Space zone) provides the following criteria for activities from the site to comply with:

Residential (Outer)

Noise emission levels when measured on any residential site in the Outer Residential Area must not exceed:

Monday to Saturday 7am to 10pm 45dBA (L_{10})

All other times 40dBA (L_{10})

All days 10pm to 7am 65dBA (L_{max})

Rural Area

Noise emission levels when measured at or within the boundary of any site (other than the site from which the noise is generated) in the Rural Area must not exceed:

At all times 55dBA (L_{10})

and

noise emission levels when measured on any Conceptual Boundary of a residential building must not exceed:

Monday to Saturday 7am to 8pm 45dBA (L_{10})

At all other times 35dBA (L_{10})

All days 8pm to 7am 60dBA (L_{max})

For the purposes of this assessment, the Conceptual Boundary has been taken as a line 20m from the most exposed facade of the house or the actual property boundary when this is closer.

The District Plan does not provide criteria for activities within the Suburban Centre zone meaning that there are no assessment criteria. However, in order to assess the potential effects it is necessary to determine what a reasonable level would be. Chapter 7 provides noise rules between sites within the Suburban Centre zone and this is an indication as to what Council consider a reasonable level between such sites. This rule is shown below and is considered to be appropriate for the assessment.

7.1.1.1.1

...noise emission levels when measured at or within the boundary of any site or at the outside wall of any building on any site, other than the site from which the noise is emitted, must not exceed the following:

At all times 60dBA (L_{10})

At all times 85dBA (L_{max})

4. NOISE ASSESSMENT

Noise from the extension of the landfill has been predicted to the surrounding properties using the Predictor computer modelling program. Predictor builds a full scale, three dimensional model of the site and of the surrounding environment. The Predictor algorithms calculate noise to the surrounding sites based on measurements undertaken of similar plant undertaking similar activities, the intervening topography, ground cover and distances. The following sections describe the model input.

4.1. Surrounding Properties

The properties surrounding the landfill have been identified with the aid of an aerial photograph. The ground level at each house was determined with a topographical survey of the area. The assessment sites are shown on Figure 1 above and described in the tables below.

4.2. Modelled Scenarios

Due to the size of the site, the area in which the plant is operating will affect noise to the surrounding sites. As the landfill develops and the plant moves through the various stages, noise levels will increase to some houses and be reduced at others. For modelling, a number of scenarios have been considered with each maximising the noise level to a particular house. The levels reported in the tables below are the maximum from all scenarios considered and will not therefore, all occur at once. For example, the noise levels reported for House 1 are for the plant working in the western part of the site while the levels for House 5 are for all plant working in the eastern part of the site.

The proposal is essentially to fill gullies meaning that over time, the noise sources will increase in height. The potential effect of this is that any screening from the intervening topography will reduce over time. For this reason, all modelling has been undertaken assuming plant is operating at the completed height of the landfill. It is therefore anticipated that noise levels will generally be below those reported in Table

1 as the plant will typically operate at lower elevation, with more screening than has been assumed for the analysis.

All modelling assumes that all of the plant will be operating in one area which is considered to be conservative as it will result in higher noise levels than would occur if the plant were spread out over the entire site.

4.3. Averaging

While the proposal is to operate for a majority of the hours permitted by the District Plan noise rules, the plant will not operate continuously for this entire time. There will be refreshment breaks throughout the day for staff and, based on experience with other landfills, the plant will not operate continuously. NZS6802:1991 Assessment of Environmental Sound allows noise that is not constant throughout the day to be averaged over the course of the day to better describe the effects of that noise.

For the proposal, averaging has not been undertaken as it was considered too difficult to accurately define the time when the plant would operate. This approach has provided for a conservative assessment.

4.4. Special Audible Characteristics

NZS6801:1991 notes that noise that has a special audible characteristic is likely to arouse an adverse response at lower levels than a noise without such characteristics. The only noise source that is considered to have a special audible characteristic would be the audible reversing alarms of the plant. Analysis of noise from reversing alarms has shown that the upper level to the most exposed houses will be 21dBA. As 20dBA is typically used to describe the threshold of hearing, it is considered that noise from the reversing alarms will be inaudible at the houses and as a result, the 5dBA penalty has not been applied for the assessment of the houses. At the Suburban Centre zoned sites, noise from the reversing alarms will be up to 37dBA L_{10} , which may be audible and has therefore conservatively been assessed as including a special audible characteristic.

4.5. Cumulative Effects

Due to the proximity of the Happy Valley Landfill, the cumulative noise from both landfills operating at the same time has been considered. Although the noise from the Happy Valley Landfill is not known, the combined noise from both sites will comply with the District Plan noise rules provided the Happy Valley Landfill complies with the noise rule when considered in isolation, and that noise from the proposed extension to the Burrell landfill is at least 10dB below the District Plan criteria.

4.6. Noise Levels

The following Table 1 summarises the noise level at the Burrell Landfill only and assumes all plant is operating in the most exposed location

Table 1. Summary of Noise Levels from all Plant at the Burrell Landfill

Reference	House Description	Criteria (dBA L ₁₀ /L _{max})		Burrell Landfill Noise Levels (all plant) (dB)	
		Day	Night	L ₁₀	L _{max}
1	Western House	45/NA	35/60	33	47
2	Mitchell St	45/NA	40/65	25	39
3	Landfill Rd	45/NA	40/65	26	40
4	Happy Valley Rd 1	45/NA	40/65	16	30
5	Happy Valley Rd 2	45/NA	40/65	25	39
A	Landfill Rd Commercial1	60/80	60/80	30	39
B	Landfill Rd Commercial2	60/80	60/80	52	61

The Table 1 results show that when considered in isolation, noise from the Burrell Landfill will comply with both the day and night time District Plan noise rules to all surrounding sites.

The effect of the cumulative noise levels from both the Burrell and Happy Valley Landfills is described below. As the L_{max} levels are not cumulative, they have not been considered.

Table 2. Summary of Combined Noise from the Burrell and Happy Valley Landfills Assuming all Plant is Operating

Reference	House Description	Criteria (dBA L ₁₀)		Combined Noise Levels (all plant)	
		Day	Night	L ₁₀	L _{max}
1	Western House	45	35	45	37
2	Mitchell St	45	40	45	40
3	Landfill Rd	45	40	45	40
4	Happy Valley Rd 1	45	40	45	40
5	Happy Valley Rd 2	45	40	45	40
A	Landfill Rd Commercial1	60	60	60	60
B	Landfill Rd Commercial2	60	60	60	60
	- Criteria exceeded.				

Table 2 shows that based on the assumption that the Happy Valley Landfill is complying with the limits of the District Plan noise rule, the combined levels with the Burrell Landfill will also comply with the day time criteria of the District Plan. During the night time, this is the case to all assessment properties with the exception of the western most house where the cumulative level would exceed the criterion by 2dB.

To comply with the 35dBA L₁₀ criterion to this house, the landfill activities during the night time hours (Monday to Saturday 8.00pm to 7.00am and all day Sunday) must be limited to truck movements only past the centre of the site. The remainder of the plant could be used elsewhere on site. The centre of the site has been defined as a line running north-south through chainage 260m on the centreline drain of the completed landfill. By excluding the front end loaders and excavator from this area during the night time and Sundays, the combined noise level from both landfills will comply with the District Plan criterion.

5. CONCLUSIONS

Noise from the plant associated with the proposed landfill extension has been assessed by predicting noise to the surrounding properties based on measurements of similar plant. This analysis has shown that restricting the locations where the front end loaders and excavator (but not the trucks) can deposit material during night time and on Sundays, noise from the operation, when combined with the noise from the nearby Happy Valley Landfill, will comply with the noise rules of the District Plan. Based on this, it can be concluded that the noise levels will be reasonable and that the effects of noise from the proposal will be no more than minor.

* * *